

# THEIVANAI AMMAL COLLEGE FOR WOMEN

(AUTONOMOUS)

(Affiliated to the Annamalai University - Chidambaram)  
(Accredited by NAAC (3<sup>rd</sup> Cycle) with CGPA of 3.2/4 at 'A' Grade)  
(Recognized under 2(f) and 12(B) by UGC)  
Villupuram, Tamilnadu



## ACADEMIC COUNCIL BOOKLET - XVII

IQAC, Arts and Science



1<sup>st</sup> July 2023

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## INTERNAL QUALITY ASSURANCE CELL

### 5<sup>th</sup> – Curriculum Revision

#### I. UG PROGRAMME PROFILE – Allotment of Hours

(With effect from 2023-2026 Batch onwards)

**PREAMBLE:** Programme Profile for UG & PG are presented in this Booklet

Components	I Sem	II Sem	III Sem	IV Sem	V Sem	VI Sem
<b>Part I</b> Languages: Tamil/Hindi/French	5	5	5	5	-	-
<b>Part II</b> Language: English	5	5	5	5	-	-
<b>Part III</b> Core Course /(CC)	10	10	8	10	15	15
Elective Course (EC) (Generic/ Discipline Specific)	4	4	4	4	9	11
Project/ Core Paper	-	-	-	-	4	
<b>Part IV</b> Skill Enhancement Course - (Foundation Course)	2					
Skill Enhancement Course –(SEC) (Discipline Specific / Generic)		2	2	2	-	-
Skill Enhancement Course (SEC)- (NME)	2	2	-	2*	-	-
Skill Enhancement Course –(SEC) (Entrepreneurial Based)	-	-	2	-	-	-
Ability Enhancement Compulsory Course (AECC) Soft Skill-1	2	2	2	2	-	-
Online Course*	Semester 4 NME is MOOC Course - Depends upon the department choice.					
Value Education/(SEC)/ E.V.S	-	-	2	-	2	-
Professional Competency Skill	-	-	-	-	-	4
<b>Total Hours</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>
<b>Part-III</b> Internship /Industrial Training/Field visit	1 (per year)		1 (per year)		1 (per year)	
<b>Part V</b> Extension Activity/ Physical Education (outside class hours)	60 Hours (Compulsory)		60 Hours (Optional)		60 Hours (Optional)	
<b>Part VI</b> Value added Courses (outside class hours)	50 Hours		80 Hours		30 Hours	
<p><b>Not more than Eight Courses per Semester for Arts and Science.</b>  <b>*8 weeks/30 Hours for Online Course has to be taken from part III in the respective Semesters as given in the Profile.</b></p>						

## 5<sup>th</sup> CURRICULUM REVISION

### UG PROGRAMME PROFILE – Allotment of Credits (With effect from 2023-2026 Batch onwards)

Components	Credit per Semester	Total Credits
<b>Part I</b> <b>Languages: Tamil/Hindi/French</b>	3	12
<b>Part II</b> <b>Language: English</b>	3	12
<b>Part III</b> <b>Core Course /(CC)</b>	4	56
<b>Elective Course (EC) (Generic/ Discipline Specific)</b>	3	25
<b>Project/ Core Paper</b>	4	4
<b>Comprehensive viva</b>	1	1
<b>Part IV</b> <b>Skill Enhancement Course (SEC) (Non Major Elective)</b>	2	4
<b>Skill Enhancement Course –(SEC) (Discipline Specific / Generic)</b>	2	6
<b>Skill Enhancement Course - (Foundation Course)</b>	2	2
<b>Skill Enhancement Course –(SEC) (Entrepreneurial Based)</b>	1	1
<b>Ability Enhancement Compulsory Course (AECC) Soft Skill-1</b>	2	8
<b>Online Course*</b>	2	2
<b>Value Education/(SEC)/ Environmental Studies</b>	2	4
<b>Professional Competency Skill</b>	2	2
<b>Part III</b> <b>Internship/Industrial Training/Field visit</b>	1(per year)	-/ 6
<b>Part V</b> <b>Extension Activity/ Physical Education (outside class hours)</b>	1/2	1/6
<b>Part VI</b> <b>Value added Courses (outside class hours)</b>	2	-/4
<b>Total Hours</b>		<b>140/155</b>

**5<sup>th</sup> CURRICULUM REVISION**  
**PG PROGRAMME PROFILE – Allotment of Hours**  
 (With effect from 2023-2025 Batches onwards)

Components	I Semester	II Semester	III Semester	IV Semester
Core Course /CC	15	15	15	15
Project with Viva-Voce	-	-	-	6
Core Industry Module	-	4	4	-
Elective Course (Generic / Discipline Centric)	10	8	7	5
Skill Enhancement Course (NME/Discipline/Interdisciplinary/Proficiency Skill)	3	3	4	4
Service Learning (outside class hours)	40 Hrs		-	-
Online Course*	2	-		
<b>Total Hours</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>

\*Minimum one MOOCs Course to be completed during the First year.

**PG PROGRAMME PROFILE – Allotment of Credits**  
 (With effect from 2023-2025 Batches onwards)

Components	Credit per Semester	Total Credit
Core Course /CC	4	48
Project with Viva-Voce	4	4
Core Industry Module	3	6
Elective Course (Generic / Discipline Centric)	3	21
Skill Enhancement Course	2	8
Internship /Industrial Training/Field visit	2	2/4
Service Learning (outside class hours)	1	1
Online Course	2	2
<b>Total Credit</b>		<b>92/94</b>

**INTERNAL QUALITY ASSURANCE CELL**

**5<sup>th</sup> – Curriculum Revision**

**I. UG PROGRAMME PROFILE – Allotment of Course Code**

**(With effect from 2023-2026 Batch onwards)**

<b>Part</b>	<b>Category</b>		<b>Course Code</b>
Part I	Languages	Tamil Hindi French	UTAL UHIL UFRL
Part II	Languages	English	UENL
Part III	Core Course (CC)	Core Course /(CC) Core Industry Module	U<>M
	Elective Course (EC)	Generic Discipline Specific	U<>A U<>O
	Practical	Practical	U<>R
	Project	Project/ Core Paper	U<>P
Part IV	Skill Enhancement Course (SEC)	Foundation Course	U<>F
		Generic Discipline Specific	U<>G U<>D
		Non Major Elective	U<>E
		Entrepreneurial Based	U<>U
	Ability Enhancement Compulsory Course (AECC)	Soft Skill-1	U<>S
	Online Course*	Online Course*	UONL
	Value Education/ E.V.S	Value Education/ E.V.S	U<>V
	Professional Competency Skill	Professional Competency Skill	U<>C
Internship /Industrial Training/Field visit	Internship /Industrial Training/Field visit	UINS	
Part V	Extension Activity/ Physical Education	Extension Activity/ Physical Education	U<>X
Part VI	Value added Courses	Certificate Diploma	VOCC VOCD

**PG PROGRAMME PROFILE – Allotment of Course Code**

**(With effect from 2023-2025 Batches onwards)**

<b>Category</b>		<b>Course Code</b>
Core Course (CC)	All Core Course & Core Industry Module	P<>M
Elective Course (EC)	Generic	P<>A
	Discipline Specific	P<>O
Practical	Practical / Core Practical	P<>R
Project	Project/ Core Paper	P<>P
Skill Enhancement Course (SEC)	Non Major Elective	P<>E
	Generic Discipline Specific	P<>G P<>D
	Interdisciplinary	P<>I
	Professional Competency Skill	P<>C
Online Course*		PONL
Internship /Industrial Training/Field visit		PINS
PG Service Learning		P<>X

**\*<>-department**

## தமிழாய்வுத்துறை இளங்கலைத்தமிழ்

### முகவுரை

ஆறு பருவங்களுக்குரிய பாடத்திட்ட வடிவமைப்பு இடம்பெற்றுள்ளது. முதல் மற்றும் இரண்டாம் பருவத்திற்குரிய பாடத்திட்டம் மற்றும் அகமதிப்பீட்டுக் கூறுகள் இடம்பெற்றுள்ளன. இப்பாடத்திட்டமானது 2023 - 2026 ஆம் கல்வியாண்டுகளில் பயிலும் மாணவியர்களுக்கு உரியது.

### பாடத்திட்ட அமைப்பு : இளங்கலைத்தமிழ் (B.A)

#### பாடத்திட்டப் பயன்கள்

- PSO – 1 தமிழ் இலக்கியம் மற்றும் இலக்கணங்களின் வளர்ச்சி நிலைகளை அறிந்து கொள்வர்.
- PSO – 2 தமிழர் வரலாற்றினையும் பண்பாட்டினையும் புரிந்து கொள்வர்.
- PSO – 3 இலக்கியம் வழி கண்டறிந்த நெறிகளை வாழ்வில் பொருத்திப் பார்க்கும் திறனைப் பெறுவர்.
- PSO – 4 தமிழியல் கூறுகின்ற மெய்மைகளைக் காரண காரிய அடிப்படையில் பகுத்தாய்வர்.
- PSO – 5 தமிழ் இலக்கியம் முன்மொழிகின்ற செந்நெறிகளை மதிப்பிட்டு ஆராயும் திறன் பெறுவர்.
- PSO – 6 தமிழ் இலக்கிய வகைமைகளை கற்றுத்தெளிந்து புத்திலக்கியங்களைப் படைக்கும் திறன் மற்றும் பணி வாய்ப்பினை பெறும் திறன் பெறுவர்.

பருவம்	பிரிவு	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	வாரம் மணி நேரம்	தரம்	
						Min/ Max	
I	I	தமிழ் - I	UTAL109/ UTAL110/	தமிழியல் கல்வி ஆதார வளங்கள் / பொதுத்தமிழ் - I	5	3	
	II	ஆங்கிலம் - I	UENL111	General English - I	5	3	
	III	முதன்மைப்பாடம் - I	UTAM111	இக்கால இலக்கியங்கள்	5	4	
		முதன்மைப்பாடம் - II	UTAM112	தமிழக வரலாறும் பண்பாடும்	5	4	
		சார்புப்பாடம் - I (மரபு சார்ந்தது)	UTAA113	நாட்டார் மரபுகள்	4	3	
	IV	துறைசாரா விருப்பப்பாடம்- I (திறன் சார்ந்தது)			2	2	
		அடித்தளப்பாடம்	UTAF101	அடிப்படை தமிழ் இலக்கணம்	2	2	
		திறன்சார் கல்வி - I	USKS101		2	2	
	<b>மொத்தம்</b>					<b>30</b>	<b>23</b>

II	I	தமிழ் - II	UTAL209/ UTAL210	தமிழ் மொழி அமைப்பியல் / பொதுத்தமிழ் - II	5	3
	II	ஆங்கிலம் - II	UENL211	General English - II	5	3
	III	முதன்மைப்பாடம் - III	UTAM207	அறநெறி இலக்கியம்	5	4
		முதன்மைப்பாடம் - IV	UTAM208	தமிழிலக்கிய வரலாறு	5	4
		சார்புப்பாடம் - II (துறை சார்ந்தது)	UTAO209	காலந்தோறும் தமிழ் மொழி வரலாறு	4	3
		துறைசாரா விருப்பப்பாடம்- II (திறன் சார்ந்தது)			2	2
		துறைச்சார் விருப்பப்பாடம் - I (திறன் சார்ந்தது)	UTAD205	அறிவியல் தமிழ்	2	2
		திறன்சார் கல்வி - II	USKS201		2	2
	III	கல்வியிடைப்பயிற்சி / தொழிற்சார் பயிற்சி / களஆய்வு	UINS201		-	-/2
	V	கூடுதல் சேவை				1/2
VI	மதிப்பீட்டுப் பாடங்கள்	UCTAM201			-/2	
<b>மொத்தம்</b>					<b>30</b>	<b>24/29</b>
III	I	தமிழ் - III	UTAL309/ UTAL310/	தமிழும் பொருண்மையியலும் / பொதுத்தமிழ் - III	5	3
	II	ஆங்கிலம் - III	UENL311	General English - III	5	3
	III	முதன்மைப்பாடம் - V	UTAM307	காப்பிய இலக்கியங்கள்	4	4
		முதன்மைப்பாடம் - VI	UTAM308	நன்னூல் - எழுத்து	4	4
		சார்புப்பாடம் - III (துறை சார்ந்தது)	UTAO307	தமிழரின் மேலாண்மைச் சிந்தனைகள்	4	3
		துறைசார் விருப்பப்பாடம் - II	UTAD301	போட்டித் தேர்வுகளுக்குரிய இலக்கிய வரலாறு	2	1
		துறைசார் விருப்பப்பாடம் - III (தொழில்முனைவு சார்ந்தது)	UTAE302	தொழில் முனைவுத் தமிழ்	2	2
		திறன்சார் கல்வி - III	USKS301		2	2



	IV	மதிப்பீட்டுக்கல்வி - I			2	2
<b>மொத்தம்</b>					<b>30</b>	<b>24</b>
IV	I	தமிழ் - IV	UTAL409/ UTAL410	தமிழகக் கலைகள் / பொதுத்தமிழ் - IV	5	3
	II	ஆங்கிலம் - IV	UENL411	General English - IV	5	3
	III	முதன்மைப்பாடம் - VII	UTAM406	பக்தி இலக்கியம்	5	4
		முதன்மைப்பாடம் - VIII	UTAM407	நன்னூல் - சொல்	5	4
		சார்புப்பாடம் - IV	UTAO405	கணிணித் தமிழ்	4	3
		இணையப்பாடம்		Spoken Tutorial	2	2
		துறைசார் விருப்பப்பாடம்- IV	UTAD404	பணிவாய்ப்புத் தமிழ்	2	2
	திறன்சார் கல்வி - IV	USKS401		2	2	
	III	கல்வியிடைப்பயிற்சி / தொழிற்சார் பயிற்சி / களஆய்வு	UINS401			-/2
	V	கூடுதல் சேவை				-/2
VI	மதிப்பீட்டுப் பாடங்கள்				-/2	
<b>மொத்தம்</b>					<b>30</b>	<b>23/29</b>
V	III	முதன்மைப்பாடம் - IX	UTAM511	சிறநிலக்கியங்கள்	5	4
		முதன்மைப்பாடம் - X	UTAM512	இலக்கணம் - பொருள்	5	4
		முதன்மைப்பாடம் - XI	UTAM513	நாட்டுப்புறவியல்	5	4
		சார்புப்பாடம் - V	UTAO514 UTAO515 UTAO516	தமிழ் மரபு மருததுவம்/ தமிழில் குறுங்கவிதைகள்/ மொழியியல்	5	3
		சார்புப்பாடம் - VI	UTAO517 UTAO518 UTAO519	தமிழ் பண்பாட்டு வரலாறு/ பெண்ணியப் படைப்புகள் / திரைப்படக்கலை	4	3
		குறுந்திட்டம் / முதன்மைப்பாடம் - XII		இணையமும் தமிழும்	4	4
		IV	சுற்றுச்சூழல்கல்வி - I	UGEV501		2
	<b>மொத்தம்</b>					<b>30</b>
		முதன்மைப்பாடம் - XIII	UTAM611	சங்க இலக்கியம்	5	4

VI	III	முதன்மைப்பாடம் - XIV	UTAM612	இலக்கணம் - யாப்பும், அணியும்	5	4
		முதன்மைப்பாடம்- XV	UTAM613	இலக்கியத் திறனாய்வு	5	4
		சார்புப்பாடம் - VII	UTAO614	திராவிட மொழிகளின் ஒப்பிலக்கணம்	6	4
		சார்புப்பாடம் - VIII	UTAO615 UTAO616 UTAO617	அயலகத் தமிழ் இலக்கியம் / பாரதியியல் / இணையத்தமிழ் இதழ்கள்	5	3
		தொழிற்முறைக்கல்வி	UTAC601	பணித்தேர்வுத் தமிழ் (அல்லது) போட்டித் தேர்வுக்களுக்குரிய இலக்கிய இலக்கண வரலாறு	4	2
		பொதுவாய்மொழித் தேர்வு			-	1
	III	கல்வியிடைப்பயிற்சி / தொழிற்சார் பயிற்சி / களஆய்வு			-	-/2
	V	கூடுதல் சேவை				-/2
	VI	மதிப்பீட்டுப் பாடங்கள்			-	-
	<b>மொத்தம்</b>					<b>30</b>
<b>கூட்டு எண்ணிக்கை</b>					<b>180</b>	<b>140 /155</b>

**துறைச்சாரா விருப்பப்பாடம்  
(பிற்துறை மாணவியர்களுக்கு உரியது)**

பருவம்	பிரிவு	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	வாரம் மணி நேரம்	தரம்
						Min/ Max
I	IV	துறைசாரா விருப்பப்பாடம்- I	UTAE101	பயன்முறைத் தமிழ்	2	2
II		துறைசாரா விருப்பப்பாடம்- II	UTAE204	பேச்சுக்கலைத்திறன்	2	2

## இக்கால இலக்கியங்கள்

UTAM111

பருவம் : முதல் பருவம்

தரம் : 03

பிரிவு : முதன்மைப்பாடம் - I

மணிநேரம்/வாரம் : 05

வகுப்பு : I BA தமிழ்

மொத்த மணிநேரம் : 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	இக்காலத் தமிழ் இலக்கியங்களின் உள்ளடக்கம், வெளியீட்டு நெறி, படைப்பாக்கத்திறம் ஆகியவற்றைப் புரிந்துகொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	இலக்கியக் கொள்கைகளின் அடிப்படையில் இக்கால இலக்கியங்களை பொருத்திப் பார்க்கும் திறன் பெறச் செய்தல்.
கற்றல் நோக்கம் 3	கவிதை, சிறுகதை, புதினம், நாடகம், கட்டுரை ஆகிய இக்கால இலக்கிய வகைகள் குறித்துப் பகுத்தாராய்ச் செய்தல்.
கற்றல் நோக்கம் 4	இலக்கிய வரலாற்றுப் பின்னணியில் இக்காலத் தமிழ் இலக்கியங்களை மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	படைப்புத் துறையிலும் ஊடகத்துறையிலும் கல்விப்புலத்திலும் வேலைவாய்ப்பினைப் பெறும் திறம் பெற செய்தல்.

### அலகு - 1 கவிதைகள்

13 மணி நேரம்

பாரதியார் - வசனக் கவிதை (காட்சிப் பகுதி) - இன்பம் - பாரதிதாசன் - அழகின் சிரிப்பில் (ஆல்) - வாணிதாசன் - புலவராற்றுப்படை - முடியரசன் - முடியரசன் கவிதைகள் - நிலவு - சுரதா - துறைமுகம் - துறைமுகம், கண்ணதாசன் - பரமசிவன் கழுத்தில் இருக்கும் பாம்பு கேட்டது, வைரமுத்து - இது போதும் எனக்கு, அப்துல் ரகுமான் - சுட்டுவிரல் - பாருக்குள்ளே நல்ல நாடு, நா.காமராசன் - கருப்பு மலர்கள் - காகிதப்பூக்கள் - மு.மேத்தா - ஆகாயத்துக்கு அடுத்த வீடு (முதல் இரண்டு கவிதைகள்) - ஈரோடு தமிழன்பன் - சென்னிமலை கிளியோபட்ராக்கள் (முதல் பத்து கவிதைகள்)

### அலகு - 2 சிறுகதைகள்

10 மணி நேரம்

புதுமைப்பித்தன் - கடவுளும் கந்தசாமிப் பிள்ளையும் - கு.பா.ரா - விடியுமா - பி.எஸ். ராமையா - நட்சத்திரக் குழந்தைகள் - கி. ரா - கதவு - ஜெயகாந்தன் - முன்னிலவும் பின் பனியும் - அ. முத்துலிங்கம் - மகாராஜாவின் ரயில் வண்டி - அம்பை - காட்டில் ஒரு மான் - கந்தசாமி - தக்கையின் மீது நான்கு கண்கள் - எஸ். ரா - தாவரங்களின் உரையாடல் - தஞ்சை பிரகாஷ் - மேபல்.

### அலகு - 3 புதினம்

20 மணி நேரம்

சு.தமிழ்ச்செல்வி - கீதாரி (புதினம்)

**அலகு - 4 நாடகம்**

10 மணி நேரம்

இன்குலாப் - ஓளவை (நாடகம்)

**அலகு - 5 பயணக்கட்டுரை**

12 மணி நேரம்

நரசய்யா - கடலோடி

**பாடநூல்கள்**

- பாரதியார். (1977). பாரதியார் கவிதைகள். மணிவாசகர் பதிப்பகம். சென்னை.
- பாரதிதாசன். (1992). பாரதிதாசன் கவிதைகள். மணிவாசகர் பதிப்பகம். சென்னை.
- கண்ணதாசன். (2012). கண்ணதாசன் கவிதைகள் (தொ.4). வானதி பதிப்பகம். சென்னை.
- புதுமைப்பித்தன். (1992). புதுமைப்பித்தன் படைப்புகள். காலச்சுவடு, ஐந்திணைப் பதிப்பகம். சென்னை.

**பார்வை நூல்கள்**

- கலாநிதி கைலாசபதி. (1999). தமிழ் நாவல் இலக்கியம். குமரன் பதிப்பகம். சென்னை.
- மருதநாயகம், ப. (2001). மேலை நோக்கில் தமிழ்க் கவிதை. உலகத் தமிழாராய்ச்சி நிறுவனம். சென்னை.
- சிவதம்பி, கா. சிவகாமி, ச. குருநாதன், இராம. (2000). உலகத் தமிழ் இலக்கிய வரலாறு: கி.பி.1851- உலகத் தமிழாராய்ச்சி நிறுவனம். தரமணி சென்னை.
- வல்லிக்கண்ணன். (2014). புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும். தமிழ் வளர்ச்சித்துறை இயக்ககம். சென்னை.
- பம்மல் சம்பந்த முதலியார். (1998). நாடகமேடை நினைவுகள். உலகத் தமிழாராய்ச்சி நிறுவனம். தரமணி சென்னை.

வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	இக்காலத் தமிழ் இலக்கியங்களின் உள்ளடக்கம், வெளியீட்டு நெறி, படைப்பாக்கத்திறம் ஆகியவற்றைப் புரிந்துகொள்வர்.	K1, K2
கற்றல் பயன் 2	இலக்கியக் கொள்கைகளின் அடிப்படையில் இக்கால இலக்கியங்களை பொருத்திப் பார்க்கும் திறன் பெறுவர்.	K3
கற்றல் பயன் 3	கவிதை, சிறுகதை, புதினம், நாடகம், கட்டுரை ஆகிய இக்கால இலக்கிய வகைகள் குறித்துப் பகுத்தாராய்வர்.	K4
கற்றல் பயன் 4	இலக்கிய வரலாற்றுப் பின்னணியில் இக்காலத் தமிழ் இலக்கியங்களை மதிப்பிடுவர்.	K5
கற்றல் பயன் 5	படைப்புத் துறையிலும் ஊடகத்துறையிலும் கல்விப்புலத்திலும் வேலைவாய்ப்பினைப் பெறும் திறம் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	2
CO 2	3	3	3	2	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை 70% இடைத்தர இணைநிலை 30 % குறைதர இணைநிலை -

### தமிழக வரலாறும் பண்பாடும்

UTAM112

பருவம் : முதல் பருவம்

தரம் : 04

பிரிவு : முதன்மைப்பாடம் - II

மணிநேரம் வாரம் : 05

வகுப்பு : I BA தமிழ்

மொத்த மணிநேரம் : 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	தமிழகம் மற்றும் தமிழரின் தொன்மையைப் புரிந்துக் கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	தமிழ் இலக்கியங்களை வரலாற்று அடிப்படையில் பொருத்திப்பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	தமிழரின் பண்பாடு, கலாச்சாரம் ஆகியவற்றை பகுத்தாராய்ச் செய்தல்.
கற்றல் நோக்கம் 4	தமிழக வரலாறும் பண்பாடும் குறித்து அறிந்து மதிப்பிட்டு தெளிவு பெறச் செய்தல்.
கற்றல் நோக்கம் 5	சமூகத்தில் பின்பற்றப்படும் பண்பாட்டு மரபுகளை அறிந்து சமூகத்தில் பண்பாடுகளை எடுத்துரைக்கும் மற்றும் பேணிக்காக்கும் திறம் பெறச் செய்தல்.

அலகு 1 வரலாற்றுக் காலத்துக்கு முந்தைய தமிழகம்

12 மணி நேரம்

சிந்துவெளி அகழ்வாராய்ச்சி - கற்காலம் - இரும்புக்காலம் - தமிழரின் வரலாற்றுத் தொன்மை - பிறநாட்டாருடன் தமிழரின் தொடர்புகள் - தமிழரின் வணிகத் தொடர்புகள் - கலை - பண்பாட்டுத் தொடர்புகள்.

அலகு 2 சங்ககாலத் தமிழர்கள்

15 மணி நேரம்

பாண்மரபு - வேளிர் வரலாறு - மூவேந்தர்கள் - அகப்புறப்பண்பாடு - களப்பிரர்கள் காலம்.

**அலகு 3 பல்லவர் காலத்தில் தமிழர் பண்பாடு****12 மணி நேரம்**

பல்லவர் ஆட்சி – கலைகளின் வளர்ச்சி – சிற்பம், ஓவியம் – கடற்கரைக் கோயில் – புடைப்புச் சிற்பங்கள் – பக்தி இலக்கியங்கள் உருவாகுதல் – பக்தி இலக்கியத் தோற்றத்திற்கான காரணங்கள்.

**அலகு 4 சோழர்கள் காலம், பிற்காலப் பாண்டியர் காலம் நாயக்கர் காலம்****12 மணி நேரம்**

சோழர்களின் எழுச்சி – இராசராச சோழன் – ராஜேந்திர சோழன் – அயல்நாட்டில் தமிழர் ஆட்சி – தஞ்சைப் பெரிய கோயில் – கட்டடக்கலை வளர்ச்சி – உரையாசிரியர்கள் – காப்பியங்கள் வளர்ச்சி – நாயக்கர்கள் வருகை – பாளையப்பட்டுகள் – கோயில் கோபுரங்கள் – சிற்றிலக்கியங்களின் தோற்றம் வளர்ச்சி – படிநிலைகள்.

**அலகு 5 சமூக எழுச்சிக்காலம்****14 மணி நேரம்**

அச்ச நூல்கள் பதிப்பு – தமிழ் இலக்கிய மறுமலர்ச்சி – உ.வே.சா, சி.வை. தா. பங்களிப்பு – தென்னிந்திய நல உரிமைச் சங்கத்தின் காலம் – திராவிட இயக்ககாலம் – தமிழர்களின் சமூக எழுச்சி.

**பாட நூல்கள்**

- பிள்ளை, கே.கே. (2002). தமிழக வரலாறும் பண்பாடும். உலகத் தமிழாராய்ச்சி நிறுவனம். தரமணி சென்னை.
- தட்சிணாமூர்த்தி, அ. (1973). தமிழர் நாகரிகமும் பண்பாடும். யாழ் வெளியீடு. சென்னை.

**பார்வை நூல்கள்**

- சேதுராமன், கு. (2017). தமிழக சமுதாய பண்பாட்டு கலை வரலாறு. நியூ செஞ்சரி புக் ஹவுஸ். சென்னை.
- பெருமாள், அ.கா. (2018). தமிழர் கலையும் பண்பாடும். நியூ செஞ்சரி புக் ஹவுஸ். சென்னை.

வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	தமிழகம் மற்றும் தமிழரின் தொன்மையைப் புரிந்துக் கொள்வர்.	K1, K2
கற்றல் பயன் 2	தமிழ் இலக்கியங்களை வரலாற்று அடிப்படையில் பொருத்திப்பார்ப்பர்.	K3
கற்றல் பயன் 3	தமிழரின் பண்பாடு, கலாச்சாரம் ஆகியவற்றை பகுத்தாராய்வர்.	K4
கற்றல் பயன் 4	தமிழக வரலாறும் பண்பாடும் குறித்து அறிந்து மதிப்பிட்டு தெளிவு பெறுவர்.	K5
கற்றல் பயன் 5	சமூகத்தில் பின்பற்றப்படும் பண்பாட்டு மரபுகளை அறிந்து சமூகத்தில் பண்பாடுகளை எடுத்துரைக்கும் மற்றும் பேணிக்காக்கும் திறம் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	2	1	1
CO 2	3	3	3	2	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 73% இடைத்தர இணைநிலை: 20 % குறைதர இணைநிலை :7%

### நாட்டார் மரபுகள் UTAA113

பருவம் : முதல் பருவம்  
பிரிவு : சார்புப்பாடம் - I  
வகுப்பு : I BA தமிழ்

தரம் : 03  
மணிநேரம்/வாரம் : 04  
மொத்தமணிநேரம் : 52

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	நாட்டார் வழக்காற்றியலின் தோற்றம் வளர்ச்சி நிலைகளை புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	நாட்டார் பண்பாட்டு விழுமியங்களைப் பொருத்திப்பார்க்கும் திறன் பெறச் செய்தல்.
கற்றல் நோக்கம் 3	நாட்டுப்புற நிகழ்க்கலைகளின் வகைகளை பகுத்தாராயச் செய்தல்.
கற்றல் நோக்கம் 4	பண்டைய தமிழர் மரபுகளை மதிப்பிட்டு அறிவும் திறன் பெறச் செய்தல்.
கற்றல் நோக்கம் 5	நாட்டார் மரபுகள் அடிப்படையில் இலக்கியங்கள், கலை நுட்பங்கள் குறித்து அறியும் திறம் மற்றும் கலைத்திறனும் பெறச் செய்தல்.

- அலகு 1 நாட்டார் வழக்காற்றியல் அறிமுகம் 10 மணி நேரம்  
நாட்டார் வழக்காற்றியல் கருத்தாக்கங்கள் - அறிஞர் கருத்துக்கள்
- அலகு 2 பிற புலங்கள் 11 மணி நேரம்  
நாட்டார் வழக்காற்றியலும் பிற புலங்களும்
- அலகு 3 வாய்மொழி வரலாறு 10 மணி நேரம்  
வாய்மொழி வழக்காறுகள்
- அலகு 4 கலைகள் 11 மணி நேரம்  
நாட்டார் நிகழ்க்கலைகள் - நிகழ்க்கலைகளின் தோற்றம் வளர்ச்சி

நாட்டார் வாழ்வு - நாட்டார் இலக்கியம் - புழங்குப் பொருட்கள் பண்பாடு - புழங்குப் பொருட்களின் தேவைகள்

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வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	நாட்டார் வழக்காற்றியலின் தோற்றம் வளர்ச்சி நிலைகளை புரிந்து கொள்வர்.	K1, K2
கற்றல் பயன் 2	நாட்டார் பண்பாட்டு விழுமியங்களைப் பொருத்திப்பார்க்கும் திறன் பெறுவர்.	K3
கற்றல் பயன் 3	நாட்டுப்புற நிகழ்க்கலைகளின் வகைகளை பகுத்தாராய்வார்.	K4
கற்றல் பயன் 4	பண்டைய தமிழர் மரபுகளை மதிப்பிட்டு அறிவும் திறன் பெறுவர்.	K5
கற்றல் பயன் 5	நாட்டார் மரபுகள் அடிப்படையில் இலக்கியங்கள், கலை நுட்பங்கள் குறித்து அறியும் திறம் மற்றும் கலைத்திறனும் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	2	1	1
CO 2	3	3	3	2	2	1
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 73% இடைத்தர இணைநிலை:17% குறைதர இணைநிலை:10%



**பயன்முறைத் தமிழ்**  
**UTAE101**

பருவம் : முதல் பருவம்

தரம் : 02

பிரிவு : துறைசாரா விருப்பப்பாடம் - I

மணி நேரம்/வாரம் : 02

வகுப்பு : I B.A. தமிழ்

மொத்த மணி நேரம் : 26

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	இலக்கணத்தின் பயன்பாடு குறித்துப் புரிந்துகொள்ள செய்தல்.
கற்றல் நோக்கம் 2	அடிப்படையாக கடைப்பிடிக்க வேண்டிய இலக்கணங்களை இலக்கியத்தில் அடிப்படையாக வாழ்வில் பொருத்திப் பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	கதை, கட்டுரை, கவிதை, ஆராய்ச்சிக் கட்டுரைகளின் அடிப்படை இலக்கணத்தின் பங்களிப்பினை பகுத்தாராய்ச் செய்தல்.
கற்றல் நோக்கம் 4	அடிப்படை இலக்கணத்தினை மக்கள் சமுதாயத்தில் பயன் படுத்தும் திறம்குறித்து மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	மாணவர்கள் இலக்கணப் பிழையின்றிப் பேசும் மற்றும் எழுதும் திறன் பெறச் செய்தல்.

**அலகு 1 தமிழ்ச் சந்தி விதிகள்**

**06 மணி நேரம்**

இக்காலத் தமிழின் இயல்புகள் - சந்தி விதிகள் - சந்தி வரையறை - சந்தியின் தேவை - சந்தி வகைப்பாடுகள் - அகச்சந்தி - புறச்சந்தி - சொற்சந்தி வருமிடங்கள் - வல்லினம் மிகும் இடங்கள் - மிகா இடங்கள் - நில தனிக் குறிப்புகள் - பழஞ்சந்தி - இக்காலச் சந்தி வேறுபாடுகள் - சிறப்புச் சந்தி விதிகள் - நிறுத்தற்குறிப் பயன்பாடும் சந்தி அறிதலும்.

**அலகு 2 நிறுத்தற்குறிகள்**

**06 மணி நேரம்**

நிறுத்தற்குறிகள் பயன்பாடு - சொற்களைச் சேர்த்தும் பிரித்தும் எழுதும் முறைகள் - பேச்சும் கால இடவெளியும் நிறுத்தற்குறிகளும் - நிறுத்தற்குறிகள் காற்புள்ளி - அரைப்புள்ளி - முக்காற்புள்ளி - முற்றுப்புள்ளி - புள்ளி - முப்புள்ளி - கேள்விக்குறி - உணர்ச்சிக்குறி - இரட்டை, ஒற்றை மேற்கோள் குறிகள் - மேற்படிக்குறி - அடைப்புக் குறிகள் - பிறை அடைப்பு - சதுர அடைப்பு - இணைப்புக்கோடு - இணைப்புச் சிறுகோடு - சாய்கோடு - அடிக் கோடு - உடுக்குறி இவற்றின் முறையான பயன்படுத்த முறைகள் - சொற்களைக் கட்டமைத்து எழுதும் முறைகள்.

**அலகு 3 மொழித் திறன்கள்**

**06 மணி நேரம்**

நடைமுறை சார் மொழித் திறன்கள் - எழுத்துத் திறன்கள் - வாக்கியக் கட்டமைப்புத்திறன் - செய்திக் கடிதம் ஆவணம் எழுதும் முறைகள் - செய்தி எழுதும் முறைகள் - செய்திக் கட்டமைப்பு - தலைப்பு - முகப்பு - உடல் - செய்தியில் மொழிப் பயன்பாடு - செய்திக் கட்டுரைத் தலைப்புத் தெரிவு - தகவல் சேகரிப்பு வகைகள் - தமிழில் நெகிழ்வுரை எழுதும் முறை - நெகிழ்வுரையில் மொழிப் பயன்பாடு - கருத்துரைகள் - மதிப்புரை - தலையங்கம் - நூல் மதிப்புரைகள் - கடிதம் எழுதும் முறைகள் - ஆவணம் எழுதும் முறைகள்.

உரையாடல் திறன் – உரையாடல் திறனை மேம்படுத்தும் வகைகள் -தேவையான நல்ல குணங்கள் – சொற்பொழிவுத் திறன் – நேர்காணல் – வாய்மொழித்தேர்வுத் திறன்களை வளர்க்கும் நெறிகள்.

அலகு 5 கட்டுரை

கட்டுரை வரையறை – கட்டுரையின் பாகங்கள் - கட்டுரையின் இயல்பு – சுருக்கமான எளிமையான மொழிப் பயன்பாட்டு முறைகள்.

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வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	இலக்கணத்தின் பயன்பாடு குறித்துப் புரிந்துகொள்வர்.	K1, K2
கற்றல் பயன் 2	அடிப்படையாக கடைப்பிடிக்க வேண்டிய இலக்கணங்களை இலக்கியத்தில் அடிப்படையாக வாழ்வில் பொருத்திப் பார்ப்பர்.	K3
கற்றல் பயன் 3	கதை, கட்டுரை, கவிதை, ஆராய்ச்சிக் கட்டுரைகளின் அடிப்படை இலக்கணத்தின் பங்களிப்பினை பகுப்பாய்வுச் செய்வர்.	K4
கற்றல் பயன் 4	அடிப்படை இலக்கணத்தினை மக்கள் சமுதாயத்தில் பயன்படுத்தும் திறம்குறித்து மதிப்பிடுவர்.	K5
கற்றல் பயன் 5	மாணவர்கள் இலக்கணப் பிழையின்றிப் பேசும் மற்றும் எழுதும் திறன் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	2	2	1
CO 2	3	3	3	2	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 86% இடைத்தர இணைநிலை:4 % குறைதர இணைநிலை:10%

### அடிப்படைத் தமிழ் இலக்கணம் UTAF101

பருவம் : முதல் பருவம் தரம் : 02  
பிரிவு : அடித்தளப்பாடம் மணிநேரம்/வாரம் : 02  
வகுப்பு : இளங்கலைத் தமிழ் முதலாமாண்டு மொத்தமணிநேரம் : 26

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	அடிப்படைத்தமிழ் இலக்கணம் குறித்துப் புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	இலக்கணத்தின் படிநிலைகளையும் தனித்தன்மைகளையும் பொருத்திப்பார்க்கும் திறன் பெறச் செய்தல்.
கற்றல் நோக்கம் 3	இலக்கணத்தினை இலக்கியங்களுடன் பகுத்தாராயும் திறன் பெறச் செய்தல்.
கற்றல் நோக்கம் 4	அடிப்படைத் தமிழ் இலக்கணத்தினை சமுதாயத்தில் மக்கள் பயன்படுத்தும் திறம் குறித்து மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	இலக்கணம் குறித்து முழுமையாக அறிந்து சொல் மற்றும் தொடர்களை உருவாக்கும் திறன் பெறச் செய்தல்.

அலகு 1 எழுத்து 06 மணி நேரம்  
அலகு 2 சொல் 06 மணி நேரம்  
அலகு 3 பொருள் 04 மணி நேரம்  
அலகு 4 யாப்பு 04 மணி நேரம்  
அலகு 5 அணி 06 மணி நேரம்

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வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	அடிப்படைத்தமிழ் இலக்கணம் குறித்துப் புரிந்து கொள்வர்.	K1, K2
கற்றல் பயன் 2	இலக்கணத்தின் படிநிலைகளையும் தனித்தன்மைகளையும் பொருத்திப்பார்க்கும் திறன் பெறுவர்.	K3
கற்றல் பயன் 3	இலக்கணத்தினை இலக்கியங்களுடன் பகுத்தாராயும் திறன் பெறுவர்.	K4
கற்றல் பயன் 4	அடிப்படைத் தமிழ் இலக்கணத்தினை சமுதாயத்தில் மக்கள் பயன்படுத்தும் திறம் குறித்து மதிப்பிடுவர்.	K5
கற்றல் பயன் 5	இலக்கணம் குறித்து முழுமையாக அறிந்து சொல் மற்றும் தொடர்களை உருவாக்கும் திறன் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	2
CO 2	3	3	3	2	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 70% இடைத்தர இணைநிலை: 30 % குறைதர இணைநிலை:-%

**அறநெறி இலக்கியம்**

**UTAM207**

பருவம் : இரண்டாம் பருவம்

தரம் : 04

பிரிவு : முதன்மைப் பாடம் - III

மணிநேரம்/வாரம் : 05

வகுப்பு : IBA தமிழ்

மொத்த மணி நேரம் : 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	தமிழரின் அற விழுமியங்களைப் புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	அற இலக்கியங்கள் உணர்த்தும் அறங்களை வாழ்வியலோடு பொருத்திப் பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	அகம் புறம் சார்ந்த அறஇலக்கியங்களைப் பகுத்தாராய்ச் செய்தல்.

கற்றல் நோக்கம் 4	தமிழரின் அறம் சார்ந்த வாழ்வியலை இலக்கியத்தின் வழி மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	அறம் சார்ந்த கருத்துகளை கற்றுணர்ந்து சமூகத்தில் விழுமியங்களுடன் வாழும் திறம் பெறச் செய்தல்.

**அலகு 1 திருக்குறள் – நாலடியார் - பழமொழி - முதுமொழிக்காஞ்சி**

**15 மணி நேரம்**

திருக்குறள் – இல்லறவியல் (1-5) - இல்வாழ்க்கை முதல் விருந்தோம்பல் வரை – நாலடியார் – துறவறவியல் (1-10) – செல்வம் நிலையாமை முதல் ஈகை வரை – பழமொழி (1-10) – அரிது அவத்து முதல் பெரிய நாட்டார்க்கும் வரை – முதுமொழிக்காஞ்சி – (4) – சிறந்த பத்து, அறிவுப் பத்து, பழியாப் பத்து, -துவ்வாப் பத்து

**அலகு 2 இன்னாநாற்பது – இனியவை நாற்பது – ஆசாரக்கோவை**

**15 மணி நேரம்**

இன்னா நாற்பது – பந்தம் இல்லா முதல் பொருள் உணர்வார் வரை – இனியவை நாற்பது (1-10) – பிச்சைப்புக்கு முதல் கடன் உண்டு வரை – ஆசாரக் கோவை – (1-10) நன்றி அறிதல் முதல் தேவர் வழிபாடு வரை

**அலகு 3 திரிகடுகம் – சிறுபஞ்சமூலம் - ஏலாதி**

**15 மணி நேரம்**

திரிகடுகம் (1-10) – அருந்ததி கற்பினார் முதல் கணக்காயர் வரை – சிறுபஞ்ச மூலம் (1-10) – ஒத்த ஒழுக்கம் முதல் சிலம்பிக்கு வரை – ஏலாதி (1-10) – சென்ற புகழ் முதல் செங்கோலான் வரை

**அலகு 4 மூதுரை – நல்வழி – வெற்றி வேட்கை**

**10 மணி நேரம்**

மூதுரை (1-20) – வாக்குண்டாம் முதல் உடன்பிறந்தார் சுற்றத்தார் வரை – நல்வழி (1-10) – பாலும் தெளிதேனும் முதல் ஆண்டாண்டு தோறும் வரை – வெற்றிவேற்கை (1-40) – எழுத்தறிவித்தவன் முதல் அச்சம் உள்ளடக்கி அறிவு வரை

**அலகு 5 உலகநீதி – நீதிநெறிவிளக்கம் – அறநெறிச்சாரம்**

**10 மணி நேரம்**

உலக நீதி (1-10) – நீதிநெறி விளக்கம் (1-10) நீரில் குமிழி முதல் எனைத்துணைய வரை – அறநெறிச் சாரம் (1-10) தாவின்றி எப்பொழுதும் முதல் புல்ல உரைத்தல் வரை.

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வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	தமிழரின் அற விழுமியங்களைப் புரிந்து கொள்வர்.	K1, K2
கற்றல் பயன் 2	அற இலக்கியங்கள் உணர்த்தும் அறங்களை வாழ்வியலோடு பொருத்திப் பார்ப்பர்.	K3

கற்றல் பயன் 3	அகம் புறம் சார்ந்த அறஇலக்கியங்களைப் பகுத்தாராய்வர்.	K4
கற்றல் பயன் 4	தமிழரின் அறம் சார்ந்த வாழ்வியலை இலக்கியத்தின் வழி மதிப்பிடுவர்.	K5
கற்றல் பயன் 5	அறம் சார்ந்த கருத்துகளை கற்றுணர்ந்து சமூகத்தில் விழுமியங்களுடன் வாழும் திறம் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	2	1	1
CO 2	3	3	3	2	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 73% இடைத்தர இணைநிலை: 20 % குறைதர இணைநிலை: 7%

### தமிழிலக்கிய வரலாறு

UTAM208

பருவம்: இரண்டாம் பருவம்

தரம் : 04

பிரிவு : முதன்மைப் பாடம் - IV

மணிநேரம்/வாரம் : 05

வகுப்பு: IBA தமிழ்

மொத்த மணி நேரம் : 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	தமிழ் இலக்கியங்களின் தனித்தன்மைகள் சிறப்புகள் குறித்து புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	தமிழ் இலக்கியங்களின் வகைமைகளை பொருத்திப் பார்க்கும் திறன் பெறச் செய்தல்.
கற்றல் நோக்கம் 3	இலக்கியங்களின் பொருண்மைகளை பகுத்தாராய்ந்து உணரும் திறன் பெறச் செய்தல்.
கற்றல் நோக்கம் 4	இலக்கிய வகைமைகளின் படைப்பாக்க உத்திமுறைகள் குறித்து மதிப்பிடும் திறன் பெறச் செய்தல்.
கற்றல் நோக்கம் 5	தமிழ் இலக்கியத்தின் தொன்மை மற்றும் புதுமை நிலையினை அறிந்து, இலக்கியங்கள் படைத்தல் மற்றும் சமூகத்தில் இலக்கியங்கள் குறித்த தெளிவை உருவாக்கும் நிலையினை பெற செய்தல்.

**அலகு 1 செவ்வியல் இலக்கியங்கள்****15 மணி நேரம்**

செவ்வியல் இலக்கியங்கள் - சங்ககாலம் - சங்கமருவிய கால இலக்கியம் - சிலப்பதிகாரம் - மணிமேகலை

**அலகு 2 பக்தி இலக்கியங்கள்****15 மணி நேரம்**

சைவம், வைணவம், பௌத்தம், சமணம், காப்பியங்கள் - கம்பராமாயணம் - மகாபாரதம் - பெரிய புராணம்

**அலகு 3 சிற்றிலக்கியங்கள்****15 மணி நேரம்**

பிள்ளைத்தமிழ் - தூது - பரணி - கலம்பகம் - பள்ளு - உலா.

**அலகு 4 பிற்காலப் பக்தி இலக்கியங்கள்****10 மணி நேரம்**

தாயுமானவர் - அருணகிரி நாதர் - வள்ளலார் - உரைநடை இலக்கியங்கள் - இஸ்லாம், கிறித்தவ இலக்கியங்கள்.

**அலகு 5 கவிதை - உரைநடை****10 மணி நேரம்**

சிறுகதை, புதினம், கட்டுரை, வாழ்க்கை வரலாறு - தன் வரலாறு - நாடகம் - புதுக்கவிதை - சென்றியூ - ஹைக்கூ - லிமரைக்கூ - ஹைபூன் இலக்கிய ஆய்வு முறைகள் - நாட்டுப்புறவியல் - மக்கள் தொடர்பியல் - தொடர்புடைய பிற துறைகள்

**பாட நூல்கள்**

- வரதராசன், மு. (1972). தமிழ் இலக்கிய வரலாறு. மணிவாசர் பதிப்பகம். சென்னை.
- தமிழண்ணல். (1980). புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு. சோலைப் பதிப்பகம். மதுரை.

**பார்வைநூல்கள்**

- பாக்கியமேரி. (2009). வகைமை நோக்கில் தமிழிலக்கிய வரலாறு, தமிழ்கோட்டம் பதிப்பகம். சென்னை.
- ஸ்ரீ சந்திரன். (1965). தமிழ் இலக்கிய வரலாறு , பாரதி புத்தகாலயம் .சென்னை.

வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	தமிழ் இலக்கியங்களின் தனித்தன்மைகள் சிறப்புகள் குறித்து புரிந்து கொள்வர்.	K1, K2
கற்றல் பயன் 2	தமிழ் இலக்கியங்களின் வகைமைகளை பொருத்திப் பார்க்கும் திறன் பெறுவர்.	K3
கற்றல் பயன் 3	இலக்கியங்களின் பொருண்மைகளை பகுத்தாராய்ந்து உணரும் திறன் பெறுவர்.	K4
கற்றல் பயன் 4	இலக்கிய வகைமைகளின் படைப்பாக்க உத்திமுறைகள் குறித்து மதிப்பிட்டு அறியும் திறன் பெறுவர்.	K5

<b>கற்றல் பயன் 5</b>	தமிழ் இலக்கியத்தின் தொன்மை மற்றும் புதுமை நிலையினை அறிந்து, இலக்கியங்கள் படைத்தல் மற்றும் சமூகத்தில் இலக்கியங்கள் குறித்த தெளிவை உருவாக்கும் நிலையினை பெறுவர்.	K6
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	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	1	1	1
CO 2	3	3	3	1	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 69% இடைத்தர இணைநிலை: 17 % குறைதர இணைநிலை:14%

**காலந்தோறும் தமிழ் மொழி வரலாறு**

**UTAO209**

பருவம் : இரண்டாம் பருவம்

தரம் : 03

பிரிவு : சார்புப் பாடம் - II

மணிநேரம்/வாரம் : 04

வகுப்பு : I BA தமிழ்

மொத்த மணி நேரம் : 52

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	தொன்மைக் காலத்திலிருந்து இக்காலம் வரை தமிழின் ஒலி, வரி வடிவ மாற்றங்களை புரிந்துக்கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	காலந்தோறும் தமிழ் இலக்கணக் கூறுகள் அடைந்த மாற்றங்களைப் பொருத்திப் பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	தமிழ்மொழியின் வரிவடிவங்களைப் பகுத்தராய்ச் செய்தல்.
கற்றல் நோக்கம் 4	தமிழில் உள்ள பழமை மொழிகளைத் தற்காலச் சமூகத்தோடு மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	தமிழ் மொழியின் வரலாற்றினையும் சிறப்பினையும் நன்கு உணர்ந்து சமுதாயத்தில் மொழியின் வளத்தினைப் பேணும் திறம் பெறச் செய்தல்.

**அலகு 1 மொழி**

**12 மணி நேரம்**

மொழி அமைப்பும் வரலாறும் - வரலாற்றுச் சான்றுகள் - தொல் திராவிட மொழியும் தமிழும் - தமிழ்ப் பிராமிக் கல்வெட்டுத் தமிழ்.

**அலகு 2 காலந்தோறும் மொழி - I**

**10 மணி நேரம்**



தொல்காப்பியத் தமிழ் - சங்க காலத்தமிழ் - சங்கம் மருவிய காலத் தமிழ்.

**அலகு 3 காலந்தோறும் மொழி - II**

**10 மணி நேரம்**

பல்லவர் காலத் தமிழ் - சோழர் காலத்தமிழ் - பாண்டியர் காலத்தமிழ் - நாயக்கர் காலத் தமிழ் - மராட்டியர் காலத் தமிழ்.

**அலகு 4 காலந்தோறும் மொழி - III**

**10 மணி நேரம்**

பத்தொன்பது, இருபதாம் நூற்றாண்டுத் தமிழ் - அறிவியல் தமிழ் - கல்வெட்டுத் தமிழ் - நவீனத்தமிழ்

**அலகு 5 காலந்தோறும் மொழி - IV**

**10 மணி நேரம்**

தமிழ்க் கிளைமொழிகள் - சொற்பொருள் மாற்றம் - தமிழ் வரிவடிவ வரலாறு - எழுத்துச் சீர்திருத்தம் - எழுத்துச் சீர்திருத்தத்தின் தனித்தன்மைகள் - சிறப்புகள்

**பாட நூல்**

- சக்திவேல், சு. (2018). தமிழ்மொழி வரலாறு. மணிவாசகர் பதிப்பகம். சிங்கர் தெரு, பாரிமுனை. சென்னை.

**பார்வை நூல்கள்**

- மீனாட்சி சுந்தரம். தெ.பொ. தமிழ்மொழி வரலாறு. (1982). சர்வோதய இலக்கியப் பண்ணை. மதுரை.
- வரதராசன், மு. (1990). மொழி வரலாறு. கழக வெளியீடு. சென்னை -18.

வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	தொன்மைக் காலத்திலிருந்து இக்காலம் வரை தமிழின் ஒலி, வரி வடிவ மாற்றங்களை புரிந்துக்கொள்வர்.	K1, K2
கற்றல் பயன் 2	காலந்தோறும் தமிழ் இலக்கணக் கூறுகள் அடைந்த மாற்றங்களைப் பொருத்திப் பார்ப்பார்.	K3
கற்றல் பயன் 3	தமிழ்மொழியின் வரிவடிவங்களைப் பகுத்தராய்வார்.	K4
கற்றல் பயன் 4	தமிழில் உள்ள பழமை மொழிகளைத் தற்காலச் சமூகத்தோடு மதிப்பிடுவர்.	K5
கற்றல் பயன் 5	தமிழ் மொழியின் வரலாற்றினையும் சிறப்பினையும் நன்கு உணர்ந்து சமுதாயத்தில் மொழியின் வளத்தினைப் பேணும் திறம் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	1	1	1
CO 2	3	3	3	1	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3

CO 5	3	3	3	3	3	3
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உயர்தர இணைநிலை: 72% இடைத்தர இணைநிலை: 14% குறைதர இணைநிலை:14%

## பேச்சுக்கலைத்திறன்

UTAE204

பருவம் : இரண்டாம் பருவம்

தரம்

: 02

பிரிவு : துறைச்சாரா விருப்பப்பாடம் -II

மணிநேரம்/வாரம் : 02

வகுப்பு : IUG

மொத்த மணி நேரம் : 26

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	பேச்சு என்பது ஓர் கலை என்பதை புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	பேச்சாளர் ஆவதற்குரிய தகுதிகளை தமது திறத்துடன் பொருத்திப் பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	சமூகத்தின் சிறந்த சொற்பொழிவாளர்களின் பேச்சுத்திறன்களை பகுத்தாராய்ச் செய்தல்.
கற்றல் நோக்கம் 4	பேச்சாற்றல் மூலம் தற்கால சூழலை அறிந்து மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	பேச்சு என்பது ஓர் கலை என்பதை புரிந்து கொள்ளச் செய்தல்.

### அலகு 1 சொற்பொழிவு

06 மணி நேரம்

சொற்பொழிவு ஓர் அரிய கலை - வரையறை - வரலாறு - விளக்கம் - பேச்சாளர் தகுதிகள் - முன்னோடிகள் - இலக்கிய அறிவு - மொழி அறிவு - அனுபவம் - தனித்தன்மை - முன் முயற்சிகள் - உச்சரிப்பு - கருத்துத்தெளிவு

### அலகு 2 சொற்பொழிவு வகைகள்

04 மணி நேரம்

சமயம் - இலக்கியம் - அரசியல் - கல்வி - அறிவியல் - பொழுதுபோக்கு - நகைச்சுவை - ஊடகப்பொழிவு

### அலகு 3 சொற்பொழிவுத் திறன்கள்

04 மணி நேரம்

அவையறிதல் - பொருளறிதல் - சொல் தெரிவு - மொழி ஆளுமை - இலக்கியப் புலமை - நாட்டுநடப்புக்களை வெளிப்படுத்தும் திறம் - வெளிப்பாட்டுத் திறம் - தொனி

### அலகு 4 சொற்பொழிவாளர்கள்

06 மணி நேரம்

வ.உ.சி - திரு.வி.க - மறைமலையடிகள் - வரதராசலு - ஜீவா - பெரியார் - அண்ணா - சி.ஆ.பெ - கலைஞர் - வாரியார் - கி.வா.ஜா - புலவர் கீரன் - வம்புரிஜான் - சிலம்பொலியார் - தென்காசி சுவாமிநாதன் - மேலை நாட்டுப் பொழிஞர்கள் -

### அலகு 5 சொற்பொழிவு பயிற்சி

06 மணி நேரம்

பேச்சைத் தொடங்குதல் – பேச்சுத் தயாரிப்புக்குக் குறிப்பெடுத்தல் – திறன் வளர்த்தல் – மாணவனை ஒரு தலைப்பு கொடுத்து மூன்று மணிநேரம் பேசுவதற்குக் குறிப்பு தயாரித்து வரச்சொல்லுதல்

**பாட நூல்கள்**

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**பார்வைநூல்கள்**

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- தெய்வசிகாமணி. (1950). மேடைத்தமிழ். tamildigitallibrary.org
- டேல் கார்னகி (2012). மேடைப்பேச்சுக்கலை. கண்ணகி பதிப்பகம்.சென்னை
- கமலா கந்தசாமி. (2013). எப்பொழுதும் வெற்றி தரும் பேச்சுக்கலை. நர்மதா பதிப்பகம். சென்னை.

வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	பேச்சு என்பது ஓர் கலை என்பதை புரிந்து கொள்வர்.	K1, K2
கற்றல் பயன் 2	பேச்சாளர் ஆவதற்குரிய தகுதிகளை தமது திறத்துடன் பொருத்திப் பார்ப்பர்.	K3
கற்றல் பயன் 3	சமூகத்தின் சிறந்த சொற்பொழிவாளர்களின் பேச்சுத்திறன்களை பகுத்தாராய்வர்.	K4
கற்றல் பயன் 4	பேச்சாற்றல் மூலம் தற்கால சூழலை அறிந்து மதிப்பிடுவர்.	K5
கற்றல் பயன் 5	பேச்சு என்பது ஓர் கலை என்பதை புரிந்து கொள்வர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	2	2	2
CO 2	3	3	3	2	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 73% இடைத்தர இணைநிலை: 27 % குறைதர இணைநிலை:-%

## அறிவியல் தமிழ்

UTAD205

பருவம்	: இரண்டாம் பருவம்	தரம்	: 02
பிரிவு	: துறைசார் விருப்பப்பாடம்	மணிநேரம் / வாரம்	: 02
வகுப்பு	: I B.A. தமிழ்	மொத்தமணி நேரம்	: 26

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	தாய்மொழி வழியாக அறிவியல் பற்றி புரிந்துக்கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	இலக்கியங்களில் உள்ள அறிவியல் சிந்தனைப் படைப்புகளை வாழ்க்கையில் பொருத்திப்பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	அறிவியல் தொழில் நுட்பத்தின் வளர்ச்சி பற்றி பகுத்தாராயச் செய்தல்.
கற்றல் நோக்கம் 4	அறிவியலும் தொழில்நுட்பமும் குறித்து மதிப்பிடச் செய்தல்
கற்றல் நோக்கம் 5	அறிவியல் தமிழின் வளர்ச்சி நிலைகளை முழுமையாக அறிந்து அறிவியலாளர்களாக மாறும் திறம் பெறச் செய்தல்.

### அலகு 1 அறிவியல் தமிழ்

04 மணி நேரம்

அறிவியல் தமிழின் தோற்றம் - வளர்ச்சி - வரலாறு - பல்துறை அறிவியல் தமிழ் நூல்கள் - அறிவியல் தமிழின் தனித்தன்மைகள் - சிறப்புகள்.

### அலகு 2 அறிவியல் இதழ்கள் வகைகள்

06 மணி நேரம்

தமிழில் அறிவியல் இதழ்கள் - சிறுவர்களுக்கான அறிவியல் இதழ்கள் - துளிர் - பெரியோருக்கான அறிவியல் இதழ்கள் - அறிக அறிவியல் - எல்லோருக்குமான அறிவியல் இதழ் - கலைக்கதிர் - அறிவியல் தமிழ் ஆய்விதழ் களஞ்சியம் - சிறுவர் இதழ்களில் அறிவியல் செய்திகள் - பொது அறிமுகம்.

### அலகு 3 அறிவியல் களஞ்சியம்

04 மணி நேரம்

அறிவியல் கலைச் சொல்லாக்கம் - அறிவியல் அகராதிகள் வழி அறிவியல் தமிழ் - அறிவியல் கலைச்சொற்கள் - பிறத்துறை சார்ந்த கலைச்சொற்கள்

### அலகு 4 அறிவியல் வளர்ச்சியில் தகவல் தொழில்நுட்பத்தின் பங்கு

06 மணி நேரம்

தமிழ்த்திணை போன்ற மின்புல ஆய்விதழ், குறுந்தகடுகள் வழி தமிழ் ஒலிகள் வழித் தமிழ் (Audio tapes) ஒளி நாடாக்கள் வழித் தமிழ் (Vedio tapes) இணையதளங்கள் வழித் தமிழ் கணிப்பொறித் தகவல்பரிமாற்றம் - ஒருங்கிணைந்த தகவல் தொழில்நுட்பம் - கல்விக்கான செயற்கைக்கோள்பயன்பாடு - தொலைக்காட்சி வழிக் கல்வி -இணையத்தில் கல்வி - வளர்ச்சிப் படி நிலைகள்

### அலகு 5 அறிவியல் இயக்கங்கள்

06 மணி நேரம்

பகுத்தறிவு இயக்கமும் அறிவியல் கண்ணோ அறிவியல் மன்றம் - சதேசி அறிவியல் இயக்கம் தமிழ் அறிவியல் மன்றங்கள் - அறிவியல் மன்றத்தின் செயல்பாடுகள் - தமிழ்நாடு தமிழக அறிவியல் பேரவை.

**பாடநூல்**

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வரிசை எண்	கற்றல் பயன்கள்	Bloom's Value
கற்றல் பயன் 1	தாய்மொழி வழியாக அறிவியல் பற்றி புரிந்துக்கொள்வர்.	K1, K2
கற்றல் பயன் 2	இலக்கியங்களில் உள்ள அறிவியல் சிந்தனைப் படைப்புகளை வாழ்க்கையில் பொருத்திப்பார்ப்பர்.	K3
கற்றல் பயன் 3	அறிவியல் தொழில் நுட்பத்தின் வளர்ச்சி பற்றி பகுத்தாராய்வர்.	K4
கற்றல் பயன் 4	அறிவியலும் தொழில்நுட்பமும் குறித்து மதிப்பிடுவர்.	K5
கற்றல் பயன் 5	அறிவியல் தமிழின் வளர்ச்சி நிலைகளை முழுமையாக அறிந்து அறிவியலாளர்களாக மாறும் திறம் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	1	1	1
CO 2	3	3	3	1	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 72% இடைத்தர இணைநிலை: 14 % குறைதர இணைநிலை: 14%

**தமிழியல் கல்வி ஆதார வளங்கள்  
UTAL109**

பருவம் : முதல் பருவம்  
பிரிவு : தமிழ் - I  
வகுப்பு : I B.A. தமிழ்

தரம் : 03  
மணிநேரம் / வாரம் : 05  
மொத்தமணி நேரம் : 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	தமிழியல் தொடர்பாக உள்ள ஆதார வளங்களை புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	தமிழில் தொன்மை மற்றும் புதுமைச் சார்ந்த ஆதார வளங்களை பொருத்திப்பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	தொன்மைக்கும் புதுமைக்கும் உள்ள தொடர்பு நிலைகளை பகுத்தாராய்ச் செய்தல்.
கற்றல் நோக்கம் 4	தமிழில் நவீன தொழில் நுட்பங்களை மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	தமிழ் சார்ந்த நவீன நுட்பங்களைப் பயன்படுத்தும் திறன் பெறச் செய்தல்.

### அலகு 1

15 மணி நேரம்

கல்வெட்டுகள் – செப்பேடுகள் – சுவடிகள் – நாணயங்கள் – பிற ஆவணங்கள் – நூல்கள் – இதழ்கள் – நூலகங்கள் – அருங்காட்சியகங்கள் – அகழ் வைப்பகங்கள்.

### அலகு 2

15 மணி நேரம்

மின்னிதழ்களின் வகைகள் – வலைப்பதிவுகள் – வலைப்பதிவு வகைகள் – மின்செயலிகள் – மின்நூலகம் – மின்நூலகங்கள் – மின் இதழ்கள் – பேசும் புத்தகங்கள் (Audio books) – விகிப்பீடியா – தமிழ் விக்சனரி மின்அகராதிகள்.

### அலகு 3

15 மணி நேரம்

தமிழ் இணையக் கல்விக் கழகம் – தமிழ் மொழி தொடர்பான இணையத் தளங்கள் – அரசு மற்றும் தனியார்.

### அலகு 4

10 மணி நேரம்

தமிழ் மென் பொருள்கள் – ஒலிபெயர்ப்பு – மொழிபெயர்ப்பு – உள்ளடக்கம் – பயன்கொள்ளும் முறைகள் – தரவிறக்கம் செய்யும் முறை – மின்பெயர்ப்புகள்

### அலகு 5

10 மணி நேரம்

திறன்பேசிச் செயலிகள் – செயல்படும் முறைகள் – தமிழ்மொழியின் பயன்பாடு – விசைப்பலகை – குரல் பதிவில் தட்டச்சு உள்ளீடு – எழுத்து முறை மாற்றி – தமிழில் எழுத்துருக்கள்.

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### பார்வை நூல்கள்

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வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	தமிழியல் தொடர்பாக உள்ள ஆதார வளங்களை புரிந்து கொள்ளும் திறன் பெறுவர்.	K1, K2
கற்றல் பயன் 2	தமிழில் தொன்மை மற்றும் புதுமைச் சார்ந்த ஆதார வளங்களை பொருத்திப்பார்க்கும் திறன் பெறுவர்.	K3
கற்றல் பயன் 3	தொன்மைக்கும் புதுமைக்கும் உள்ள தொடர்பு நிலைகளை பகுத்தாராய்ந்து பார்க்கும் திறன் பெறுவர்.	K4
கற்றல் பயன் 4	தமிழில் நவீன தொழில் நுட்பங்களை மதிப்பிடும் திறன் குறித்து அறிவர்.	K5
கற்றல் பயன் 5	தமிழ் சார்ந்த நவீன நுட்பங்களைப் பயன்படுத்தும் திறன் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	1	1	1
CO 2	3	3	3	1	1	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 73% இடைத்தர இணைநிலை: 17 % குறைதர இணைநிலை:10%

## தமிழ் மொழி அமைப்பியல்

UTAL209

பருவம் : இரண்டாம் பருவம் தரம் : 03  
 பிரிவு : தமிழ் - II மணிநேரம் / வரம் : 05  
 வகுப்பு : இளங்கலை முதலாம் ஆண்டு (தமிழ்) மொத்தமணி நேரம் : 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	மொழியின் பண்புகளையும் பயன்பாட்டையும் பொதுநிலையில் புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	தமிழ் மொழியின் அமைப்பியல்புகளை ஒலி, சொல், தொடர் முதலிய நிலைகளின் வாயிலாக பொருத்திப் பார்க்கச் செய்தல்.

கற்றல் நோக்கம் 3	மொழிக்குடும்பம், மொழிகளுக்கிடையேயான உறவுகளை பகுத்தாராய்ச் செய்தல்.
கற்றல் நோக்கம் 4	தமிழ் மொழி அமைப்பியலில் உள்ள கூறுகளை மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	மொழிக்கூறுகளைச் செம்மையாகப் பயன்படுத்தும் திறன் பெறச் செய்தல்.

### அலகு 1 மொழி

15 மணி நேரம்

மொழியின் இயல்புகள் - மொழி பற்றிய நம்பிக்கைகள் - மொழிக்குடும்பம் - திராவிட மொழிகள் - தமிழின் தனித்தன்மைகள் - தமிழ் செவ்வியல் மொழி - தமிழில் கிளைமொழிகள் - பேச்சு வழக்கும் எழுத்து வழக்கும் - பிறமொழிக்கலப்பு - பிறமொழிக் கலப்பு நிலைகள்

### அலகு 2 எழுத்துக்களின் வகைகள்

15 மணி நேரம்

முதல் - சார்பு - உயிரொலிப் பகுப்பு - மெய்யொலிப் பகுப்பு - எழுத்துகளின் பிறப்புமுறை - எழுத்துகளின் வருகை - மொழி முதல் - இறுதி எழுத்துகள் - மெய்மயக்கம் - வரி வடிவம் - கிரந்த எழுத்துகள்.

### அலகு 3 விதிகள்

10 மணி நேரம்

சந்தி - விதி - வகைகள் - இயல்பு - விகாரம் - வேற்றுமை - வேற்றுமையின் வகைகள் - அல்வழி.

### அலகு 4 சொல் வகைப்பாடு

15 மணி நேரம்

பெயர்ச்சொல்லின் பண்புகள் - வகைகள் - மாற்றுப்பெயர் - தொழிற்பெயர் - வினையாலணையும் பெயர் - ஆகுபெயர் - எண்ணுப்பெயர் - ஆக்கப்பெயர் - பெயர்ச்சொற்கள் - திணை - பால் எண் உணர்த்தும் முறை - வேற்றுமைகள் - பெயர்ச்சொற்கள் - வேற்றுமை ஏற்கும் முறை - சாரியைகள் - பின்னருட்புகள் - வினைச்சொல் - வினைச்சொல்லின் பண்புகள் - காலமும் எதிர்மறையும் - வினைச்சொல்லின் வகைகள்.

### அலகு 5 தொடர்

10 மணி நேரம்

முற்று - எச்சம் - தமிழில் துணைவினைகள் - தமிழ்த் தொடர் அமைப்பு - தொடர் அமைப்பு விதிகள் - தொடர் வகைகள் - பெயர்ப் பயனிலை - எச்சத் தொடர் - முற்றுத் தொடர் - உடன்பாடு - எதிர்மறைத் தொடர் - திணை - பால் - எண் - இடம் இயைபு.

### பாடநூல்கள்

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### பார்வை நூல்கள்

- பொற்கோ. (2002). இக்காலத் தமிழ் இலக்கணம். பூம்பொழில் வெளியீடு. சென்னை.
- பரமசிவம், கு. (1991). இக்காலத் தமிழ் மரபு. கழக வெளியீடு. சென்னை.
- நுஃமான், எம்.ஏ. (1999). அடிப்படைத் தமிழ் இலக்கணம். வாசகர் சங்கம்.



வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	மொழியின் பண்புகளையும் பயன்பாட்டையும் பொதுநிலையில் புரிந்து கொள்வர்	K1, K2
கற்றல் பயன் 2	தமிழ் மொழியின் அமைப்பியல்புகளை ஒலி, சொல், தொடர் முதலிய நிலைகளின் வாயிலாக பொருத்திப் பார்க்கும் திறன் பெறுவர்.	K3
கற்றல் பயன் 3	மொழிக்குடும்பம், மொழிகளுக்கிடையேயான உறவுகளை பகுத்தாராயும் திறன் பெறுவர்.	K4
கற்றல் பயன் 4	தமிழ் மொழி அமைப்பியலில் உள்ள கூறுகளை மதிப்பிட்டு அறியும் திறன் பெறுவர்.	K5
கற்றல் பயன் 5	மொழிக்கூறுகளைச் செம்மையாகப் பயன்படுத்தும் திறன் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	1	1	1
CO 2	3	3	3	1	1	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 73% இடைத்தர இணைநிலை: 17 % குறைதர இணைநிலை:10%

### பொதுத்தமிழ் - I

UTAL110

பருவம் : முதலாம் பருவம்  
பிரிவு : பொதுத்தமிழ் - I  
வகுப்பு : IUG (Basic Level)

தரம் : 03  
மணிநேரம்/வாரம் : 05  
மொத்த மணி நேரம் : 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	நவீன இலக்கிய வகைமைகளின் தோற்றம் வளர்ச்சி படிநிலைகளை புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	இலக்கிய வகைமைகளின் பொருண்மைகளை பொருத்திப்பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	இக்கால இலக்கியங்களின் படைப்பாக்க உத்தி முறைகளை பகுத்தாராய்ச் செய்தல்.

கற்றல் நோக்கம் 4	நவீன இலக்கியங்களின் மொழித்திறன் குறித்து மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	இலக்கிய வகமைகளில் உள்ள செந்நெறிகளை வாழிவில் பின்பற்றுதல் மற்றும் புதிய இலக்கியங்களை படைக்கும் திறன் பெறச் செய்தல்.

#### அலகு 1 மரபுக் கவிதை

15 மணி நேரம்

பெ.சுந்தரனார் - தமிழ் தெய்வ வணக்கம் - பாரதிதாசன் - சிறுத்தையே வெளியில் வா - கவிமணி - புத்தரும் சிறுவனும் - முடியரசன்- மொழி உணர்ச்சி - கண்ணதாசன் - ஆட்டனத்தி ஆதிமந்தி - (ஆதிமந்தி புலம்பல்) - சுரதா - துறைமுகம் - துறைமுகம் - தமிழ் ஒளி - கடல்

#### அலகு 2 புதுக்கவிதை

15 மணி நேரம்

அப்துல் ரகுமான் - வீட்டுக்கொரு மரம் வளர்ப்போம் - ஈரோடு தமிழன்பன் - சென்ரியூ கவிதைகள் - ஒரு வண்டி சென்ரியூ (10 கவிதைகள்) - வைரமுத்து - பிற்சேர்க்கை - மு.மேத்தா - வாழைமரம் - அறிவுமதி - வள்ளுவம் பத்து - நா.முத்துக்குமார் - ஆனந்த யாழை மீட்டுகிறாய் - சுகிர்தராணி - சபிக்கப்பட்ட முத்தம் - இளம்பிறை - நீ எழுத மறுக்கும் எனது அழகு

#### அலகு 3 சிறுகதைகள்

15 மணி நேரம்

ஜெயகாந்தன் - தேவன் வருவாரா? - புதுமைப்பித்தன் - கடவுளும் கந்தசாமி பிள்ளையும் - உமா மகேஷ்வரி - கரு - தி.ஜானகிராமன் - முள்முடி - விழி.பா.இதயவேந்தன் - சிதறல்கள் - சு.சமுத்திரம் - காகித உறவு - அம்பை - காட்டில் ஒரு மான் - மொழிபெயர்ப்புக் கதை - ஆண்டாள் செக்காவ் - நாயக்காரச் சீமாட்டி

#### அலகு 4 இலக்கிய வரலாறு

10 மணி நேரம்

பாடம் சார்ந்த இலக்கிய வரலாறு - மரபுக்கவிதை, புதுக்கவிதை, சிறுகதை வளர்ச்சி நிலைகள்

#### அலகு 5 மொழித் திறன்

10 மணி நேரம்

பொருள் பொதிந்த சொற்றொடர்கள் அமைத்தல் - ஓர் எழுத்து ஒரு மொழி - வேற்றுமை உருபுகள் - திணை, பால், எண், இடம் - கலைச்சொல்லாக்கம், மொழிபெயர்ப்பு

#### பாட நூல்கள்

- பாலசுப்ரமணியன், சிற்பி. (2009). தமிழ் இலக்கிய வரலாறு. நியூசெஞ்சரி புத்தக நிலையம். சென்னை.
- தமிழண்ணல், (2002). புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு. திருநெல்வேலி தென்னிந்திய சைவசித்தாந்த நூற் பதிப்புக்கழகம். சென்னை.

#### பார்வைநூல்கள்

- பாக்கியமேரி, எப். (2009). வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு. சாரதா பதிப்பகம். சென்னை.

வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
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கற்றல் பயன் 1	நவீன இலக்கிய வகைமைகளின் தோற்றம் வளர்ச்சி படிநிலைகளை புரிந்து கொள்ளும் திறன் பெறுவர்.	K1, K2
கற்றல் பயன் 2	இலக்கிய வகைமைகளின் பொருண்மைகளை பொருத்திப்பார்க்கும் திறன் பெறுவர்.	K3
கற்றல் பயன் 3	இக்கால இலக்கியங்களின் படைப்பாக்க உத்தி முறைகளை பகுத்தாராய்ந்து அறிவும் திறன் பெறுவர்.	K4
கற்றல் பயன் 4	நவீன இலக்கியங்களின் மொழித்திறன் குறித்து மதிப்பிட்டு அறியும் திறன் பெறுவர்.	K5
கற்றல் பயன் 5	இலக்கிய வகைமைகளில் உள்ள செந்நெறிகளை வாழ்வில் பின்பற்றுதல் மற்றும் புதிய இலக்கியங்களை படைக்கும் திறன் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	2	1	1
CO 2	3	3	3	2	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 69% இடைத்தர இணைநிலை: 24% குறைதர இணைநிலை: 7%

## பொதுத்தமிழ் - II

UTAL210

பருவம் : இரண்டாம் பருவம்

தரம் : 03

பிரிவு : பொதுத்தமிழ் - II

மணிநேரம்/வாரம் : 05

வகுப்பு : I UG (Basic Level)

மொத்த மணி நேரம் : 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	தமிழ் இலக்கிய வகைமைகளைப்பற்றி புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	இலக்கிய வகைமைகளின் தனித்தன்மைகளைப் பொருத்திப் பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	தமிழ் இலக்கிய வகைமைகளின் படைப்பாக்க உத்திகளை பகுத்தாராய்ச் செய்தல்.
கற்றல் நோக்கம் 4	இலக்கியங்களின் வழி சமூக விழுமியங்களை மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	இலக்கியங்களின் செல்நெறிகளை வாழ்வில் கடைபிடிக்கும் திறன் பெறச் செய்தல்.

**அலகு 1 பக்தி இலக்கியம்****15 மணி நேரம்**

திருஞானசம்பந்தர் – தேவாரம் (பத்து பாடல்கள்) - திருநாவுக்கரசர் - தேவாரம் - நாமார்க்கும் குடியல்லோம் எனத் தொடங்கும் பதிகம் (10 பாடல்கள்) - சுந்தரர் - தேவாரம் (பத்து பாடல்கள்) – ஆண்டாள் - திருப்பாவை – (முதல் 20 பாடல்கள்)

**அலகு 2 பக்தி இலக்கியம்****15 மணிநேரம்**

வள்ளலார் - அருள் விளக்க மாலை (முதல் 10 பாடல்கள்) – எச்.ஏ.கிருட்டிணம்பிள்ளை - இரட்சணிய மனோரகம் - பால்ய பிராத்தனை – குணங்குடி மஸ்தான் சாகிபு – பராபரக் கண்ணி (முதல் 20 பாடல்கள்)

**அலகு 3 சிற்றிலக்கியங்கள்****15 மணி நேரம்**

தமிழ் விடு தூது – முதல் 30 கண்ணிகள் - திருக்குற்றாலக் குறவஞ்சி – குறத்தி மலைவளம் கூறுதல் - முக்கூடல் பள்ளு – நாட்டு வளம்

**அலகு 4 இலக்கிய வரலாறு****10 மணி நேரம்**

பல்லவர் காலம் - நாயக்கர் காலம்

**அலகு 5 மொழித்திறன் போட்டித் தேர்வுத் திறன்****10 மணி நேரம்**

தொடர் வகைகள் - மரபுத்தொடர், பழமொழிகள் - பிறமொழிச் சொற்களைக் களைதல் - வழச்சொற்கள் நீக்குதல் - இலக்கணக் குறிப்பு அறிதல்

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வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	தமிழ் இலக்கிய வகைமைகளைப்பற்றி புரிந்து கொள்ளும் திறன் பெறுவர்.	K1, K2
கற்றல் பயன் 2	இலக்கிய வகைமைகளின் தனித்தன்மைகளைப் பொருத்திப் பார்க்கும் திறன் பெறுவர்.	K3
கற்றல் பயன் 3	தமிழ் இலக்கிய வகைமைகளின் படைப்பாக்க உத்திகளை பகுத்தாராய்ந்து பார்க்கும் திறன் பெறுவர்.	K4

கற்றல் பயன் 4	இலக்கியங்களின் வழி சமூக விழுமியங்களை மதிப்பிட்டு பார்க்கும் திறன் பெறுவர்.	K5
கற்றல் பயன் 5	இலக்கியங்களின் செல்நெறிகளை வாழ்வில் கடைபிடிக்கும் திறன் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	2	2	1
CO 2	3	3	3	2	2	1
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 73% இடைத்தர இணைநிலை: 20 % குறைதர இணைநிலை:7%

பாடத்திட்ட அமைப்பு-அகமதிப்பீட்டிற்கான III ஆம் மற்றும் IV ஆம் உட்கூறுகள் -  
இளங்கலைத்தமிழ்

பருவம்	வகை	பாடக்குறியீடு	பாடத்தலைப்பு	III உட்கூறுகள்	IV உட்கூறுகள்
I	தமிழ்	UTAL109	தமிழியல் கல்வி ஆதார வளங்கள்	ஒப்படைப்பு	தரவு சேமித்தல்
	தமிழ்	UTAL110	பொதுத்தமிழ்	ஒப்படைப்பு	குறிப்பேடு
	தமிழ்	UTAL111	சிறப்புத்தமிழ்	ஒப்படைப்பு	நூல்பட்டியல் தயாரித்தல்
	முதன்மைப்பாடம் - I	UTAM111	இக்கால இலக்கியங்கள்	தரவு அட்டை	கவிதை/ சிறுகதை/ எழுத்துத்
	முதன்மைப்பாடம் - II	UTAM112	தமிழக வரலாறும் பண்பாடும்	வரைபடம் தயாரித்தல்	குறிப்பேடு
	சார்புப்பாடம் - I	UTAA113	நாட்டார் மரபுகள்	சொற்களஞ்சியம்	கண்காட்சி
	துறைசாரா விருப்பப்பாடம்- I	UTAE101	பயன்முறைத் தமிழ்	குறிப்பு அட்டை	பதிவு ஆக்கம்/பயிற்சி
	அடித்தளப்பாடம்	UTAF101	அடிப்படை தமிழ் இலக்கணம்	அட்டவணை	நூல்பட்டியல் தயாரித்தல்
II	தமிழ்	UTAL209	தமிழ் மொழி அமைப்பியல்	குறிப்பு அட்டை தயாரித்தல்	தரவு சேமித்தல்
	தமிழ்	UTAL210	பொதுத்தமிழ் - II	ஒப்படைப்பு	இலக்கணக் குறிப்பினைக் கண்டறிதல்
	தமிழ்	UTAL211	சிறப்புத்தமிழ் - II	ஒப்படைப்பு	கருத்தரங்கம்

முதன்மைப்பாடம் - III	UTAM207	அறநெறி இலக்கியம்	தரவு திரட்டுதல்	தரவு சேமித்தல்
முதன்மைப்பாடம் - IV	UTAM208	தமிழிலக்கிய வரலாறு	கால அட்டவணை	நூல் மதிப்பீடு
சார்புப்பாடம் - II	UTAA209	காலந்தோறும் தமிழ் மொழி வரலாறு	நிரல்படுத்துதல்	குறிப்பு அட்டை
துறைசாரா விருப்பப்பாடம்- II / III	UTAE204/ UTAE205	பேச்சுக்கலைத்திறன்/ அறிவியல் தமிழ்	பதிவு ஆக்கம்	பயிற்சி/அகராதி தயாரித்தல்

## தமிழாய்வுத்துறை முதுகலைத்தமிழ்

### முகவுரை

நான்கு பருவங்களுக்குரிய பாடத்திட்ட வடிவமைப்பு இடம்பெற்றுள்ளது. முதல் மற்றும் இரண்டாம் பருவத்திற்குரிய பாடத்திட்டம் மற்றும் அகமதிப்பீட்டுக் கூறுகள் இடம்பெற்றுள்ளன. இப்பாடத்திட்டமானது 2023 - 2026ஆம் கல்வியாண்டுகளில் பயிலும் மாணவியர்களுக்கு உரியது.

### பாடத்திட்ட அமைப்பு : முதுகலைத்தமிழ் (M.A)

#### பாடத்திட்டப் பயன்கள்

- PSO – 1 தமிழ் இலக்கியம் மற்றும் இலக்கண கொள்கைகளை அறிந்து கொள்வர்.
- PSO – 2 தமிழர் வரலாறு மற்றும் பண்பாட்டினை கோட்பாடுகள் அடிப்படையில் புரிந்து கொள்வர்.
- PSO – 3 இலக்கியம் வழி கண்டறிந்த வாழ்வியல் நெறிகளை சமுதாயத்தில் நடைமுறைப்படுத்தும் அல்லது பொருத்திப்பார்க்கும் திறனைப் பெறுவர்.
- PSO – 4 தமிழியல் கூறுகின்ற மெய்மைகளைக் காரண காரிய அடிப்படையில் பகுத்தாய்வர்.
- PSO – 5 தமிழ் இலக்கியம் முன்மொழிகின்ற செந்நெறிகளை மதிப்பிட்டு ஆராயும் திறன் பெறுவர்.
- PSO – 6 தமிழ் இலக்கிய வகைமைகளை கற்றுத்தெளிந்து புத்திலக்கியங்களைப் படைக்கும் திறன் மற்றும் பணி வாய்ப்பினை பெறும் திறன் பெறுவர்.

பருவம்	வகை	பாடக் குறியீடு	பாடத் தலைப்பு	வாரம் மணி நேரம்	தரம்
I	முதன்மைப்பாடம் - I	PTAM112	இக்கால இலக்கியம்	5	4
	முதன்மைப்பாடம் - II	PTAM113	அறஇலக்கியம்	5	4
	முதன்மைப்பாடம் - III	PTAM114	தொல்காப்பியம் - பொருளதிகாரம்	5	4
	சார்புப்பாடம் - I	PTAA101	தமிழ் அழகியல்	5	3
	சார்புப்பாடம்- II	PTAA102	செம்மொழித் தமிழ்	5	3

	துறைசாரா விருப்பப்பாடம் - I			3	2
	இணையப்பாடம்			2	2
<b>மொத்தம்</b>				<b>30</b>	<b>22</b>
II	முதன்மைப்பாடம்- IV	PTAM214	பக்தி இலக்கியம்	5	4
	முதன்மைப்பாடம் - V	PTAM215	காப்பிய இலக்கியம்	5	4
	முதன்மைப்பாடம் - VI	PTAM216	தொல்காப்பியம் பொருளதிகாரம்	5	4
	தொழில்சார் பாடம்	PTAM217	திரைப்படக்கலை	4	3
	சார்புப்பாடம் - III (துறை சார்ந்தது)	PTAO201	சுவடியியல்	4	3
	சார்புப்பாடம்- IV (மரபு சார்ந்தது)	PTAO202	நோக்கு நூல்கள்	4	3
	திறன்சார் பாடம்	PTAD201	பண்பாட்டு மானுடவியல்	3	2
	கல்வியிடைப் பயிற்சி				2
	கற்றல் சேவை திறம்				1
<b>மொத்தம்</b>				<b>30</b>	<b>26</b>
III	முதன்மைப்பாடம் - VII	PTAM311	சிறுநிலக்கியம்	5	4
	முதன்மைப்பாடம் - VIII	PTAM312	தொல்காப்பியம் எழுத்து	5	4
	முதன்மைப்பாடம் - IX	PTAM313	ஆராச்சி நெறிமுறைகள்	5	4
	தொழில்சார் பாடம்	PTAM314	விளம்பரவியல்	4	3
	சார்புப்பாடம்- V (துறை சார்ந்தது)	PTAO301	படைப்புத்திறன்	3	3
	சார்புப்பாடம்- VI (மரபு சார்ந்தது)	PTAO302	சிறார் இலக்கியம்	4	3
	துறையிடைப்பாடம்	PTAI301	மொழிபெயர்ப்பும் பயிற்சியும்	4	2
<b>மொத்தம்</b>				<b>30</b>	<b>23</b>
IV	முதன்மைப்பாடம் - X	PTAM412	சங்க இலக்கியம்	5	4
	முதன்மைப்பாடம் - XI	PTAM413	தொல்காப்பியம் சொல்லதிகாரம்	5	4
	முதன்மைப்பாடம் - XII	PTAM414	இணையத்தமிழ்	5	4
	சார்புப்பாடம் - VII (துறை சார்ந்தது)	PTAO401	நாடகவியல்	5	3
	ஆய்வு	PTAP402	ஆய்வேடு	6	4
	பணிச்சார் திறன் பாடம்	PTAC401	பணித்தேர்வுத் தமிழ் - I (NET / SLET) (அல்லது) பணித்தேர்வுத் தமிழ் - II (UPSC/ TNPSE) (அல்லது) சமகாலத் தமிழியல் ஆய்வுச் செல்நெறிகள்	4	2
	கல்வியிடைப்பயிற்சி				-/2
<b>மொத்தம்</b>				<b>30</b>	<b>21/23</b>
<b>கூட்டு எண்ணிக்கை</b>				<b>120</b>	<b>92/94</b>

**துறைச்சாரா விருப்பப்பாடம்**

(பிறகுதுறை மாணவியர்களுக்கு உரியது)

பருவம்	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	வாரம் மணி நேரம்	தரம்
					Min/ Max
I	துறைசாரா விருப்பப்பாடம் - I	PTAE103	சுற்றுலாவியல்	3	2

**இக்கால இலக்கியம்**  
**PTAM112**

பருவம் : முதல் பருவம்

தரம் : 04

பிரிவு : முதன்மைப்பாடம் - I

மணிநேரம்/வாரம் : 05

வகுப்பு : I MA தமிழ்

மொத்தமணிநேரம் : 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	இக்கால இலக்கிய தோற்றம் வளர்ச்சி படிநிலைகளை புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	இக்கால இலக்கிய வகைமைகளின் இலக்கணங்களை பொருத்திப்பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	இக்கால இலக்கியங்களின் வடிவம், பொருள் முதலியவற்றைப் பகுத்தாராய்ச் செய்தல்.
கற்றல் நோக்கம் 4	இக்கால இலக்கியங்களின் போக்குகளையும் தனித்தன்மைகளையும் விரிவாக மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	இக்கால இலக்கியங்களில் இடம்பெற்றுள்ள சமூக நன்னெறிகளைவாழ்வில் பின்பற்றுதல் மற்றும் நவீன படைப்புகளை படைக்கும் திறம் பெறச் செய்தல்.

**அலகு 1 கவிதைகள்**

**12 மணி நேரம்**

பாரதியார் - கனவு (சுயசரிதை) முழுமையும் - பாரதிதாசன் - சஞ்சீவி பர்வதத்தின் சாரல் (முழுமையும்)

**அலகு 2 தெரிவு செய்த பாடப்பகுதிகள்**

**15 மணி நேரம்**

ந. பிச்சமுர்த்தி (ந. பிச்சமுர்த்தி கவிதைகள்: காதல்), பிரமிள் (பிரமிள் தேர்ந்தெடுத்த கவிதைகள்: எல்லை, காவியம்), ஞானக்கூத்தன் (அன்று வேறு கிழமை: கீழ்வெண்மணி), நா.காமராசன் (காகிதப் பூக்கள், விலை மகளிர்), அப்துல் ரகுமான் (நேயர் விருப்பம்: மண்), மீரா (குக்கூ 1, 3, 14, 15, 16, 18), இன்குலாப் (ஒவ்வொரு புல்லையும் பெயர் சொல்லி அழைப்பேன்: ஒவ்வொரு புல்லையும், மிச்சமிருக்கும் ஓரிரு தளிர்கள்), ஈரோடு தமிழன்பன் (மாற்று மனிதம்: அம்மாவும் மல்லிகையும்), சிற்பி (கண்ணாடிச் சிறகுகள் ஒரு பறவை: மின் துளிகள் - 5), மு. மேத்தா (கண்ணீர்ப் பூக்கள் மரங்கள்), வைரமுத்து (இந்தப் பூக்கள் விற்பனைக்கல்ல)

**அலகு 3 சிறுகதைகள்**

**15 மணி நேரம்**

புதுமைப்பித்தன் - பொன்னகரம் - கு.ப.ரா - கனகாம்பரம் - அழகிரிசாமி - ராஜா வந்திருக்கிறார் - கி.ராஜநாராயணன் - கதவு - ஜெயகாந்தன் - அஹ்ரகாரத்துப் பூனை -



சுந்தரராமசாமி - பிரசாதம் - அசோகமித்திரன் - புலிக் கலைஞன் - பிரபஞ்சன் அப்பாவின் வேஷ்டி - அம்பை - அம்மா ஒரு கொலை செய்தாள் - புதினம் - இமையம் - கோவேறு கழுதைகள்.

**அலகு 4 கடிதம்**

**12 மணி நேரம்**

உ.வே.சாமிநாதையர் கடிதக் கருவூலம் (5 - கடிதங்கள் - தெரிவு செய்யப்பட்டவை)

நாடகம் - சந்திரஹரி - பம்மல் சம்பந்தனார்

**அலகு 5 தன் வரலாறு**

**11 மணி நேரம்**

அக்னிச் சிறகுகள் - ஏ.பி.ஜெ. அப்துல் கலாம்.

**பாட நூல்கள்**

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- தமிழ் ஒளி. (1966). கண்ணப்பன் கிளிகள். புகழ் புத்தகாலயம். சென்னை.
- சுகுமாரன்.(2016).பிரமிள் தேர்ந்தெடுத்த கவிதைகள். காலச்சுவடு நாகர்கோவில்.

**பார்வை நூல்கள்**

- பஞ்சாங்கம், க.(2021). மகாகவி பாரதியாரின் தடைசெய்யப்பட்ட கனவு. அன்னம். தஞ்சாவூர்.
- வல்லிக்கண்ணன்.(1977). புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும். பாரி நிலையம். சென்னை.
- பாலா. (1983). புதுக்கவிதை ஒரு புதுப்பார்வை. அகரம். தஞ்சாவூர்.

வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	இக்கால இலக்கிய தோற்றம் வளர்ச்சி படிநிலைகளை புரிந்து கொள்வர்.	K1, K2
கற்றல் பயன் 2	இக்கால இலக்கிய வகைமைகளின் இலக்கணங்களை பொருத்திப்பார்க்கும் திறன்பெறுவர்.	K3
கற்றல் பயன் 3	இக்கால இலக்கியங்களின் வடிவம், பொருள் முதலியவற்றைப் பகுத்தாராயும் திறன்பெறுவர்.	K4
கற்றல் பயன் 4	இக்கால இலக்கியங்களின் போக்குகளையும் தனித்தன்மைகளையும் விரிவாக மதிப்பிட்டு அறியும் திறன்பெறுவர்.	K5
கற்றல் பயன் 5	இக்கால இலக்கியங்களில் இடம்பெற்றுள்ள சமூக நன்னெறிகளைவாழ்வில் பின்பற்றுதல் மற்றும் நவீன படைப்புகளை படைக்கும் திறம் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	2
CO 2	3	3	3	2	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 70% இடைத்தர இணைநிலை: 30 % குறைதர இணைநிலை:-%

## அற இலக்கியம்

PTAM113

பருவம் : முதல் பருவம்

தரம் : 04

பிரிவு : முதன்மைப்பாடம் - II

மணிநேரம்/வாரம் : 05

வகுப்பு : I MA தமிழ்

மொத்தமணிநேரம் : 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	அறஇலக்கியங்களின் தோற்றம் வளர்ச்சி படிநிலைகளை புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	அறஇலக்கிய யாப்பு முறைகளை பொருத்திப்பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	அற இலக்கியங்களின் வடிவம், பொருள் ஆகியவற்றைப் பகுத்தாராயச் செய்தல்.
கற்றல் நோக்கம் 4	அறஇலக்கியங்களின் தனித்தன்மைகளை ஆழமாக மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	அற இலக்கியங்களில் இடம் பெற்றுள்ள வாழ்வியல் விழுமியங்களை சமூகத்தில் கடைப்பிடிக்கும் திறன் பெறச் செய்தல்.

அலகு 1 திருக்குறள் 1 - பொருட்பால் 20 அதிகாரங்கள்

12 மணி நேரம்

அறக் கருத்துகள் இடம்பெறும் சங்க இலக்கியங்கள் தொடங்கி வேதநாயகரின் நீதிநூல், பெண்மதிமாலை, பாரதியாரின் புதிய ஆத்திச்சூடி வரையிலான அற இலக்கியங்கள் குறித்துப் பொதுநிலையில் அறிமுகம் செய்தல் - பதினெண் கீழ்க்கணக்கின் அற நூல்களைச் சிறப்பு நிலையில் கற்பித்தல். பாடப்பகுதி: திருக்குறள் 1 பொருட்பால் (20 அதிகாரங்கள்) கல்வி (40ஆவது அதிகாரம்) - கேள்வி (42ஆவது அதிகாரம்) - அறிவுடைமை (43ஆவது அதிகாரம்) - பெரியாரைத் துணைக்கோடல் (45ஆவது அதிகாரம்) - சிற்றினஞ் சேரமை (46ஆவது அதிகாரம்) - வலியறிதல் (48ஆவது அதிகாரம்) - காலமறிதல் (49ஆவது அதிகாரம்) - தெரிந்து வினையாடல் (52ஆவது அதிகாரம்) - சுற்றந்தழால் (53 ஆவது அதிகாரம்) - கண்ணோட்டம் (58 ஆவது அதிகாரம்) - ஊக்கமுடைமை (60ஆவது அதிகாரம்) - மடியின்மை (61ஆவது அதிகாரம்) - ஆள்வினையுடைமை (62ஆவது அதிகாரம்) - சொல்வன்மை (65ஆவது அதிகாரம்) - வினைத்தாய்மை (66 ஆவது அதிகாரம்) - வினைசெயல்வகை (68ஆவது அதிகாரம்) - குறிப்பறிதல் (71ஆவது அதிகாரம்) -

அவையறிதல் (72ஆவது அதிகாரம்) - நாடு (74ஆவது அதிகாரம்) - பொருள்செயல்வகை ( 76ஆவது அதிகாரம்).

**அலகு 2 திருக்குறள் 2 – பொருட்பால் (20 அதிகாரங்கள்)**

**15 மணி நேரம்**

நட்பு (79 ஆவது அதிகாரம்) – நட்பாராய்தல் (80 ஆவது அதிகாரம்) – கூடாநட்பு (83 ஆவது அதிகாரம்) – பேதைமை (84 ஆவது அதிகாரம்) – பகைத்திறம் தெரிதல் (88 ஆவது அதிகாரம்) – பெரியாரைப் பிழையாமை (90 ஆவது அதிகாரம்) – கள்ளுண்ணாமை (93 ஆவது அதிகாரம்) – சூது (94 ஆவது அதிகாரம்) - மருந்து (95 ஆவது அதிகாரம்) – மானம் (97 ஆவது அதிகாரம்) – பெருமை (98 ஆவது அதிகாரம்) – சான்றாண்மை (99 ஆவது அதிகாரம்) – பண்புடைமை (100 ஆவது அதிகாரம்) – நன்றியில் செல்வம் (101 ஆவது அதிகாரம்) – நாணுடைமை (102 ஆவது அதிகாரம்) – குடிசெயல்வகை (103 ஆவது அதிகாரம்) – உழவு (104 ஆவது அதிகாரம்) – நல்குரவு (105ஆவது அதிகாரம்) – இரவு (106 ஆவது அதிகாரம்) – இரவச்சம் (107 ஆவது அதிகாரம்).

**அலகு 3 நாலடியார் 1**

**12 மணி நேரம்**

பொருட்பால் – அரசியல் (முதல் 8 அதிகாரங்கள்)

**அலகு 4 நாலடியார் 2**

**11 மணி நேரம்**

பொருட்பால் – அரசியல் (அடுத்த 8 அதிகாரங்கள்)

**அலகு 5 பிற கீழ்க்கணக்கு அற நூல்கள்**

**15 மணி நேரம்**

பழமொழி நானூறு 5 பாடல்கள் - பா.எண். 8 (எந்நெறி யானும்...), பா.எண். 52 (பாரதத் துள்ளும்...), பா.எண். 55 (ஆற்றவும் கற்றார்...), பா.எண். 68 (எனைப்பலவே யாயினும்...), பா.எண். 149 (நெறியால் உணராது...) – நான்மணிக்கடிகை 5 பாடல்கள் - பா.எண். 23 (மலைப்பினும் வாரணம்...), பா.எண். 28 (குழித்துழி நிற்பது...), பா.எண். 57 (என்று முளவாகு...), பா.எண். 69 (பதிநன்று பல்லார்...), பா.எண். 97 (மாசுபடினு மணிதன்...), திரிகடுகம் 5 பாடல்கள் - பா.எண்: 15 (பொய்வழங்கி வாழும்...), பா.எண்: 23 (தானம் கொடுக்கும்...), பா.எண்: 68 (இல்லார்க்கு ஒன்று ஈயும்..), பா.எண்: 75 (வள்ளன்மை பூண்டான்கண்...), பா.எண்: 82 (சான்றாருள் சான்றான்...) - சிறுபஞ்சமூலம் 5 பாடல்கள் - பா.எண்: 2 (கற்புடைய பெண்அமிர்து...), பா.எண்: 20 (பூவாது காய்க்கும்...), பா.எண்: 26 (அறம் நட்பான்...), பா.எண்:61 (நீரறம் நன்று...), பா.எண்: 64 (குளம் தொட்டுக் காவு பதித்து...) - ஆசாரக்கோவை 5 பாடல்கள் - பா.எண்: 2 (பிறப்பு நெடுவாழ்க்கை...), பா.எண்: 16 (அரசன் உபாத்தியாயன்...), பா.எண்: 76 (விரைந்துரையார்...), பா.எண்: 88 (உதவிப் பயன் உரையார்...), பா.எண்: 96 (நந்தெறும்பு தூக்கணம்...) - ஏலாதி 5 பாடல்கள் - பா.எண்: 4 (இடர்தீர்த்தல்...), பா.எண்: 21 (இளமை கழியும்...), பா.எண்: 33 (பொய்யுரையான்...), .பா.எண்: 39 (சாவது எளிது...), பா.எண்: 46 (கனியான் கள்ளுண்ணான்...) - இன்னா நாற்பது 5 பாடல்கள் - பா.எண்:7 (ஆற்றல் இலாதான்...), பா.எண்: 10 (பொருள் உணர்வார்...), பா.எண்:18 (உரனுடையான் உள்ளம்...), பா.எண்: 36 (பொருளிலான் வேளாண்மை...), பா.எண்:38 (பிறன்மனையாள்...) - இனியவை நாற்பது 5 பாடல்கள் - பா.எண்: 3 (ஏவது மாறா...), பா.எண்: 5 (கொல்லாமை முன்னினிது...), பா.எண்: 9 (தங்கண் அமர்புடையா...), பா.எண்: 16 (கற்றார்முன் கல்வி ), பா.எண் 30 (குன்றிப் பயன்தூக்கி) – முதுமொழிக்காஞ்சி - சிறந்தபத்து.

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வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	அறஇலக்கியங்களின் தோற்றம் வளர்ச்சி படிநிலைகளை புரிந்து கொள்வர்.	K1, K2
கற்றல் பயன் 2	அறஇலக்கிய யாப்பு முறைகளை பொருத்திப்பார்க்கும் திறன்பெறுவர்.	K3
கற்றல் பயன் 3	அற இலக்கியங்களின் வடிவம், பொருள் ஆகியவற்றைப் பகுத்தாராயும் திறன்பெறுவர்.	K4
கற்றல் பயன் 4	அறஇலக்கியங்களின் தனித்தன்மைகளை ஆழமாக மதிப்பிட்டு அறியும் திறன் பெறுவர்.	K5
கற்றல் பயன் 5	அற இலக்கியங்களில் இடம் பெற்றுள்ள வாழ்வியல் விழுமியங்களை சமூகத்தில் கடைப்பிடிக்கும் திறன் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	2
CO 2	3	3	3	2	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 70% இடைத்தர இணைநிலை: 30 % குறைதர இணைநிலை:-%

**தொல்காப்பியம் பொருளதிகாரம் – I**  
**PTAM114**

பருவம்	: முதல் பருவம்	தரம்	: 04
பிரிவு	: முதன்மைப்பாடம் - III	மணிநேரம்/வாரம்	: 05
வகுப்பு	: I MA தமிழ்	மொத்தமணிநேரம்	: 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	தொல்காப்பிய இலக்கண நெறிகளை புரிந்துக் கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	இலக்கணத்தினை இலக்கியத்துடன் பொருத்திப் பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	இலக்கணத்தின் படிநிலைகளை பகுத்தாராயச் செய்தல்.
கற்றல் நோக்கம் 4	இலக்கணக்கொள்கைகளை அக்கால சமூகம் சார்ந்து மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	இலக்கணத்தின் தனித்துவத்தினையும் இலக்கியம் படைக்கும் உத்தி முறைகளையும் அறிந்து வாழ்க்கையையிலும், படைப்புகளிலும் இலக்கணத்தினை பயன்படுத்தும் திறனை பெற செய்தல்.

அலகு 1	அகத்திணை இயல்	12 மணி நேரம்
அலகு 2	புறத்திணை இயல்	15 மணி நேரம்
அலகு 3	களவியல்	12 மணி நேரம்
அலகு 4	கற்பியல்	11 மணி நேரம்
அலகு 5	பொருளியல்	15 மணி நேரம்

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வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	தொல்காப்பிய இலக்கண நெறிகளை புரிந்துக் கொள்வர்.	K1, K2
கற்றல் பயன் 2	இலக்கணத்தினை இலக்கியத்துடன் பொருத்திப் பார்க்கும் திறன் பெறுவர்.	K3
கற்றல் பயன் 3	இலக்கணத்தின் படிநிலைகளை பகுத்தாராய்ந்து பார்க்கும் திறன் பெறுவர்.	K4
கற்றல் பயன் 4	இலக்கணக்கொள்கைகளை அக்கால சமூகம் சார்ந்து மதிப்பிடும் திறன் பெறுவர்.	K5
கற்றல் பயன் 5	இலக்கணத்தின் தனித்துவத்தினையும் இலக்கியம் படைக்கும் உத்தி முறைகளையும் அறிந்து வாழ்க்கையையிலும், படைப்புகளிலும் இலக்கணத்தினை பயன்படுத்தும் திறனை பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	1	1	1	1
CO 2	3	3	3	1	2	2
CO 3	3	3	3	2	2	2
CO 4	3	3	3	3	2	2
CO 5	3	3	3	3	3	2

உயர்தர இணைநிலை: 66% இடைத்தர இணைநிலை: 17% குறைதர இணைநிலை: 17%

### தமிழ் அழகியல்

PTAA101

பருவம் : முதல் பருவம்

தரம் : 03

பிரிவு : சார்புப்பாடம் - I

மணிநேரம்/வாரம் : 05

வகுப்பு : I MA தமிழ்

மொத்தமணிநேரம் : 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	தமிழ் அழகியலின் தோற்றம் வளர்ச்சி படிநிலைகளை புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	இலக்கியங்களில் இடம்பெற்றுள்ள முருகியல் திறனை வாழ்வில் பொருத்திப்பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	தமிழ் இலக்கியங்களை அழகியல் கண்ணோட்டத்துடன் பகுத்தாராய்ச் செய்தல்.
கற்றல் நோக்கம் 4	சிற்பம், ஓவியம் போன்ற நுண்கலைகளை இலக்கியத்தோடு

	தொடர்புபடுத்தி மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	படைப்புகளில் அழகியலின் இன்றியாமையாத நிலையினை உணர்ந்து முருகியல் துவத்துடன் படைப்புகளை படைக்கும் திறன் பெறச் செய்தல்.

### அலகு 1

12 மணி நேரம்

அழகியல் என்றால் என்ன? - அழகியல் வரையறைகளும் விளக்கங்களும் - இலக்கியத்தில் கலைசார்ந்த கூறுகளையும் - கலையில் இலக்கியம் சார்ந்த கூறுகளையும் விளக்கிக் கூறுதல் - அழகியலின் தனித்தன்மைகள்

### அலகு 2

15 மணி நேரம்

புலனுணர்வு இயங்குதிறன் அடிப்படையில் அழகியலைக் கற்பித்து விளக்குதல் - பாணர் புலவர் என்ற பண்பாட்டு மரபு அடிப்படையில் ஒருங்கிணைப்புக் கோட்பாட்டை அறிமுகம் செய்தல்.

### அலகு 3

11 மணி நேரம்

சமகாலத்தியப் பனுவல்கள் - சங்க இலக்கியத்திலும் தொல்காப்பியத்திலும் மொழிசார் கூறுகளைக் கண்டறிவது - அதனைக் கவிதையியல் கோட்பாட்டு வழி ஆராய அறிமுகம் செய்தல்.

### அலகு 4

15 மணி நேரம்

அகம் புறம் பாகுபாடு தனித்தன்மைகள் - கூற்றுநிலை - உள்ளுறை - இறைச்சி அழகியல் நோக்கில் கற்பது.

### அலகு 5

12 மணி நேரம்

கலை இலக்கியத்தோடு கலை - அழகியல் - கோடு - வண்ணம் - வெளி - கால அடையாளம் - குறியீடு - தமிழ் அழகியல் அடிப்படையில் நமக்கென்று ஒரு அழகியலைக் கட்டமைக்கும் முறைகள்

#### பாடநூல்

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#### பார்வை நூல்கள்

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வரிசை எண்	கற்றல் பயன்கள்	Bloom's
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		Level
கற்றல் பயன் 1	தமிழ் அழகியலின் தோற்றம் வளர்ச்சி படிநிலைகளை புரிந்து கொள்வர்.	K1, K2
கற்றல் பயன் 2	இலக்கியங்களில் இடம்பெற்றுள்ள முருகியல் திறனை வாழ்வில் பொருத்திப்பார்க்கும் திறன்பெறுவர்.	K3
கற்றல் பயன் 3	தமிழ் இலக்கியங்களை அழகியல் கண்ணோட்டத்துடன் பகுத்தாராயும் திறன் பெறுவர்.	K4
கற்றல் பயன் 4	சிற்பம், ஓவியம் போன்ற நுண்கலைகளை இலக்கியத்தோடு தொடர்புபடுத்தி மதிப்பிட்டு அறியும் திறன் பெறுவர்.	K5
கற்றல் பயன் 5	படைப்புகளில் அழகியலின் இன்றியாமையாத நிலையினை உணர்ந்து முருகியல் துவத்துடன் படைப்புகளை படைக்கும் திறன் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	1	1	1
CO 2	3	3	3	2	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 70% இடைத்தர இணைநிலை: 20 % குறைதர இணைநிலை:10%

## செம்மொழித் தமிழ்

PTAA102

பருவம் : முதல் பருவம்

தரம் : 03

பிரிவு : சார்புப்பாடம் - II

மணிநேரம்/வாரம் : 05

வகுப்பு : I MA தமிழ்

மொத்த மணிநேரம் : 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	உலக மொழிகளில் செம்மொழித் தமிழின் தொன்மையினை புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	பிற செம்மொழிகளின் பண்புகளுடன் தமிழ் மொழியினை பொருத்திப்பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	செம்மொழித் தமிழினைப் பிற செம்மொழிகளின் தனித்தன்மைகளுடன் பகுத்தாராயச் செய்தல்.
கற்றல் நோக்கம் 4	செம்மொழித்தமிழ் இலக்கியங்களின் பொருணமைகளை மதிப்பிடச் செய்தல்.



கற்றல் நோக்கம் 5	செம்மொழித்தமிழின் இலக்கிய வளத்தினை முழுமையாக உணர்ந்து சமூகத்திற்கு உணர்த்தும் திறன் பெறச் செய்தல்.
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### அலகு 1 செம்மொழி அறிமுகம்

12 மணி நேரம்

உலகச் செம்மொழிகள் - செம்மொழிகளின் தகுதிகள் - அறிஞர்களின் கருத்துக்கள் - செம்மொழி இலக்கணம் - உலகச் செம்மொழி வரலாறு - கிரேக்க மொழி - இலத்தீன் மொழி - செம்மொழியின் சிறப்பியல்புகள்- இலக்கண இலக்கிய வளர்ச்சி - அறிவியல் தமிழ் - இணையப் பல்கலைக்கழகம் - தமிழ்ச் செம்மொழி வரலாறு.

### அலகு 2 தமிழ் செம்மொழி அறிஞர்களின் பங்களிப்புகள்

15 மணி நேரம்

மொழி அறிஞர்களின் அங்கீகாரம் - பரிதிமாற்கலைஞரின் முழுக்கம் - சங்கங்களின் தீர்மானங்கள் - இந்திய அமைச்சரின் அங்கீகாரம் - நாடாளுமன்ற உறுப்பினர்களின் முயற்சி - தமிழக அரசின் செம்மொழி அறிக்கை - மாநாட்டில் டாக்டர் கலைஞர் பேருரை - பல்கலைக்கழகங்களின் பெரும்பங்கு - உண்ணா நோன்புப் போராட்டம் - கையெழுத்து இயக்கம் - போராட்ட வெற்றி - பயன்கள் - மத்தியத் தமிழாய்வு நிறுவனம்.

### அலகு 3 இந்தியச் செம்மொழிகள்

12 மணி நேரம்

இந்தியச் செம்மொழிகள் - தமிழ் - சமஸ்கிருத மொழி - பாரசீகமொழி - பிராகிருத மொழி - பாலி மொழி - அராபி மொழி

### அலகு 4 தமிழ் மொழியின் தன்மை

11 மணி நேரம்

தமிழ் மொழியின் தன்மை - தமிழின் சிறப்புகள் - தனித்தன்மைகள்

### அலகு 5 தமிழ் இலக்கியங்கள்

15 மணி நேரம்

செம்மொழித் தமிழ் இலக்கியங்கள் - செவ்விலக்கியங்கள் - இந்தியச் செவ்விலக்கியங்கள் - தொல்காப்பியம் - இறையனார் களவியல் - சங்க இலக்கியங்கள் - இரட்டைக் காப்பியங்கள் - பதினெண்கீழ்க்கணக்கு நூல்கள் - முத்தொள்ளாயிரம்.

#### பாடநூல்கள்

- மீனாட்சி சுந்தரம், கா. (2012). தமிழின் செம்மொழித்தன்மையும் உலக இலக்கியங்களும். நியூசெஞ்சுரி புக் ஹவுஸ். சென்னை.

#### பார்வை நூல்கள்

- சுயம்பு, பெ. (2012). செம்மொழித் தமிழ் சிறப்பும் வரலாறும். பாவை பப்ளிகேஷன்ஸ். சென்னை.

- மணவை முஸ்தபா. (2010). செம்மொழி உள்ளும் புறமும். சீதை பதிப்பகம். சென்னை.
- ஜான் சாமுவேல். ஜி. (2007). செம்மொழிகளின் வரிசையில் தமிழ். ஹோம்லாண்ட் பதிப்பகம். சென்னை.

வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	உலக மொழிகளில் செம்மொழித் தமிழின் தொன்மையினை புரிந்து கொள்வர்.	K1, K2
கற்றல் பயன் 2	பிற செம்மொழிகளின் பண்புகளுடன் தமிழ் மொழியினை பொருத்திப்பார்க்கும் திறன் பெறுவர்.	K3
கற்றல் பயன் 3	செம்மொழித் தமிழினைப் பிற செம்மொழிகளின் தனித்தன்மைகளுடன் பகுத்தாராயும் திறன் பெறுவர்.	K4
கற்றல் பயன் 4	செம்மொழித்தமிழ் இலக்கியங்களின் பொருணமைகளை மதிப்பிட்டு அறியும் திறன் பெறுவர்.	K5
கற்றல் பயன் 5	செம்மொழித்தமிழின் இலக்கிய வளத்தினை முழுமையாக உணர்ந்து சமூகத்திற்கு உணர்த்தும் திறன் பெறுவர்	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	1	1	1	1
CO 2	3	3	3	1	1	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 73% இடைத்தர இணைநிலை: 10% குறைதர இணைநிலை: 17%

### சுற்றுலாவியல்

#### PTAE103

பருவம் : முதல் பருவம்

தரம் : 02

பிரிவு : துறைசாரா விருப்பப்பாடம்- I

மணிநேரம்/வாரம் : 03

வகுப்பு : I MA தமிழ்

மொத்த மணிநேரம் : 39

கற்றலின் நோக்கம் வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	தமிழகத்தில் உள்ள சுற்றுலாத் தலங்களையும் வரலாற்றுச் சிறப்புமிக்க இடங்களின் தனித்துவத்தையும் புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	சுற்றுலாத்தலங்களின் கலாச்சாரம், பண்பாடு ஆகியவற்றை பொருத்திப் பார்க்கச் செய்தல்.

கற்றல் நோக்கம் 3	தமிழகத்தில் உள்ள சுற்றுலாத் தலங்களை உலக கூற்றுலாத் தலங்களுடன் பகுத்தாராய்ச் செய்தல்.
கற்றல் நோக்கம் 4	தமிழகச் சுற்றுலா வளர்ச்சி கழகம், சுற்றுலாவின் பயன்பாடு குறித்து மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	சுற்றுலாத்துறையில் உள்ள வேலைவாய்ப்புகளை அறிந்து அதனை பெறும் திறம் பெறச் செய்தல்.

**அலகு 1 சுற்றுலாவியல் அறிமுகம்**

**9 மணி நேரம்**

சுற்றுலாப் பொருள் - வகைகள் -அமைப்பாளர்கள் - வழிகாட்டிகள் - பயணிகள்

**அலகு 2 பண்டைக்காலச் சுற்றுலாப் பயணிகள்**

**9 மணி நேரம்**

யுவான் சுவாங் - பாகியான் - மார்க்கோ போலோ - அனுபவக் குறிப்புகள்

**அலகு 3 சுற்றுலாப் பயன்கள்**

**7 மணி நேரம்**

அறிவு வளர்ச்சி - பொருளாதார வளர்ச்சி - வேலைவாய்ப்பு - ஊக்கம் - அனுபவம் - கலாச்சாரப் புரிதல் நிலை

**அலகு 4 தமிழகத்துள் புகழ்மிக்க தலங்கள்**

**7 மணி நேரம்**

மாமல்லபுரம் - சிற்பக்கலை - தஞ்சைப் பெரிய கோவில் - கட்டடக்கலை - சித்தன்னவாசல் - ஓவியக்கலை.

**அலகு 5 தமிழகத்தில் சுற்றுலா வளர்ச்சிக்கான வாய்ப்புகள்**

**7 மணி நேரம்**

தமிழகச் சுற்றுலாத் துறையின் செயல்பாடும் - வளர்ச்சிப் பயன்களும் - நோக்கங்கள் - எதிர்கால அணுகுமுறைகள்

**பாடநூல்கள்**

- தங்கமணி, ம.இரா. (2000). சுற்றுலாவியல். கொங்கு பதிப்பகம். கரூர்.
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**பார்வை நூல்கள்**

- கிருட்டினசாமி, வெ. (2012). சுற்றுலா வளர்ச்சி. மணிவாசகர் பதிப்பகம். சென்னை.

வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	தமிழகத்தில் உள்ள சுற்றுலாத் தலங்களையும் வரலாற்றுச் சிறப்புமிக்க இடங்களின் தனித்துவத்தையும் புரிந்து கொள்வர்.	K1, K2
கற்றல் பயன் 2	சுற்றுலாத்தலங்களின் கலாச்சாரம், பண்பாடு ஆகியவற்றை பொருத்திப் பார்ப்பர்.	K3
கற்றல் பயன் 3	தமிழகத்தில் உள்ள சுற்றுலாத் தலங்களை உலக கூற்றுலாத் தலங்களுடன் பகுத்தாராயும் திறன் பெறுவர்.	K4

கற்றல் பயன் 4	தமிழகச் சுற்றுலா வளர்ச்சி கழகம், சுற்றுலாவின் பயன்பாடு குறித்து மதிப்பிடுவர்.	K5
கற்றல் பயன் 5	சுற்றுலாத்துறையில் உள்ள வேலைவாய்ப்புகளை அறிந்து அதனை பெறும் திறம் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	2
CO 2	3	3	3	2	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 70% இடைத்தர இணைநிலை: 30 % குறைதர இணைநிலை:-%

### பக்தி இலக்கியம்

PTAM214

பருவம் : இரண்டாம் பருவம்  
பிரிவு : முதன்மைப்பாடம் - IV  
வகுப்பு : I MA தமிழ்

தரம் : 04  
மணிநேரம்/வாரம் : 05  
மொத்தமணிநேரம் : 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	பக்தி இலக்கியத்தின் தோற்றம் வளர்ச்சி படிநிலைகளை புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	பக்தி இலக்கியத்தின் தனித்தன்மைகளை பொருத்திப்பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	சைவ, வைணவ, சித்தர் இலக்கியங்களின் கருத்துநலன்களையும் யாப்புச் சிறப்பையும் பகுத்தாராய்ச் செய்தல்.
கற்றல் நோக்கம் 4	பக்தி இலக்கியப் போக்கினை உணர்ந்து மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	பக்தி இலக்கிய மரபினை அடியொற்றி சமூகத்தில் இறையாண்மையினை உருவாக்கும் திறனைப் பெறச் செய்தல்.

அலகு 1 காரைக்கால் அம்மையார், திருநாவுக்கரசர், திருஞானசம்பந்தர் 12 மணி நேரம்  
காரைக்கால் அம்மையார் - பதினொன்றாம் திருமுறை - திருவிரட்டை மணிமாலை - 20 பாடல்கள்) - திருநாவுக்கரசர் - திரு அங்கமாலை - தலையே நீ வணங்காய் என்று தொடங்கும் பதிகம் - திருஞானசம்பந்தர் - முதல் திருமுறை - திருவையாற்றுப் பதிகம் - "புலனைந்தும் பொறிகலங்கி நெறிமயங்கி" பாடல் முதல் "அன்னமலி பொழில்புடைசூழ் ஐயாற்றெம்" பாடல் வரை.

**அலகு 2 சுந்தரர், மாணிக்கவாசகர்****15 மணி நேரம்**

சுந்தரர் - ஏழாம் திருமுறை (திருவெண்ணெய் நல்லூர்ப் பதிகம், திருக்கோளிப் பதிகம்) மாணிக்கவாசகர் - திருவம்மாளை (20 பாடல்கள்), திருக்கோத்தும்பி (10 பாடல்கள்).

**அலகு 3 பெரியாழ்வார், நம்மாழ்வார், ஆண்டாள்****15 மணி நேரம்**

பெரியாழ்வார் - 3ஆம் திருமொழி - முதற்பத்து - மாணிக்கங் கட்டி முதல் 10 பாடல்கள் (44 - 53) நம்மாழ்வார் - 3ஆம் திருமொழி விற்பெரு விழவும் முதல் 10 பாடல்கள் (1068 - 1077) ஆண்டாள் - நாச்சியார் திருமொழி - 20 பாடல்கள் - தையொரு திங்களும் முதல் 20 பாடல்கள்.

**அலகு 4 அருணகிரி நாதர், தாயுமானவர், இராமலிங்க அடிகள்****12 மணி நேரம்**

அருணகிரி நாதர் - திருப்புகழ் (5 பாடல்கள்) - கைத்தல நிறைகனி - முத்தைத்தரு - கலகலெனச்சில - கழைமுத்து மாலை - பத்தியால் யானுனைப் - கந்தரலங்காரம் - தேன் என்று பாகு என்று - தண்டாயுதமும் - சேல்பட்டழிந்தது - விழிக்குத் துணைதிரு - மண்கமழுந்தி - தாயுமானவர் -15 பாடல்கள் - இராமலிங்க அடிகள் - பிள்ளைப் பெரு விண்ணப்பம்.

**அலகு 5 குணங்குடி மஸ்தான் சாகிபு, வேதநாயக சாஸ்திரியார்****11 மணி நேரம்**

குணங்குடி மஸ்தான் சாகிபு பாடல்கள் - ஆனந்தக்களிப்பு (244 - 253) (கொடிகட்டிக் கொண்டெழு, என்னிலை தன்னை அறிந்தே) - வேதநாயக சாத்திரியார் பாடல்கள் - 4(பாடல் தொடக்கம்: யார் அவர் ஆரோ? யார் இவர் ஆரோ? - எண்: 1539, பாடல் தொடக்கம்: கும்பிடுகிறேன் நான் கும்பிடுகிறேன் - எண்: 1759, பாடல் தொடக்கம்: நெஞ்சே நீ கலங்காதே - எண்: 1774, வேதநாயகர் - சர்வ சமய சமரச கீர்த்தனைகள் (1. ஐயனே உன் அழகைக் காண (43), 2.ஏனின்னம் ரமதமையா (47), 3. அபயம்நீ யருளுவாய் (74), 4. உள்ளையெனக்குக்காட்டையா (84), 5. மனமேநீ ஈசனாமத்தை (140).

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வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	பக்தி இலக்கியத்தின் தோற்றம் வளர்ச்சி படிநிலைகளை புரிந்து கொள்வர்.	K1, K2
கற்றல் பயன் 2	பக்தி இலக்கியத்தின் தனித்தன்மைகளை பொருத்திப்	K3

	பார்க்கும் திறன் பெறுவர்.	
கற்றல் பயன் 3	சைவ, வைணவ, சித்தர் இலக்கியங்களின் கருத்துநலன்களையும் யாப்புச் சிறப்பையும் பகுத்தாராய்ந்து அறியும் திறன் பெறுவர்.	K4
கற்றல் பயன் 4	பக்தி இலக்கியப் போக்கினை உணர்ந்து மதிப்பீடு செய்யும் திறன் பெறுவர்.	K5
கற்றல் பயன் 5	பக்தி இலக்கிய மரபினை அடியொற்றி சமூகத்தில் இறையாண்மையினை உருவாக்கும் திறனைப் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	1
CO 2	3	3	3	2	2	1
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 69% இடைத்தர இணைநிலை: 24 % குறைதர இணைநிலை: 7%

### காப்பிய இலக்கியம்

PTAM215

பருவம் : இரண்டாம் பருவம்  
பிரிவு : முதன்மைப்பாடம்- V  
வகுப்பு : I MA தமிழ்

தரம் : 04  
மணிநேரம்/வாரம் : 05  
மொத்தமணிநேரம் : 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	தமிழில் காப்பிய இலக்கியத்தின் தோற்றம் வளர்ச்சி நிலைகளை புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	தமிழில் தோன்றிய காப்பியங்களின் தனித்தன்மைகளை பொருத்திப்பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	காப்பிய இலக்கியங்களின் நோக்கு நிலை மற்றும் போக்கு நிலைகள் குறித்து பகுத்தாராய்ச் செய்தல்.
கற்றல் நோக்கம் 4	காப்பியங்களின் அமைப்பு, யாப்பு, பொருண்மை, இலக்கிய நலன்கள் முதலியவற்றைத் திறனாய்வுப் பார்வையோடு மதிப்பிடச் செய்தல்.
கற்றலின் நோக்கம் 5	காப்பிய இலக்கிய அற நெறிகளை சமூகத்தில் பின்பற்றும் திறன்களைப் பெறச் செய்தல்.

- அலகு 1 சிலப்பதிகாரம்** **12 மணி நேரம்**  
புகார் காண்டம் (முழுமையும்)
- அலகு 2 மணிமேகலை, சீவகசிந்தாமணி** **15 மணி நேரம்**  
மணிமேகலை - பாத்திர மாபு கூறிய காதை - சீவகசிந்தாமணி - விமலையார் இலம்பகம்.
- அலகு 3 கம்பராமாயணம், பெரியபுராணம்** **15 மணி நேரம்**  
கம்பராமாயணம் - திருவடி தொழுத படலம் (27 81) 66 பாடல்கள் - பெரியபுராணம் -  
கண்ணப்ப நாயனார் புராணம், காரைக்கால் அம்மையார் புராணம்.
- அலகு 4 இரட்சண்ய யாத்திரிகம்** **12 மணி நேரம்**  
குமார பருவம் - இரட்சணிய சரிதப் பாடலம் என்னும் உள்ளம் கொண்ட வரலாறு (50  
பாடல்கள் முடிய) (சிலுவைப்பாடுகள்).
- அலகு 5 சீறாப்புராணம்** **11 மணி நேரம்**  
விலாதத்துக்காண்டம் - நதி கடந்த படலம்
- பாடநூல்கள்**
- உ.வே.சா. (ப.ஆ). (1969). இளங்கோவடிகள் இயற்றிய சிலப்பதிகாரம் (மூலமும் அரும்பத உரையும்) அடியார்க்கு நல்லார் உரையுடன். டாக்டர் உ.வே.சா. நூல் நிலையம். சென்னை.
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வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
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கற்றல் பயன் 1	தமிழில் காப்பிய இலக்கியத்தின் தோற்றம் வளர்ச்சி நிலைகளை புரிந்து கொள்வர்.	K1, K2
கற்றல் பயன் 2	தமிழில் தோன்றிய காப்பியங்களின் தனித்தன்மைகளை பொருத்திப்பார்க்கும் திறன் பெறுவர்.	K3
கற்றல் பயன் 3	காப்பிய இலக்கியங்களின் நோக்கு நிலை மற்றும் போக்கு நிலைகள் குறித்து பகுத்தாராயும் திறன் பெறுவர்.	K4
கற்றல் பயன் 4	காப்பியங்களின் அமைப்பு, யாப்பு, பொருண்மை, இலக்கிய நலன்கள் முதலியவற்றைத் திறனாய்வுப் பார்வையோடு மதிப்பீடு செய்து அறிவர்.	K5
கற்றல் பயன் 5	காப்பிய இலக்கிய அற நெறிகளை சமூகத்தில் பின்பற்றும் திறன்களைப் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	2
CO 2	3	3	3	2	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 70% இடைத்தர இணைநிலை: 30 % குறைதர இணைநிலை:-%

## தொல்காப்பியம் – பொருளதிகாரம் II

PTAM216

பருவம் : இரண்டாம் பருவம்  
பிரிவு : முதன்மைப்பாடம் - VI  
வகுப்பு : I MA தமிழ்

தரம் : 04  
மணிநேரம்/வாரம் : 05  
மொத்தமணிநேரம் : 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	தொல்காப்பிய இலக்கண நெறிகளை புரிந்துக் கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	இலக்கணத்தினை இலக்கியத்துடன் பொருத்திப் பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	இலக்கணத்தின் படிநிலைகளை பகுத்தாராயச் செய்தல்.
கற்றல் நோக்கம் 4	இலக்கணக்கொள்கைகளை அக்கால சமூகம் சார்ந்து மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	இலக்கணத்தின் தனித்துவத்தினையும் இலக்கியம் படைக்கும் உத்தி முறைகளையும் அறிந்து வாழ்க்கையையிலும், படைப்புகளிலும் இலக்கணத்தினை பயன்படுத்தும் திறனை பெறச் செய்தல்.



அலகு 1 மெய்ப்பாட்டியல்	12 மணிநேரம்
அலகு 2 உவமையியல்	15 மணிநேரம்
அலகு 3 செய்யுளியியல்	15 மணிநேரம்
அலகு 4 செய்யுளியல்	12 மணிநேரம்
அலகு 5 மரபியல்	11 மணிநேரம்

#### பாடநூல்கள்

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வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	தொல்காப்பிய இலக்கண நெறிகளை புரிந்துக் கொள்வர்.	K1,K2
கற்றல் பயன் 2	இலக்கணத்தினை இலக்கியத்துடன் பொருத்திப் பார்க்கும் திறன் பெறுவர்.	K3
கற்றல் பயன் 3	இலக்கணத்தின் படிநிலைகளை பகுத்தாராய்ந்து பார்க்கும் திறன் பெறுவர்.	K4
கற்றல் பயன் 4	இலக்கணக்கொள்கைகளை அக்கால சமூகம் சார்ந்து மதிப்பிடும் திறன் பெறுவர்.	K5
கற்றல் பயன் 5	இலக்கணத்தின் தனித்துவத்தினையும் இலக்கியம் படைக்கும் உத்தி முறைகளையும் அறிந்து வாழ்க்கையையிலும், படைப்புகளிலும் இலக்கணத்தினை பயன்படுத்தும் திறனை பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	1	1	1
CO 2	3	3	3	1	1	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 73% இடைத்தர இணைநிலை: 10% குறைதர இணைநிலை:17%

## திரைப்படக்கலை

### PTAM217

பருவம் : இரண்டாம் பருவம்  
பிரிவு : தொழில்சார் பாடம்  
வகுப்பு : I MA தமிழ்

தரம் : 03  
மணிநேரம்/வாரம் : 04  
மொத்தமணிநேரம் : 52

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	திரைப்படம் தோன்றிய வரலாற்றுப் பின்னணியை அறிந்து புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	பல்வேறு காலக்கட்டங்களில் எடுக்கப்பட்ட திரைப்படங்களை திரைப்படத்தின் வளர்ச்சி படிநிலைகளில் பொருத்திப்பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	சமுதாயத்தில் திரைப்படத்தால் ஏற்பட்ட தாக்கங்களைப் பகுத்தாராயச் செய்தல்.
கற்றல் நோக்கம் 4	பொழுதுபோக்குப் படங்கள், கருத்துப்படங்கள், விளம்பரப் படங்கள் ஆகியவற்றை மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	திரைப்படத் துறையிலும் ஊடகத்துறையிலும் வேலை வாய்ப்பினைப் பெறும் திறத்தினை பெறச் செய்தல்.

அலகு 1 திரைப்பட வரலாறு

12 மணி நேரம்

திரைப்படம் தோன்றிய வரலாறு – வகைகள் – சமுதாயத்தில் ஏற்பட்ட தாக்கங்கள்

அலகு 2 திரைப்பட வகைகள்

10 மணி நேரம்

திரைப்பட வகைகள் - பொழுதுபோக்கு படங்கள் - கருத்துப்படங்கள்- விளம்பரப்படங்கள்- செய்திப்படங்கள்- குறும்படங்கள்- தொலைக்காட்சிப் படங்கள் - படங்கள் - கார்ட்டூன்கள்

அலகு 3 சமூகமும் திரைப்படமும்

10 மணி நேரம்

திரைப்படங்களில் தேசிய உணர்வு - திரைப்படங்களால் ஏற்படும் சமுதாயத் தாக்கங்கள்- தமிழ்ச் சினிமாவும் அரசியல் இயக்கங்களும் (காங்கிரஸ், திமுக, அதிமுக, கம்னியூஸ்ட்)

**அலகு 4 திரைப்படத்தின் தனித்துவம்**

**10 மணி நேரம்**

திரைப்படத்தணிக்கை - திரைப்படங்களில் பாடல்களின் பங்கு - தமிழ் சினிமாவின் மூவேந்தர்கள் (சிவாஜி, எம்ஜிஆர், ஜெமினிகணேசன்) ஒப்பனைகலை

**அலகு 5 திரைப்பட கலைஞர்கள்**

**10 மணி நேரம்**

இயக்குனர்கள் - ஏ.வி.மெய்யப்பச் செட்டியார் - ஏ.பி. நாகராஜன்- பாலசந்தர் - பாலா - சங்கர் - பாரதிராஜா - இசையமைப்பாளர்கள் - எம்.எஸ்.விஸ்வநாதன் - இளையராஜா - ஏ.ஆர். ரகுமான் - பாடலாசிரியர்கள்- உடுமலை நாராயணகவி - கண்ணதாசன் - பட்டுக்கோட்டை - வாலி - வைரமுத்து - நா. முத்துக்குமார் - தாமரை

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வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	திரைப்படம் தோன்றிய வரலாற்றுப் பின்னணியை அறிந்து புரிந்து கொள்வர்	K1, K2
கற்றல் பயன் 2	பல்வேறு காலக்கட்டங்களில் எடுக்கப்பட்ட திரைப்படங்களை பொருத்திப்பார்த்து திரைப்படத்தின் வளர்ச்சி படிநிலைகளை அறிந்துக் கொள்வர்.	K3
கற்றல் பயன் 3	சமுதாயத்தில் திரைப்படத்தால் ஏற்பட்ட தாக்கங்களைப் பகுத்தாராய்வர்.	K4
கற்றல் பயன் 4	பொழுதுபோக்குப் படங்கள், கருத்துப்படங்கள், விளம்பரப் படங்கள் ஆகியவற்றை மதிப்பிடுவர்.	K5
கற்றல் பயன் 5	திரைப்படத் துறையிலும் ஊடகத்துறையிலும் வேலை வாய்ப்பினைப் பெறும் திறத்தினை பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	2
CO 2	3	3	3	2	2	2

CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 70% இடைத்தர இணைநிலை: 30 % குறைதர இணைநிலை:-%

### சுவடியியல்

PTAO201

பருவம் : இரண்டாம் பருவம்

தரம் : 03

பிரிவு : சார்புப்பாடம் - III

மணிநேரம்/வாரம் : 04

வகுப்பு : I MA தமிழ்

மொத்தமணிநேரம் : 52

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	சுவடிகளின் வரலாறு, வகைமைகளை புரிந்து கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	துறைசார் சுவடிகளை இனம் கண்டு பொருத்திப்பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	அரிய சுவடிகளைச் சேகரித்து பகுத்தாராய்ச் செய்தல்.
கற்றல் நோக்கம் 4	சுவடி பாதுகாக்கும் முறைகள், பதிப்பிக்கும் முறைகளை மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	சுவடிப் பாதுகாப்பில் நவீன முறைகளைப் பயன்படுத்தி சுவடிகளை படிக்கும் மற்றும் பாதுகாக்கும் திறனை பெறச் செய்தல்.

அலகு 1 சுவடியின் தோற்றம் வளர்ச்சி

12 மணி நேரம்

வரலாறும் வகையும் - சுவடிகளின் வரலாறு, விளக்கம், சுவடிகளின் வகைகள், பனைப் ஓலைகள், சுவடித் தயாரிப்பு, எழுத்தாணிகள், சுவடி எழுத்துமுறை, சுவடித் தொகுப்பு வரலாறு, விளக்கம், இலக்கியத் தொகுப்புகள்.

அலகு 2 சுவடி பதிப்பு முறைகள் - I

10 மணி நேரம்

சுவடி சேகரித்தல், பதிப்பித்தல், சுவடி சேகரித்தல் - அட்டவணைகள், சுவடி சேகரிப்புப் பணிகள், சுவடிப் பதிவு. விளக்கம், சுவடி விளக்க அட்டவணை - ஆவணங்கள் கடிதங்கள் பதிவு செய்தல் சுவடிகளில் எழுதப்பட்டுள்ள முறைகள் - குறியீடுகள் கூட்டெழுத்துக்கள் - தமிழ் எண்கள்.

அலகு 3 சுவடி பதிப்பு முறைகள் - II

10 மணி நேரம்

சுவடி அமைப்பும் குறியீட்டு முறை, சுவடிப் பதிப்பித்தல் மூலப்பாடத் திறனாய்வு பாட வேறுபாடு சுவடிப்பதிப்பில் யாப்பின் தேவை - சுவடிகளை நூலாக்குதல்.

அலகு 4 சுவடியை பாதுகாக்கும் முறைகள் - I

10 மணி நேரம்

சுவடிக் காப்பகங்கள் சுவடிக் காப்பகங்கள் சுவடிக் காப்பில் கல்வி நிறுவனங்கள் அரசு நிறுவனங்கள், பொது நிறுவனங்கள் சமய நிறுவனங்கள் தனியார் தொகுப்புகளின் பங்களிப்பு, சுவடிப்பதிப்பு நிறுவனங்களில் பல்கலைக்கழகங்களின் பங்களிப்பு.

#### அலகு 5 சுவடியை பாதுகாக்கும் முறைகள் - II

10 மணி நேரம்

சுவடிகளைப் பாதுகாத்தல் - காரணங்கள் - காத்தலின் பண்டைய முறைகள் - இயற்கை முறை - பழுது நீக்கல் முறைகள் - நவீனப் பாதுகாப்பு முறைகள் - சுவடி செயலிகளின் பயன்பாடு.

#### பாட நூல்கள்

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- சுப்பிரமணியன். (1991). சுவடியியல். உலகத் தமிழாராய்ச்சி நிறுவனம். சென்னை.
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வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	சுவடிகளின் வரலாறு, வகைமைகளை புரிந்து கொள்வர்.	K1, K2
கற்றல் பயன் 2	துறைசார் சுவடிகளை இனம் கண்டு பொருத்திப்பார்க்கும் திறன் பெறுவர்.	K3
கற்றல் பயன் 3	அரிய சுவடிகளைச் சேகரித்து பகுத்தாராய்ந்து பார்க்கும் திறன் பெறுவர்.	K4
கற்றல் பயன் 4	சுவடி பாதுகாக்கும் முறைகள், பதிப்பிக்கும் முறைகளை மதிப்பீட்டு அறியும் திறன் பெறுவர்.	K5
கற்றல் பயன் 5	சுவடிப் பாதுகாப்பில் நவீன முறைகளைப் பயன்படுத்தி சுவடிகளை படிக்கும் மற்றும் பாதுகாக்கும் திறனை பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	1	1	1
CO 2	3	3	3	1	1	1
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 70% இடைத்தர இணைநிலை: 20 % குறைதர இணைநிலை:10%

## நோக்கு நூல்கள்

PTAO202

<b>பருவம்</b> : இரண்டாம் பருவம்	<b>தரம்</b> : 03
<b>பிரிவு</b> : சார்புப்பாடம் – IV	<b>மணிநேரம்/வாரம்</b> : 05
<b>வகுப்பு</b> : I MA தமிழ்	<b>மொத்தமணிநேரம்</b> : 65

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	நோக்கு நூல்களின் தனித்தன்மைகள் குறித்த புரிந்துக் கொள்ளச் செய்தல்.
கற்றல் நோக்கம் 2	நோக்கு நூல்களின் வகைமைகளை பொருத்திப்பார்க்கச் செய்தல்.
கற்றல் நோக்கம் 3	இலக்கண இலக்கியப் பொருளைத் தெளிவாக உணர்த்தும் நோக்கு நூல்களின் தனித்தன்மைகளை பகுத்தாராய்ச் செய்தல்.
கற்றல் நோக்கம் 4	கலைக்களஞ்சியங்களைப் பற்றிய முழுமையான தெளிவைப் பெற்று, மதிப்பிடச் செய்தல்.
கற்றல் நோக்கம் 5	நோக்கு நூல்களின் வாயிலாக புதிய சொற்களை கண்டறிதல், பொருள்களை கண்டறிதல், கலைக்களஞ்சியங்களை உருவக்கும் திறன் பெறச் செய்தல்.

**அலகு 1 நோக்கு நூல் வகைகள்**

**12 மணி நேரம்**

பிறவகை நூல்களும் நோக்கு நூல்களும் - நோக்கு நூல்களின் பண்பும் பயனும் - நோக்கு நூல் வகைகள் - அகராதி - கலைக்களஞ்சியம் - நூலடைவு - பிறவகைகள்.

**அலகு 2 அகராதிகள்**

**15 மணி நேரம்**

அகராதிகள் - மின் அகராதிகள் - தமிழில் குறிக்கத்தக்க அச்ச அகராதிகள் - இணைய அகராதிகள் - இணைய அகராதிகளின் வகைகள்.

**அலகு 3 கலைக்களஞ்சியங்கள்**

**15 மணி நேரம்**

அகராதியும் கலைக்களஞ்சியங்களும் ஒற்றுமை வேற்றுமைகள் - கலைக்களஞ்சிய வகைகள் - தமிழில் இன்றியமையாத கலைக்களஞ்சியங்கள் - கலைக்களஞ்சியங்களின் அமைப்பு முறைகள்.

**அலகு 4 நூல் அடைவுகள்**

**12 மணி நேரம்**

நூல் அடைவு வகைகள் - தமிழ் நூல் விவர அட்டவணை - தமிழில் நூல் அடைவுகள் - வகைகள்.

**அலகு 5 கையேடுகள்**

**11 மணி நேரம்**

பிறவகை நோக்கு நூல்கள் - யார் ? எவர்? - ஆண்டு நூல்கள் - உலகப் படங்கள் - நடைக்கையேடுகள் - வழக்குக் கையேடுகள்.

**பாடநூல்கள்**

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வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
கற்றல் பயன் 1	நோக்கு நூல்களின் தனித்தன்மைகள் குறித்த புரிதல் திறன் பெறுவர்.	K1, K2
கற்றல் பயன் 2	நோக்கு நூல்களின் வகைமைகளை பொருத்திப்பார்க்கும் திறன் பெறுவர்.	K3
கற்றல் பயன் 3	இலக்கண இலக்கியப் பொருளைத் தெளிவாக உணர்த்தும் நோக்கு நூல்களின் தனித்தன்மைகளை பகுத்தாராய்ந்து அறிவர்.	K4
கற்றல் பயன் 4	கலைக்களஞ்சியங்களைப் பற்றிய முழுமையான தெளிவைப் பெற்று, மதிப்பிட்டு அறியும் திறன் பெறுவர்.	K5
கற்றல் பயன் 5	நோக்கு நூல்களின் வாயிலாக புதிய சொற்களை கண்டறிதல், பொருள்களை கண்டறிதல், கலைக்களஞ்சியங்களை உருவாக்கும் திறன் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	1	1	1
CO 2	3	3	3	1	1	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

**உயர்தர இணைநிலை: 73% இடைத்தர இணைநிலை: 10 % குறைதர இணைநிலை:17%**

**பண்பாட்டு மானுடவியல்  
PTAD201**

பருவம் : இரண்டாம் பருவம் தரம் : 02  
பிரிவு : திறன்சார் பாடம் மணிநேரம்/வாரம் : 03  
வகுப்பு : I MA தமிழ் மொத்தமணிநேரம் : 39

வரிசை எண்	கற்றல் நோக்கங்கள்
கற்றல் நோக்கம் 1	பண்பாட்டு மானுடவியல் குறித்து புரியச்செய்தல்
கற்றல் நோக்கம் 2	மானுடவியல் வகைகளை அறிந்து பொருத்திப்பார்க்கச்செய்தல்

கற்றல் நோக்கம் 3	மானுடவியல் ஏற்படுத்தும் சமூக மாற்றத்தை பகுத்தராயச்செய்தல்
கற்றல் நோக்கம் 4	மானுடவியலின் தனித்தன்மைகளை மதிப்பீடச்செய்தல்
கற்றல் நோக்கம் 5	மானுடவியலின் பாங்கினை உணர்ந்து சமூக கட்டமைப்பு நிலையினை அறியும் திறன் பெறச்செய்தல்.

#### அலகு 1 மானிடவியலின் தோற்றம்

8 மணி நேரம்

மானிடவியலின் தோற்றம் அரிஸ்டாட்டிலின் கொள்கை மானிடவியலின் உலகம் தழுவிய வளர்ச்சி.

#### அலகு 2 மானிடவியல் பிரிவுகள்

8 மணி நேரம்

மானிடவியல் பிரிகளின் அறிமுகம் - உடல்சார்மானிடவியல் பண்பாட்டு மானிடவியல் தொல்லியல் - மொழியியல்.

#### அலகு 3 சாதி முறைமைகள்

8 மணி நேரம்

சாதிமுறை - சாதி முறையின் வகைகள் - இந்தியச் சாதிமுறை - சாதிக் கொள்கைகள் - மரபுக் கொள்கை - தொழிற்கொள்கை - சமயக் கொள்கை - அரசியற் கொள்கை - படிமலர்ச்சிக் கொள்கை - குடி ஊழிய முறை.

#### அலகு 4 சமயமும் சடங்கு முறைகளும்

8 மணி நேரம்

சமய நம்பிக்கைகளும் வாழ்வியலும் - சமயத்தின் தோற்றம் ஆவியுலகக் கோட்பாடு - உயிரியம் - குலக்குறியியம் - முன்னோர் வழிபாடு-புனிதத் தன்மையை ஏற்படுத்தியுள்ளமை - சடங்கு முறைகள் - மக்கள் வாழ்வில் சமயத்தின் பங்கு.

#### அலகு 5 உணவும் பங்கீடும்

7 மணி நேரம்

உணவு ஈட்டுதலும் பரிமாற்ற முன்றகளும் - பொருளியல் முறைகள் - பரிமாற்றமும் பகிர்ந்து கொள்ளுதலும் பொதுப்படியான பரிமாற்றம் சமச்சீர் பரிமாற்றம் - குலப் பரிமாற்றம் - குடிஊழிய முறை - விருந்துப் பரிமாற்றம் -மௌனப் பரிமாற்றம் அன்பளிப்புப் பரிமாற்றம் மறுபங்கீட்டு முறை.

#### பாட நூல்

பக்தவச்சல பாரதி, (2019). பண்பாட்டு மானிடவியல். அடையாளம் பதிப்பகம். சென்னை.

#### பார்வை நூல்

- பக்தவச்சல பாரதி. (2005). மானிடவியல் கோட்பாடுகள். வல்லினம் வெளியீடு. சென்னை
- பக்தவச்சல பாரதி. வைஷ்ணவி,க. (2016). திராவிட மானிடவியல். காலச்சுவடு பதிப்பகம். நாகர்கோவில்.

வரிசை எண்	கற்றல் பயன்கள்	Bloom's Level
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கற்றல் பயன் 1	மானுடவியலின் தோற்றம் மற்றும் படிநிலைகள் குறித்து புரிந்து கொள்வர்	K1, K2
கற்றல் பயன் 2	மானுடவியல் ஏற்படுத்தும் சமூக மாற்றத்தை பொருத்திப்பார்க்கும் திறன் பெறுவர்.	K3
கற்றல் பயன் 3	மானுடவியல் தனித்தன்மைகளை பகுத்தாய்ந்து பார்க்கும் திறன் பெறுவர்.	K4
கற்றல் பயன் 4	மானுடவியலின் பாங்கினை சமூகத்தில் உணர்ந்து மதிப்பிடும் திறன் பெறுவர்.	K5
கற்றல் பயன் 5	பண்பாட்டு மானுடவியல் சார்ந்த கருத்தாக்கங்களை நன்கு புரிந்து சமூகத்தில் ஏடுத்துரைக்கும் மற்றும் கட்டமைக்கும் திறன் பெறுவர்.	K6

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	1	1	1
CO 2	3	3	3	1	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

உயர்தர இணைநிலை: 69% இடைத்தர இணைநிலை: 17% குறைதர இணைநிலை:14%

### அகமதிப்பீட்டிற்கான III ஆம் மற்றும் IV ஆம் உட்கூறுகள்

#### முதுகலைத்தமிழ்

பருவம்	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	III உட்கூறுகள்	IV உட்கூறுகள்
I	முதன்மைப்பாடம் - I	PTAM112	இக்கால இலக்கியம்	கருத்தரங்கம்	கவிதை /சிறுகதை எழுதுதல்
	முதன்மைப்பாடம் - II	PTAM113	அறஇலக்கியம்	படைப்பு நூல் மதிப்புரை	நூல் பட்டியல் தயாரித்தல்
	முதன்மைப்பாடம் - III	PTAM114	தொல்காப்பியம் பொருளதிகாரம்	கருத்தரங்கம்	இலக்கண ஒப்பீடு
	சார்புப்பாடம் - I	PTAA101	தமிழ் அழகியல்	கருத்தரங்கம்	தரவு சேமித்தல்
	சார்புப்பாடம்- II	PTAA102	செம்மொழித் தமிழ்	கருத்தரங்கம்	நூல் மதிப்பீடு
	துறைசாரா விருப்பப்பாடம் - I	PTAA103	சுற்றுலாவியல்	தல வரலாறு	கள ஆய்வு
II	முதன்மைப்பாடம்- IV	PTAM214	பக்தி இலக்கியம்	கருத்தரங்கம்	அட்டவணை
	முதன்மைப்பாடம் - V	PTAM215	காப்பிய இலக்கியம்	கருத்தரங்கம்	அட்டவணை
	முதன்மைப்பாடம் - VI	PTAM216	தொல்காப்பியம் பொருளதிகாரம்	கருத்தரங்கம்	இலக்கண ஒப்பீடு
	தொழில்சார் பாடம்	PTAM217	திரைப்படக்கலை	காட்சி அமைப்பு	திரைக்கதை உருவாக்கம்
	சார்புப்பாடம் - III	PTAA201	சுவடியியல்	தல வரலாறு	கள ஆய்வு
	சார்புப்பாடம்- IV	PTAA202	நோக்கு நூல்கள்	பல்நோக்கு நூல்களைப் பொருத்திப்பார் த்தல்	நூல் பட்டியல் தயாரித்தல்
	திறன்சார் பாடம்	PTAD201	பண்பாட்டு மானுடவியல்	கருத்தரங்கம்	தரவுச் சேமித்தல்

## DEPARTMENT OF ENGLISH

### PREAMBLE

Programme Profile and Syllabi of Courses from I to II semesters along with Evaluation  
**UG** : Components III and IV (With effect from 2023-2026 Batch Onwards)

### PROGRAMME PROFILE B.A (ENGLISH)

#### PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO No.	Upon completion of the programme, the students will be able to
PSO-1	Understand literary texts and theoretical framework of literature.
PSO-2	Apply the theoretical and communication knowledge of different theories in English Learning and Teaching.
PSO-3	Compare the cultural context of different nations through literature.
PSO-4	Acquire employability skills to excel in literary and media professions.
PSO-5	Critique the socio-political and environmental inequalities.
PSO-6	Develop a research skill through project and present their independent ideas effectively.

### PROGRAMME PROFILE – B.A ENGLISH

Semester	Part	Category	Course Code	Course Title	Contact Hour/Week	Credit Min/Max
I	I	Language: Tamil/ Hindi/ French	UTAL110/ UHIL102 UFRL102	General Tamil-I/ Hindi-I/ French-I	5	3
	II	Language: English	UENL111	General English -I	5	3
	III	Core Courses - I	UENM111	Introduction to Literature	5	4
	III	Core Courses - II	UENM112	Indian Writing in English	5	4
	III	Elective Course 1 (Generic / Discipline Specific)	UENA105	Social History of England	4	3
	IV	Foundation Course FC	UENF101	Foundation Course	2	2
	IV	Skill Enhancement Course – SEC-1 (Non Major Elective)			2	2
	IV	Ability Enhancement Compulsory Course (AECC 1) -Soft Skill	USKS105	Soft Skill-1- Communicative English	2	2
<b>Total</b>					<b>30</b>	<b>23</b>
II	I	Language : Tamil/ Hindi/ French	UTAL210/ UHIL202/	General Tamil II/ Hindi-II/ French-II	5	3

			UFRL202			
	II	LE: Language	UENL211	General English-II	5	3
	III	Core Courses - III	UENM211	British Literature-I	5	4
		Core Courses - IV	UENM212	American Literature -I	5	4
		Elective Course –II ( <b>Generic</b> / Discipline Specific)	UENA205	History of English Literature	4	3
		Internship / Industrial Training	UINS201	Internship / Industrial Training		-/2
	IV	Skill Enhancement Course – SEC-3 ( <b>Discipline</b> / Subject Specific)	UEND201	The Art of Radio Jockey	2	2
	IV	Skill Enhancement Course – SEC-1 (Non Major Elective)			2	2
	IV	Ability Enhancement Compulsory Course (AECC 2) Soft Skill-2	USKS205	Soft Skill-2	2	2
	V	Extension Activity/ Physical Education/ NCC				1/2
	VI	Value added courses (Outside class hours)				-/2
<b>Total</b>					<b>30</b>	<b>24/29</b>
III	I	Language: Tamil/ Hindi/ French	UTAL310/ UHIL302 UFRL302	General Tamil-III/ Hindi-III/ French-III	5	3
	II	Language: English	UENL311	General English -III	5	3
	III	Core Course - V	UENM311	British Literature-II	4	4
	III	Core Course – VI	UENM312	Introduction to Comparative Literature	4	4
	III	Elective Course 3 ( <b>Generic</b> / Discipline Specific) -EC3	UENA305	Literary Genres and Forms	4	3
	IV	Skill Enhancement Course -SEC-5 ( <b>Discipline Specific</b> / Generic)	UEND301	English for Communication	2	2
	IV	Skill Enhancement Course -SEC-4 (Entrepreneurial Based)	UENU302	Content Writing for Marketing & Branding	2	1
	IV	Ability Enhancement Compulsory Course (AECC 3) Soft Skill-3	USKS301	Soft Skill-3	2	2
	IV	Value Education	UGEV301	Value Education	2	2
<b>Total</b>					<b>30</b>	<b>24</b>
IV	I	Language: Tamil/ Hindi/French	UTAL410/ UHIL402/ UFRL402	General Tamil IV/ Hindi-II/ French-II	5	3

	II	Language: English	UENL411	General English-IV	5	3
	III	Core Course - VII	UENM411	American Literature-II	5	4
		Core Course - VIII	UENM412	World Literature in Translation	5	4
		Elective Course - EC4 ( <b>Generic</b> )	UENA405	Myth and Literature	4	3
		Internship / Industrial Training	UINS401	Internship / Industrial Training	-	-/2
	IV	Skill Enhancement Course – SEC-6 ( <b>Discipline Specific</b> )	UEND401	English for Business	2	2
	IV	Skill Enhancement Course- <b>Online course</b>	UONL401	Online Course *	2	2
	IV	Ability Enhancement Compulsory Course (AECC 4) Soft Skill-4	USKS401	Soft Skill-4	2	2
	V	Extension Activity/ Physical Education/NCC			-	-/2
	VI	Value added course (Outside class hours)			-	-/2
<b>Total</b>					<b>30</b>	<b>23/29</b>
V	III	Core Course - IX	UENM511	Aspects of Language and Linguistics	5	4
	III	Core Course - X	UENM512	Women’s Writing in English	5	4
	III	Core Course - XI	UENM513	Introduction to Literary Theory and Criticism	5	4
	III	Elective Course – EC5 ( <b>Generic / Discipline Specific</b> )	UENO505	Media Communication and Publication	5	3
	III	Elective Course – EC6 ( <b>Generic / Discipline Specific</b> )	UENO506	English for Competitive Examinations	4	3
	III	Core Course - XII	UENP502	Project with Viva voce	4	4
	IV	Environmental Studies		Environmental studies	2	2
<b>Total</b>					<b>30</b>	<b>24</b>
VI	III	Core Course - XIII	UENM611	Literary Criticism	5	4
		Core Course - XIV	UENM612	Indian Literature in Translation	5	4
		Core Course - XV	UENM613	Travel Writing	5	4
		Elective Course – EC7 ( <b>Generic / Discipline Specific</b> )	UENO605	Digital Literature	6	4
		Elective Course – EC8 ( <b>Generic / Discipline Specific</b> )	UENA606	English at Workplace	5	3
		Comprehensive Viva-voce	UENM619		-	1
		Internship / Industrial Training (semester vacation 30 Hrs)	UINS601	Internship / Industrial Training	-	-/2
	IV	Professional Competency Skill	UENC601	Professional Competency	4	2

		Enhancement Course SEC8				
	V	Extension Activity/ Physical Education/NCC			-	-/2
	VI	Value add course			-	-
				<b>Total</b>	<b>30</b>	<b>22/26</b>
				<b>OVERALL TOTAL</b>	<b>180</b>	<b>140/155</b>

### NON MAJOR ELECTIVES

Semester	Category	Course Code	Course Title	Contact Hrs/week	Credit
I	Skill Enhancement Course (Non Major Elective)	UENE105	Film Studies	2	2
II	Skill Enhancement Course- SEC-2 (Non Major Elective)	UENE206	Public Speaking	2	2

### EXTRA CREDIT EARNING PROVISION

Semester	Category	Course Code	Course Title	Contact Hrs /week	Credit
II	Core	UENI201	Summer Internship	-	1
IV	Core	UENI 401	Summer Internship	-	1
V	Self-Study	UENS501	Practice of Translation (Self Study)	26	1
VI	Core	UENP601	Mini-Project	26	1

### GENERAL ENGLISH –I

#### UENL111

**Semester : I**  
**Category : Language: English**  
**Class &Major: I B.A. English**

**Credits : 3**  
**Hours/Week : 5**  
**Total Hours : 65**

#### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Understand the written text and use of skimming and scanning skills
CO-2	Acquire the linguistic competence necessarily required in various life situations
CO-3	Apply creative thinking skills on literary texts.
CO-4	Develop correct reading habits, extensively and intensively.
CO-5	Create their own literary texts.

#### UNIT I Poetry

Subramania Bharati  
 Langston Hughes

: A Patch of Land  
 : I too Sing America

**13 Hours**

Ralph Waldo Emerson : A Nation's Strength  
 Chinua Achebe : Love Cycle  
 Kamala Das : My Grandmother's House

**UNIT II Prose** **13 Hours**

Francis Bacon : Of Studies  
 Harish Bhat : JRD  
 David Sedaris : Us and Them, from (Dress Your Family in Corduroy and Denim)  
 Jerome K Jerome : Uncle Podger Hangs a Picture

**UNIT III Short Stories** **13 Hours**

Bhabani Bhattacharya : The Faltering Pendulum  
 Indira Goswami : The Journey  
 Sudha Murthy : How I Taught my Grandmother Read  
 R.K. Laxman : The Gold Frame

**UNIT IV Language Competency** **13 Hours**

Vocabulary - Synonyms, Antonyms, Word Formation Appropriate use of Articles and Parts of Speech, Error correction, Tenses, Degrees of Comparison.

**UNIT V English for Workplace** **13 Hours**

Self - introduction, Greetings, Introducing to others.  
 Listening for General and Specific Information.  
 Listening and Giving to Instructions / Directions, Group Discussion.

**Text Books**

- Bhattacharya, Bhabani, (1968). *Steel Hawk and other Stories*, Sahitya Akademi, New Delhi.
- Murthy, Sudha, (2004). *How I taught my Grandmother to Read and other Stories*, Penguin Books, India.

**Reference Books**

- Kumar, Vijay, K Durga Bhavani, YL Srinivas. *English in use - A textbook for College Students* (English, Paperback).
- Swan, Michael *Practical English Usage*, 4th Edition.

**E-Resources**

- The Sparrow by Paul Laurence Dunbar <https://poets.org/poem/sparrow-0>
- A Nation's Strength by Emerson <https://poets.org/poem/nations-strength>

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Recall the use of four language skills i.e. Reading, Listening, Speaking and Writing	K1
CO-2	Understand the total content and underlying meaning in the Context.	K2
CO-3	Classify the habit of reading for pleasure and for information	K2

<b>CO-4</b>	Organize the material other than the prescribed text	<b>K3</b>
<b>CO-5</b>	Analyze the linguistic competence that enables them to create literary texts.	<b>K4</b>

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	2	2	2	3	1	2
CO-2	2	3	3	2	2	3
CO-3	3	3	3	2	2	2
CO-4	3	3	3	2	2	3
CO-5	3	3	3	3	3	3

**High Correlation : 57% Moderate correlation: 40% Low Correlation : 3**

**INTRODUCTION TO LITERATURE  
UENM111**

**Semester : I**  
**Category : Core I**  
**Class & Major: I BA English**

**Credits : 4**  
**Hours /Week : 5**  
**Total Hours : 65**

**COURSE OBJECTIVES**

CO.NO	To enable the students
<b>CO-1</b>	Understand the different forms of literature.
<b>CO-2</b>	Apply the background knowledge of literature to understand the lifestyles.
<b>CO-3</b>	Develop Critical thinking over literary texts
<b>CO-4</b>	Examine the various themes and methodologies present in literature.
<b>CO-5</b>	Create the ability to critically analyze the text.

**UNIT- I**

**13 Hours.**

Introduction: Poetry-Different forms of poetry: Sonnet, Ode, Elegy, and Lyric Ballad. Prose- Short Story, Novella, Novel. Drama - Comedy, Tragedy, Tragi-Comedy.

**UNIT- II**

**13 Hours.**

Michael Drayton : The Parting. (Poem)  
William Shakespeare : Sonnet18, Sonnet116. (Poem)  
William Wordsworth : The Solitary Reaper (Poem)  
John Keats : Ode to Nightingale. (Poem)  
Thomas Gray :Elegy Written in a Country  
Churchyard.(Poem) : Mending Wall (Poem)  
Robert Frost

**UNIT- III**

**12 Hours.**

J.M. Barrie : The Admirable Crichton. (Play)  
Lady Gregory : The Rising of the Moon. (Play)

**UNIT- IV**

**12Hours.**

Manohar Malgonkar : Spy in Amber. (Fiction)  
Don Quixote : Tilting at the Windmills. (Fiction) Katherine

Mansfield : Bliss and other Stories (Short Story)

**UNIT- V Fiction**

**15 Hours.**

- Saki : Open Window (Short Story)  
 Emmy Laybourne : Sweet (Fiction)  
 Jerome K. Jerome : Packing (excerpt from: Three Men in a Boat) (Fiction)

**Text Books:**

- Drayton, Michael, (2016).*The Parting*, X. J. Kennedy, Pearson.
- Jerome k Jerome 2014,*The packing* Original from, the University of Wisconsin : Madison; Digitized, Nov 8, 2012.

**Reference Books:**

- Gray Thomas 1910,'*Elegy Written in a Country* Kodokunachinshi". ... Books and Bibliography: Essays in Commemoration of Don McKenzie, Chicago
- Mansfield, Katherine1962...*Bliss and Other Stories*. London. Penguin Books,Harmondsworth, Davin, D.M. Ed.

**e-Resources:**

- Asiatic: IITUM Journal of English Language & Literature
- <https://www.goodreads.com/book/show/20408795:spy:in:amber>

**COURSE OUTCOMES**

CO.NO	On completion of the course the Students will be able to	Bloom's Level
CO-1	Remember the basic elements of poetry, meter, rhyme and theme.	K1
CO-2	Understand the elements of fiction, narrative structure, character analysis and comparison between different literary texts.	K2
CO-3	Interpret the dramatic plot, play structure, monologues, dialogue and scene setting.	K2
CO-4	Identify the various themes and methodologies present in literature.	K3
CO-5	Analyze the plot, characterization, themes and techniques of literature.	K4

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	1	0	2
CO-2	3	3	3	1	1	3
CO-3	1	2	3	1	1	3
CO-4	3	2	3	2	2	3
CO-5	3	2	3	3	3	3

**High Correlation : 57%**                      **Moderate correlation: 20%**  
**Low Correlation : 20%**                      **No Correlation : 3%**



**INDIAN WRITING IN ENGLISH**  
**UENM112**

**Semester : I**  
**Category : Core II**  
**Class & Major : I BA English**

**Credits : 4**  
**Hours/Week: 5**  
**Total Hours : 65**

**COURSE OBJECTIVES**

CO.NO	To enable the students
CO 1	Understand the emergence and growth of Indian Writing in English
CO 2	Acquire representation of culture, identity, history, constructions of nation, (post) national and gender politics, cross-cultural transformations in literature
CO 3	Analyze Indian Diaspora Writings and their characteristics features.
CO 4	Closely examine the various themes and methodologies existing in contemporary Indian writing in English.
CO 5	Apply the ideas encapsulated in Indian aesthetics literary texts.

**UNIT- I**

**13 Hours.**

Hansda Sowvendra Shekhar : This Adivasi Will not Dance (Short Story)  
R.K Narayan : Four rupee (Short Story)  
Ruskin Bond : Handful of Nuts, Night Train to Deoli (Short Story)  
K.A. Abbas : Sparrows (Short Story)

**UNIT-II**

**13 Hours.**

Ananda Commarasamy : The Dance of Shiva (Collection of 14 Essays)  
Rabindranath Tagore : Khabhuliwala. (Short Story)  
Pearl S Buck : Excerpt from My Several Worlds: India through Traveler's Eye.  
Girish Karnard : Fire and the Rain (Play)

**UNIT- III**

**13 Hours.**

Toru Dutt : The Lotus (Poem)  
Sri Aurobindo : The Tiger and the Deer. (Poem)  
Vikram Seth : Eating Wheat. (Poem)  
Manohar Shetty : Fire Flies. (Poem)

**UNIT- IV**

**14 Hours.**

Sarojini Naidu : The Village Song (Poem)  
A.K. Ramanujam : Still another View of Grace (Poem)  
Shiv K Kumar : Indian Women (Poem)  
Mirza Ghalib : It is not Love, it is Madness (Poem)

**UNIT- V**

**12Hours.**

Rabindranath Tagore : Mukhthadhara. (Drama)  
Nissim Ezeikel : Nalini: A Comedy in Three Acts (Drama)  
Joginder Paul : Sleepwalkers. (Drama)

## Text Books

- Rexroth, Kenneth. (1976). The New British Poets: An Anthology. Granger Books.
- Bond Ruskin 2009 *A Handful Of Nuts* ; Author, Ruskin Bond ; Publisher, PenguinBooks Limited ; ISBN, 8184754280,
- Tagore Rabindranath; 1950; *Mukthadhara* translated by, Marjoraqie Sykes; Edition, reprint; Publisher, Oxford University Press, 1950; Original from...

## Reference Books

- Tagore. Rabindranath (1938) *Kabuliwala*. Print Book, Gujarati, 1938. Publisher: Mihir,
- Bond Ruskin "*The Night Train at Deoli and Other Stories* (English, Paperback, BondRuskin) ; Genre · Fiction ; ISBN · 9780140116151, 014011615X
- Ramanujam. A.K.(1976) *Still another view of grace* Oxford University Press, poetry (English)

## E- Resources:

- <https://books.google.com/books/about/Sleepwalkers.html>  
<https://thesmolt.com/sparrows:by:k:a:abbas/>

## COURSE OUTCOMES

CO.NO	On completion of the course the Students will be able to	Bloom's Level
CO-1	Identify the historical trajectory of various genres of Indian Writing in English from colonial times till the present.	K1
CO-2	Extrapolate the Indian literary texts written in English, in terms of Colonialism, Post Colonialism, Regionalism and Nationalism.	K2
CO-3	Apply relevant literary theories and frameworks to analyze and interpret Indian Writing in English, showcasing a deep understanding of theoretical perspectives.	K3
CO-4	Analyze how the sociological, historical, cultural and political context impacted the texts selected for study.	K4
CO-5	Evaluate the relevance and impact of various literary movements within Indian Writing in English, considering their historical context and their lasting influence on literature.	K5

## CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	1	0	2
CO-2	3	3	3	1	1	3
CO-3	1	2	3	1	1	3
CO-4	1	2	3	2	2	3
CO-5	3	2	3	3	3	3

**High Correlation : 53%**                      **Moderate correlation : 20%**  
**Low Correlation : 23%**                      **No Correlation : 3%**

**SOCIAL HISTORY OF ENGLAND  
UENA105**

<b>Semester</b>	: I		<b>Credits</b>	: 3
<b>Category</b>	: Allied		<b>Hours/Week:</b>	4
<b>Class &amp;Major:</b>	I B.A. English		<b>Total Hours:</b>	52

**COURSE OBJECTIVES**

CO.NO	On completion of the course the Students will
CO-1	Introduced to the pre – historic England.
CO-2	Explore social structures, changes, and problems in early modern England Context.
CO-3	Acquire comprehensive idea about the development of English literature and language over the ages.
CO-4	Develop the ability to read the texts from a variety of periods in the history of English.
CO-5	Explain the major trends which had molded the English society.

**UNIT- I Tudor England 10 Hours**

Tudor England (1485-1603), The Renaissance and its Impact on England, The Reformation - causes and effects

**UNIT- II Age of Restoration 10 Hours.**

Puritan Revolution, Puritan Interregnum, The Commonwealth of Nations, The Restoration, Coffeehouses and their Social Relevance.

**UNIT- III Age of Revolution 11 Hours.**

Impact of the Industrial, Agrarian and the French Revolutions on the English society, The Rise of Methodism, Humanitarian Movements in England

**UNIT- IV Age of World wars 11 Hours.**

The Reform Bills, The Chartist Movement & the Spread of Education- Social impact of the Two World Wars, The Labor Movement, and The Welfare State.

**UNIT-V 20<sup>th</sup> & 21<sup>st</sup> Century in England 10Hours.**

The Cold War (1945- 1991), the Falkland War (1981) –The Gulf War (1991), England in the Twenty –First Century.

**Text Books**

- Ed. Keith Wrightson, 2018. *Social History of England, 1500-1750*. Norn Press.
- Ed. Julia Crick, Elisabeth VanHouts, 2012. *A social History of England, 900-1200*, Cambridge University Press.

**Reference Books**

- Xavier. A.G., *An Introduction the Social History of England*, Viswanthan, s., Printers & Publishers Pvt Ltd, Chennai, 2009.
- Traveyan, G.M., *English Social History: A Survey of Six Centuries Chaucer Queen Victoria*, Longmans, Greenland Co., London, 2011
- Kathirkamu, Dr .A. M, “*The Social History of England since the Renaissance*”, Chennai, New Century Book House, 2014

### E-Resources

- *A Social history of England*: Briggs, Asa, 1921: Free Download, Borrow, and Internet Archive

### COURSE OUTCOMES

CO No.	On completion of the course the students will be able to	Bloom's Level
CO-1	Demonstrate the main social issues covered by the Module	K1
CO-2	Classify the opportunity to develop critical analytical skills through the assessment of historical approaches	K2
CO-3	Integrate the interaction between social and other branches of history, and of the multiple character of causes and effects	K3
CO-4	Analyze the influence of political developments on social history, considering the impact of laws, governance structures, and political movements on the lives of individuals and communities.	K4
CO-5	Evaluate the ethical implications of historical events on social structures, considering issues such as justice, equity, and human rights.	K5

### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	2	0	2	3
CO-2	3	2	1	1	2	3
CO-3	3	2	2	0	2	3
CO-4	2	2	1	1	3	3
CO-5	3	2	1	0	3	3

High Correlation : 37%

Low Correlation : 17%

Moderate correlation : 36%

No Correlation : 10%

### FILM STUDIES

#### UENE105

Semester : I  
 Category : NME  
 Class & Major: I B.A. English

Credits :2  
 Hours/Week : 2  
 Total Hours :26

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Understand the film history and development in world and India.
CO-2	Analyze the various genres of films and film appreciation

<b>CO-3</b>	Develop a broad view of cinema and history of film producing cultures
<b>CO-4</b>	Identify the visual and narrative characteristics of film
<b>CO-5</b>	Interpret films based on the range of diverse historical, cultural and ideological context

**UNIT- I INTRODUCTION** **5 Hours**

History of Cinema in India- Major landmarks in India Cinema

**UNIT- II GENERS OF FILM** **5 Hours**

Kinds of Films- Historical- Patriotic- Documentary- Thrillers - Detective – Mystery - Fantasy

**UNIT-III TECHNIQUES OF FILM MAKING** **6 Hours**

Art of Film Making- Some Important Technique - Acting- photography-Direction- Scriptwriting, Film Narrative etc.

**UNIT-IV SOCIAL RESPONSIBILITIES OF FILM** **5 Hours**

Films and Entertainment- Films and Social Responsibility

**UNIT-V CONCLUSION** **5 Hours**

Review of Films

**Text Books**

- Geoffrey Nowell Smith (2018). *The History of Cinema: A short Introduction*. Oxford UP. Chennai.

**Reference Books**

- Nelmes Jill. (2021). *Introduction Film's Studies*. Routledge, (5<sup>th</sup> ed.,)New York.
- Steven Ascher. (2019). *The Filmmaker's Handbook: A Comprehensive Guide for the Digital Age*. Plume. New York.
- Renu Saran. (2014). *History of Indian Cinema*. Diamond Publishers. NewDelhi.

**E-Resources:**

- <https://www.academicinfo.net/film.html>.
- <https://www.slideshare.net/sanrachna/film-marketing-present-senario>
- <https://www.nextbigwhat.com/film-marketing-strategies-297>

**COURSE OUTCOMES**

<b>CO No.</b>	<b>On completion of the course the students will be able to</b>	<b>Bloom's Level</b>
<b>CO-1</b>	Recall key events and developments in the history of cinema, including the invention of the motion picture, the transition to sound, and the rise of digital filmmaking.	<b>K1</b>
<b>CO-2</b>	Explain the various roles in film production, discussing the responsibilities of directors, producers, cinematographers, editors, and other key contributors to the filmmaking process.	<b>K2</b>

<b>CO-3</b>	Apply the understanding of iconic scenes by evaluating their impact on the overall narrative, emotional tone, and thematic significance of films.	<b>K3</b>
<b>CO-4</b>	Analyze the role of symbolism in film narratives, examining how symbols are used to convey complex ideas, themes, and emotions in specific films.	<b>K4</b>
<b>CO-5</b>	Synthesize directorial styles in film critiques, comparing and contrasting how different directors employ unique techniques and thematic concerns in their works.	<b>K5</b>

### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	2	0	1	0	0	1
CO-2	2	0	0	1	0	2
CO-3	3	1	1	1	1	2
CO-4	3	0	1	1	1	3
CO-5	3	0	1	1	0	3

**High Correlation : 17%**  
**Low Correlation : 40%**

**Moderate correlation : 13%**  
**No Correlation : 30%**

## FOUNDATION COURSE TO ENGLISH

### UENF101

**Semester : I** **Credits : 2**  
**Category : Foundation Course** **Hours : 2**  
**Class & Major : I UG** **Total Hours : 26**

### COURSE OBJECTIVES

CO No.	To enable the students to
<b>CO-1</b>	Understand and practice the basic knowledge of English Grammar.
<b>CO-2</b>	Read and write without errors
<b>CO-3</b>	Write paragraphs, essays and letters.
<b>CO-4</b>	Enhance the knowledge skills in Grammar and Pronunciation.
<b>CO-5</b>	Conceive the grammatical rudiments of the language.

**Unit -I** **5 Hours**

Nouns-Gender- Class-Countable and Uncountable Numbers-Pronouns-Adjectives-Article

**Unit – II** **5 Hours**

Verbs -Transitive and Intransitive-Concord-Auxiliaries-Adverbs

**Unit - III** **6 Hours**

Prepositions- Conjunctions- Interjections- Common Errors.

**Unit - IV** **5 Hours**

Vocabulary – Synonyms-Antonyms-Words often confused –Words with appropriate

prepositions.

## Unit - V

5 Hours

Using: Dictionary-Thesaurus-Encyclopedia-Expansion of an Idea-Reading comprehension-  
Hints Developing

### Text Books:

- Saraswathi Mudbhatlal, M. K. (2011). *English for Competitive Examinations*. Emerald Chennai.
- Green, D. (1971). *Contemporary English grammar structures and composition*. Macmillan India Limited.
- Turnbull, J., Lea, D., Parkinson, D., Phillips, P., Francis, B., Webb, S & Ashby, M. (2010). Oxford advanced learner's dictionary. *International Student's Edition*.

### References Books:

- Kipfer, B. A. (1992). Roget's 21st century thesaurus in dictionary form: the essential reference for home, school, or office.

### E-Resources:

- <https://www.grammarly.com/blog/nouns/#:~:text=A%20noun%20is%20a%20word,bi cycle>
- <https://www.scribbr.com/category/verbs/#:~:text=What%20is%20the%20definition%20of,noun%20or%20pronoun%20is%20doing>.

## COURSE OUTCOMES

CO No.	On completion of the course the students will be able to	Bloom's Level
CO-1	Remember the basic elements of English Grammar.	K1
CO-2	Understand the common mistakes in writing and speaking and rectify the mistakes.	K2
CO-3	Apply these skills effectively in academic and non-academic contexts.	K3
CO-4	Construct different style of language and to communicate professionally.	K4
CO-5	Evaluate grammatical enlightenment in the language	K5

### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	2	2	0	0	0	2
CO-2	2	2	0	1	0	2
CO-3	2	3	0	2	0	2
CO-4	2	3	0	3	0	2
CO-5	1	2	0	1	0	2

**High Correlation : 10%**  
**Low Correlation : 10%**

**Moderate correlation : 43%**  
**No Correlation : 27%**

## GENERAL ENGLISH-II

UENL211

Semester : II  
Category : Language: English  
Class & Major : I B.A. English

Credits : 3  
Hours/Week : 5  
Total Hours : 65

### COURSE OBJECTIVES

CO No.	To enable the students to
CO-1	Learn the essential skills of communication in English.
CO-2	Identify and eliminate common mistakes in writing and speaking.
CO-3	Apply these skills effectively in academic and non-academic contexts.
CO-4	Employ various business communication strategies and use advanced vocabulary.
CO-5	Acquaint in writing descriptive essays and respond arguments orally.

#### UNIT-I Poetry

13 Hours

Nissim Ezekiel : Very Indian Poem in Indian English  
Maya Angelou : Still I Rise  
Tennyson : The Flower  
Gieve Patel : On Killing a Tree  
Robert Frost : Mending Wall

#### UNIT -II Prose

13 Hours

Dale Carnegie : If you are wrong admit it  
Shashi Tharoor : Kindly Adjust Please  
Indira Ghandhi : What Makes an India?

#### UNIT- III Fiction

13 Hours

Paulo Coelho : Eleven Minutes

#### UNIT- IV Language Competency

13 Hours

Homonyms, Homophones, Homograph, Portmanteau words Verbs and Tenses, Subject Verb Agreement, Correction Errors

#### UNIT -V English for Workplace

13 Hours

Reading for General and Specific information [charts, tables, schedules, graphs etc]. Reading news and weather reports, Writing paragraphs, Taking and making note Expansion of Proverbs.

#### Text Books

- Coelho, Paulo (2006). *Eleven Minutes*. Harper; Latest edition.
- Barbara Sherman (2014), *Skimming and Scanning Techniques*, Liberty University Press.

#### Reference Books



- Advanced English Grammar. Martin Hewings. Cambridge University Press, 2000.
- Descriptive English. SP Bakshi, Richa Sharma · 2019, Arihant Publications(India) Ltd.
- The Reading Book: A Complete Guide Teaching Reading. Sheena Cameron, Louise Dempsey, S & L. Publishing, 2019.
- Brilliant Speed Reading: Whatever you need read, however ...Phil Chambers,Pearson, 2013.

#### E-Resources

- Very Indian poem by Nissim Ezekiel  
[http://econtent.in/pacc.in/admin/contents/40\\_%202020103001102714.pdf](http://econtent.in/pacc.in/admin/contents/40_%202020103001102714.pdf)
- Still I Rise by Maya Angelou  
<https://www.poetryfoundation.org/poems/46446/still-i-rise>
- The Flower by Tennyson: <https://www.poemhunter.com/poem/the-flower-2/>

#### COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Define the techniques used in different genres.	K1
CO-2	Interpret short paragraphs on people, places and events.	K2
CO-3	Extend knowledge to write subjective and objective descriptions.	K2
CO-4	Identify the purpose of using various tenses and effectively employ them in speaking and writing.	K3
CO-5	Analyze their skills and use them effectively in formal contexts.	K4

#### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	2	1	1	1	0	2
CO-2	2	2	2	1	1	2
CO-3	2	2	1	1	0	2
CO-4	2	3	1	2	0	2
CO-5	2	3	0	3	2	3

**High Correlation : 13%**

**Low Correlation : 27%**

**Moderate correlation : 47%**

**No Correlation : 13%**

#### BRITISH LITERATURE -I

UENM211

**Semester : II**  
**Category : Core III**  
**Class & Major : I BA English**

**Credits :4**  
**Hours/Week : 5**  
**Total Hours : 65**

#### COURSE OBJECTIVES

CO.NO	To enable the students
CO-1	Introduced to British Identity, Periods and other related forms.
CO-2	Understand that British literature is the foundation of English- speaking People culture.
CO-3	Acquire the intellectual to assess the world through colonialism

<b>CO-4</b>	Closely examine the various themes and methodologies present in British literature
<b>CO-5</b>	Create an aptitude of critically probing through the text.

### UNIT- I

**13 Hours**

Francis Bacon	: Of Truth, Of Adversity (Prose)
Oliver Goldsmith	: A City Night - Piece (Prose)
Joseph Addison and Sir Richard Steele	: The Spectator Club, On Gratitude, On Giving Advice (Prose)

### UNIT-II

**13Hours**

Thomas Gray	: The Progress of Poesy: A Pindaric ode (Poem)
Anne Bradstreet	: Prologue (Poem)
William Blake	: The Chimney Sweeper (Poem)
John Keats	: Endymion Book -I (Poem)

### UNIT-III

**13 Hour**

P. B. Shelley	: Alastor or The Spirit of Solitude (Poem)
William Wordsworth	: Ode to Intimation & Immorality (Poem)
Lord Byron	: She Walks in Beauty (Poem)
John Milton	: Paradise Lost Bk 4. (Poem)

### UNIT-IV

**13 Hours**

William Shakespeare	: Tempest (Drama)
Oliver Goldsmith	: She Stoops to Conquer (Drama)

### UNIT-V

**13 Hours**

Jonathan Swift	: Voyage to Lilliput/ Houyhnhnms: Gulliver's
Travels Charles Dickens	: A Tale of Two Cities. (Fiction)
	: Oliver Twist

### Text Books

- Robert Jamieson (1806) *Robinhood and the Monk* Popular Ballads and Songs from Tradition.
- Lindsay, David William Blake (1967). *The chimney sweeper*

### Reference Books

- Bacon, Francis, (2008) *.Of adversity, of truth* and Michel Lairise. *Francis Bacon*. Ediciones Poligrafa, Gunn, Drewey (2009). *The Golden Age of Gay Fiction* (first Ed.).Albion, NY: MLR Press.
- Shelley, Mary Wollstonecraft, 2015. *Frankenstein*. Create Space.

### E-Resources:

- Ranger, Paul. "Technical Features. "She Stoops to Conquer by Oliver Goldsmith, 1985,pp.51–68. [https://doi.org/10.1007/978:1:349:07664:2\\_5](https://doi.org/10.1007/978:1:349:07664:2_5)
- <https://litpriest.com/essays/of:adversity:summary:analysis/>

- Full text of *The Yellow Wallpaper* at the CUNY Library

### COURSE OUTCOMES

CO.NO	On completion of the course the student will be able to	Bloom's Level
CO-1	Demonstrate the knowledge of the major social, political, philosophical and scientific events forming the backdrop for the development of early British Literature.	K1
CO-2	Comprehend key literary movements within British literature, such as the Enlightenment, Neoclassicism, and Romanticism etc.	K2
CO-3	Explore the themes, approaches, styles, and contributions to the development of British literature.	K3
CO-4	Distinguish between the characteristics of British literary movements indiscussing and writing about British literature.	K4
CO-5	Evaluate the significance of major literary periods in British literature, assessing their impact on the development of literary forms, styles, and thematic concerns.	K5

### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	2	1	2	0	2	2
CO-2	2	2	2	1	2	2
CO-3	2	3	2	1	2	3
CO-4	2	3	3	2	3	3
CO-5	3	3	3	2	3	3

**High Correlation : 37%**  
**Low Correlation : 10%**

**Moderate correlation : 50%**  
**No Correlation : 3%**

## AMERICAN LITERATURE

### UENM212

**Semester : II**  
**Category : Core IV**  
**Class & Major : I BA ENGLISH**

**Credit : 4**  
**Hours/Week : 5**  
**Total Hours : 65**

### COURSE OBJECTIVES

CO NO.	To enable the students
CO-1	Understand the growth and development of American literature.
CO-2	Explore prominent writers and famous works in American literature.
CO-3	Critically examine how various genres developed and progressed.
CO-4	Closely examine the various themes and methodologies present in American literature
CO-5	Create an aptitude of critically probing through the text

### UNIT- I

Henry David Thoreau : Conscience (Poem)

**11 Hours**

Walt Whitman : O Captain, My Captain! (Poem)  
 Paul Laurence Dunbar : We Wear the Mask (Poem)

**UNIT –II**

**14 Hours**

Oliver Wendell Holmes : Old Ironsides (Poem)  
 Edgar Allan Poe : The Raven (Poem)  
 Emily Dickinson : Because I Could Not Stop for Death. (Poem)

**UNIT-III**

**13 Hours.**

Edgar Allan Poe : The Philosophy of Composition (Prose)  
 Martin Luther King Jr : I have a Dream (Prose)  
 Abraham Lincoln : Gettysburg Address (Prose)

**UNIT-IV**

**13 Hours.**

Lorraine Hansberry : A Raisin in the Sun (Drama)  
 Eugene O'Neill : Emperor Jones (Drama)

**UNIT-V**

**14 Hours**

Harriet Beecher Stowe : Uncle Tom’s Cabin  
 Herman Melville : Billy Budd (Novella)  
 Washington Irving : Rip Van Winkle (Short Story)  
 Leslie Marmon Silko : Ceremony (Fiction)

**Text Books:**

- Silko, Leslie Marmon (2008). *Ceremony*. Recorded Books, Inc; Unabridged edition.
- Melville, Herman (2017). *Billy Budd*. Digireads.com.

**Reference Books:**

- Dickinson, Emily, and Johanna Brownell. 2015. *Emily Dickinson: Poems*. Chart well Books,
- Poe, Edgar Allan, etal. 1995. *Poetry for Young People: Edgar Allen Poe*. Sterling Pub. Co.

**E-Resources:**

- Harriet Beecher Stowe's Uncle m'sCabin.”2003,https://doi.org/10.4324/9781315812113.
- Mason, Ronald. “Herman Melville and ‘Billy Budd.’” *Tempo*, no. 21, 1951, pp.6–8.,https://doi.org/10.1017/s0040298200054863

**COURSE OUTCOMES**

CO.No	On completion of this course, students will be able to	Bloom’s Level
CO-1	Identify major American literary periods, including Colonial, Romantic, Realistic, Modernist, and Contemporary periods.	K1
CO-2	Classify the relationships between moments in American history, colonialism, and culture and their representation in works of	K2

	American literature.	
<b>CO-3</b>	Identify the ways that American literature reflects complex historical and cultural experiences.	<b>K3</b>
<b>CO-4</b>	Apply the historical context, and cultural understanding to develop unique perspectives in American Literature.	<b>K4</b>
<b>CO-5</b>	Critically assess the representation of American identity in literature.	<b>K5</b>

### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	2	1	2	0	2	2
CO-2	2	2	3	1	3	3
CO-3	2	2	3	1	3	3
CO-4	3	3	3	2	3	3
CO-5	3	3	3	2	3	3

**High Correlation : 54%**

**Moderate correlation : 33%**

**Low Correlation : 10%**

**No Correlation : 3%**

## HISTORY OF ENGLISH LITERATURE-I

**UENA205**

**Semester : II**

**Credits : 3**

**Category : Elective**

**Hours/Week: 4**

**Class &Major: I B.A. English**

**Total Hours : 52**

### COURSE OBJECTIVES

CO No.	To enable the students
<b>CO-1</b>	Understand the history of English literature from Old English Period to the Modern English period.
<b>CO-2</b>	Identify the historical events in the history of English literature.
<b>CO-3</b>	Acquire the critical thinking ability to examine a text
<b>CO-4</b>	Analyse the major literary movements and authors.
<b>CO-5</b>	Examine the major historical achievements in different ages of literature.

#### **UNIT- I Chaucerian Age**

**10 Hours.**

Chaucerian Age, The Renaissance Period (1350–1660): An Introduction to Bible Translation: Tyndale, Coverdale, The University Wits, Elizabethan and Jacobean drama, Comedy of Humours

#### **UNIT-II Romantic Age**

**11 Hours.**

The Late Seventeenth and the Eighteenth Centuries (1660-1800) Comedy of Manners, Neo-Classicism, Sentimental and Anti-sentimental comedies, Pre-Romantics, Romanticism.

#### **UNIT-III Age of Drama**

**11 Hours.**

Well- made play (Drama of Ideas –Shaw and Ibsen), Existential Drama, Comedy of

menace, Kitchen-sink drama, Problem Play, Didactic Drama (Propaganda play), One-act play, Realistic Play, Morality and Mystery Play.

**UNIT- IV Victorian Age**

**10 Hours.**

The Victorian Age (1832-1901): Pre-Raphaelite movement: D.G. Rossetti, Christina Rossetti Victorian Poets-Tennyson, Browning Victorian Novelists: Charles Dickens, Thackeray

**UNIT- V Age of Modernism**

**10 Hours.**

Victorian Writers - Carlyle, Ruskin Impressionistic Writers - Proust, Joyce, Symbolist Movement - Yeats, Cubism – Virginia Woolf, James Joyce, Imagism – Ezra Pound, Amy Lowell

**Text Book**

- Edward Albert, *History of English Literature*, Oxford University Press, New Delhi.

**Reference Books**

- Hudson W.H, 2001. *An Introduction the study of English Literature*, Emerald Publishers, New Delhi,
- Hudson W.H, 2012. *An Outline History of English Literature*, Maple Press, New Delhi,

**E-Resources:**

- <https://leverageedu.com/blog/history-of-english-literature/>

**COURSE OUTCOMES**

CO No	On completion of the course the student will be able to	Bloom's Level
CO-1	Recognize the growth and development of English Literature.	K1
CO-2	Understand a wide variety of forms, styles, structures and modes in English Literature.	K2
CO-3	Classify the socio-cultural ambience and the discursive frameworks of various ages.	K3
CO-4	Compare about prominent writers and famous works in literature.	K4
CO-5	Examine the way of socio-cultural and historical phenomena influence the literary production of a Particular period.	K5

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	2	2	2	1	2	2
CO-2	2	2	2	1	2	2
CO-3	2	2	3	1	3	3
CO-4	2	3	3	2	3	3
CO-5	3	3	3	2	3	3

**High Correlation : 40%**  
**Low Correlation : 10%**

**Moderate correlation : 50%**  
**No Correlation : 0%**

## ART OF RADIO JOCKEY

UEND201

Semester : II  
Category : SEC  
Class & Major : I B.A. English

Credits : 2  
Hours/Week : 2  
Total Hours : 26

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Acquire proper voice culture and communication skills.
CO-2	Recite and train to write script for the Radio.
CO-3	Identify the various radio formats.
CO-4	Participate in Radio Programme
CO-5	Understand the technical process of Radio Broadcasting and streaming.

<b>UNIT - I</b>	<b>4 Hours</b>
Radio as a medium, Public Broadcasting/Community Radio/ Commercial Radio.	
<b>UNIT- II</b>	<b>5 Hours</b>
Know your voice, know your listener. Presentation Techniques, Role of Announcer/Radio Jockey/News reader.	
<b>UNIT - III</b>	<b>5 Hours</b>
Writing Script for Radio, Radio Formats, News Presentation.	
<b>UNIT- IV</b>	<b>6 Hours</b>
Know your equipment. Sound Recording, Editing and streaming. The technical process of Radio Broadcasting.	
<b>UNIT V</b>	<b>6 Hours</b>
Industry Visit / Internship Program in FM Radio Station.	

### Text Books

- Kohli, Simran, (2020). *Radio Jockey Handbook* .Diamond Pocket Books Pvt.
- Gupta, Swaty, (2011). *Romancing the Microphone: Be a Radio Jockey*. Rupa Publications.

### E-Resources

- Kohli, S. Radio Jockey Handbook Diamond Pocket Books Pvt <https://books.google.co.in/books?id=8HZYCgAAQhttps://books.google.co.in/books?id=0SuPwwEACA>

## COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Define the concept, role and significance of RJ in professional environment	K1
CO-2	Interpret the best traditions and practices of commercial RJ trade.	K2
CO-3	Identify the art and craft of RJ profession and equip them with skills and practices in Radio Industry.	K3
CO-4	Construct their understanding of radio broadcasting principles and audience engagement strategies to create original and engaging radio content, including shows, segments, and promotional materials.	K4
CO-5	Evaluate the responsibility of RJ in addressing sensitive topics, maintaining integrity, and adhering to regulatory standards.	K5

### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	2	2	1	1	2	2
CO-2	2	3	1	1	2	2
CO-3	2	3	3	2	2	3
CO-4	3	3	3	3	3	3
CO-5	3	2	2	1	3	2

**High Correlation : 40%**

**Moderate correlation : 43%**

**Low Correlation : 17%**

**No Correlation : 0%**

### III AND IV EVALUATION COMPONENTS OF CIA

SEMESTER	CATEGORY	COURSE CODE	COURSE TITLE	COMPONENT-III	COMPONENT-IV
I/II	Language	UENL111	General English I	Poster Presentation	Assignment
	Major Core	UENM111	Introduction to Literature	Assignment	Seminar
	Major Core	UENM112	Indian Writing in English	Writing Papers Or Assignment	Enactment of short story or Drama
	Major Core	UENA105	Social History of England	Assignment	Poster Presentation
	Foundation Course	UENF101	Foundation Course	Assignment	Seminar
	Elective	UENE 105	Film Studies	Poster Presentation	Film Review Writing
	Language	UENL212	General English II	Assignment	Seminar
	Major Core	UENM211	British Literature-I	Assignment	Seminar
	Major Core	UENM212	American Literature-I	Assignment	Enactment
	Major Elective / DSE II	UENA205	History of English Literature	Assignment	Poster Presentation Or Mind Map
	UENE206	Public Speaking	Debate	Oration	



## DEPARTMENT OF ENGLISH (M.A.)

### PREAMBLE

**PG** : Programme Profile and Syllabi of Courses from I to II semesters along with Evaluation Components III and IV (With effect from 2023-2025 Batch Onwards)

### PROGRAMME PROFILE M.A. (ENGLISH) PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO No	Upon completion of the programme, the students will be able to
PSO-1	Acquaint with the historical and conceptual understanding of literature from 16th century to 21st century
PSO-2	Categorize the major trends, ideas and genres of the different ages of literature.
PSO-3	Interpret the classical literary text and its rich translation.
PSO-4	Reinforce the pronunciation skills through phonetics and linguistics terms.
PSO-5	Defend equalities in all sectors of literature such as race, age and gender and practice them in real life.
PSO-6	Create their own idea of complex nature of literary studies and apply them in their original works within a research framework.

Semester	Category	Course Code	Course Title	Contact Hrs/Week	Credit Min/Max
I	Core Courses - I	PENM123	English Poetry	4	3
	Core Courses - II	PENM124	English Drama	4	3
	Core Courses - III	PENM125	English Fiction	4	3
	Core Courses - IV	PENM126	English Literature for Competitive Examinations	3	3
	Elective (Generic / <b>Discipline Centric</b> )-I	PENO101	Indian Writing in English	5	3
	Elective (Generic / <b>Discipline Centric</b> )-II	PENO102	Theatre Art	5	3
	Skill Enhancement Course SEC 1 –(NME)			3	2
	Skill Enhancement Online Course	PONL101	Online Course	2	2
<b>Total</b>				<b>30</b>	<b>22</b>
II	Core Courses – IV	PENM223	American Literature	5	4
	Core Courses – V	PENM224	Shakespeare Studies	5	4
	Core Courses –VI	PENM225	Post - Colonial Theory and Literature	5	4
	Core Industry Module	PENM204	Digital Media	4	3
	Elective (Generic /	PENO201	Approaches to English Language	4	3

	<b>Discipline Centric</b> -III		Teaching		
	Elective (Generic / <b>Discipline Centric</b> )-IV	PENO202	A Glimpse of Nobel Laureates	4	3
	Skill Enhancement Course SEC 2( <b>Discipline</b> )	PEND201	Language and Linguistics	3	2
	Service Learning (IV)	PENX201		-	1
	Internship/Field visit(IV)	PINS201		-	2
<b>Total</b>				<b>30</b>	<b>26</b>
III	Core Courses -VII	PENM323	Contemporary Literary Criticism	5	4
	Core Courses -VIII	PENM324	Canadian Studies	5	4
	Core Courses -IX	PENM325	Literature of the Marginalized in India	5	4
	Core Industry Module	PENM304	Blog Writing	4	3
	Elective (Generic / <b>Discipline Centric</b> )-V	PENO301	Translation Studies	4	3
	Elective (Generic / <b>Discipline Centric</b> )-VI	PENO302	Functional English	3	3
	Skill Enhancement Course SEC 3 Interdisciplinary	PENI301	Translation Theory and Practice	4	2
<b>Total</b>				<b>30</b>	<b>23</b>
IV	Core Courses – X	PENM423	Twenty First Century Millennial Literature and Culture	5	4
	Core Courses –XI	PENM424	Subaltern Studies	5	4
	Core Courses –XII	PENM425	Film and Media Studies	5	4
	Project with Viva-Voce	PENP401	Project and Viva-Voce	6	4
	Elective-Discipline Specific	PENO401	English Literature for NTA NET,SET & GATE	5	3
	Skill Enhancement Course–III (Proficiency skill )	PENC401	Research Methodology	4	2
	Internship/Field visit(IV)	PINS401	Internship		-/2
<b>Total</b>				<b>30</b>	<b>21/23</b>
<b>Grand Total</b>				<b>120</b>	<b>92/94</b>

## ENGLISH POETRY

PENM123

**Semester : I**  
**Category : Core I**  
**Class &Major : I MA English**

**Credits : 3**  
**Hours/Week : 4**  
**Total Hours : 52**

### COURSE OBJECTIVES

CO. No	To enable the students
CO-1	Understand History of English literature and its Genres.
CO-2	Describe English Poetry starting from Medieval England to 17 <sup>th</sup> Century.
CO-3	Analyze the evolution of Poetic forms such as Sonnet, Ballad, Lyric, Satire, Epic etc.
CO-4	Identify differentiation among the various stages of English.
CO-5	Critical approaches towards various literary forms.

**Unit – I Middle English Poetry** **10 Hours.**

Chaucer : The General Prologue – Pardoner, The Nun: Doctor, Frail, The Host, The Summoner, The Knight, The Miller, The Squire, The Cook

**Unit – II Elizabethan Poetry** **11 Hours.**

Spenser : Epithalamion  
Donne : A Valediction: Forbidding Mourning The Canonization  
Shakespeare : Sonnet 9, 10, 11, 12  
Sidney : Philomela  
Christopher Marlowe : The Passionate Shepherd to His Love

**Unit – III Seventeenth Century Poetry** **11 Hours.**

John Milton : Paradise Lost – Book IX  
Marvell : His Coy Mistress  
Matthew Arnold : Dover Beach

**Unit – IV Eighteenth Century Poetry** **10 Hours**

Dryden : Absalom and Achitophel (Lines 150 – 476)  
Thomas Gray : Elegy  
William Wordsworth : Tintern Abbey  
Robert Burns : Holy Willie's Prayer

**Unit – V Modern Poetry** **10 Hours**

Rupert Brooke : The Soldier  
W.B. Yeast : Sailing to Byzantium  
W. H. Auden : Elegy on the Death of W. B. Yeast Musee des Beaux Arts

Dylan Thomas : Do Not Go Gentle in That Good Poem in October

Philip Larkin : Whitsun Weddings

Ted Hughes : Hawk Roosting

Seamus Heaney : Digging

Carol Ann Duffy : Standing Female Nude

Eavan Boland : Achilles Woman

**Text Books**

- Sen, S (2020).*Paradise Lost – Book IX*. Unique Publication.
- William R. Keats, (1971).*Seventeenth Century English Poetry: Modern Essays in Criticism*, Oxford University Press, and London.

**Reference Books**

- Eliot, T.S, (1932).*The Metaphysical Poets from Selected Essay*. Faber and Faber limited, London.
- H.S. Bennett, (1970).*Chaucer and the Fifteenth Century*. Clarendon Press, London.

## E-Resources

- <https://www.britannica.com/pic/The-Canonization>
- <https://www.britannica.com/pic/Absalom-and-Achiphel>
- [https://www.cs.mcgill.ca/~rwest/wikispeedia/wpcd/wp/m/Modernist\\_poetry\\_in\\_English.html](https://www.cs.mcgill.ca/~rwest/wikispeedia/wpcd/wp/m/Modernist_poetry_in_English.html)

## COURSE OUTCOME

CO. No	On completion of this course, students will be able to	Bloom's Level
CO-1	Interpret the ideas about old English writing style.	K1, K2
CO-2	Develop knowledge about various forms of poetry during different centuries.	K3
CO-3	Discover various poets as representatives of their periods.	K4
CO-4	Evaluate the emergence of various literary movements.	K5
CO-5	Formulate British Poetry as an aesthetic record of the societies concerned.	K6

### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	3	1	2	3
CO-2	3	2	3	1	1	3
CO-3	1	2	3	1	0	3
CO-4	1	2	3	1	0	3
CO-5	1	2	3	3	3	3

High Correlation : 47%

Low Correlation : 27%

Moderate correlation : 20%

No Correlation : 6%

## ENGLISH DRAMA

### PENM124

Semester : I  
Category : Core II  
Class & Major : I MA English

Credits : 3  
Hours/Week : 4  
Total Hours : 52

## COURSE OBJECTIVES

CO. No	To enable the students
CO-1	Acquaint with the origin of drama in Britain.
CO-2	Understand the different stages of British Drama and its evolution in the context of theatre.
CO-3	Interpret Socio-cultural scenario comprehended through study of representative texts from the Elizabethan age to 20 <sup>th</sup> century.
CO-4	Evaluate different forms of drama from the historical background.
CO-5	Illustrate the dramatic techniques implied by the pioneers of English drama.

**UNIT I Beginnings of Drama** **10 Hours.**

Miracle and Morality Plays : Everyman  
: The Senecan and Revenge Tragedy  
Thomas Kyd : The Spanish Tragedy

**UNIT II – Introduction** **11 Hours.**

Elizabethan Theatre : Theatres, Theatre groups, Audience, Actors  
and Conventions Tragedy and Comedy,  
Christopher Marlowe : The Jew of Malta  
Ben Jonson : Volpone

**UNIT III – Jacobean Drama** **10 Hours.**

John Webster : The White Devil  
Paulo Coelho : The Alchemist

**UNIT IV Restoration** **10 Hours**

William Congreve : The Way of the World, Irish Dramatic Movement  
J.M Synge : The Playboy of the Western World

**UNIT V- Epic Theatre** **11 Hours.**

Berlt Brecht : Mother Courage and her Children Comedy of Menace  
Harold Pinter : Birthday Party Post-Modern Drama  
Samuel Beckett : Waiting for Godot

**Text Books**

- Bradbrook, M.C., (1955). *The Growth and Structure and Elizabethan Comedy*, London.
- Tillyard E.M.W., (1958). *The Nature of Comedy & Shakespeare*, London.

**Reference Books**

- Una Ellis-Fermor, (1965). *The Jacobean Drama: An Interpretation*, Methuen & Co., London.
- Allardyce Nicoll, (1973). *British Drama*. Harrap, London.
- Michael Hathaway, 1982, *Elizabethan Popular Theatre: Plays in Performance*, Routledge, London.

**E-Resources**

- <http://www.clt.astate.edu/wmarey/asste%>
- <https://nosweatshakespeare.com/resources/era/jacobean-drama-theatre/>
- <https://www.britannica.com/art/English-literature/The-Resration>
- <https://www.britannica.com/art/epic-theatre>

## COURSE OUTCOME

CO .No	On completion of this course, students will be able to	Bloom's Level
CO-1	Classify the various aspects of drama and theatre.	K1, K2
CO-2	Apply historical and cultural context to the analysis of English dramas.	K3
CO-3	Examining how playwrights employ language to convey character relationships, themes, and the overall atmosphere of the play.	K4
CO-4	Defend the Drama scripts as aesthetic records of their times viz., Elizabethan, Restoration, Victorian and Early Modern ages.	K5
CO-5	Critically assess directorial choices made for thematic interpretation in English dramas	K6

### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	3	1	1
CO-2	3	3	3	3	1	1
CO-3	3	3	3	2	1	1
CO-4	3	3	3	3	3	1
CO-5	3	3	3	3	1	3

**High Correlation : 70%**

**Low Correlation : 27%**

**Moderate correlation : 3%**

**No Correlation : 0%**

## ENGLISH FICTION

### PENM125

**Semester : I**

**Category : Core III**

**Class &Major: I MA English**

**Credits : 3**

**Hours/Week: 4**

**Total Hours : 52**

### COURSE OBJECTIVES

CO. No	To enable the students
CO-1	Identify the origin and development of the British Novel up the 20 <sup>th</sup> Century.
CO-2	Elucidate the various concepts and theories of the novel.
CO-3	Acknowledge the social background base on the prescribed novels.
CO-4	Comprehend the Plot, Characterization, Themes and Techniques of fiction.
CO-5	Critically analyze the prescribed fictions.

### UNIT I –Introduction

**10 Hours.**

Novel as a Form, Concepts and Theories about the Novel; Poetics of the Novel – definition,types, narrative modes:

#### Allegorical Novel and Satire

John Bunyan : The Pilgrim's Progress

Jonathan Swift : Gulliver's Travels

**UNIT II-the new World Novel** **11 Hours.**

Daniel Defoe : Laurence Stern,  
Robinson Crusoe : Tristram Shandy.

**UNIT III -Middle Class Novel of Manners** **10 Hours.**

Jane Austen : Emma Pride and Prejudice

**UNIT IV-Women's Issues** **11 Hours.**

Charlotte Bronte : Jane Eyre  
Margaret Atwood : The Handmaid's Tale

**UNIT V - Liberal Humanism, Individual Environment and Class Issues** **10 Hours.**

D.H. Lawrence : The Rainbow  
James Joyce : Portrait of the Artist as a Young Man

**Text Books (Latest Editions)**

- Wayne, C. Booth, (1961). *The Rhetoric of Fiction*, Chicago University Press, London.
- Leavis, F.R, 1973. *The Great Tradition*. Chat & Windus, London.

**Reference Books**

- Watt, Ian, 1974. *Rise of the English Novel*, Chat & Windus, London.
- Kettle, Arnold, 1967. *An Introduction to English Novel Vol. II*, Universal Book Stall, New Delhi.
- Milligan, Ian, 1983. *The Novel in English: An Introduction*. Macmillan, Hong Kong.

**E-Resources**

- <https://www.britannica.com/art/picaresque-novel>

**COURSE OUTCOMES**

CO.NO	On completion of this course, students will be able to	Bloom's Level
CO-1	Interpret the knowledge about different types of novels.	K1, K2
CO-2	Develop the art of writing, different forms of novel with the learned notions.	K3
CO-3	Examine Social, domestic and gothic novels.	K4
CO-4	Evaluate philosophical and political underpinnings of Victorian morality, anti-Victorian realities and the aesthetic movement.	K5
CO-5	Formulate themes relating to the turn of the century events through close reading of text	K6

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	1	3	2	2
CO-2	3	3	3	3	2	3
CO-3	3	3	3	3	3	1
CO-4	3	3	3	3	3	2
CO-5	3	3	3	3	3	2

**High Correlation : 77%**  
**Low Correlation : 6%**

**Moderate correlation : 17%**  
**No Correlation : 0%**

**PROFESSIONAL COMPETENCY COURSE- ENGLISH LITERATURE  
FORCOMPETITIVE EXAMINATIONS**

**PENM126****Semester : I****Category : Core IV****Class &Major : I MA English****Credits :3****Hours/Week : 3****Total Hours : 39****COURSE OBJECTIVES**

CO. No	To enable the students
CO-1	Build the knowledge of literary terms and theory strong in students.
CO-2	Develop the competency of students to face competitive examinations.
CO-3	Improve the learning skills of students through various modes of testing.
CO-4	Able to succeed in competitive exams.
CO-5	Understand of professional, ethical and social responsibilities.

**UNIT I 8 Hours.**

Literature of the Absurd to Burlesque.

**UNIT II 8 Hours.**

Canons of Literature to Dream Vision

**UNIT III 8 Hours.**

Edition to Great Chain of Being

**UNIT IV 7 Hours.**

Haiku to Ivory Tower

**UNIT V 8 Hours.**

Jeremiad to Myth

**Text Books**

- Abrahams, M.H .A *Glossary of Literary Terms*, Harcourt Asia PTE Ltd or ThomsonAsia Pvt Ltd
- Ashcroft, Bill, Griffithsand Helen Tiffin. *The Post –Colonial Studies: The Key*





<b>UNIT I Poetry</b>		<b>13 Hours.</b>
Aurobindo	: The Golden Light, Rose of God	
Toru Dutt	: The Sower, The Casuarina Tree	
Sarojini Naidu	: Palanquin Bearers, Coromandel Fishers	
<b>UNIT II Poetry</b>		<b>13Hours.</b>
Kamala Das	: Looking Glass, An Introduction	
Parthasarathy	: A River Once, Under the Sky,	
Nissim Ezekiel	: Morning Prayer, Enterprise.	
<b>UNIT III Drama</b>		<b>13Hours.</b>
Girish Karnad	: Taledanda	
Asif Currimbhoy	: Inquilab.	
Badal Sircar	: Evam Indrajit	
<b>UNIT IV Prose</b>		<b>13Hours.</b>
Rabindranath Tagore	: My School	
Dr. S. Radhakrishnan	:Emerging World	
Society,		
Dr. A. P. J. Abdul Kalam	: Orientation (Wings of Fire).	
<b>UNIT V Fiction</b>		<b>13Hours.</b>
Anita Desai	: Where Shall we go this summer?	
Shashi Deshpande	: Roots and Shadows	
Jhumpa Lahiri	: The Namesake	

#### Text Books

- Ramamurti, K.S.(ed.).*Twenty five Indian Poets in English*,Macmillan.1995.
- Herbert H. Gown, 1975, A History of Indian Literature, Seem Publications, Delhi.

#### Reference Books

- K. R. Srinivasa Iyengar, 1962,—History of Indian Writing in English, Sterling Publishers,New Delhi.
- K. Satchidanandan, 2003, Authors, Texts, Issues: Essays on Indian literature,Pencraft International, New Delhi.

#### E-Resources

- <https://www.thehindu.com/books/books-children/short-History-of-indian-writing-inenglish/article5226149.ece/amp/>
- <https://www.literaryladiesguide.com/author-biography/kamala-das-indian-poet/>

#### COURSE OUTCOMES

CO. No	On completion of this course, students will be able to	Bloom's Level
CO-1	Understand recurring themes in Indian literature, such as identity, diaspora, post colonialism and the intersectionality of cultural, religious,	K1,K2



**UNIT III–Fundamentals of Play directing** **13Hours.**

Fundamentals of Play directing: Concept, technique, physical balance, demonstration  
The director and the stage

**UNITIV–Components of acting** **13Hours.**

Components of acting: Gesture, voice, costume, make-up, mask and different styles in acting as an art form, violence in the theatre, need for censorship, managing time and space.

**UNIT V –Theatre Setup** **13 Hours.**

Theatre of illusion, Expressionism and dramatic symbolism, Stage design in the modernworld, Lighting in the modern world, Word versus spectacles.

**Text Book**

- Sangeetha, K, 2015.*A Introduction to Theatre Art*. New Century Book House (P) Ltd.

**Reference Books**

- Balme, Chrispher B, 2008.*The Cambridge Introduction to Theatre Studies*. Cambridge University Press,
- Leach, Robert, 2013.*Theatre Studies: The Basics*, Routledge.

**E-Resources**

- [https://paradisevalley.libguides.com/the111/theatre\\_History\\_websites](https://paradisevalley.libguides.com/the111/theatre_History_websites)
- [https://www.worldHistory.org/Greek\\_Theatre/](https://www.worldHistory.org/Greek_Theatre/)
- [https://archive.org/details/fundamentalsofpl0000dean\\_y3x3](https://archive.org/details/fundamentalsofpl0000dean_y3x3)

**COURSE OUTCOMES**

CO. No	On completion of this course, students will be able to	Bloom's Level
CO-1	Interpret the broad range of theatrical disciplines and Experiences.	K1, K2
CO-2	Construct the diversity of theatrical experiences and the role of theatre in society.	K3
CO-3	Discover the relationships among the various facetsof Theatre.	K4
CO-4	Estimate drama as a performing art and the aspects of stagecraft.	K5
CO-5	Develop exposure to diverse components of acting and techniques.	K6

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	2	2	1
CO-2	3	3	3	3	2	1
CO-3	3	3	3	3	2	1
CO-4	3	3	3	2	2	1
CO-5	3	3	3	2	2	1

**High Correlation : 57%** **Moderate correlation : 27%**  
**Low Correlation : 16%** **No Correlation : 0%**

## AMERICAN LITERATURE

### PENM223

**Semester : II** **Credits : 4**  
**Category : Core IV** **Hours/Week : 5**  
**Class & Major : I MA English** **Total Hours : 65**

#### Course Objectives

CO. NO	To the enable the students
CO-1	Understand the concepts and emerging themes in American literature
CO-2	Analyze social and political events through American literary writings.
CO-3	Identify the Diction and Phraseology of American Writings.
CO-4	Inculcate the movements and trends that shaped American literature.
CO-5	Familiarize the relation between aesthetics and racism in American Fiction.

#### UNIT - I POETRY

**13 Hours.**

Walt Whitman : Out of the Cradle Endlessly Rocking  
Maya Angelou : On the Pulse of Morning  
Robert Frost : After Apple Picking  
E. E. Cummings : Cambridge Ladies  
Wallace Stevens : Anecdote of the Jar

#### UNIT II – PROSE

**13 Hours.**

Emerson : The American Scholar,  
Amy Tan : Mother Tongue,  
Thoreau : Walden (Chapter “Pond”)

#### UNIT III - DRAMA

**13 Hours.**

Arthur Miller : Death of a Salesman, Tennessee  
Williams : A Street Car Named Desire Marsha  
Norman : Night Mother,  
Ntozake Shange : For Colored Girls

#### UNIT IV - FICTION/ SHORT STORY

**13 Hours.**

Edgar Allan Poe : The Cask of Amontillado  
Herman Melville : Bartleby the Scrivener  
N.Scott Moma Day : The House Made of  
DawnToni Morrison : Tar Baby  
Kate Chopin : The Awakening

## UNIT V AUBIOGRAPHY

13 Hours.

- Malcolm X : Excerpts from Malcolm X
- Sonia Somayor : My Beloved World (Hispanic Women Writing)
- Aurora Levins Morales : Getting Home Alive

### Text Books

- Wagner, Willis. *American Literature-A World View*
- Whitman, Walt. *Out of the Cradle Endlessly Rocking*, 1860.

### Reference Books

- Marcus, Cunliffe, 1900. *Sphere History of Literature -American Literature.*
- Boris Ford, *The New Pelican Guide English Literature-Vol.9.*
- P Merivale · 1965 · Cited by 8 — Stevens' poem, "Anecdote of the Jar".  
(Collected Poems, p. *References.* Stevens' works, Collected
- Khandelwal, K.N. *The American Scholar*, Oxford Publication, London.

### E Resources

- <https://www.thoughtco.com/american-literary-periods-741872>
- <https://www.poetryfoundation.org/poets/walt-whitman>
- <https://blog.eyewire.org/emerson-vs-thoreau-transcendentalist-battle/>

### Course Outcome

CO. No	On completion of this course, students will be able to	Bloom's Level
CO-1	Understand the movements and trends that shaped American literature.	K1, K2
CO-2	Analyze the various literary styles and techniques employed by American authors	K3
CO-3	Examine the representation of cultural diversity in American literature, analyzing how different voices, perspectives, and experiences contribute to the overall literary landscape.	K4
CO-4	Explore the representative socio-political, cultural, racial and gender perspectives in the theatrical works.	K5
CO-5	Generate new perspectives on American literature by combining insights from different authors, genres, and time periods, fostering a broader understanding of the cultural and historical contexts.	K6

### CO-PSO MAPPING:



- Richard II : Context, Source of the Play, Plot overview, Character list, Analysis of Major characters, Themes, Motifs, Symbols and Summary analysis)
- Henry IV Part I : (Context, Source of the Play, Plot overview, Character list, Analysis of Major characters, Themes, Motifs, Symbols and Summary analysis)

## UNIT- V SHAKESPEAREAN CRITICISM

13 Hours

- A.C. Bradley : Shakespearean Tragedy (Chapter V & VI)
- Stephen Greenblatt : Invisible Bullets: Renaissance Authority and its Subversion
- Ania Loomba : Sexuality and Racial Difference in Gender, Race and Renaissance Drama, Manchester UP, 1989.

### Text Books

- *Shakespeare Studies*. 1970. *Colleagues*, 1986. *Reinventing Shakespeare* Schoenbaum, Samuel.
- *The Shakespeare Claimants: A Critical Survey of the Four Principle; Theories Concerning the Authorship of the Shakespearean Plays*, London, 2005.

### Reference Books

- Harrison, 1951, G.B. *Shakespeare's Tragedies*, Routledge, London.
- Knight G.W., 1957, *The Wheel of Fire: Essays in Interpretation of Shakespeare's*
- Knight G.W., 1947, *The Crown of Life: Essays in Interpretation of Shakespeare's*

### E-Resources

- <http://www.shakespeare.bham.ac.uk/resources>
- <https://www.folger.edu/shakespeares-theater>
- <https://www.sparknotes.com/shakespeare/othello/genre/>

### COURSE OUTCOMES

CO. No	On completion of this course, students will be able to	Bloom's Level
CO-1	Describe the theatrical conventions of Shakespeare's time, including the use of the Globe Theatre, the role of actors, and the influence of the monarchy on drama.	K1, K2
CO-2	Examine and comprehend the portrayal of gender roles in Shakespeare's works, recognizing how societal expectations and norms influence character behavior.	K3
CO-3	Evaluate modern adaptations of Shakespearean plays, considering how different directors and performers interpret and reinterpret the text in	K4



	contemporary contexts.	
<b>CO-4</b>	Critically evaluate variations in the textual transmission of Shakespeare's works.	<b>K5</b>
<b>CO-5</b>	Develop and execute original research projects on specific aspects of Shakespearean literature	<b>K6</b>

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	2	2	1
CO-2	3	3	3	3	2	1
CO-3	3	3	3	3	3	2
CO-4	3	3	3	3	2	1
CO-5	1	1	3	3	3	3

**High Correlation : 67%**  
**Low Correlation : 16%**

**Moderate correlation : 17%**  
**No Correlation : 0%**

**POST -COLONIAL THEORY AND LITERATURE**

**PENM225**

**Semester : II**

**Credits : 4**

**Category : Core VI**

**Hours. /Week : 5**

**Class & Major: I M.A. English**

**Total Hours. : 65**

**COURSE OBJECTIVES**

CO.NO	To enable the students to
<b>CO-1</b>	Understand current socio political mood in` third-world 'countries, through the study of Postcolonial literary texts.
<b>CO-2</b>	Analyze the basic concepts and theories related to Post Colonialism as expressed in different literary genres.
<b>CO-3</b>	Acquire the problems and consequences of the decolonization of a country, especially relating to the political and cultural independence of formerly subjugate people.
<b>CO-4</b>	Emphasize on tracing the development of post-colonial literature and theory.
<b>CO-5</b>	Evaluate the critical perspectives in Postcolonial literatures.

**UNIT- I Prose**

**13 Hours.**

Bill Ashcroft, Gareth Griffiths & Helen Tiffin: The Empire Writes Back  
(Introduction)Edward Said : Introduction to Orientation.

**UNIT- II Poetry**

**13Hours**

Arun Kolatkar : The Priest,  
Yeshwant Rao : An Old Woman  
A. K. Ramanujan : Return in Death

Kofi Awonoor : The Weaver Bird  
 Leopold Senghor : In Memoriam  
 Grace Nichols : In My Name  
 James Reaney : Maps  
 George Bowering : Grand Father

**UNIT-III Drama 13Hours.**

Wole Soyinka : The Strong Breed  
 Douglas Stuart : Shuggie Bain

**UNIT-IV Fiction 13Hours**

Bapsi Sidwa : Ice Candy man  
 Rohinn Mistry : A Fine Balance

**UNIT-V Short Stories 13Hours**

Jhumpa Lahiri : This Blessed House  
 Kate Grenville : Mate  
 Chinua Achebe : Dead Men's path, The Sacrificial Egg  
 Katherine Mansfield : The Garden Part

**Text Books**

- Ashcroft, Bill. (1989). Griffiths Tiffin, Helen. *The Empire Writes Back: Theory and Practice in Post-Colonial Literatures.*
- Said, Edward, 1977. *Introduction to orientation in Art, Politics, and Will: Essays in Honor of Lionel Trilling*, edited by Quentin Anderson et al. Copyright

**References Books**

- Post-colonial Studies Reader. eds. Griffith Garreth and Tiffin Helen ; References (7)
- S.S. Dulai, First and Only Sight: The Centre and the Circles of A.K. Ramanujan Poe
- Senghor, Leopold, 2015. *In Memoriam: Old Norse* Löffler, Leopold Frederik.

**E-Resources**

- [https://en.wikipedia.org/wiki/Postcolonial\\_literature#Postcolonial\\_feminist\\_literature](https://en.wikipedia.org/wiki/Postcolonial_literature#Postcolonial_feminist_literature)
- <https://www.thebritishacademy.ac.uk/blog/what-is-postcolonial-literature/>

**COURSE OUTCOMES**

CO.NO	On completion of this course, the students will be able to	Bloom's Level
CO-1	Understand the emerging trends in Post-Colonial Literature and theory.	K1, K2

<b>CO-2</b>	Interpret the Post -Colonial concepts found in different literary genres	<b>K3</b>
<b>CO-3</b>	Analyze the concept of cultural hybridity in post-colonial literature, exploring how authors represent the blending of different cultural influences and identities.	<b>K4</b>
<b>CO-4</b>	Examine the ethnocentric perspective of different colonial cultures with respect Post- Colonial literature	<b>K5</b>
<b>CO-5</b>	Critically analyze the political and social background of the third world nations.	<b>K6</b>

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	2	2	1
CO-2	3	3	3	3	3	1
CO-3	3	3	3	3	2	1
CO-4	3	3	3	3	3	2
CO-5	1	1	3	3	3	3

**High Correlation : 70%**

**Moderate correlation : 17%**

**Low Correlation : 13%**

**No Correlation : 0%**

**CORE INDUSTRY MODULE I – DIGITAL MEDIA**

**PENR204**

**Semester : II**

**Credits :3**

**Category : Core Industry Module**

**Hours/Week : 4**

**Class &Major : I MA English**

**Total Hours : 52**

**COURSE OBJECTIVES**

CO. No	To enable the students
CO1	Identify key terminology and concepts related to digital media, such as pixels, resolution, file formats, and compression techniques.
CO2	Investigate current trends and emerging technologies in digital media.
CO3	Develop innovative solutions to real-world challenges in digital media production
CO4	Critically evaluate digital media content and campaigns.
CO5	Assess the impact of digital media campaigns and strategies in achieving organizational objectives.

**UNIT - I Introduction to the Digital Media**

**10Hours**

Understanding Digital Media: Evolution and Development, Digital Media and its computer components, Digital Media Application Software: Word processing, Spreadsheet, Image Editing

**UNIT II Digital Media Characteristics**

**10Hours**

Characteristics of Digital Media: Digital, Interactive, Hypertext, Virtual, Dispersion, Telepresence

**UNIT III Internet as a Medium 11Hours**

Basics of Internet, Characteristics of Internet, Internet concepts, its working style & uses, Internet as a Medium: Conceptual & functional dimensions.

**UNIT IV Digital Audiences 10 Hours**

Understanding Audiences: Difference between Public, Crowd, Group, Mass & Audience

**UNIT V Digital Media Design 11Hours**

Essential of Digital Media Design, Design Blueprint, Digital Illustration, UI & UX, Photographic Imaging Process

**Text Books**

- Athique, A. (2013). *Digital media and society: An introduction*. John Wiley & Sons
- Dewdney, A., & Ride, P. (2006). *The Digital Media Handbook*. Routledge

**Reference Books**

- Feldman, T. (2003). *An introduction to digital media*. Routledge.
- Lindgren, S. (2017). *Digital media and society*. Sage

**E-Resources**

- <https://www.diva-portal.org/smash/get/diva2:1534731/FULLTEXT01.pdf>
- <https://www.sciencedirect.com/topics/social-sciences/digital-media>

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able	Bloom's Level
CO-1	Develop a foundational understanding of the theories and methods of media and communication studies	K1, K2
CO-2	Gain an advanced critical thinking skills in written analysis of text and visual media objects	K3
CO-3	Demonstrate technical skills in traditional and digital media, applying principles of design to their work.	K4
CO-4	Equip broad knowledge of software applications related to digital media.	K5
CO-5	Prepare web pages, print layouts, and animations that display both technical knowledge and design principles.	K6

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	2	2	1
CO-2	3	3	3	3	3	1
CO-3	3	3	3	3	3	2
CO-4	3	2	3	3	2	1
CO-5	3	3	3	3	3	2

**High Correlation : 70%**  
**Low Correlation : 13%**

**Moderate correlation : 17%**  
**No Correlation : 0%**

**APPROACHES TO ENGLISH LANGUAGE TEACHING  
 PENA 201**

**Semester : II Credits : 3**  
**Category : Elective IV Hours./Week : 4**  
**Class & Major : I M.A. English Total Hours. : 52**

**COURSE OBJECTIVES**

CO. No	To enable the students
CO-1	Enhance the learning and teaching skills of English
CO-2	Familiarize students about the basic concepts and theories related English language teaching
CO-3	Focus on the problems and consequences on language teaching
CO-4	Emphasis the development of language in teaching skills
CO-5	Understand the teaching aspects of ELT.

**UNIT - I A Brief History of Language Teaching 10 Hours**

The Grammar – Translation method; The Direct method; The Audiolingual method; Language teaching innovations in the nineteenth century.

**UNIT II – Nature of approaches and methods in Language Teaching 11Hours**

Active Listening, Critical Thinking, Organization , Reading Skills, Research Skills

1. Definition of Approach and method
2. Objectives, Syllabus, learning activities, roles of learners, teachers and materials of the following approaches:
  - Oral approach and situational language teaching
  - The Silent Way
  - Community Language Learning. Suggestopedia. Competency based Language teaching
  - Note Taking Skills

**UNIT III - Approaches of Methodology 11 Hours**

Listening Skills: (Visual, Auditory and Kinesthetic)

Research Oriented Learning: Stages of Research Based learning, Teacher’s Role, Student outcome, Current Communicative Approaches The Natural Approach, Cooperative language learning Content based instruction, Task-based language teaching

**UNIT IV Pedagogical Aspects in ELT 10 Hours**

Create Theatre Art, Teaching Aspects, Teaching Prose, Teaching Poetry, Teaching Grammar, Teaching of Non-Detailed Text.

### UNIT V Implementation of Media in ELT

10 Hours

Use of Media in ELT

- The integration of elements in multi- media language learningsystems
- BBC English by Radio and Television- an outline History
- Using BBC English by Radio and Television in the classroom
- Blogs and Microblogging.

#### Text Books

- Richards, Jack C., and Theodore S. Rodgers *Approaches and Methods InLanguage Teaching*. Cambridge University Press, 2015.
- *TheUseofMedia.in ELT*TheBritishCouncil1979ProducedinEnglandbytheBritish Council Printing and Publishing Department, London.

#### Reference Books

- Dr.Shaikh Mowla Methods of Teaching English.
- Dr. Gurav H.K Teaching Aspects of English Language.
- Philadelphia: Open. University Press. Harmer, Jeremy, 1998. How teach *English*. Introduction the Practice of. *English Language Teaching*( Second Edition).

#### E-Resources

- [http://www.ehow.com/way-5557572\\_effective-teaching-strategies-prose.htm/](http://www.ehow.com/way-5557572_effective-teaching-strategies-prose.htm/)
- <https://www.englishclub.com/efl/tefl-articles/tips/History-of-english-language-teaching/>
- <https://tesoladvantage.com/methods-and-approaches-of-english-teaching/>

### COURSE OUTCOMES

CO No.	On completion of the course the student will be able	Bloom's Level
CO-1	Describe various language assessment techniques, including formative and summative assessments, as well as standardized tests commonly used in ELT.	K1, K2
CO-2	Apply knowledge of language teaching methods in practical contexts, designing and implementing instructional activities aligned with specific methods, such as the Communicative Language Teaching (CLT) approach.	K3
CO-3	Evaluate how language acquisition theories are applied in real-world language teaching situations	K4
CO-4	Critically examine the socio-cultural dimensions of language teaching, exploring the intersections of language, culture, and identity in the learning process.	K5
CO-5	Propose an original research project in the field of English Language Teaching	K6

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	2	2	1
CO-2	3	3	3	3	3	1
CO-3	3	3	3	3	2	1
CO-4	3	3	3	3	3	2
CO-5	1	1	3	3	3	3

**High Correlation : 70%**  
**Low Correlation : 13%**

**Moderate correlation : 17%**  
**No Correlation : 0%**

**A GLIMPSE OF NOBEL LAUREATES  
PENA202**

<b>Semester : II</b>	<b>Credits : 3</b>
<b>Category : ELECTIVE-IV</b>	<b>Hours/Week : 4</b>
<b>Class &amp;Major : I MA English</b>	<b>Total Hours : 52</b>

**COURSE OBJECTIVES**

CO. No	To enable the students
CO1	Introduce the learners the Nobel Laureates of various genres of Literature
CO2	Familiarize students on various Nobel Laureates
CO3	Focus on interpreting the works of various Nobel Laureates
CO4	Critically evaluate the prescribed texts
CO5	Explain the Nobel Laureates contribution to the society

**UNIT - IDETAILED POETRY****11 Hours**

Pablo Neruda : If You Forget A Song of Despair, Ode to the Onion, Your  
Laughter

**NON-DETAILED POETRY**

Octavio Paz : As One Listens the Rain, The Street  
Rudyard Kipling : The Power of the Dog  
Seamus Heaney : Oracle

**UNIT- II DETAILED PROSE****11 Hours**

Nadine Gordimer : Loot  
Thomas Mann : Disorder and Early Sorrow, He Comes Round the Corner

**NON-DETAILED PROSE**

J.M. Coetzee :Excerpts from  
Disgrace Toni Morrison : Excerpt from Sula

**UNIT III DRAMA DETAILED DRAMA****10 Hours**

Harold Pinter : The Caretaker

**NON-DETAILED DRAMA**

George Bernard Shaw : Man and Superman

**UNIT IV SHORT STORIES**

**10 Hours**

Alice Munro : The Turkey Season, Differently, Runaway  
The Bear Came Over the Mountain, Boys and Girls

**UNIT V NOVELS**

**10 Hours**

John Steinbeck : The Pearl  
Gabriel Garcia Marquez : One Hundred Years of Solitude

**Text Books**

- Shankar, Shiv.(2012.)Nine Nobel Laureates in English Literature. OmegaPublications, New Delhi
- Harold Pinter (1991) The Caretaker. Faber & Faber; Main edition, London.

**Reference Books**

- Garcia Marquez, Gabriel .(2007) One Hundred Years Of Solitude, Penguin India.
- Munro, Alice. (2011) The Bear Came over the Mountain. Vintage Digital edition, Toronto.

**E-Resources**

- <https://www.britannica.com/biography/Pablo-Neruda>
- <https://www.britannica.com/pic/Nobel-Prize>
- <https://interestingliterature.com/2021/07/harold-pinter-the-caretaker-summary-analysis/amp/>

**COURSE OUTCOMES**

<b>CO. No</b>	<b>On completion of this course, students will</b>	<b>Bloom's Level</b>
<b>CO1</b>	Relate the outstanding works of Nobel Laureates in an idealistic direction that adds the greatest benefit to humankind.	<b>K1</b>
<b>CO2</b>	Interpret the works of various Nobel Laureates.	<b>K2</b>
<b>CO3</b>	Analyze the different themes with regard to social, Political and cultural aspects.	<b>K3</b>
<b>CO4</b>	Appreciate and comprehend the ideas presented in Nobel Laureates in Literature.	<b>K4</b>
<b>CO5</b>	Classify the influence of Nobel Laureates in Literature.	<b>K5</b>



**LANGUAGE AND LINGUISTICS**  
**PEND201**

<b>Semester</b>	: II	<b>Credits</b>	: 2
<b>Category</b>	: Skill Enhancement Course	<b>Hours/Week</b>	: 3
<b>Class&amp; Major:</b>	II M.A English	<b>Total Hours</b>	: 39

**COURSE OBJECTIVES**

CO No.	To enable the students
CO-1	Recognize the need for learning correct (RP) pronunciation.
CO-2	Examine different stages of speech production.
CO-3	Organize the criteria for the description of English vowels and consonants
CO-4	Defend with the use supra-segmental features.
CO-5	Develop the structural, grammatical and functional aspects in language.

**Unit-I THE HISTORY OF ENGLISH LANGUAGE 9 Hours**

The descent of English language; Old English Period; Middle English; Renaissance & After; Growth of Vocabulary; Change of Meaning; Evolution of Standard English.

**Unit- II PHONOLOGY 6 Hours**

Air stream mechanisms - The organs of speech – Classification and description of sounds, Cardinal Vowels, English Vowels, Diphthongs and Consonants, Transcription, Syllable

**Unit-III PHONOLOGY 9 Hours**

Accent, Rhythm and Intonation, Assimilation, Elision, Liaison and Juncture, Phonetic transcription of dialogues

**Unit-IV LEVELS OF LINGUISTIC ANALYSIS 6 Hours**

Morphology, Phrases Sentence, Grammar, phrases, semantics, Pragmatics, Discourse Analysis

**UNIT V SEMANTICS AND SYNTAX 9 Hours**

Semantics - Properties of Meaning- Syntax

**Text Book:**

- Yule, G. (2017). The Study of Language (7th edition). Cambridge: Cambridge University Press. Oxford University Press, Oxford.
- Bala subramanian .(1993) A Textbook of English Phonetics for Indian Students. Madras Macmillan.
- Wood F.T.( , 2001) An Outline History of the English Language. Madras. Macmillan.
- Hall, Christopher, J. (2008). Introduction to Language & Linguistics. Delhi: Vivabooks.

**Reference Books:**

- Akmajian, A; Demers, R.A.; Farmer, A.K. and Harnish, R.M.( 2001). Linguistics: An Introduction to Language and Communication. MIT, Cambridge, USA.
- Fasold, R. & J. Connor-Linton. (2006). An introduction to language and linguistics. Cambridge: Cambridge University Press,
- Fromkin, V., and R. Rodman and Nina Hyams. (2013). An Introduction to Lan-guage. New York: Cengage Learning. (10thEdition).
- Majumdar, A. (2014). Bhasha-Prasanga O dhvanivijnan, Kolkata, Deys Publishers.

### E –Resources

- <https://linguistics.ucla.edu/people/stabler/20-14.pdf>
- <https://linguistics.ucla.edu/people/Kracht/courses/ling20-fall07/ling-intro.pdf>

### COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Understand the concepts of linguistics	K1
CO-2	Discuss the basic symbols of the International Phonetic Alphabet.	K2
CO-3	Demonstrate intrinsic values of language usage.	K3
CO-4	Argue the various aspects of articulation effects.	K5
CO-5	Design structures of modern English and to write transcription.	K6

### III AND IV EVALUATION COMPONENTS OF CIA

SEMESTER	CATEGORY	COURSE CODE	COURSE TITLE	COMPONENT-III	COMPONENT-IV
I	Major Core	PENM123	English Poetry	Writing poems	Seminar
	Major Core	PENM124	English Drama	Assignment	Enactment
	Major Core	PENM125	English Fiction	Assignment	Seminar
	Major Core	Professional Competency Course	English for Competitive Examinations	Prepare Question Bank	Group Discussion
	Elective– II	PENA102	Indian Writing in English	Assignment	Seminar
	Elective–I	PENA101	Theatre Art	Poster Presentation	Enactment
II	Major Core	PENM223	American Literature	Writing or Paper Presentation	Seminar
	Major Core	PENM224	Shakespeare Studies	Assignment	Enactment
	Major Core	PENM225	Post-colonial Theory and Literature	Paper Presentation	Group Discussion
	Core Industry Module	PENR204	Digital Media	Poster Presentation	Seminar
	Elective - III	PENA201	Approaches to English Language Teaching	Seminar	Paper Presentation
	Elective Course –	PENA202	A Glimpse of Nobel Laureates	Quiz	Seminar
	Skill Enhancement Course (Discipline Specific)	PEND201	Language & Linguistics	Assignment	Seminar

## DEPARTMENT OF BUSINESS ADMINISTRATION

### PREAMBLE:

**UG:** Programme Profile and the Syllabi of courses from I to II semesters along with evaluation components III and IV (With effect from 2023 – 2026 Batch onwards).

### PROGRAM PROFILE OF BUSINESS ADMINISTRATION

#### LEARNING OUTCOMES- BASED CURRICULUM FRAMEWORK

PSO No.	Upon completion of the Programme, the students will be able to
PSO-1	Understand and remember the concepts of various disciplines of management, economics, accounting, marketing, finance, human resource and corporate governance.
PSO-2	Apply conceptual foundations of management to solve practical decision-making problems.
PSO-3	Execute technical competence in domestic and global business through the study of various dimensions in the field of business studies.
PSO-4	Develops overall personality through proper education skill enhancement courses & inculcate human values.
PSO-5	Create an impact of managerial decisions on global economic and environmental context.
PSO-6	Acquire Entrepreneurial traits start to manage their own innovative business successfully.

### COURSE PROFILE BUSINESS ADMINISTRATION

Semester	Part	Category	Course Code	Course Title	Hours/Week	Credit	
I	I	Language: Tamil/Hindi / French	UTAL110/ UHIL101/ UFRL101	General Tamil –I / Hindi I / French I	5	3	
	II	English	UENL111	General English I	5	3	
	III		Core Course I	UBAM101	Principles of Management	5	4
			Core Course II	UBAM102	Accounting for Managers I	5	4
			Allied – Discipline Non-Specific Elective- I	UBAA101	Managerial Economics	4	3
	IV		Foundation Course	UBAF101	Office Management	2	2
			Skill Enhancement course – NME I /			2	2

		SEC I				
		Ability Enhancement Compulsory Course (AECC 1)- Soft Skill			2	2
				<b>Total</b>	<b>30</b>	<b>23</b>
<b>II</b>	I	Language: Tamil/Hindi / French	UTAL210/ UHIL102/ UFRL102	General Tamil –II / Hindi II / French II	5	3
	II	English	UENL211	General English II	5	3
	III	Core Course III	UBAM203	Business Communication	5	4
		Core Course IV	UBAM204	Accounting for Managers II	5	4
		Allied II / GE II	UBAO202	International Trade	4	3
		Internship/Industrial Training	UINS201	Semester vacation 30 Hrs Summer vacation 60 Hrs	-	-/2
	IV	Skill Enhancement course - SEC –II (Non Major Elective)			2	2
		Skill Enhancement course - SEC –III Discipline / Subject Specific)	UBAD201	Integrated Marketing Communications	2	2
		(AECCII) Soft Skill– II	USKS203	Soft Skill - II	2	2
	V	Extension Activity/ Physical Education/NCC			-	1/2
VI	Value Added Course			-	-/2	
			<b>Total</b>	<b>30</b>	<b>24/29</b>	
<b>III</b>	I	Language: Tamil/Hindi / French	UTAL310/ UHIL103/ UFRL103	General Tamil –III / Hindi III / French III	5	3
	II	English	UENL311	General English III	5	3
	III	Core Course V	UBAM305	Organizational Behaviour	4	4
		Core Course VI	UBAM306	Marketing Management	4	4
		Allied III / GE III	UBAA303	Business Statistics	4	3
	IV	Skill Enhancement course - NME IV / SEC IV Discipline / Subject Specific)	UBAD301	Company law and secretarial practices	2	2
		Skill Enhancement course- NME V / SEC V Entrepreneurial	UBAU301	Startup and venture management	2	1
Ability Enhancement Compulsory Course		USKS303	Soft Skill-3	2	2	

		(AECCIII)Soft Skill– III				
		Value Education	UGEV301		2	2
				<b>Total</b>	<b>30</b>	<b>24</b>
<b>IV</b>	I	Language: Tamil/Hindi / French	UTAL410/ UHIL104/ UFRL104	General Tamil –IV / Hindi IV/ French IV	5	3
	II	English	UENL411	General English IV	5	3
	III	Core Course VII	UBAM407	Human Resource Management	5	4
		Core Course VIII	UBAM408	Management Information system	5	4
		Allied IV / GE IV	UBAA404	Operations Research	4	3
		Online course *	UONL 401		2	2
	Internship/Industrial Training	UINS401		-	-/2	
	IV	Skill Enhancement course- NME VI / SEC VI- Discipline specific	UBAD401	Talent Management	2	2
		Ability Enhancement Compulsory Course (AECC– IV) - Soft Skill– IV	USKS403	Soft Skill - 4	2	2
	V	Extension Activity/ Physical Education/NCC			-	-/2
VI	Value Added Course			-	-/2	
				<b>Total</b>	<b>30</b>	<b>23/29</b>
<b>V</b>	III	Core Course IX	UBAM509	Advertising Management and Sales Promotion	5	4
		Core Course X	UBAM510	Research Methodology	5	4
		Core Course XI	UBAM511	Operations Management	5	4
		Allied V / GE V	UBAA505	Digital Marketing	5	3
		Allied V / GE V	UBAA506	Industrial Relations	4	3
			UBAA507	Financial Literacy		
	Project	UBAP501	Project with Viva - Voce	4	4	
IV	Environmental Studies	UGEV501		2	2	
				<b>Total</b>	<b>30</b>	<b>24</b>
<b>VI</b>	III	Core Course XII	UBAM612	Materials Management	5	4
		Core Course XIII	UBAM613	Services Marketing	5	4
		Core Course XIV	UBAM614	Business Taxation	5	4
		Allied VI / Discipline	UBAO608	Consumer Behaviour	6	4

<b>VI</b>		Elective VI	UBAO609	Competency Mapping		
			UBAO610	Security Analysis & Portfolio Management		
		Allied VII / Discipline Specific VII	UBAO611	Logistics and Supply Chain Management	5	3
			UBAO612	E-Business		
		Comprehensive Viva-Voce			-	1
		Internship / Industrial Training (semester vacation 30 Hrs/) UINS601	-	-	-	-/2
	IV	Professional Competency Enhancement	UBAC 601	Quantitative Aptitude I And Quantitative Aptitude II (2 hours each)	4	2
	V	Extension Activity Physical Education/NCC			-	-/2
	VI	Value Added Course			-	-
			<b>Total</b>			<b>30</b>
		<b>Overall Total</b>			<b>180</b>	<b>140/155</b>

### COURSES OFFERED TO OTHER DEPARTMENTS

#### NON MAJOR ELECTIVES (NME)

Semester	Part	Category	Course Code	Course Title	Hour/Week	Credit Min/Max
I	IV	Non Major Elective-I	UBAE101	Basics of event management	2	2
II	IV	Non Major Elective-II	UBAE202	Managerial skill development	2	2
II	IV	Non Major Elective-II	UBAE203	Business etiquette and corporate grooming	2	2
III	IV	Non Major Elective-III	UBAE304	Computer application in business	2	2
III	IV	Non Major Elective-III	UBAE305	Entrepreneurial skill new venture management	1	1
IV	IV	Non Major Elective-III	UBAE406	Tally	2	2
IV	IV	Non Major Elective-III	UBAE407	Intellectual property rights	2	2

## EXPERIENTIAL LEARNING

(Only for Interested Students)

Course mapping				Collaborating agency- Small Scale Industries		
Semester	Course Code	Course Title	Assessment	Industry Agency	Hour/Days/ Month	Mode of Evaluation
III	UBAM307	Entrepreneurial Development	Component III	Shabana Pottery Industry	2 Days	Reflection
V	UBAM618	Service Marketing	Component IV	Pipdic Industry	2 Days	Reflection

## PRINCIPLES OF MANAGEMENT UBAM101

**Semester** :I  
**Category** :Core Course I  
**Class &Major** :I BBA

**Credits** :04  
**Hours/week** :05  
**Total Hours** :65

### Course Objectives:

CO No.	To enable the students to
CO-1	Know about evolution of management
CO-2	Understand the planning process and importance of decision making in organization
CO-3	Apply the Management principles in organization
CO-4	Analyze the process of effective controlling in organization
CO-5	Assess the significance of ethics in business and its implications.

### UNIT I INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS

**13 Hours**

Definition – nature, process and significance of management –Role of managers – Managerial Skills and Roles - Evolution of Management Thought : Classical Management Approaches, Behavioral Management Approaches, Quantitative Management Approaches, Modern Management Approaches - Management as a Science or Art - Management as a profession- Administration and Management- Functions of Management – Functional Areas of Management.

### UNIT II PLANNING AND DECISION MAKING

**13 Hours**

Planning - Nature and Importance of Planning- Types of Plans - Levels of Planning - Steps in planning - Making Effective Plans- Management By Objective (MBO) –Management By Exception (MBE) - Policy and Strategy- Forecasting and Decision Making - Nature of decision making - Types of decisions – Decision Making Process – Rational Perspectives and Behavioural Aspects of decision making

### **UNIT III ORGANIZING**

**13 Hours**

Organizing - Nature and purpose - Principles of Organization - Types of Organization - Organisational Structure and Design – Line, Staff and functional authority – Conflict between Line and Staff – Overcoming the Line-Staff Conflict. Committees, Departmentation - Span of control – Authority, Responsibility and Accountability - Principles of Delegation - Steps - Centralization Vs Decentralization – Factors determining the degree of Decentralization of authority.

### **UNIT IV STAFFING**

**13 Hours**

Staffing - Nature and Purpose of staffing – Importance of staffing – Components of Staffing - Manpower planning - Recruitment and Selection - Training and Development – Performance Appraisal.

### **UNIT V DIRECTING AND CONTROLLING**

**13 Hours**

Directing – Nature of Directing function - Principles – Importance of Effective Direction – Motivating people at work – Motivation theories: Early theories, Contemporary theories – Morale Building – Job Satisfaction - Effective Communication skills for directing – Barriers of communication. Controlling - Concept, Nature and Importance - Essentials of Control - Requirements of an Effective Control System.

#### **Text Books**

- L.M.Prasad (2018), *Principles & Practice of Management*, Sultan Chand & Sons (8th Ed.), Purvanchal University, Janpur (U.P).

#### **Reference Books**

- JAF Stoner, Freeman R.E and Daniel R Gilbert (2004), *Management*, (6th Ed), Pearson Education.
- Stephen A. Robbins & David A. Decenzo & Mary Coulter (2011), *Fundamentals of Management* (7th Ed), Pearson Education.



### e- Resources

- <https://www.toolshero.com/management/14-principles-of-management/>
- <https://open.umn.edu/opentextbooks/textbooks/693>
- <https://open.umn.edu/opentextbooks/textbooks/34>
- <https://openstax.org/subjects/business>
- <https://blog.hubspot.com/marketing/management-principles>

### Course Outcomes:

CO.No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Understand the basic concepts involved in planning and decision making of conceptual knowledge.	K1, K2
CO-2	Compare and contrast the Principles of various organisational designs.	K2
CO-3	Apply the concepts for the effective functioning of a management.	K3
CO-4	Develop the leadership style to anticipate the consequences of each leadership style.	K3
CO-5	Examine the techniques for controlling and coordination of the Management.	K4

### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	2	1	2	2
CO-2	3	2	2	2	3	2
CO-3	3	3	3	2	2	2
CO-4	2	3	3	3	2	2
CO-5	3	3	2	3	3	2

High Correlation: 46 %    Medium Correlation: 53 %    Low Correlation: 3 %

## ACCOUNTING FOR MANAGERS I

### UBAM102

Semester	:I	Credits	:04
Category	:Core Course II	Hours/week	:05
Class & Major	:I BBA	Total Hours	:65

### Course Objectives:

CO No.	To enable the students to
CO-1	Know about basic concepts of accounting its applications
CO-2	Analyze and interpret financial reports of a company
CO-3	Understand the gross profit and net profit earned by organization
CO-4	Know about Depreciation Accounting.
CO-5	Understand the procedures of Accounting under Single entry system.

#### UNIT I INTRODUCTION

**13 Hours**

Meaning and scope of Accounting, Basic Accounting Concepts and Conventions – Objectives of Accounting – Accounting Transactions – Double Entry Book Keeping – Journal, Ledger, Preparation of Trial Balance

#### UNIT II CASHBOOK AND ACCOUNT STATEMENT

**13 Hours**

Subsidiary book – Preparation of cash Book – Bank reconciliation statement – rectification of errors – Suspense account.

#### UNIT III FINAL ACCOUNTS

**13 Hours**

Preparation of Final Accounts – Adjustments – Closing stock, outstanding, prepaid and accrued, depreciation, bad and doubtful debts, provision and discount on debtors and creditors, interest on drawings and capital, Abnormal loss, managerial remuneration.

#### UNIT IV PARTNERSHIP ACCOUNTS

**13 Hours**

Partnership Accounts- Basic concepts of admission, retirement and death of a partner including treatment of goodwill. Depreciation – Meaning, Causes, Types – Straight Line Method – Written Down Value Method

#### UNIT V SINGLE ENTRY & DOUBLE ENTRY

**13 Hours**

Single Entry – Meaning, Features, Defects, Differences between Single Entry and Double Entry System – Statement of Affairs Method – Conversion Method.

#### Text Books

- Goel.D.K and Shelly Goel (2018), *Financial Accounting (2nd Ed)*, Arya Publications.
- Jain .S.P & Narang .K (1999), *Financial Accounting (4<sup>th</sup> Ed)*, Kalyani Publishers, Ludhiana.

#### Reference Books

- TS Reddy & amp, A.Murthy (2019) *Financial Accounting (6th Ed)* -Margham Publications.

- David Kolitz (2017), *Financial Accounting* – Taylor and Francis group, USA

#### E-resources

- [https://ebooks.lpude.in/management/mba/term\\_1/DMGT403\\_ACCOUNTING\\_FOR MANAGERS.pdf](https://ebooks.lpude.in/management/mba/term_1/DMGT403_ACCOUNTING_FOR MANAGERS.pdf)
- <https://www.drnishikantjha.com/booksCollection/Accounting%20for%20Management%20for%20MBA%20.pdf>
- <https://www.accountingtools.com/articles/2017/5/15/basic-accounting-principles>
- [https://en.wikipedia.org/wiki/Single-entry\\_bookkeeping\\_system](https://en.wikipedia.org/wiki/Single-entry_bookkeeping_system)
- <https://www.profitbooks.net/what-is-depreciation>

#### Course Outcomes:

CO No.	On completion of the course the student will be able to	Bloom's Level
CO1	Recall and explain fundamental accounting principles and concepts.	K1
CO2	Demonstrate the applications of advanced financial accounting principles and costing methods.	K2
CO3	Interpret the ethical considerations in accounting practices, including the responsibilities of management and auditors, and comprehend their impact on financial decision-making	K2
CO4	Apply budgeting and forecasting techniques, accounting for income taxes, IFRS, and strategic management accounting.	K3
CO5	Analyze consolidated financial statements, costing methods, capital budgeting decisions and performance measurement systems.	K4

#### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	2	2	2
CO-2	3	3	3	2	3	2
CO-3	2	3	3	3	2	1
CO-4	2	3	3	2	3	2
CO-5	3	2	3	2	3	1

**High Correlation: 67 %      Medium Correlation: 23 %      Low Correlation: 10 %**

## MANAGERIAL ECONOMICS

### UBAA101

<b>Semester</b>	<b>:I</b>	<b>Credits</b>	<b>:03</b>
<b>Category</b>	<b>:Allied I / GE I</b>	<b>Hours/week</b>	<b>:04</b>
<b>Class &amp;Major</b>	<b>:I BBA</b>	<b>Total Hours</b>	<b>:52</b>

**Course Objectives:**

CO No.	To enable the students to
CO-1	Know the concepts of economics and its relevant in business scenario
CO-2	Understand the applications & implications of economics in decision-making and problem solving.
CO-3	Analyze the optimal point of productivity of a firm.
CO-4	Evaluate the pricing strategies that are consistent with evolving marketing needs
CO-5	Analyze the various market structures in an economy.

**UNIT I INTRODUCTION****10 Hours**

Nature and scope of managerial economics – definition of economics – important concepts of economics – relationship between micro, macro and managerial economics – nature and scope – objectives of firm.

**UNIT II DEMAND ANALYSIS****10 Hours**

Demand analysis – Theory of consumer behavior – Marginal utility analysis – indifference curve analysis Meaning of demand – Law of demand – Types of demand-Determinants of demand – Elasticity of demand –Demand forecasting.

**UNIT III FACTORS OF PRODUCTION****12 Hours**

Production and Scrap analysis – Production – Factors of production – production function – Concept – Law of variable proportion – Law of return to scale and economics of scale – Scrap analysis – Different cost concepts – Cost output relationship short run and long run – Revenue curves of firms – Law of Supply. Determinants of Supply analysis.

**UNIT IV PRICING METHODS****10 Hours**

Pricing methods and strategies – Objectives – Factors – General consideration of pricing – methods of pricing – Dual pricing – Price discrimination

**UNIT V MARKET STRUTURE****10 Hours**

Market classification – Perfect competition – Monopoly – Monopolistic competition – Duopoly – Oligopoly.

**Text Books**

- Dr. S. Sankaran (2019); *Managerial Economics (5<sup>th</sup> Ed)*, Margham Publication, Chennai.
- Thomas and Maurice (2017) *Managerial Economics (10<sup>th</sup> Ed)*, McGraw Hill Education.

### Reference Books

- Mithani D.M. (2016), *Managerial Economics (1<sup>st</sup> Ed)*, Himalaya Publishing House, Mumbai.
- Mehta P.L (2016), *Managerial Economics (4<sup>th</sup> Ed)*, Sultan Chand & Sons, New Delhi.

### e-resources

- <https://www.studocu.com/row/document/azerbaycan-dovlet-iqtisad-universiteti/business-and-management/lecture-notes-on-managerial-economics/6061597>
- <http://www.simplynotes.in/e-notes/mbabba/managerial-economics/>
- <https://businessjargons.com/determinants-of-elasticity-of-demand.html>

### Course Outcomes:

CO No.	On completion of the course the student will be able to	Bloom's Level
CO1	Remember the various economic concepts in individual & business decisions.	K1
CO2	Compare and contrast the factors influencing elasticity in different markets.	K2
CO3	Identify the demand concepts, underlying theories and identify demand forecasting techniques.	K3
CO4	Organize the cost functions to make informed production and pricing decisions	K3
CO5	Analyze market structures, economic externalities, government intervention, and economic forecasts.	K4

### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	2	2	2
CO-2	3	3	3	2	3	2
CO-3	2	3	3	3	2	1
CO-4	2	3	3	2	3	2
CO-5	3	2	3	2	3	1

**High Correlation: 53 %      Medium Correlation: 40 %      Low Correlation: 7 %**

## BASICS OF EVENT MANAGEMENT UBAE101

<b>Semester</b>	<b>:I</b>	<b>Credits</b>	<b>:02</b>
<b>Category</b>	<b>:NME</b>	<b>Hours/week</b>	<b>:02</b>
<b>Class &amp;Major</b>	<b>:I BBA</b>	<b>Total Hours</b>	<b>:26</b>

### Course Objectives:

CO No.	To enable the students to
CO1	Know the basic of event management its concepts
CO2	Demonstrate ability in an event design

CO3	Evaluate the feasibility analysis for event.
CO4	Understand the 5 Ps of Event Marketing
CO5	Asses the financial aspects of event management and its promotion

## **UNIT I INTRODUCTION TO EVENT**

**5 Hours**

Scope – Nature and Importance – Types of Events – Unique features and similarities – Practices in Event Management – Duties and Responsibilities of Event Manager – Key steps to a successful event

## **UNIT II THE DYNAMICS OF EVENT MANAGEMENT**

**5 Hours**

Event Planning and Organizing – Leadership traits and Characteristics – Event Proposal – SWOC (Strength, Weakness, Opportunity and Challenges) Analysis – Event Budget – Implementation – Evaluation – Site and Infrastructure Management.

## **UNIT III EVENT MARKETING**

**5 Hours**

Customer Care Equipment and Tools – Promotion, Media Relation and Publicity – Event Coordination – Visual and Electronic Communication – Event Sponsorship – Event Presentation – Event Evaluation.

## **UNIT IV EVENT PLANNING**

**6 Hours**

Event Planning & Promotion – Marketing & Promotion – 5Ps of Event Marketing – Product, Price, Place, Promotion, Public Relations.

## **UNIT V EVENT BUDGET**

**5 Hours**

Event Budget – Financial Analysis – Event Cost – Event Sponsorship.

### **Text Books:**

- Chaudhary & Krishna (2022), *Event Management (1<sup>st</sup> Ed)*, Bio-Green Publishers
- Razaq Raj, Paul Walters & Tahir Rashid (2017), *Event management (3<sup>rd</sup> Ed)*, An integrated & practical approach, SAGE Publications Ltd.

### **Reference Books**

- Joe Goldblatt (2005), *Special events : A New Generation and the Next Frontier (6<sup>th</sup> Ed)*, John Wiley & Sons.
- Meegan Jones(2017), *Sustainable Event Management: A Practical Guide (3<sup>rd</sup> Ed)*.

**e-resources**

- <https://www.himpub.com/documents/Chapter760.pdf>
- <https://hmhub.in/event-management/>

**Course Outcomes**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO1	Remember the key concepts related to event management.	K1
CO2	Compare different event planning methodologies and strategies.	K2
CO3	Summarize the essential steps involved in planning an event.	K2
CO4	Apply the tools to plan and organize tasks effectively.	K3
CO5	Analyze risks, logistical aspects, and stakeholder communication.	K4

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	2	3	2
CO-2	3	3	3	2	2	3
CO-3	3	3	3	3	2	3
CO-4	3	2	3	2	3	2
CO-5	3	1	3	1	3	2

**High Correlation: 63 % Medium Correlation: 30 % Low Correlation: 7 %**

## OFFICE MANAGEMENT UBAF101

<b>Semester</b>	<b>:I</b>	<b>Credits</b>	<b>:02</b>
<b>Category</b>	<b>: Foundation Course</b>	<b>Hours/week</b>	<b>:02</b>
<b>Class &amp;Major</b>	<b>:I BBA</b>	<b>Total Hours</b>	<b>:26</b>

**Course Objectives:**

CO No.	To enable the students to
CO-1	Understand the basics of office management
CO-2	Analyse the roles and responsibilities of Office Administrator
CO-3	Understand the record management
CO-4	Acquired knowledge on the correspondence in office
CO-5	Familiar with reports writing

**UNIT I INTRODUCTION****5 Hours**

Office management – Meaning – Elements of office management – Functions of office

management.

## **UNIT II OFFICE ORGANISATION**

**5 Hours**

Office organization – Definition, Characteristics and Steps – Types of Organization – Functions of an Office administrator.

## **UNIT III RECORDS MANAGEMENT**

**6 Hours**

Office record management – Importance – Filing essentials –Classification and arrangement of files-Modern methods of filing-Modern filing devices.

## **UNIT IV OFFICE CORRESPONDENCE**

**5 Hours**

Office Communication – Correspondence and Report writing –Meaning of office communication & mailing.

## **UNIT V OFFICE FORMS & LETTERS**

**5 Hours**

Form letters –Meaning, Principles, and Factors to be considered in designing office forms – Types of report writing.

### **Text Books**

- R.S.N.Pillai Bagavathi(2010),Office Management(2nd Ed),S Chand & Company.
- Dr.I.M.Sahai (2019), Office Management and Secretarial Practice (1st Ed), Sahitya Bhawan Publications.

### **Reference Books**

- Jonathan Mcilroy(2018) ,The New Executive Assistant: Exceptional executive office management(1st Ed), Executive Assistant Network.
- R.C.Bhatia(2005) Principles of Office Management(1st Ed), Lotus Press, New Delhi.

### **e-resources**

- <https://www.himpub.com/documents/chapter871.pdf>
- <https://www.studocu.com/row/document/kca-university/instructional-methods/cba-0014-office-management-notes/17884288>
- <https://www.scribd.com/doc/222281422/Office-Management-Notes>

### **Course Outcomes:**

<b>CO No.</b>	<b>On completion of the course the student will be able to</b>	<b>Bloom's Level</b>
CO1	Recall the key terms and concepts of office management.	K1



CO2	Compare the various process involved in office management.	K2
CO3	Build the office management skills and software applications in practical scenarios.	K3
CO4	Identify the different office management strategies and implement time management techniques in an office setting.	K4
CO5	Analyze organisational structures and identify potential issues.	K4

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	2	3	2	3
CO-2	3	3	2	3	3	2
CO-3	3	3	3	3	2	2
CO-4	3	3	2	3	3	3
CO-5	3	2	3	3	3	1

**High Correlation: 66 %    Medium Correlation: 30 %    Low Correlation: 3 %**

**BUSINESS COMMUNICATION  
UBAM203**

<b>Semester</b>	<b>:II</b>	<b>Credits</b>	<b>:04</b>
<b>Category</b>	<b>: Core Course III</b>	<b>Hours/week</b>	<b>:05</b>
<b>Class &amp;Major</b>	<b>:I BBA</b>	<b>Total Hours</b>	<b>:65</b>

**Course Objectives:**

CO No.	To enable the students to
CO-1	Educate students role & importance of communication skills
CO-2	Analyze their listening, reading, writing & speaking communication skills.
CO-3	Develop the modern communication skill for managers.
CO-4	Understand the skills required for facing interview
CO-5	Facilitate the students to understand the concept of Communication.

**UNIT I INTRODUCTION**

**13Hours**

Definition – Methods – Types – Principles of effective Communication – Barriers to Communication – Communication etiquette. Resume Writing.

**UNIT II BUSINESS LETTERS**

**13 Hours**

Business Letter – Layout- Kinds of Business Letters: application, offer, acceptance/ acknowledgement and promotion letters. Business Development Letters – Enquiry, replies, Order,

Sales, circulars, Grievances- Letters of complaints – Collection letters –Status enquiries. Handling Customer Complaints.

### **UNIT III INTERVIEWS**

**13 Hours**

Interviews- Direct, telephonic & Virtual interviews- Group discussion – Presentation skills – body language.

### **UNIT IV BUSINESS REPORTS**

**13 Hours**

Communication through Reports – Essentials – Importance – Contents - Reports by individuals – Committees – Annual report – Application for appointment – reference and appointment orders – Internal communication: Short speeches – Memo – Circulars – Notices – Explanations to superiors - Agenda- Minutes of Meeting.

### **UNIT V MODERN FORMS OF COMMUNICATION**

**13 Hours**

Modern Forms of Communication: podcasts, Email, virtual meetings – Websites and their use in Business – social media- Professional Networking sites.

#### **Text Books**

- Krishan Mohan & Meena Banerji(2008), *Developing Communication Skills*, Macmillan India Ltd.
- Rajendra Paul & J S Kovalahalli(2017), *Essentials of Business Communication*, Sultan Chand & Sons, New Delhi.

#### **Reference Books**

- Bovee Thill Schatzman, *Business Communication Today* - Pearson Education Private Ltd, New Delhi.
- Michael Brown(2008),*Making Presentation Happen*, Allen & Unwin, Australia.

#### **e-resources**

- [https://www.managementstudyguide.com/business\\_communication.html](https://www.managementstudyguide.com/business_communication.html)
- <https://studiousguy.com/business-communication/>
- <https://www.oercommons.org/curated-collections/469>

#### **Course Outcomes:**

<b>CO No.</b>	<b>On completion of the course the student will be able to</b>	<b>Bloom's Level</b>
CO1	Remember the business communication concepts.	K1

CO2	Compare the communication process and its barriers.	K2
CO3	Develop oral communication skills & face the interviews confidently.	K3
CO4	Discover effective strategies in a diverse business environment and analyze the potential challenges and solutions related to intercultural communication.	K4
CO5	Develop business letters to face the challenges according to the need of organizational sectors.	K4

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	2	3	2	2
CO-2	3	3	3	3	3	3
CO-3	3	3	3	2	3	2
CO-4	3	1	3	2	1	1
CO-5	3	3	3	2	2	1

**High Correlation: 57 % Medium Correlation: 30 % Low Correlation: 13 %**

**ACCOUNTING FOR MANAGERS II  
UBAM204**

<b>Semester</b>	<b>:II</b>	<b>Credits</b>	<b>:04</b>
<b>Category</b>	<b>: Core Course IV</b>	<b>Hours/week</b>	<b>:05</b>
<b>Class &amp; Major</b>	<b>:I BBA</b>	<b>Total Hours</b>	<b>:65</b>

**Course Objectives:**

CO.No.	To enable the students to
CO-1	Analyze the basic of cost concepts and classification.
CO-2	Develop skills in tools & techniques and critically evaluate decision making in business.
CO-3	Understand various ratios and cash flow related to finance
CO-4	Evaluate the role of budgets and variance as a tool of planning and control.
CO-5	Gain knowledge on the fundamental principles of accounting and use them in day-to-day business scenarios

**UNIT I INTRODUCTION**

**13Hours**

Cost accounting – Meaning, nature, scope and functions, need, importance and limitations-  
Cost concepts and classification – cost sheets – Tenders & Quotation.

**UNIT II MANAGEMENT ACCOUNTING**

**13 Hours**

Management accounting – Meaning, nature, scope and functions, need, importance and limitations – Management Accounting vs. Cost Accounting. Management Accounting vs. Financial Accounting.

Analysis and Interpretation of financial statements – Nature, objectives, essentials and tools, methods – Comparative Statements, Common Size statement and Trend analysis.

**UNIT III RATIO ANALYSIS**

**13 Hours**

Ratio Analysis – Interpretation, benefits and limitations. Classification of ratios - Liquidity, Profitability, turnover.

**UNIT IV BUDGETARY CONTROL**

**13 Hours**

Budgets and budgetary control – Meaning, objectives, merits and demerits – Sales, Production, flexible budgets and cash budget.

**UNIT V MARGINAL COSTING**

**13 Hours**

Marginal Costing – CVP analysis – Break even analysis.

**Text Books**

- Gupta, R.L and M. Radhaswamy(2016), *Advanced Accountancy*,Sultan Chand & Sons.
- T. S. and A .Murthy(2007),*Management Accounting*, Margham Publications,Chennai.

**Reference Books**

- Antony Atkinson, Rebert S Kalpan(2015), *Advance Management Accounting*, Pearson Publications.
- T. S. Reddy and Hari Prasad Reddy(2016)- *Management Accounting*, Margham Publications,Chennai.

**e-resources**

- <https://www.toppr.com/guides/fundamentals-of-accounting/fundamentals-of-cost-accounting/meaning-of-management-accounting/>
- <https://efinancemanagement.com/financial-accounting/management-accounting>
- <http://www.accountingnotes.net/management-accounting/management-accountingmeaning-limitations-and-scope/5859>

**Course Outcomes:**

CO No.	On completion of the course the student will be able to	Bloom’s Level
CO1	Recall and explain fundamental accounting principles and concepts.	K1
CO2	Demonstrate the applications of advanced financial accounting principles and costing methods.	K2
CO3	Interpret the ethical considerations in accounting practices, including the responsibilities of management and auditors, and comprehend their impact on financial decision-making	K2
CO4	Apply budgeting and forecasting techniques, accounting for income taxes, IFRS, and strategic management accounting.	K3
CO5	Analyze consolidated financial statements, costing methods, capital budgeting decisions and performance measurement systems.	K4

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	1
CO-2	3	3	3	2	3	3
CO-3	3	3	3	2	3	1
CO-4	3	3	3	2	3	3
CO-5	3	3	3	2	3	1

**High Correlation: 67 %      Medium Correlation: 23 %      Low Correlation: 10 %**

## INTERNATIONAL TRADE UBAA202

<b>Semester</b>	<b>:II</b>	<b>Credits</b>	<b>:03</b>
<b>Category</b>	<b>:Allied II/ GE -II</b>	<b>Hours/week</b>	<b>:04</b>
<b>Class&amp;Major</b>	<b>:I BBA</b>	<b>Total Hours</b>	<b>:52</b>

**Course Objectives:**

CONo.	To enable the students to
CO-1	Understand the basics & theories of International Trade.
CO-2	Gain knowledge about international trade organization.
CO-3	Develop the awareness about recent trends in International Trade and its implications.
CO-4	Identify the key areas and terms relating to trade in the global economy
CO-5	Gain knowledge on the various modes of entry and the roles played by global institutions in international business.

**UNIT I INTRODUCTION****10 Hours**

Difference between Internal and International Trade – Importance of International Trade in the Global context.

**UNIT II THEORIES OF FOREIGN TRADE****12 Hours**

Theories of Foreign Trade: - Absolute, Comparative, equal cost differences (Adam Smith, Ricardo, Haberler's Hechsher-Ohlin theories only).

**UNIT III BALANCE OF TRADE****10 Hours**

Balance of Trade, Balance of Payment – Concepts – Causes of Disequilibrium, Methods to Correct Disequilibrium – Fixed and Floating Exchange Rates.

**UNIT IV INTERNATIONAL MONETARY FUND****10 Hours**

International Monetary Fund – IMF – International Liquidity- IBRD- WTO and its implications

with special reference to India.

## UNIT V INTERNATIONAL BUSINESS

10 Hours

International business Overview – globalization – MNC – FDI – Export management – significance to GDP- Export procedure & documentation.

### Text Books

- Dr. S.Sankaran(2019), International Trade, Margham publications.
- Amrita Narlikar(2016),International Trade and Developing Countries: Bargaining Coalitions in the GATT & WTO, Routledge.

### Reference Books

- V.K. Bhalla(2013), International Business(1st Ed), S CHAND publications.
- Francis Cherunilam(2017), International Trade & Export Management(20th Ed), Himalaya Publications.

### e-resources

- <chromeextension://efaidnbmnnnibpcajpcglclefindmkaj/http://bgc.ac.in/pdf/study-material/International-Trade.pdf>
- <https://www.britannica.com/topic/international-trade>
- [www.imf.org/external/pubs/ft/fund/basics/trade.html](http://www.imf.org/external/pubs/ft/fund/basics/trade.html)
- <https://www.wto.org>
- <https://www.imt.org>

### Course Outcomes:

CO No.	On completion of the course the student will be able to	Bloom's Level
CO1	Remember the key concepts related to international trade, such as exports, imports, tariffs, and balance of trade.	K1
CO2	Summarize trade theories, exchange rates, trade regulations, and sustainable trade practices.	K2
CO3	Apply knowledge of trade finance, payment methods, and risk management in international trade	K3
CO4	Develop global trade patterns, trade policies, trade barriers, impact of globalization, international supply chains, and sustainable trade practices.	K3
CO5	Analyze the challenges and opportunities of sustainable trade practices and corporate social responsibility in international business.	K4

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	1	2	3	3
CO-2	3	3	2	3	2	1
CO-3	3	3	3	2	3	1
CO-4	3	3	3	2	3	1
CO-5	3	3	3	2	2	2

**High Correlation: 60%      Medium Correlation: 27 %      Low Correlation: 13 %**

**INTEGRATED MARKETING COMMUNICATIONS  
UBAD201**

<b>Semester</b>	<b>:I</b>	<b>Credits</b>	<b>:02</b>
<b>Category</b>	<b>: Foundation Course</b>	<b>Hours/week</b>	<b>:02</b>
<b>Class &amp;Major</b>	<b>:I BBA</b>	<b>Total Hours</b>	<b>:26</b>

**Course Objectives:**

CO No.	To enable the students to
CO-1	Understand the concepts of Marketing communication
CO-2	Develop an effectively use the tools and techniques of marketing communication
CO-3	Describe the IMC mix and the IMC planning Process Campaign
CO-4	Design a sales promotion campaign
CO-5	Select the avenue for public relations, publicity and corporate advertising for a consumer

**UNIT I INTRODUCTION****5 Hours**

Enhancing Brand Equity through IMC-Importance of IMC-Managing IMC, Barrier-Role of IMC in Building Brands.

**-UNIT II ADVERTISING****5 Hours**

Role of Advertisement-types of advertising-OMC Message Design-AIDA Model-considerations for Creative Idea Visualisation-IMC planning process-targeting.

**UNIT III Traditional Marketing****6 Hours**

Traditional vs Modern Media-Online and MOBILE Advertising-Social Media for Advertising and promotion-Social media communication.

**UNIT IV Direct Marketing****5 Hours**

Direct Marketing and other media-Advertising media-planning and Analysis-Measuring Ad Message effectiveness.

**UNIT V Consumer Protection****5 Hours**

Consumer Sales Promotion-Sampling and couponing-consumer sales promotion-premium and other promotions-public relations.

**Text Books**

- Dr. S.Sankaran(2019), *Integrated Marketing Communication*, Margham publications.

**Reference Books**

- Tannenbaum Robert (2015), *Integrated Marketing Communication (1<sup>st</sup> Ed)*, S CHAND publications.
- Francis Cherunilam(2017), *International Trade & Export Management(20<sup>th</sup> Ed)*, Himalaya Publications.

**Course Outcomes:**

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Recall the importance of self-confidence through various activities and exercises designed to enhance self-esteem and assertiveness.	K1
CO-2	Summarize the principles effectively in simulated scenarios and real-world situations.	K2
CO-3	Identify the strategies to enhance emotional intelligence by practicing the planning of marketing Communication.	K3
CO-4	Solve the complex problems using critical-thinking skills, logical reasoning, and evidence-based decision-making techniques.	K3
CO-5	Analyze a positive environment for change by applying change management principle.	K4

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	3	2	2
CO-2	3	3	3	2	2	2
CO-3	3	3	3	3	2	3
CO-4	3	3	2	3	3	1
CO-5	3	2	3	3	2	2

**High Correlation: 60%      Medium Correlation: 37 %      Low Correlation: 3 %**



## MANAGERIAL SKILL DEVELOPMENT UBAE202

<b>Semester</b>	<b>:II</b>	<b>Credits</b>	<b>:02</b>
<b>Category</b>	<b>:NME</b>	<b>Hours/week</b>	<b>:02</b>
<b>Class&amp;Major</b>	<b>:I BBA</b>	<b>Total Hours</b>	<b>:26</b>

### Course Objectives:

CO.No.	To enable the students to
CO-1	Develop the self-confidence, groom the personality and build emotional competence
CO-2	Facilitate self-awareness and the assessment of core management skills such as communication, working with teams and creating a positive environment for change.
CO-3	Assess the Emotional intelligence
CO-4	Develop critical-thinking and analytical skills to investigate complex problems to propose viable solutions
CO-5	Evaluate the professional etiquettes

### UNIT I INTRODUCTION

**5 Hours**

Self: Core Competency, Understanding of Self, Components of Self— Self-identity, Self-concept, Self - confidence and Self-image. Skill Analysis and finding the right fit. Self-learning styles, attitude towards change and applications of skills.

### UNIT II SELF ESTEEM

**5 Hours**

Self Esteem: Meaning & Importance, Components of self-esteem, High and low self-esteem, measuring our self-esteem and its effectiveness, Personality mapping tests, Appreciative Intelligence.

### UNIT III BUILDING EMOTIONAL COMPETENCE

**6 Hours**

Building Emotional Competence: Emotional Intelligence — Meaning, Components, Importance and Relevance, Positive and Negative Emotions., Healthy and Unhealthy expression of Emotions, The six-phase model of Creative Thinking: ICEDIP model.

### UNIT IV THINKING SKILLS

**5 Hours**

Thinking skills: The Mind/Brain/Behaviour, thinking skills, Critical Thinking and Learning, Making Predictions and Reasoning, Memory and Critical Thinking, Emotions and Critical Thinking.

Creativity: Definition and meaning of creativity, The nature of creative thinking, Convergent and Divergent thinking, Idea generation and evaluation (Brain Storming), Image generation and evaluation.

## UNIT V COMMUNICATION RELATED TO COURSE

5 Hours

Communication related to course: How to make oral presentations, conducting meetings, reporting of projects, reporting of case analysis, answering in Viva Voce, Assignment writing

Debates, presentations, role plays and group discussions on current topics. Audio and Video Recording of the above exercises to improve the non-verbal communication and professional etiquettes.

### Text Books

- Cynthia Menezes Prabhu, *Managerial Skills 2*, Pen to Print Publishing LLP.
- Kevin Gallagher (2010), *Skills Development for Business & Management Students (1<sup>st</sup> Ed)*, Oxford University Press.

### References Books

- Joshi G (2015), *Campus to Corporate-Your Roadmap to Employability*, Sage Publication.
- McGrath E. H. (2011), *Basic Managerial Skills (9 Ed)*, Prentice Hall India Learning Private Limited.

### e-resources

- <https://www.ipjugaad.com/syllabus/ggsip-university-bba-4th-semester-managerial-skill-development-syllabus/63>
- [https://www.academia.edu/4358901/managerial\\_skill\\_development\\_pdf](https://www.academia.edu/4358901/managerial_skill_development_pdf)
- [https://www.academia.edu/4358901/managerial\\_skill\\_development\\_pdf](https://www.academia.edu/4358901/managerial_skill_development_pdf)
- <https://rccmindore.com/wp-content/uploads/2015/06/Managerial-SkillsAll-Units-AC.pdf>

### Course Outcomes:

CO No.	On completion of the course the student will be able to	Bloom's Level
CO1	Define the concept of self and self-esteem.	K1
CO2	Summarize the problem-solving and decision-making techniques to address managerial challenges and opportunities.	K2
CO3	Identify ethical dilemmas and apply ethical principles in managerial decision-making processes.	K3
CO4	Analyze innovation and creativity within teams to drive organizational growth and competitiveness.	K4
CO5	Classify the changes in the business environment.	K4

### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	2	3	2
CO-2	3	3	3	2	3	3
CO-3	3	3	3	1	3	2
CO-4	3	3	3	2	3	2
CO-5	2	3	3	1	2	1

High Correlation: 63% Medium Correlation: 27 % Low Correlation: 10 %

## **BUSINESS ETIQUETTE AND CORPORATE GROOMING UBAE203**

<b>Semester</b>	<b>:II</b>	<b>Credits</b>	<b>:02</b>
<b>Category</b>	<b>:NME</b>	<b>Hours/week</b>	<b>:02</b>
<b>Class&amp;Major</b>	<b>:I BBA</b>	<b>Total Hours</b>	<b>:26</b>

### **Course Objectives:**

CO No.	To enable the students to
CO-1	Gain knowledge about basic etiquettes in professional conduct
CO-2	Understanding about the workplace courtesy and ethical issues involved
CO-3	Impart guidelines in managing rude and impatient clients
CO-4	Familiarize students about significance of cultural sensitivity and the relative business attire
CO-5	Evaluate the stress on the importance of attire

### **UNIT I INTRODUCTION TO BUSINESS ETIQUETTE 5 Hours**

Introduction to Business Etiquette: Introduction- ABCs of etiquette- meeting and greetings scenarios-principles of exceptional work behavior-role of good manners in business-professional conduct and personal spacing.

### **UNIT II WORKPLACE COURTESY AND BUSINESS ETHICS 6 Hours**

Workplace Courtesy and Business Ethics: Workplace Courtesy- Practicing common courtesy and manners in a workplace-Etiquette at formal gatherings- Professional qualities expected from an employer's perspective - Hierarchy and Protocol. Ethical issues - preventing sexual harassment-conflict resolution strategies-Choosing appropriate gift in the business environment-reallife workplace scenarios –company policy for business etiquette.

### **UNIT III TELEPHONE ETIQUETTE AND DISABILITY ETIQUETTE 5 Hours**

Telephone Etiquette and Disability Etiquette Mastering the telephone courtesy, handling rude or impatient clients -internet usage in the workplace, email etiquette, online chat etiquette guidelines - Basic disability Etiquette practices.

### **UNIT IV WORKPLACE DIVERSITY 5 Hours**

Diversity and Cultural Awareness at Workplace Impact of diversity-Cultural Sensitivity-Taboos and Practices-Inter-Cultural Communication.

## UNIT V BUSINESS ATTIRE

5 Hours

Business Attire and Professionalism Business style and professional image-dress code-guidelines for appropriate business attire-grooming for success.

### Text Books

- Nina Kochhar(2011), *At Ease with Etiquette*, B.jain Publisher.
- Shital Kakkar Mehra (2012), *Business Etiquette: A guide for the Indian Professional*, Harper Collins Publisher.

### Reference Books

- Myka Meier, *Business Etiquette Made Easy: The Essential Guide to Professional Success*, Skyhorse.
- Sarvesh Gulati (2012), *Corporate Grooming and Etiquette*, Rupa Publications India Pvt. Ltd.

### e- Resources:

- <http://osou.ac.in/eresources/DIM-08-BLOCK-3.pdf>
- [https://www.columbustech.edu/skins/userfiles/files/Training%20Manual%20-%20Business%20Etiquette%20\(1\).pdf](https://www.columbustech.edu/skins/userfiles/files/Training%20Manual%20-%20Business%20Etiquette%20(1).pdf)
- <https://www.sbu.edu/docs/default-source/life-at-sbu-documents/professional-wardrobe-nbsp-.pdf>

### Course Outcomes:

CO No.	On completion of the course the student will be able to	Bloom's Level
CO1	Describe basic concepts of business etiquette and Corporate grooming.	K1
CO2	Outline the etiquette and grooming standards followed in business environment and the significance of communication	K2
CO3	Create cultural awareness and moral practices in real life workplace scenarios	K3
CO4	Analyze workplace courtesy and resolve ethical issues with respect to etiquette and grooming for success	K2
CO5	Apply the professionalism in the workplace considering diversity and courtesy	K4

### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	1
CO-2	3	3	3	2	3	3
CO-3	3	3	3	2	3	1

CO-4	3	3	3	2	3	3
CO-5	3	3	2	2	2	1

**High Correlation: 60%      Medium Correlation: 30 %      Low Correlation: 3.33%**

### III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
I	Core I	UBAM101	Principles of Management	Assignment	Poster Presentation
	Core II	UBAM102	Accounting for Managers I	Seminar	Assignment
	Major Elective - I	UBAA101	Managerial Economics	Poster Presentation	Assignment
	NME	UBAE101	Basics of Event Management	Poster Presentation	Seminar
	Foundation Course	UBAF101	Office Management	Role Play	Seminar
II	Core III	UBAM203	Business communication	Role Play	Case Study
	Core IV	UBAM204	Accounting for Managers II	Seminar	Assignment
	Major Elective - II	UBAA202	International Trade	Assignment	Poster Presentation
	NME	UBAE202	Managerial Skill Development	Role Play	Case Study
		UBAE203	Business Etiquette and Corporate Grooming	Assignment	Case Study
	Major Elective - VI	UBAA608	Consumer Behaviour	Case Study	Assignment
		UBAA609	Competency Mapping	Seminar	Assignment
		UBAA610	Security Analysis & Portfolio Management	Assignment	Seminar
	Major Elective - VII	UBAA611	Logistics and Supply Chain Management	Case Study	Assignment
		UBAA612	E-Business	Assignment	Seminar

## DEPARTMENT OF COMMERCE

### PREAMBLE

UG: Programme profile and the syllabi of courses offered in semester I and II along with III and IV evaluation Components (with effect from 2023 - 2026 batch onwards).

### PROGRAMME PROFILE B.Com. PROGRAM SPECIFIC OUTCOMES (PSO)

PSO No.	Upon completion of the programme, the students will be able to
PSO-1	Understand and acquire knowledge on various concepts in the discipline of Commerce
PSO-2	Develop business skills, positive attitude to meet the expectation of the industry at the national and global level.
PSO-3	Apply the statutory regulations that govern business of corporate sectors.
PSO-4	Discover the business opportunities to create and manage social innovations for sustainable entrepreneurship.
PSO-5	Adapt to rapidly changing environment with learned knowledge and skills and become socially responsible citizen.
PSO-6	Build a professional career and/or further higher education in the specified areas of specialization.

Semester	Part	Category	Course code	Course Title	Contact Hrs/Week	Credits Min/Max
I	I	Language	UTAL110 UHIL102 UFRL102	General Tamil I Hindi I French I	5	3
	II	English	UENL111	General English I	5	3
	III	Core Course-I	UCOM105 UCCM103	Basics of Financial Accounting	5	4
	III	Core Course-II	UCOM106 UCCM106	Principles of Management	5	4
		Discipline Specific Elective	UCOO107	Business Economics	4	3
	IV	Foundation Course	UCOF101 UCCF101	Fundamentals of Commerce	2	2
		Skill Enhancement Course-SEC1(Non-Major Elective)	UCOE101	NME	2	2
AECC1 Soft skill		USKS103	Communicative English	2	2	
<b>TOTAL</b>					<b>30</b>	<b>23</b>
	I	Language	UTAL210 UHIL202 UFRL202	General Tamil II Hindi II French II	5	3
	II	English	UENL211	General English II	5	3

II	III	Core Course-III	UCOM207 UCCM207	Advanced Financial Accounting	5	4
		Core Course-IV	UCOM208 UCCM208	Business Law	5	4
	III	Discipline Specific Elective	UCOO209	Office Management & Secretarial Practice	4	3
		Internship	UINS201		-	-/2
	IV	Skill Enhancement Course (NME)	UCOE202	NME	2	2
		Discipline Specific/ SEC II	UCOD201 UCCD201	Computerized Accounting	2	2
		AECCII – Soft Skill	USKS201	Interview Skills	2	2
	V	Extension Activity			-	1/2
	VI	Value Added Course\Outside classes			-	-/2
<b>TOTAL</b>					<b>30</b>	<b>24/29</b>
III	I	Language	UTAL310	General Tamil III	5	3
			UHIL302	Hindi III		
			UFRL302	French III		
	II	English	UENL311	General English III	5	3
			UCOM309 UCCM309	Corporate Accounting I	4	4
	III	Core Course - VI	UCOM310 UCCM310	Company Law	4	4
			Discipline Specific Elective	UCOO311	Exim Procedures and Documentation	4
	IV	Skill enhancement course (Entrepreneur)	UCOD302 UCCD302	Entrepreneurship	2	1
			Skill Enhancement Course – Discipline Specific	UCOE303	NME	2
IV	Value Education	UGEV301	Value Education	2	2	
		AECC III	USKS303	Soft Skill	2	2
<b>TOTAL</b>					<b>30</b>	<b>24</b>
IV	I	Language	UTAL410	General Tamil IV	5	3
			UHIL402	Hindi IV		
			UFRL402	French IV		
	II	English	UENL411	General English IV	5	3
	III	Core Course-VII	UCOM413 UCCM413	Corporate Accounting II	5	4
Allied				Business Mathematics & Statistics	5	4
Discipline Specific Elective	UCOO414	E – Commerce	4	3		

		Discipline Specific SEC	UCOD4 05UCC D405	Service Marketing	2	2
	III	Internship / Industrial Training	UINS401	Internship / Industrial Training		-/2
	IV	Skill Enhancement Course IV/NME	UONL401	Online Course	2	2
		AECCIV Soft Skill			2	2
	V	Extension Activity/Physical Education/NCC			-	-/2
	VI	Value Added Course/ outside classes			-	-/2
<b>TOTAL</b>					<b>30</b>	<b>23/29</b>
V	III	Core Course - IX	UCOM5 13UCC M513	Cost Accounting-I	5	4
		Core Course - X	UCOM5 14UCC M514	Banking Law and Practice	5	4
		Core Course - XI	UCOM5 15UCC M515	Income Tax Law and Practice I	5	4
		Core Course - XII	UCOM516 UCCM516	Auditing and Corporate Governance	5	4
	III	Core Project Discipline Specific	UCOP501		4	3
	III	Discipline Specific VII	UCOM518	Financial Services	4	3
	IV	Environmental Studies	UGEV501	Environmental Studies	2	2
<b>TOTAL</b>					<b>30</b>	<b>24</b>
VI	III	Core Course-XIII	UCOM61 8UCCM6 18	Cost Accounting–II	5	4
		Core Course-XIV	UCOM61 9UCCM6 19	Management Accounting	5	4
		Core Course-XV	UCOM62 0UCCM6 20	Income Tax Law &Practice II	5	4
		Elective Discipline Specific	UCOO621	Financial Management	6	4
		Elective Discipline Specific	UCOO622	Basics Of MS Excel	5	3
		Internship/Industrial Training	UINS601	Internship/Industrial Training		-/2
		Comprehensive Viva	UCOM607/ UCCM607/ UIAM606			
	IV	Professional Competency Skill Enhancement Course SEC	UCOC601	Professional Competency	4	2



	V	Extension Activity/Physical Education/ NCC				-/2
	VI	Value Added Course				-
				<b>TOTAL</b>	<b>30</b>	<b>22/26</b>
				<b>GRAND TOTAL</b>	<b>180</b>	<b>140/155</b>

## NON – MAJOR ELECTIVE

The Courses are offered to all major except B.Com, B.Com CA, BBA and BCA

Semester	Category	Course Code	Course Title	Contact /Week	Credit
					Min /Max
I	Non Major Elective – I / (SEC)	UCOE101	Basics of Accounting	2	2
II	Non Major Elective–I / (SEC)	UCOE202	Accounting for Non-Trading Concern	2	2
III	Non Major Elective–I / (SEC)	UCOE303	Basics of business correspondence	2	2
IV	Non Major Elective–I / (SEC)	UCOE404	Micro Small Medium Enterprises	2	2

## SELF STUDY

Semester	Course code	Course Title	Contact /hours	Credit	
				Min	Max
I	UCOS101/ UCCS101	Business organization/ Corporate Governance	-		1

## DEPARTMENT OF COMMERCE (CA)

### PREAMBLE

**UG:** Programme profile and the syllabi of courses offered in semester I and II along with III and IV evaluation Components (with effect from 2023-2024 batch onwards) are presented in this booklet.

### PROGRAM SPECIFIC OUTCOMES (PSO)

PSO No.	Upon completion of the programme, the students will be able to
PSO-1	Understand the operative systems fundamental knowledge of software commonly used in academic and professional environments.
PSO-2	Develop business skills, positive attitude to meet the expectation in the industry at the national and global level.
PSO-3	Apply the statutory regulations that govern business of corporate sectors.
PSO-4	Discover e- business opportunities to create and manage social innovations for sustainable e-entrepreneurship and become socially responsible citizen.
PSO-5	Adapt to recent office automation with computers and computer software applications.
PSO-6	Build a professional career and / or further higher education in the specified areas of specialization.

	Part	Category	Course code	Course Title	Contact Cr Hrs/Week	Credits Min/Max
I	I	Language	UTAL110/ UHIL102/ UFRL102	General Tamil I/ Hindi I/ French I	5	3
	II	English	UENL111	General English I	5	3
	III	Core Course-I	UCCM103/ UCOM105	Basics of Financial Accounting	5	4
		Core Course-II	UCCM106/ UCOM106	Principles of Management	5	4
		Generic(EC1)	UCSA106	Computer Fundamentals	4	3
	IV	Foundation Course	UCCF101/ UCOF101	Fundamentals of Commerce	2	2
		Skill Enhancement Course SEC – 1 (Non Major Elective)	UCOE101	NME	2	2
		AECC1 – Soft Skill	USKS103	Communicative English	2	2
<b>TOTAL</b>					<b>30</b>	<b>23</b>
II	I	Language	UTAL210 UHIL202 UFRL202	General Tamil II Hindi II French II	5	3
	II	English	UENL211	General English II	5	3
	III	Core Course III	UCCM207 UCOM207	Advanced Financial Accounting	5	4
		Core Course-IV	UCCM208 UCOM208	Business Law	5	4

		Generic(EC2)	UCSA206	Programming with C++	4	3
	III	Internship	UINS201			-/2
	IV	SECII	UCOE202	NME	2	2
		Discipline Specific (SEC3)	UCCD201	Computerized Accounting	2	2
		AECCII Soft Skill	USKS201		2	2
	V	Extension Activity/Physical Education/ NCC				1/2
	VI	Value Added Course				-/2
<b>TOTAL</b>					<b>30</b>	<b>24/29</b>
III	I	Language	UTAL310/ UHIL302/ UFRL302	General Tamil III Hindi III French III	5	3
	II	English	UENL311	General English III	5	3
	III	Core Course-V	UCCM309 UCOM309	Corporate Accounting I	4	4
		Core Course-VI	UCCM310 UCOM310	Company Law	4	4
		Generic(EC3)	UCSA307	Visual Basic	4	3
	IV	Discipline Specific(SEC 4)	UCCD301	Entrepreneurship	2	1
		Skill Enhancement course 5 (Discipline Specific )	UCOE303	NME	2	2
	IV	AECC3 - Soft Skill	USKS303	Soft Skill	2	2
IV	Value Education	UGEV301	Value Education	2	2	
<b>TOTAL</b>					<b>30</b>	<b>24</b>
IV	I	Language	UTAL410/ UHIL402/ UFRL402	General Tamil IV Hindi IV French IV	5	3
	II	English	UENL411	General English IV	5	3
	III	Core Course-VII	UCCM413 UCOM413	Corporate Accounting II	5	4
		Allied		Business Mathematics & Statistics	5	4
	III	Generic(EC4)	UCSA409	Computer Networks	4	3
	III	Internship	UINS401			-/2
	IV	Discipline Specific (SEC6)	UCOD405/ UCCD405	Service Marketing	2	2
		Skill Enhancement Course – 7 NME	UONL401 Online Course		2	2
		AECC4 - Soft Skill		Soft Skill	2	2
V	Extension Activity/Physical Education/ NCC				-/2	
VI	Value Added Course				-/2	
<b>TOTAL</b>					<b>30</b>	<b>23/29</b>

V	III	Core Course-IX	UCCM513 UCOM513	Cost Accounting-I	5	4
		Core Course-X	UCCM514/ UCOM514	Banking Law and Practice	5	4
		Core Course-XI	UCCM515 UCOM515	Income Tax Law and Practice I	5	4
		Core Course-XII	UCCM516 UCOM516	Auditing and Corporate Governance	5	4
		Generic(EC5)	UCSA511	Mobile Computing	4	3
		Core Project	UCCP501		4	3
	IV	Value Education	UGEV501	Environmental studies	2	2
<b>TOTAL</b>					<b>30</b>	<b>24</b>
VI	III	Core Course-XIII	UCCM618 UCOM618	Cost Accounting – II	5	4
		Core Course-XIV	UCCM619 UCOM619	Management Accounting	5	4
		Core Course-XV	UCCM620 UCOM620	Income Tax Law & Practice II	5	4
		Generic(EC6)	UCSA601	Web Designing	5	3
		Elective Discipline Specific	UCCO621	Financial Management	6	4
		Internship				-/2
		Comprehensive Viva	UCOM607/ UCCM607/ UIAM606		-	1
	IV	Professional competency Skill Enhancement Course	UCCC601	Professional Competency	4	2
	V	Extension Activity/Physical Education/NCC				-/2
	VI	Value Added Course				-
<b>TOTAL</b>					<b>30</b>	<b>22/26</b>
<b>GRANDTOTAL</b>					<b>180</b>	<b>140/155</b>

**BASICS OF FINANCIAL ACCOUNTING**  
**UCOM105/UCCM103**

<b>Semester</b>	: I	<b>Credit</b>	: 4
<b>Category</b>	: Core I	<b>Hours/Week:</b>	5
<b>Class &amp; Major</b>	: I B. Com/B. Com CA	<b>Total Hours:</b>	65

**Course Objectives**

Course	To enable the students
CO1	Understand the fundamental accounting principles and concepts.
CO2	Know the basis for calculating the business profit
CO3	Become familiar with how depreciation is treated in accounting.
CO4	Acquire knowledge of profit/loss calculation under single & double entry system
CO5	Gain knowledge on accounting treatment on Royalty

**UNIT - I FUNDAMENTALS OF FINANCIAL ACCOUNTING 10 Hours**

Financial Accounting–Meaning, Definition, Objectives, Basic Accounting Concepts and Conventions - Journal, Ledger Accounts– Subsidiary Books — Trial Balance – Classification of Errors–Rectification of Errors–Preparation of Suspense Account–Need and Preparation-Bank Reconciliation Statement.

**UNIT - II FINAL ACCOUNT 15 Hours**

Final Accounts of Sole Trading Concern - Capital and Revenue Expenditure and Receipts – Preparation of Trading, Profit and Loss Account and Balance Sheet with Adjustments.

**UNIT - III DEPRECIATION AND BILLS OF EXCHANGE 15 Hours**

Depreciation - Meaning – Objectives – Accounting Treatments - Types - Straight Line Method– Diminishing Balance method–Conversion method. Annuity Method–Depreciation Fund Method – Insurance Policy Method – Revaluation Method – Depletion Method – Sum of Digits Method – Machine Hour Rate Method. Bills of Exchange – Definition – Specimens – Discounting of Bills – Endorsement of Bill.

**UNIT – IV ACCOUNTING FROM INCOMPLETE RECORDS 15 Hours**

Incomplete Records-Meaning and Features – Limitations – Difference between Incomplete Records and Double Entry System - Methods of Calculation of Profit - Statement of Affairs Method – Preparation of final statements by Conversion method.

**UNIT – V ROYALTY AND INSURANCE OF CLAIMS 10 Hours**

Meaning of Royalty – Treatment in final Accounts – Explanation of technical terms – Accounting Treatment - Specimen Journal Entries. Types of Insurance policies – Computation of Insurance policy.

**THEORY 20% & PROBLEM 80%**

**Text Books**

1. Jain S. P. and K. L. Narang. (2017) *Financial Accounting-I*, Kalyani Publishers, New Delhi.
2. Maheshwari, S.N (2018) *Financial Accounting*, Vikas Publications, Noida.
3. Shukla Grewal and Gupta, (2019) “*Advanced Accounts*”, volume1, S Chand and Sons, New Delhi.
4. Radhaswamy and R.L, (2017) Gupta: *Advanced Accounting*, Sultan Chand, New Delhi.

## Reference books

1. Dr. Arulanandan and Raman :( 2017) *Advanced Accountancy*, Himalaya Publications, Mumbai.
2. Tulsian, (2018) *Advanced Accounting* Tata McGraw Hills, Noida.
3. Charumathi and Vinayagam, (2019) *Financial Accounting*, S. Chand and Sons, New Delhi.

## E-Resources

1. <https://www.slideshare.net/mcsharma1/accounting-for-depreciation-1>
2. <https://www.slideshare.net/ramusakha/basics-of-financial-accounting>
3. <https://www.accountingtools.com/articles/what-is-a-single-entry-system.html>

## Course Outcomes

Co No	On completion of the course the student will be able to	Blooms Level
CO1	Recall the various financial concepts and relate to final accounts, depreciation, bill of exchange and royalty.	K1, K2
CO2	Solve the different problems relating final accounts and royalty.	K3
CO3	Analyze and carryout the various accounting treatment relating to final accounts.	K4
CO4	Justify the financial statements of various enterprises.	K5
CO5	Estimate the future financial growth.	K6

## CO - PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	3	2	2
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 63.33%**

**Moderate Correlation: 36.67%**

**Low Correlation: Nil**

## PRINCIPLES OF MANAGEMENT

UCOM106/UCCM106

<b>Semester</b>	<b>: I</b>	<b>Credit</b>	<b>: 4</b>
<b>Category</b>	<b>: Core I</b>	<b>Hours/Week:</b>	<b>5</b>
<b>Class &amp; Major</b>	<b>: I B. Com/B. Com CA</b>	<b>Total Hours:</b>	<b>65</b>

### Course Objectives

CO No.	To enable the students
CO1	Understand the basic management concepts and functions
CO2	Know the various techniques of planning and decision making
CO3	Familiarize with the concepts of organization structure
CO4	Gain knowledge about the various procedures of staffing
CO5	Analyses the control techniques of an organization

### UNIT - I INTRODUCTION TO MANAGEMENT

**15 Hours**

Meaning- Definitions – Nature and Scope - Levels of Management – Importance - Management Vs. Administration – Management: Science or Art –Evolution of Management Thoughts – F. W. Taylor, Henry Fayol, Elton Mayo, Max Weber -Functions of Management - Managers – Qualification – Duties & Responsibilities.

### UNIT – II PLANNING

**10 Hours**

Planning–Meaning–Definitions–Nature–ScopeandFunctions–Importanceand Elements of Planning – Types – Planning Process - Tools and Techniques of Planning – Management by Objective (MBO). Decision Making: Meaning – Characteristics – Types – Steps in Decision Making – Forecasting.

### UNIT – III ORGANIZING

**10 Hours**

Meaning - Definitions - Nature and Scope – Characteristics – Importance – Types - Formal and Informal Organization–Organization Chart–Organization Structure: Meaning and Types-Departmentalization– Authority and Responsibility – Centralization and Decentralization – Span of Management.

### UNIT – IV STAFFING

**15 Hours**

Introduction - Concept of Staffing- Staffing Process – Recruitment – Sources of Recruitment – Modern Recruitment Methods - Selection Procedure – Test- Interview– Training: Need – Types – Promotion– Management Games – Performance Appraisal – Meaning and Methods – 360 Performance Appraisal.

### UNIT-V DIRECTING

**15 Hours**

Motivation – Meaning – Theories – Communication – Types - Barriers to Communications – Measures to Overcome the Barriers. Leadership – Nature - Types and Theories of Leadership – Styles of Leadership - Qualities of a Good Leader and Control Co-ordination – Meaning – Techniques of Co-ordination. Control - Characteristics -Importance – Stages in the Control Process - Requisites of Effective Control and Controlling Techniques – Management by Exception [MBE].

### Text books

1. Gupta. C.B,-(2019).Principles of Management-L.M.Prasad, Chand & Sons Co.Ltd, New Delhi.
2. Dinkar Pagare, (2018).Principles of Management, Sultan Chand & Sons Publications, New Delhi.
3. Prasad L.M, (2020).Principles of Management, S. Chand & Sons Co. Ltd, New Delhi.



## Reference Books

- Sundhar. K (2020).Principles Of Management, Vijay Nichole Imprints Limited, Chennai.
- Harold Koontz, Heinz Weirich (2018).*Essentials of Management*, Mc Graw Hill, Sultan Chand and Sons, New Delhi.
- Griffffin, K (2018).*Management principles and applications*, Cengage learning, India. Mintz berg H (2018).- *The Nature of Managerial Work*, Harper & Row, New York Eccles,

## E Resources

- <http://www.universityofcalicut.info/syl/management>
- <https://www.managementstudyguide.com/manpower-planning.htm>
- <https://www.businessmanagementideas.com/notes/management-notes/coordination/coordination/21392>

## Course Outcomes

CO No.	On completion of the course the student will be able to	Bloom's Level
CO 1	Recall the primary functions of management and explain the role of managers in an organization.	K1, K2
CO 2	Identify the major contributors in the field of management.	K3
CO 3	Examine the managerial functions having an impact on the organizational effectiveness.	K4
CO 4	Assess the contemporary issues and challenges in management.	K5
CO 5	Develop ethical workplace practices in decision making.	K6

## CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	3	1	2
CO-3	3	3	3	2	1	2
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 66.66%   Moderate correlation: 26.67%   Low Correlation: 6.67%**

## BUSINESS ECONOMICS

UCOM107

Semester : I  
Category : Discipline Specific  
Class & Major: I B.Com

Credit : 3  
Hours/Week: 4  
Total Hours: 52

### Course Objectives

CO No.	To enable the students
CO1	Understand the approaches to economic analysis
CO2	Know the various determinants of demand
CO3	Gain knowledge on concept and features of consumer behavior
CO4	Learn the laws of variable proportions
CO5	Enable the students to understand the objectives and importance of Pricing policy

### UNIT – I INTRODUCTION TO ECONOMICS

15 Hours

Introduction to Economics – Definition - Wealth, Welfare and Scarcity View on Economics – Positive and Normative Economics – Decision Making in Business – Scope and Importance of Business Economics – Roles and responsibility of business economist - Concepts: Production Possibility frontiers – Opportunity Cost.

### UNIT - II DEMAND & SUPPLY FUNCTIONS

15 Hours

Meaning of Demand - Demand Analysis: Demand Determinants, Law of Demand and its Exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance. Demand Forecasting - Factors Governing Demand Forecasting - Methods of Demand Forecasting, Law of Supply and Determinants.

### UNIT III CONSUMER BEHAVIOUR

10 Hours

Consumer Behavior– Meaning, Concepts and Features Law of Diminishing Marginal Utility –Indifference Curve: Meaning, Definition, Assumptions, Significance and Properties–Consumer’s Equilibrium. Price, Income and Substitution Effects. Types of Goods: Normal, Inferior and Giffen Goods.

### UNIT – IV THEORY OF PRODUCTION

10 Hours

Concept of Production – Production Functions: Linear and Non – Linear Homogeneous Production Functions - Law of Variable Proportion – Laws of Returns to Scale - Difference between Laws of variable proportion and returns to scale – Economies of Scale.

### UNIT – V PRODUCT PRICING`

12 Hours

Price and Output Determination under Perfect Competition, Objectives of Pricing Policy, its importance, Pricing Methods and Objectives – Price Determination under Monopoly – Price Discrimination,– Monopolistic Competition – Price Discrimination – Oligopoly – Meaning – feature.

### Text books

- Ahuja H.L, (2019).*Business Economics*–Micro & Macro – Sultan Chand & Sons, New Delhi.
- Chaudhary, C.M. (2018).*Business Economics* – RBSA Publishers – Jaipur - 03.
- Aryamala.T, (2019). *Business Economics*, Vijay Nicole, Chennai.

### Reference Books

- Shankaran S, (2019).*Business Economics*-Margham Publications, Chennai.
- Mehta P.L, (2019).*Managerial Economics* – Analysis, Problems & Cases, Sultan Chand & Sons, New Delhi.

## E – Resources

[https://youtube.com/channel/UC69\\_-P77nf5-rKrjcpVESqQ](https://youtube.com/channel/UC69_-P77nf5-rKrjcpVESqQ)

<https://www.icsi.edu/>

<https://www.yourarticlelibrary.com/marketing/pricing/product-pricing-objectives-basis-and-factors/74160>

### Course Outcomes

CO. No.	The student will be able to	Blooms Level
CO 1	Relate the economic concepts and explain the economic variables in general business scenario.	K1, K2
CO 2	Identify the Economics function at micro level and macro level.	K3
CO 3	Comprehend the relationship between various economic policies of business.	K4
CO 4	Appraise short run and long run equilibrium of a firm and industry.	K5
CO 5	Formulate a rational decision making in economic development.	K6

### CO - PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	3	2	2
CO-3	3	2	3	2	3	3
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 70%**

**Moderate correlation: 30%**

**Low Correlation: Nil%**

## FUNDAMENTAL OF COMMERCE

### UCOF101/UCCF101

**Semester: I**

**Category: Foundation Course**

**Class & Major: IB.Com /B.Com CA**

**Credit : 2**

**Hours/Week: 2**

**Total Hours: 26**

#### Course Objectives

CO. No.	To enable the students
CO1	Learn about the nature and potential of commercial businesses.
CO2	Extend their knowledge about the banking trends.
CO3	Construct the sense of marketing and their real – time applications.
CO4	Discover the risk handling capacities and its principles.
CO5	Build the transit & storage ability of the business.

#### UNIT – I: INTRODUCTION TO COMMERCE

**5 Hours**

Meaning – Definition - Functions – Nature & Scope – Significance – Branches of Commerce.

#### UNIT – II: Banking & E - BANKING

**6 Hours**

Meaning- Definition – Plastic money - Electronic Fund Transfer – NEFT – RTGS - IMPS  
UPI – AEPS.

#### UNIT - III: MARKETING & E-Marketing

**5 Hours**

Meaning – Definition – Marketing & E – Marketing mix.

#### UNIT - IV: Risk Management (Insurance)

**5 Hours**

Meaning & Definition of Insurance – Types – Kinds – Principles.

#### UNIT - V: Transport & Warehousing

**5 Hours**

Meaning & Definition – Modes of Transport – Types of Warehousing.

#### Text Books:

- Stephenson J, (2019). *Principles and Practice of Commerce*, Pitman Publication, California.
- Gerstenberg C. W, (2011). *Principles of Business*, Prentice Hall, New Delhi, 2011.

#### Reference Book:

- Dlabay, Bureau and Kleindl, (2020). *Principles of Business*, Cengage Learning, New Delhi.

#### E-Resources:

- WWW.Rbi.org.in
- WWW.Sebi.org.in

## Course Outcomes

CO No.	The students will be able to	Blooms Level
CO 1	Recall and summarize the concepts of marketing, banking, insurance, transport and warehousing.	K1, K2
CO 2	Utilize the latest online technologies of banks, insurance companies and transportation.	K3
CO 3	Distinguish the unique functions of banks, insurance, companies etc.	K4
CO 4	Evaluate the working procedure of banks, insurance, companies etc.	K5
CO 5	Develop self-confidence for online techniques.	K6

## CO - PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	3	3	3	3	3
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

High Correlation: 73.33%

Moderate correlation: 26.67%

Low Correlation: Nil

### ADVANCED FINANCIAL ACCOUNTING UCOM207/UCCM207

Semester : II

Credit : 4

Category : Core III

Hours/Week: 5

Class& Major : IB.Com/B.ComCA

Total Hours: 65

## Course Objectives

CO No.	To enable the students
CO1	RelatethedifferentkindsofaccountssuchasHigherpurchaseandInstalmentsSystem.
CO2	Classify the allocation of expenses under departmental accounts
CO3	Construct the partnership accounts relating to Admission and retirement.
CO4	Assess the Partnership Accounts relating to dissolution of firm.
CO5	Estimate the requirements of international accounting standards.

### UNIT – I HIRE PURCHASE AND INSTALMENT SYSTEM

10 Hours

Hire Purchase System – Accounting Treatment – Calculation of Interest Default and Repossession - Hire Purchase Trading Account Instalment System.

**UNIT – II BRANCH AND DEPARTMENTAL ACCOUNTS****15 Hours**

Branch – Dependent Branches: Accounting Aspects – Debtors system-Stock and Debtors system – Independent Branches (Foreign Branches excluded) Departmental Accounts: Basis of Allocation of Expenses – Inter – Departmental Transfer at Cost or Selling Price.

**UNIT – III PARTNERSHIP ACCOUNTS – I****10 Hours**

Partnership Accounts: – Admission of a Partner – Calculation of Hidden Goodwill – Retirement of a Partner – Death of a Partner.

**UNIT – IV PARTNERSHIP– II****15Hours**

Dissolution of Partnership – Methods – Settlement of Accounts Regarding Losses and Assets – Realization account – Preparation of Balance Sheet – Insolvency of a Partner – Garner Vs Murray – Accounting Treatment – Piecemeal Distribution.

**UNIVT – V ACCCOUNTING STANDARDS FOR FINANCIAL REPORTING 15 Hours**

Objectives and Uses of Financial Statements for Users - Role of Accounting Standards - Role of Developing IFRS – IFRS Adoption or Convergence in India - Implementation Plan in India – Ind AS – An Introduction – Difference between Ind AS and IFRS.

**THEORY 20% & PROBLEMS 80%****Textbooks**

- Radhaswamy and R.L, (2019).Gupta: *Advanced Accounting*, Sultan Chand, New Delhi, 2019.
- Shukla M.C, Grewal T.S. & Gupta S.C., (2019).*Advance Accounts*, S Chand Publishing, New Delhi.

**Reference Books**

- Dr. Maheswari S.N, (2019). *Financial Accounting*, Vikas Publications, Noida.
- Dr. Venkataraman & others (7lecturers) (2019).*Financial Accounting*, VBH publication, Chennai.
- Gupta R.L. and Gupta, V.K. (2019). “*Financial Accounting*”, Sultan Chand, New Delhi.
- Jain S.P and. Narang K.L, (2019).*Financial Accounting-I*, Kalyani Publishers, New Delhi.
- Reddy T.S. & Murthy A., (2018). *Financial Accounting*, Margham Publishers, Chennai.

**E - Resources**

- <https://www.slideshare.net/mcsharma1/accounting-for-depreciation-1>
- <https://www.slideshare.net/ramusakha/basics-of-financial-accounting>
- <https://www.accountingtools.com/articles/what-is-a-single-entry-system.html>

**Course Outcomes**

CO No.	The student will be able to	Bloom Level
CO 1	Recall and illustrate the various advanced financial concepts relating to hire purchase, installment, branch accounts and departmental accounts.	K1, K2
CO 2	Solve the different problems relating hire purchase, installment, branch accounts and departmental accounts.	K3
CO 3	Analyze and carryout the various accounting treatment relating to IND vs IFRS standards.	K4
CO 4	Justify the various accounting treatment of different enterprises.	K5
CO 5	Develop the job skills related to the current scenario.	K6

**CO - PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	2	2	2
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 60%****Moderate correlation: 40%****Low Correlation: NIL %**

**BUSINESS LAW  
UCOM208/UCCM208**

**Semester: II****Credit : 4****Category: Core IV****Hours/Week: 5****Class & Major: IB.Com/B.ComCA****Total Hours: 65****Course Objectives**

CO No.	To enable the students
CO1	Define the nature and objectives of Mercantile law.
CO2	Summarize the essentials of valid contract.
CO3	Make use of performance contracts
CO4	Classify the concepts of indemnity and guarantee.
CO5	Determine the essentials of contract of sale.

**UNIT I – INTRODUCTION****10 Hours**

Introduction – Definition – Objectives of Law – Meaning and its Significance, Mercantile Law: Meaning, Definition, Nature, Objectives, Sources.

**UNIT II – ELEMENT OF CONTRACT****10 Hours**

Indian Contract Act 1872: Definition of Contract, Essentials of Valid Contract, Classification of Contract, Offer and Acceptance – Consideration – Free Consent – Legality of Object – Contingent Contracts – Void Contract.

**UNIT – III PERFORMANCE OF CONTRACT****15 Hours**

Meaning of Performance, Offer to Perform, Joint liabilities & Rights, Assignment of Contracts- Remedies for Breach of contract – Termination and Discharge of Contract – Quasi Contract

**UNIT – IV CONTRACT OF INDEMNITY AND GURANTEE****15 Hours**

Contract of Indemnity and Contract of Guarantee – Extent of Surety’s Liability, Kinds of Guarantee, Rights of Surety, Discharge of Surety – Bailment and Pledge – Bailment – Concept – Classification of Bailments, Duties and Rights of Bailor and Bailee – Law of Pledge – Meaning – Essentials of Valid Pledge.

**UNIT – V SALE OF GOODS 1930****15 Hours**

Definition of Contract of Sale – Formation - Essentials of Contract of Sale - Conditions and Warranties – Transfer of Property – Contracts involving Sea Routes – Sale by Non – owners – Rights and duties of buyer - Rights of an Unpaid Seller.

### Text books

- Kapoor N.D. (2020) - *Business Laws*- Sultan Chand and Sons, New Delhi.
- Pillai R.S.N, (2019). – *Business Law*, S. Chand, New Delhi.
- Kuchhal M. C & Vivek Kuchhal, (2020). *Business law*, S. Chand Publishing, New Delhi.

### Reference Books

- Preethi Agarwal, (2019). *Business Law*, CA foundation study material, Chennai.
- Saravanavel, Sumathi, (2019). *Business Law* by, Anu, Himalaya Publications, Mumbai.
- Kavya and Vidhyasagar, *Business Law*, Nithya Publication, New Delhi, 2020.

### E - Resources

- [www.cramerz.com](http://www.cramerz.com)[www.digitalbusinesslawgroup.com](http://www.digitalbusinesslawgroup.com)
- <http://swcu.libguides.com/buslaw>.

### Course Outcomes

CO No.	On completion of the course the student will be able to	Blooms Level
CO 1	Recall the basics of laws governing commercial and special contracts and relate it to valid contract.	K1, K2
CO 2	Identify the fundamental legal principles behind contractual agreements.	K3
CO 3	Examine how businesses can be held liable in torts.	K4
CO 4	Assess problem solving techniques and present coherent, concise legal argument.	K5
CO 5	Adapt to changing legal process in developing a business or enter into legal filed.	K6

### CO - PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	3	2	2
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 63.33%**

**Moderate correlation: 36.67%**

**Low Correlation: Nil%**



**OFFICE MANAGEMENT & SECRETARIAL PRACTICE**  
**UCOO209**

**Semester : II**

**Category: Discipline Specific Elective**

**Class & Major: II B.Com/B.Com CA**

**Credit : 3**

**Hours/Week: 4**

**Total Hours: 52**

**Course Objectives**

<b>CO No.</b>	<b>To enable the students</b>
CO1	Show the modern office management.
CO2	Extend the work atmosphere.
CO3	Organizing in maintaining and running the office effectively.
CO4	Classify the data records.
CO5	Justify the knowledge about the role of a secretary.

**UNIT – I MODERN OFFICE AND ITS FUNCTION**

**10 Hours**

Introduction – Meaning of Office – Office Work – Office Activities – The Purpose of an Office – Office Functions – Importance of Office – The Changing Office – The Paperless Office – Office Management – Elements – Function – Office Manager.

**UNIT II – OFFICE SPACE AND ENVIRONMENT MANAGEMENT**

**10 Hours**

Introduction - Principles - Location of Office - Office Building - Office Layout – Preparing the Layout - Open and Private Offices - New Trends in Office Layout. Office Lighting - Benefits of Good Lighting in Office – Ventilation - Interior Decoration – Furniture - Safety from Physical Hazards – Sanitary Requirements – Cleanliness - Security.

**UNIT III – OFFICE SYSTEM AND PROCEDURES**

**10 Hours**

The Systems Concept – Definitions - Systems Analysis - Flow of Work - Analysis of Flow of Work - Role of Office Manager in Systems and Procedures - Systems Illustrated – Office Machines and Equipment's. Office forms – Design, Management and Control.

**UNIT IV – RECORDS MANAGEMENT**

**12 Hours**

Records – Importance of Records – Records Management – Filing Essentials and Characteristics of a Good Filing System - Classification and Arrangement of Files – Filing Equipment - Methods of Filing - Modern Filing Devices - The Filing Routine - The Filing Manual – Records Retention – Evaluating the Records Management Programme – Modern Tendencies in Records Making.

**UNIT V – SECRETARIAL PRACTICE**

**10 Hours**

Role of Secretary: Definition; Appointment, Duties and Responsibilities of a Personal Secretary - Qualifications for Appointment as Personal Secretary. Modern Technology and Office Communication, Email, Voice Mail, Internet, Video Conferencing, Agenda and Minutes of Meeting, Drafting, Fax - Messages, Email. Maintenance of Appointment Diary.

**Text books**

- Pillai RSN & Bagavathi, (2018). *Office Management*, S. Chand Publications, New Delhi.
- Ghosh P.K, (2018). *Office Management*, Sultan Chand & Sons, New Delhi.
- .Chopra R.K (2019). *Office Management*, Himalaya Publishing House, Mumbai.

## Reference Books

- Chhabra, T.N., (2018). *Modern Business Organisation*, Dhanpat Rai & Sons New Delhi.
- Terry, George R, (2020). *Office Management and Control*, Irwin, United States.
- Duggal, Balraj, (2019). *Office Management and Commercial Correspondence*, Kitab Mahal, New Delhi.

## E Resources

- <https://accountlearning.com/basic-functions-modern-office/>
- <https://records.princeton.edu/records-management-manual/records-management-concepts-definitions>

## Course Outcomes

CO. No.	The student will be able to	Blooms Level
CO 1	Recall the basic concepts of office functions and relate it to the various types of organization.	K1, K2
CO 2	Plan for the latest infrastructure needs of the different organization.	K3
CO 3	Classify the importance of different office equipment in the workplace.	K4
CO 4	Determine the types of equipment's and their appropriate selection.	K5
CO 5	Develop with regard to office equipment handling, the different duties, rights and liabilities.	K6

## CO - PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	2	2	2
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 60%**

**Moderate correlation: 40%**

**Low Correlation: Nil%**

**COMPUTERIZED ACCOUNTING**  
**UCOD201/UCCD201**

**Semester: I**  
**Category: Core V/ (DSC)**  
**Class & Major: I B.Com**

**Credit : 2**  
**Hours /Week: 2**  
**Total Hours: 26**

**Course Objective**

CO.No.	To enable the students
CO1	On completion of the course On completion of the course the student will be able to Analyze the various features of Tally.
CO2	Understand the accounting concepts and conventions.
CO3	Obtain knowledge on Inventory report, cost report & tax filling procedure.
CO4	Apply the knowledge of Tally in creation of company.
CO5	Evaluate budgetary control.

**UNIT I - INTRODUCTION TO COMPUTERIZED ACCOUNTING** **5 Hours**

Types of Accounts - Golden rules of accounting - Accounting Concepts and Conventions - Double Entry System of Book keeping - Mode of Accounting - Financial Statements – Transactions - Recording of transactions – Basic Concepts of computerized accounting - Features of Tally.

**UNIT II - VOUCHER CREATION** **5 Hours**

Creation of Company – Alteration – Deletion – Creation of groups – Alteration Deletion Creation of ledger – Creation of vouchers in Tally.

**UNIT III - FINAL ACCOUNTS** **5 Hours**

Preparation of Trial balance, Trading and profit and loss account - Preparation of Final Accounts with and without adjustment.

**UNIT IV - COST REPORT** **5 Hours**

Bill of materials Introduction – Cost Centers and Cost Categories – Multiple Currencies.

**UNIT V - TAX REPORTS** **6 Hours**

Tax Deduction at Source in Tally and Payroll Report – Bank Reconciliation – Interest calculations – Budgetary Control.

**Proportion: Problem: 80%, Theory: 20%**

**Text Books**

- Nadhani A.K. and Nadhani K.K (2020) Implementing Tally. BPB Publications. New Delhi
- Palanivel S (2020) Tally Accounting Software. Margham Publications. Chennai.

**Reference Books**

- Vishnu Priya Singh (2019) Quick Learn Tally. Computech Publication Pvt. New Delhi.
- Srinivasa Valaban (2020) Computer Applications in Business. Sultan Chand & Sons.

## Course Outcomes

CO. No.	The student will be able to	Blooms Level
CO-1	Recall the basics of accounts and relate its utilization in application software to perform accounting tasks.	K1, K2
CO-2	Apply the practical knowledge of tally to create company and enter accounting ledgers and vouchers.	K3
CO-3	Classify the various predefined inventory vouchers to suit the various business requirements.	K4
CO-4	Determine how to maintain management related information, statutory forms and reports in the prescribed formats.	K5
CO-5	Develop the use of tally software, that helps to prepare accounting, payroll, billing, sales and profit analysis, taxation such as GST, TDS, TCS etc.	K6

### CO - PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	3	2	2
CO-4	3	3	2	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 60%**

**Moderate correlation: 40%**

**Low Correlation: NIL%**

## BASICS OF ACCOUNTING UCOE101

**Semester: I**

**Category: Non Major Elective**

**Class & Major: I UG**

**Course Objectives**

**Credit : 2**

**Hours/Week: 2**

**Total Hours: 26**

CO. No.	To enable the students
CO1	Define the Accounting Principles and Practice
CO2	Interpret the preparation of Double entry system of Book Keeping
CO3	Develop themselves to prepare the final accounts
CO4	Examine the Subsidiary books
CO5	How to measure the final accounts

### UNIT I - INTRODUCTION

**5 Hours**

Meaning and Scope of Accounting, Basics Accounting concepts and conventions.

### UNIT II – BASIC OF ACCOUNTING

**5 Hours**

Journal – Ledger – Purchase, Sales, Purchase/ Sales Returns Book – Petty Cash Book.

**UNIT III - SUBSIDIARY BOOKS****6 Hours**

Subsidiary Books – Purchase, Sales, Purchase / Sales Returns Book – Cash Book Petty Cash.

**UNIT IV – PREPARATION FOR FINANCIAL REPORT****4 Hours**

Preparation of Receipts and payment account, income and expenditure account.

**UNIT V – PREPARATION OF FINAL ACCOUNTS****6 Hours**

Preparation of Final Accounts – Trading and Profit and Loss account and Balance sheet.

**Text Book**

- Grewal T.S (2018), *Introduction to Accountancy*, S. Chand & Sons, Chennai.
- Reddy, T.S and Murthy. A, (2019). *Financial Accounting*, Margham publications, Chennai.

**Reference books:**

- Gupta R.L. and Gupta,(2019). *VK Advanced Accounting*, Sulthan Chand ,,New Delhi
- Shukla &Grewal, (2019). *Advanced Accounting*, & S. Chand, New Delhi.

**Course Outcomes**

CO.No.	The student will be able to	Blooms Level
CO-1	Explain the basic concepts of financial accounting and relate it to maintenance of accounts, journal, ledger and different types of subsidiary books.	K1, K2
CO-2	Apply the concepts of accounting equation, types of accounts, golden rules of accounting, trial balance and final accounts.	K3
CO-3	Analyze the assets and liabilities in the balance sheet.	K4
CO-4	Appraise the financial position.	K5
CO-5	Develop the techniques for preparing financial accounts	K6

**CO – PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	3	3	2
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 66.67%****Moderate Correlation: 33.33%****Low Correlation: Nil%**

## ACCOUNTING FOR NON – TRADING CONCERNS

UCOE202

**Semester: II**  
**Category: Non Major Elective**  
**Class & Major: I UG**

**Credit : 2**  
**Hours/Week: 2**  
**Total Hours: 26**

### Course Objectives

CO.No.	To enable the students
CO 1	Understand the basic Concepts of Accounting
CO 2	Analyze Income and Expenditure of Non – trading concerns
CO 3	Develop accounting skills
CO 4	Prepare income and expenditure account
CO 5	Apply the knowledge of the accounting for prepare accounts for non-trading concerns.

### UNIT I - INTRODUCTION

**5 Hours**

Meaning and characteristics of Non-profit organization – main sources of income – difference between NGO and Non – profit organizations.

### UNIT II - RECEIPTS AND PAYMENTS ACCOUNTS

**5 Hours**

Income and expenditure account – need and preparation – differences between Receipts and Payments A/C and income and Expenditure A/C.

### UNIT III - ACCOUNTS FOR TRUST

**5 Hours**

Treatment of peculiar items – legacy - donations – subscription – entrance fees- life membership fees – entrance fees – sale of newspaper – sale of sports material – honorarium – special fund – capital fund.

### UNIT IV – ACCOUNTS FOR EDUCATIONAL INSTITUTIONS

**6 Hours**

Educational Institutions – registration – organization pattern – features- source of finance for running the educational Institutions – sponsorship from public – admission fees – use of term fees – recurring grants – use of grant-in-aid.

### UNIT V – ACCOUNTING FOR OTHER INSTITUTIONS

**5 Hours**

Accounting treatments for self-help groups – cricket association – nursing association – football federation of India – trust – charitable institutions – welfare association.

### Text Books

- Grewal, T.S (2016). *Accountancy*, S. Chand Publications, Delhi, 9<sup>th</sup> Edition, New Delhi.
- John McCarthy, Nancy E. Shelmon, John Mattie, (2018). *Financial and Accounting Guide For Non – Profit Organizations*, John Wiley and Sons Publishers, 8<sup>th</sup> Edition.
- Jain SP Narang KL, (2015). *Accounting Principles*, Kalyani Publishers, 8<sup>th</sup> Edition,

### Reference Books

- Arulanandan, M.A. & Raman K.S, (2016). *Financial Accounting*, Himalaya publishing house, New Delhi.
- Gupta R.L., & Gupta V.K. (2014)., *Financial Accounting*, Sultan Chand & Sons, New Delhi.

## Course Outcomes

CO.No.	The student will be able to	Blooms Level
CO-1	Explain the basic concepts of accounting for non-trading concerns and relate to other institutions.	K1, K2
CO-2	Apply the concepts of non-trading accounts to service concerns.	K3
CO-3	Categorize the receipts and payments accounts to respective service concerns.	K4
CO-4	Determine the surplus / deficit amount relating to educational institution, trust etc.	K5
CO-5	Formulate the accounting treatment with respect to the service concerns.	K6

## CO – PSO Mapping

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	3	2
CO-3	3	2	3	2	3	2
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 66.67%**

**Moderate correlation: 33.33%**

**Low Correlation: Nil%**

## III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	COM III	COM IV
I	CORE	UCOM105/UCC M103	Basics of Financial Accounting	Problem Solving	Open Test
	Core II	UCOM106/UCC M106	Principles of Management	Comparative Study	Case study
	Elective I	UCOO103/UCCO 103	Business Economics	Poster Presentation	Case study
	Part IV	UCOE101	Basics of Accounting	Assignment	Problem Solving
	Core III	UCOF101/UCCF 101	Fundamentals of Commerce	Quiz	Problem Solving
II	Core IV	UCOM207/UCC M207	Advanced Financial Accounting	Problem Solving	Assignment
	Core V	UCOM208/ UCCM208	Business Law	Case study	Quiz
	Elective II	UCOO203	Office Management & Secretarial Practice	Quiz	Comparative Study
		UCOD201	Computerized Accounting	Problem Solving	Assignment

**PG & RESEARCH DEPARTMENT OF COMMERCE**

**PREAMBLE**

**PG:** Programme profile and the syllabi of Courses Offered in Semester I & II along with III and IV Evaluation Components (with effect from 2023 - 2024 Batch onwards)

**Programme Specific Outcomes (PSO)**

<b>PSO</b>	<b>Upon completion of the Programme ,the students will be able to</b>
PSO 1	Identify and use of practical tools of Finance required in Decision Making
PSO 2	Reasoning and Legal Implications
PSO 3	Assess Global Opportunities and Challenges for Business Growth.
PSO 4	Analyzes Ethical Implication of Business Practices using Advanced levels of Ethical Practices.
PSO5	Investigate effectively the Research Tools, Apply appropriate Tools and draw Conclusion.

<b>Semester</b>	<b>Category</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Contact Hrs/ Week</b>	<b>Credits Min/Max</b>
<b>I</b>	Core Course I	PCOM109	Business Finance	5	4
	Core Course II	PCOM110	Digital Marketing	5	4
	Core Course III	PCOM111	Banking and Insurance	5	4
	Elective Course I	PCOO101	Operations Research	5	3
	Elective Course II	PCOO102	Strategic Human Resource Management	5	3
	Skill Enhancement Course (NME)	PCOE101	NME	3	2
	Skill Enhancement Course	PCOR110	Advance Excel	2	2
<b>TOTAL</b>				<b>30</b>	<b>22</b>
<b>II</b>	Core Course IV	PCOM211	Strategic Cost Management	5	4
	Core Course V	PCOM212	Corporate Accounting	5	4
	Core Course VI	PCOM213	Setting up of Business Entities	5	4
	Elective Course III	PCOO201	Business Ethics and Corporate Sustainability	4	3
	Elective Course IV	PCOO202	Logistics and Supply Chain Management	4	3



	Core Industry Module - I	PCOM214	Capital Market	4	3
	Skill Enhancement Course (Discipline)	PCOD201	Project Management	3	2
	Service Learning		Service Learning	-	1
	Internship, Field Visit	PINS201	Internship/ Field Visit	-	2
<b>TOTAL</b>				<b>30</b>	<b>26</b>
<b>III</b>	Core Course VII	PCOM308	Taxation	5	4
	Core Course VIII	PCOM309	Research Methodology	4	3
	Core Course IX	PCOM310	Computers in Business	4	3
	Elective Course V	PCOO301	Strategic Management	4	3
	Elective Course VI	PCOO302	Service Marketing	3	3
	Core Industry Module - II	PCOM311	Global Marketing	4	3
	Skill Enhancement Course Interdisciplinary	PCOI301	Competitive Exam	4	2
	Online Course	PONL301	Online Course	2	2
<b>TOTAL</b>				<b>30</b>	<b>23</b>
<b>IV</b>	Core Course X	PCOM412	Corporate and Economic Laws	5	4
	Core Course XI	PCOM413	Human Resource Analytics	5	4
	Core Course XII	PCOM414	International Business	5	4
	Elective Course VI	PCOO 401	Organizational Behavior	5	3
	Project	PCOP 401	Project with Viva	6	4
	Skill Enhancement Course (Proficiency Skill)	PCOC401	Professional Competency	4	2
	Summer Internship	PINS401	Internship/ Field Visit	-	-/2
	<b>TOTAL</b>				<b>30</b>
<b>TOTAL</b>				<b>120</b>	<b>92/94</b>

### NON – MAJOR ELECTIVE

**These courses are offered to all except M. COM**

Semester	Category	Course Code	Course Title	Contact/Week	Credit
					Min/Max
I	Skill Enhancement	PCOE101	Export Import Procedures	3	2
II	Skill Enhancement	PCOE201	Project Management	3	2
III	Skill Enhancement	PCOE301	Competitive Exam for NET/SET	3	2
IV	Skill Enhancement	PCOE401	SPSS Package	3	2

# BUSINESS FINANCE

## PCOM109

**Semester: I**  
**Category: Core I**  
**Class: I.M.COM**

**Credit : 4**  
**Hours/Week: 5**  
**Total Hours: 65**

### Course Objectives

CO. No.	To enable the students
CO-1	Understand the fundamental concepts in finance.
CO-2	Expand the awareness regarding investment proposals
CO-3	Familiarize with leasing as a source of finance and determine the sources of Startup financing
CO-4	Know the cash and inventory management techniques
CO-5	Gain knowledge on capital budgeting techniques for MNCs

### UNIT I - INTRODUCTION TO BUSINESS FINANCE AND TIME VALUE OF MONEY **10 Hours**

Business Finance: Meaning, Objectives, Scope – Time Value of Money: Meaning, Causes – Compounding – Discounting – Sinking Fund Deposit Factor – Capital Recovery Factor – Multiple Compounding – Effective rate of interest – Doubling period (Rule of 69 and Rule of 72) – Practical problems.

### UNIT II - RISK MANAGEMENT **10 Hours**

Risk and Uncertainty: Meaning – Sources of Risk – Measures of Risk – Measurement of Return – General pattern of Risk and Return – Criteria for evaluating proposals to minimize Risk (Single Asset and Portfolio) – Methods of Risk Management – Hedging currency risk.

### UNIT III - DIVIDEND THEORY **15 Hours**

Learning objectives – Introduction – Issues in Dividend policy – Dividend relevance: Walter's Model – Dividend Relevance: Gordon's Models – Dividend and Uncertainty: The Bird – in-the-hand Argument-Dividend irrelevance: The Miller – Modigliani (MM) Hypothesis – Relevance of Dividend policy under market imperfections.

### UNIT IV – CASH RECEIVABLE AND INVENTORY MANAGEMENT **15 Hours**

Cash Management: Meaning, Objectives and Importance – Cash Cycle – Minimum Operating Cash – Safety level of cash – Optimum cash balance - Receivable Management: Meaning – Credit policy – Controlling receivables: Debt collection period, Factoring – Evaluating investment in accounts receivable – Inventory Management: Meaning and Objectives.

### UNIT V - MULTINATIONAL CAPITAL BUDGETING **15 Hours**

Multi National Capital Budgeting: Meaning, Steps involved, Complexities, Factors to be considered – International sources of finance – Techniques to evaluate multi-national capital expenditure proposals: Discounted Pay Back Period, NPV, Profitability Index, Net Profitability Index and Internal Rate of Return – Capital rationing - Techniques of Risk analysis in Capital Budgeting.

**Question pattern: Theory 40%; Problems: 60%**

## Text books

- Maheshwari S.N. (2019) “*Financial Management Principles and Practices*”, 15<sup>th</sup> Edition, Sultan Chand & Sons, New Delhi.
- Khan M.Y & Jain P.K, (2011). “*Financial Management: Text, Problems and Cases*”, 8<sup>th</sup> Edition, McGraw Hill Education, New Delhi.

## Reference Books

- Pandey I. M., , “*Financial Management*”, 12<sup>th</sup> Edition, Pearson India Education Services Pvt. Ltd, Noida, 2021.
- Kulkarni P.V. & Satya Prasad B. G. (2015.), “*Financial Management*”, 14<sup>th</sup> Edition, Himalaya Publishing House Pvt Ltd, Mumbai.
- Prasanna Chandra, (2019). “*Financial Management, Theory and Practice*”, 10th Edition, Mc Graw Hill Education, New Delhi.

## E - Resources:

- <https://resource.cdn.icai.org/66674bos53808-cp8.pdf>
- <https://resource.cdn.icai.org/66677bos53808-cp10u2.pdf>
- <https://resource.cdn.icai.org/66592bos53773-cp4u5.pdf>
- <https://resource.cdn.icai.org/65599bos52876parta-cp16.pdf>

## Course Outcomes

CO No.	On completion of the course the student will be able to	Blooms Level
CO1	Understand and summarize the various financial concepts relating to time value of money, capital budgeting and dividend decision.	K1, K2
CO2	Apply relevant accounting concept to prepare financial return.	K3
CO3	Analyze and carryout the various accounting treatments relating to business finance.	K4
CO4	Assess the risk investment pattern and rate of return.	K5
CO5	Design a plan for effective operation and optimum rate of return in business.	K6

## CO - PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	2	3	3
CO-4	3	2	2	3	3	3
CO-5	3	3	3	3	3	3

High Correlation: 60%

Moderate correlation: 40%

Low Correlation: Nil

# DIGITAL MARKETING

PCOM110

Semester: I  
Category: Core II  
Class & Major: I. M.COM

Credit : 4  
Hours/Week: 5  
Total Hours: 65

## Course Objectives

CO.No.	To enable the students
CO-1	Understand the importance of dimensions of online marketing mix.
CO-2	Customize the techniques of digital marketing.
CO-3	Gain knowledge on online consumer behavior.
CO-4	Interpret data from social media and to evaluate game based marketing
CO-5	Familiarize with evolution of digital marketing

### UNIT I – INTRODUCTION TO DIGITAL MARKETING 10 Hours

Digital Marketing – Transition from traditional to digital marketing – Emergence of digital marketing as a tool – Digital marketing channels – Digital marketing applications, benefits and limitations – Factors for success of digital marketing – Emerging opportunities for digital marketing professionals.

### UNIT II – ONLINE MARKETING MIX 15 Hours

Online marketing mix – E-product – E-promotion – E-price – E-place – Targeting – Positioning – Consumers and online shopping issues – Website characteristics affecting online purchase decisions.

### UNIT III – DIGITAL MEDIA CHANNELS 10 Hours

Digital media channels – Search engine marketing – Affiliate marketing –Interactive display advertising - Opt-in-email marketing and mobile text messaging, Invasive marketing – Campaign management using Facebook, Twitter, Corporate Blogs – Advantages and disadvantages of digital media channels.

### UNIT IV - ONLINE CONSUMER BEHAVIOR 15 Hours

Online consumer behavior – Cultural implications of key website characteristics – Web and consumer decision making process – Data base marketing Electronic consumer relationship management – Goals – Process – Benefits – Role – Next generation CRM.

### UNIT V – ANALYTICS AND GAMIFICATION 15 Hours

Digital Analytics – Concept – Measurement frame work – Measurement metrics for Facebook, Twitter, YouTube, Slide Share, Pinterest, Instagram, Snapchat and LinkedIn –.Earned social media metrics – Digital brand analysis – Meaning – Benefits – Components – Brand shared dimensions – Brand audience dimensions – Market influence analytics – Consumer generated media and opinion leaders – Peer review – Word of mouth – Influence analytics – Gamification and game based marketing – Benefits – Consumer motivation for playing online games.

#### Text Book

- Puneet Singh Bhatia, R. (2019),“*Fundamentals of Digital Marketing*”, 2<sup>nd</sup> Edition, Pearson Education Pvt Ltd, Noida.
- Dave Chaffey, (2019). Fiona Ellis-Chadwick, “*Digital Marketing*”, Pearson Education Pvt Ltd, Noida.

## Reference Books

- Vandana Ahuja. (2016). “*Digital lMarketing*”, Oxford University Press. London.
- Ryan Deiss & Russ Henneberry, (2017). “*Digital Marketing*”, John Wiley and Sons Inc. Hoboken.

## E-Resources:

- <https://www.digitalmarketer.com/digital-marketing/assets/pdf/ultimate-guide-to-digital-marketing.pdf>
- <https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching-tips/educational-technologies/all/gamification-and-game-based-learning>
- <https://journals.ala.org/index.php/ltr/article/download/6143/7938>

## Course Outcomes

CO.No.	The student will be able to	Blooms Level
CO 1	Understand the concepts of digital marketing and outline its benefits.	K1, K2
CO 2	Identify innovative insights of digital marketing enabling competitive edge.	K3
CO 3	Analyze the various tools such as social media etc.	K4
CO 4	Assess the different game based digital marketing.	K5
CO 5	Create and run digital media sites or go for digital business.	K6

## CO - PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	2	3	3
CO-4	3	2	2	3	3	3
CO-5	3	3	3	3	3	3

High Correlation: 60%

Moderate correlation: 40%

Low Correlation: Nil

## BANKING AND INSURANCE

### PCOM111

Semester : I

Category : Core III

Class & Major: I.M.COM

Credit : 4

Hours/Week: 5

Total Hours: 65

## Course Objectives

CO.No.	To enable the students
CO 1	Gain thorough knowledge in the evolution of new era banking.
CO 2	Explore the digital banking techniques.
CO 3	Analyze the role of insurance sector.
CO 4	Gain knowledge on mechanism of customer service in insurance and the relevant regulations.
CO 5	Assess risk and its impact in banking and insurance industry.

## **UNIT I – INTRODUCTION TO BANKING**

**10 Hours**

Banking: Brief History of Banking – Rapid Transformation in Banking: Customer Shift-Fintech Overview - Fintech Outlook - The Financial Disruptors - Digital Financial Revolution - New Era of Banking. Digital Banking – Electronic Payment Systems – Electronic Fund Transfer System – Electronic Credit and Debit Clearing – NEFT – RTGS – VSAT – SFMS – SWIFT.

## **UNIT II CONTEMPORARY DEVELOPMENTS IN BANKING**

**15 Hours**

Distributed Ledger Technology – Block chain: Meaning – Structure of Block Chain – Types of Block Chain – Differences between DLT and Block chain – Benefits of Block chain and DLT-Unlocking the potential of Block chain – Crypto currencies, Central Bank Digital Currency (CBDC) - Role of DLT in financial services

## **UNIT III - INDIAN INSURANCE MARKET**

**15 Hours**

History of Insurance in India – Definition and Functions of Insurance – Insurance Contract – Indian Insurance Market – Insurance organization structure. Insurance Intermediaries: Insurance Broker –Insurance Agent - Surveyors and Loss Assessors – Third Party Administrators (Health Services) – Procedures – Code of Conduct.

## **UNIT IV CUSTOMER SERVICES IN INSURANCE**

**15 Hours**

Customer Service in Insurance – Role of Insurance Agents in Customer Service - Agent’s Communication and Customer Service – Grievance Redressal System in Insurance Sector – Integrated Grievance Management System – Insurance Ombudsman - Insurance Regulatory and Development Authority of India Act (IRDA) – Regulations and Guidelines.

## **UNIT V – RISK MANAGEMENT**

**10 Hours**

Risk Management and Control in banking and insurance industries – Methods of Risk Management – Risk Management by Individuals and Corporations.

### **Text Books**

- Mishra M.N& Mishra SB, (2016). “*Insurance Principles and Practice*”, 22<sup>nd</sup> Edition, S. Chand and Company Ltd, Noida, Uttar Pradesh.
- Emmett, Vaughan, (2016). Therese Vaughan M., “*Fundamentals of Risk and Insurance*”, 11<sup>th</sup> Edition, Wiley & Sons, New Jersey, USA.

### **Reference Books**

- Sundharam KPM & Varshney P.N., (2020). “*Banking Theory, Law and Practice*”, 20<sup>th</sup> Edition, Sultan Chand & Sons, New Delhi.
- Gupta P.K. (2021). “*Insurance and Risk Management*” 6<sup>th</sup> Edition, Himalaya Publishing House Pvt Ltd, Mumbai.

### **E - Resources:**

- <https://corporatefinanceinstitute.com/resources/knowledge/finance/fintech-financial-technology>
- [https://mrcet.com/downloads/digital\\_notes/CSE/IV%20Year/CSE%20B.TECH%20IV%20YEAR%20II%20SEM%20BCT%20\(R18A0534\)%20NOTES%20Final%20PDF.pdf](https://mrcet.com/downloads/digital_notes/CSE/IV%20Year/CSE%20B.TECH%20IV%20YEAR%20II%20SEM%20BCT%20(R18A0534)%20NOTES%20Final%20PDF.pdf)
- [https://www.irdai.gov.in/ADMINCMS/cms/frmGeneral\\_Layout.aspx?page=PageNo108&flag=1](https://www.irdai.gov.in/ADMINCMS/cms/frmGeneral_Layout.aspx?page=PageNo108&flag=1)

## Course Outcomes

CO.No.	The student will be able to	Bloom's Level
CO 1	Understand the concepts of banking and insurance and relate the concepts to banking and insurance field.	K1, K2
CO 2	Apply the online banking and insurances technology in real life situation.	K3
CO 3	Analyze the benefits of technology based business.	K4
CO 4	Appraise the risk in operation of online business.	K5
CO 5	Adapt to the changing technological scenario.	K6

## CO - PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	2	3	3
CO-4	3	2	2	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 60%**

**Moderate correlation: 40%**

**Low Correlation: Nil**

## OPERATIONS RESEARCH PCOO101

**Semester : I**

**Category : Elective Course I**

**Class & Major: IM.COM**

**Credit : 3**

**Hours/Week: 5**

**Total Hours: 65**

## Course Objectives

CO. No.	To enable the students
CO 1	To outline the fundamentals of Operations Research
CO 2	To use OR models for problem solving
CO 3	To examine the role of sequencing and game theory
CO 4	To design and apply network analysis
CO 5	To apply modelling techniques

## UNIT I – INTRODUCTION AND LINEAR PROGRAMMING PROBLEM 12 Hours

Introduction and Linear Programming Problem Introduction to Operations Research – Uses and Limitations – Linear Programming Problem: Formulation, Solving LPP: Graphical method, Simplex method, the Big-M Method.

**UNIT II - TRANSPORTATION AND ASSIGNMENT PROBLEMS** **15 Hours**

Transportation problem: Introduction – Assumptions – Formulation of Transportation models – Basic feasible solution (North - West Corner Method, Least Cost Method, Vogel’s Approximation Method) – Optimal solution (Stepping-Stone Method, Modified Distribution Method) – Degeneracy in Transportation problem. Assignment Problem: Introduction – Comparison with the Transportation problem – Formulation of assignment problems - The Hungarian method of solution.

**UNIT III SEQUENCING AND GAME THEORY** **15 Hours**

Sequencing problem: Introduction – Assumptions – Processing of n jobs through one machine – Processing n jobs through two machines – Processing of n jobs through three machines. Game Theory: Introduction – Rules for Games theory – Two person zero sum game without saddle point – Mixed strategies (2xn games, mx2 games) – Graphical method (2xn, mx2 games).

**UNIT IV REPLACEMENT AND NETWORK ANALYSIS** **10 Hours**

Replacement: Introduction – Individual replacement problems – Group replacement problems. Network Analysis: PERT and CPM.

**UNIT V DECISION TREE ANALYSIS AND QUEUING THEORY** **13 Hours**

Decision Tree analysis – Queuing: Introduction – Applications of queuing models, Waiting time and Idle time costs – Single channel Poisson arrivals with Exponential Service, Infinite population model.

**Text Books**

- Gupta P.K and Hira D.S., (2022) “*Operations Research*”, 7 th Edition, S. Chand, Noida (UP).
- Kapoor V.K., (2014) *Operations Research*, 9<sup>th</sup> Edition, Sultan Chand, New Delhi.
- Kothari C.R., (2022) *An Introduction to Operational Research*, 3<sup>rd</sup> Edition, S. Chand, Noida (UP).

**Reference Books:**

- Tulsian P.C. and Bharat Tulsian, (2022) *Fundamentals of Operations Research (Theory and Practice)*, 3<sup>rd</sup> Edition, S. Chand, Noida (UP).
- Sharma J.K., (2016) *Operations Research*, 6 th Edition, Lakshmi Publications, Chennai.

**Web references:**

- <https://www.bbau.ac.in/dept/UIET/EMER-601%20Operation%20Research%20Queuing%20theory.pdf>
- [https://mdu.ac.in/UpFiles/UpPdfFiles/2021/Jun/4\\_06-11-2021\\_16-06-](https://mdu.ac.in/UpFiles/UpPdfFiles/2021/Jun/4_06-11-2021_16-06-)

**Course Outcomes**

CO. No.	The student will be able to	Bloom’s Level
CO 1	Demonstrate knowledge of OR fundamentals	K1
CO 2	Identify models for problem solving	K2
CO 3	Apply sequencing and game theory	K3
CO 4	Apply network analysis to enhance effectiveness	K3
CO 5	Examine the models for decision making	K4



**CO - PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	3	2
CO-3	3	2	3	2	3	2
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 60%      Moderate correlation: 40%      Low Correlation: Nil**

**STRATEGIC HUMANRE SOURCE MANAGEMENT**

**PCOO102**

<b>Semester</b> :I	<b>Credit</b> :3
<b>Category</b> :Elective course II	<b>Hours/Week</b> :5
<b>Class &amp; Major</b> : I.M.COM	<b>Total Hours</b> : 65

**Course Objectives**

CO. No.	To enable the students
CO-1	Know the importance of HRM field of study and central management function.
CO-2	Understand the implication of HRM on Government regulations and Corporate decisions.
CO-3	Analyze the key elements of the HR functions.
CO-4	Gain knowledge about the elements, key concepts and terminology of HRM.
CO-5	Apply the principles and techniques of HRM to the discussion of major Personnel issues in case studies.

**UNIT I INTRODUCTION TO SHRM 10 Hours**

SHRM Meaning, Features, Evolution, Objectives, Advantages, Barriers to SHRM, SHRMv/s Traditional HRM, Steps in SHRM, Roles in SHRM: Top Management, Front-line Management, HR – Changing Role of HR Professionals.

**UNIT II MODELS OF SHRM 10 Hours**

Models of SHRM – High Performance Working Model, High Commitment Management Model, High Involvement Management Model - HR Environment – Environmental trends and HR Challenges – Linking SHRM and Business Performance.

**UNIT III STRATEGIC PLANNING AND COMPENSATION 15 Hours**

Resourcing Strategy: Meaning and Objectives-Strategic HR Planning: Meaning, Advantages, Interaction between Strategic Planning and HRP, Managing HR Surplus and Shortages, Strategic Recruitment and Selection: Meaning and Need - Strategic Human Resource Development: Meaning, Advantages and Process -Strategic Compensation as a Competitive Advantage.

**UNIT IV HUMAN RESOURCE POLICIES 15 Hours**

Human Resource Policies – Meaning, Features, Purpose of HR Policies, Process of Developing HR Policies, Factors affecting HR Policies, Areas of HR Policies in Organization, Requisites of Sound HR Policies – Recruitment, Selection, Training and Development, Performance Appraisal, Compensation, Promotion, Outsourcing, Retrenchment, Barriers to Effective Implementation of HR Policies and Ways to Overcome these Barriers).

**UNIT V – LATEST TRENDS IN STRATEGIC HRM****15 Hours**

Mentoring - Employee Engagement – Meaning, Factors Influencing Employee Engagement, Strategies for Enhancing Employee Engagement - Competency based HRM: Meaning, Types of Competencies and Benefits of Competencies for Effective Execution of HRM Functions - Human Capital Management: Meaning and Role - New Approaches to Recruitment – Employer Branding.

**Text Books**

- Mathur, SP(2015). “*Strategic Human Resource Management* “1<sup>st</sup> Edition New Age International (P) Ltd Publishers, New Delhi.
- Catherine Truss, David Mankin & Clare Kelliher (2014). “*Strategic Human Resource Management*”, Oxford University Press, India.

**Reference Books**

- Jean M Phillips & Stan M Gully, (2006). “*Strategic staffing*”, Pearson International Edition, India.
- Ananda Das Gupta (2021), “*Strategic Human Resource Management –Formulating and Implementing HR Strategies for a Competitive Advantage*”, Productivity Press; 1<sup>st</sup> edition, Routledge.

**E - Resources:**

- <https://emeritus.org/in/learn/what-is-strategic-human-resource-management-shrm/>
- <https://www.shrm.org/resourcesandtools/tools-and-samples/toolkits/pages/practicing-strategic-human-resources.aspx>
- <https://www.cegid.com/en/blog/5-steps-for-developing-and-implementing-an-effective-hr-strategy-in-2021/>
- <https://www.managementstudyhq.com/hrm-evaluation-approaches>.

**Course Outcomes**

CO.No	The student will be able to	Blooms Level
CO1	Explain the concepts of SHRM and relate it to the nature and scope of SHRM.	K1, K2
CO2	Identify competency gaps in the organization or department.	K3
CO3	Analyze the HR strategy appropriate to the organization.	K4
CO4	Interpret the feedback to employees to help them reach personal and organizational goals.	K5
CO5	Formulate strategic HRM cost and benefit analyze for an organization.	K6

**CO - PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	2	3	3
CO-4	3	2	2	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 60%****Moderate correlation: 40%****Low Correlation: Nil**

# STRATEGIC COST MANAGEMENT

PCOM211

Semester : II  
Category : Core IV  
Class & Major: I. M.COM

Credit : 4  
Hours/Week: 5  
Total Hours: 65

## Course Objectives

CO.No.	To enable the students
CO 1	Understand the aspects of strategic and quality control management
CO 2	Familiarize with select cost control techniques.
CO 3	Gain knowledge on activity based costing for decision making.
CO 4	Understand transfer pricing methods in cost determination.
CO 5	Apply cost management techniques in various sectors

## UNIT I - INTRODUCTION TO STRATEGIC COST MANAGEMENT 15 Hours

Introduction to Strategic Cost Management (SCM) – Need for SCM – Differences between SCM and Traditional Cost Management - Value Chain Analysis: Meaning and steps - Quality Cost Management: Meaning of Quality and Quality Management – Cost of Quality – Introduction to Lean System – Benefits of Lean System – Just in Time (JIT) –Kaizen Costing.

## UNIT II – COST CONTROL AND REDUCTION 15 Hours

Cost Management Techniques: Cost Control: Meaning and Prerequisites – Cost Reduction: Meaning and Scope Differences between Cost control and cost reduction – tools for strategic cost management; Value Chain analysis, Target Costing and Life Cycle Costing.

## UNIT III – ACTIVITY BASED COST MANAGEMENT 10 Hours

Activity Based Cost Management: Concept, Purpose, Stages, Benefits, Relevance in Decision making and its Application in Budgeting – Practical problems.

## UNIT IV – TRANSFER PRICING 10 Hours

Transfer Pricing: Meaning, Benefits, Methods: Pricing based on cost, Market price on transfer price, Negotiated pricing and Pricing based on opportunity costs – Practical Problems.

## UNIT V – COST MANAGEMENT IN AGRICULTURE AND IT SECTOR 15Hours

Agriculture Sector: Features, Cost Structure, Cost Management, Tools to measure the performance, Minimum Support Price and International Perspective – Information Technology Sector: Features, Cost Structure, Cost Management and International Perspective.

### Text Books

- Ravi M Kishore, 2018. “*Strategic Cost Management*”, 5<sup>th</sup> Edition, Taxman Publications Pvt. Ltd, New Delhi.
- Bandgar P. K., (2017) “*Strategic Cost Management*”, 1<sup>st</sup> Edition, Himalaya Publishing House Pvt Ltd, Mumbai.
- Sexena V.K. (2020). *Strategic Cost Management and Performance Evaluation*”, 1<sup>st</sup> Edition, Sultan Chand & Sons, New Delhi.

### Reference Books

- John K Shank and Vijay Govindarajan, (2008). *Strategic Cost Management*” Simon & Schuster; Latest edition, UK.
- JawaharLal, (2015). “*Strategic Cost Management*”, 1<sup>st</sup> Edition, Himalaya Publishing House Pvt Ltd, Mumbai.

## E - Resources:

- <https://www.accountingtools.com/articles/strategic-cost-management.html#:~:text=Strategic%20cost%20management%20is%20the,it%20or%20have%20no%20>
- <https://ca-final.in/wp-content/uploads/2018/09/Chapter-4-Cost-Management-Techniques.pdf>
- <https://resource.cdn.icai.org/66530bos53753-cp5.pdf>

## Course Outcomes

CO.No.	The Student will be able to	Blooms Level
CO 1	Relate fundamental theories and methodologies in strategic cost management	K1, K2
CO 2	Construct advanced project management skills for complex business projects in the commerce domain.	K3
CO 3	Examine social concerns in commerce, including economic disparities and ethical practices.	K4
CO 4	Assess and apply ethical principles in business decision-making.	K5
CO 5	Design independent research projects and strategies for employability in commerce and industry	K6

## CO - PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	2	3	3
CO-4	3	2	2	3	3	3
CO-5	3	3	3	3	3	3

High Correlation: 60%

Moderate correlation: 40%

Low Correlation: Nil

## CORPORATE ACCOUNTING

### PCOM212

Semester: II

Category: Core V

Class : I. M.COM

Credit : 4

Hours/Week: 5

Total hours : 65

## Course Objectives

CO.No.	To enable the students
CO-1	Understand the accounting treatment for issue of shares
CO-2	Assess profits for fire and marine insurance
CO-3	Construct consolidated financial statements
CO-4	Gain knowledge on account for price level changes
CO-5	Measures to adopt financial reporting standards

## UNIT I – ISSUE OF SHARES AND FINAL ACCOUNTS OF COMPANIES 10 Hours

Issue of Shares: ESOPs – ESPS – Sweat Equity Shares – Book Building – Buy – back of Shares – Conversion of debentures into shares – Final accounts of Companies as per Schedule III of the Companies Act, 2013 – Managerial remuneration.

**UNIT II - INSURANCE COMPANY ACCOUNTS****15.Hours**

Insurance Company Accounts: Types of Insurance - Final accounts of life assurance Companies- Ascertainment of profit- Valuation Balance Sheet - Final accounts of Fire, Marine and miscellaneous Insurance Companies.

**UNIT III - CONSOLIDATED FINANCIAL STATEMENTS****15. Hours**

Consolidated financial statements as per AS 21: Consolidated Profit and Loss Account – Minority interest Cost of control – Capital reserve – Inter – company holdings – Preparation of consolidated Balance Sheet.

**UNIT IV – CONTEMPORARY ACCOUNTING METHODS****10 Hours**

Accounting for price level changes – Social responsibility accounting – Human resource accounting – Forensic Accounting.

**UNIT V – FINANCIAL REPORTING****15 Hours**

Financial reporting: Meaning, Objectives, Characteristics – Indian Accounting Standards (AS 5, AS 10, AS19, AS 20) – Corporate Social Responsibility: Meaning, Key provisions of Companies Act, 2013, Accounting for CSR expenditure, Reporting of CSR, Presentation and disclosure in the financial statements.

**Question pattern: Theory: 20%; Problems: 80%**

**Text Books**

- Gupta R.L. & Radhaswamy (2021).M. “*Corporate Accounting – Volume I & IP*”, 14<sup>th</sup> Edition, Sultan Chand & Sons, New Delhi.
- Maheshwari S.N., Sharad K. Maheshwari & Suneel K. Maheshwari, (2022). *Advanced Accountancy – Volume I & IP*, 11<sup>th</sup> Edition, Vikas Publishing House Pvt.Ltd. New Delhi.
- Jain S. P., Narang K. L., Simmi Agrawal and Monika Sehgal “*Advanced Accountancy*.”

**Reference Books.**

- Arulanandan M.A & Raman K.S., (2021). “*Advanced Accounting (Corporate Accounting – II)*”, 8<sup>th</sup> Edition, Himalaya Publishing House Pvt Ltd, Mumbai.
- Shukla MC, Grewal TS and Gupta SC, (2022) “*Advanced Accounts Volume II*”, 19<sup>th</sup> Edition, Sultan Chand & Sons, New Delhi.
- Gupta R.L., (2022). “*Problems and Solutions in Company Accounts*”, 2<sup>nd</sup> Edition, Sultan Chand & Sons, New Delhi.

**E - Resources:**

- <https://resource.cdn.icai.org/66550bos53754-p1-cp9.pdf>
- <https://resource.cdn.icai.org/66545bos53754-p1-cp4.pdf>
- <https://resource.cdn.icai.org/66638bos53803-cp1.pdf>
- <http://ppup.ac.in/download/econtent/pdf/MBA%201st%20sem%20Lecture%20note%20on%20forensic%20accounting%20by%20Anjali.pdf>

## Course Outcomes

CO.No.	The student will be able to	Blooms Level
CO 1	Recall the basic concepts and relate it to corporate accounting.	K1, K2
CO 2	Apply the accounting treatment in issue of shares at par premium and discount, issues of debenture, managerial remuneration, calculation of goodwill and shares and liquidator's statement of affairs.	K3
CO 3	Analyze the develop the application skills.	K4
CO 4	Evaluate the techniques of preparing balance sheet of various concerns.	K5
CO 5	Develop and prepare company accounts, bank accounts, insurance company accounts, holding company accounts independently.	K6

### CO - PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	2	3	3
CO-4	3	2	2	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 60%**

**Moderate correlation: 40%**

**Low Correlation: Nil**

## SETTING UP OF BUSINESS ENTITIES PCOM213

**Semester : II**

**Credit : 4**

**Category : Core VI**

**Hours/Week: 5**

**Class & Major: I M.COM**

**Total Hours: 65**

### Course Objectives

CO. No.	To enable the students
CO1	Understand the startup landscape and its financing
CO2	Analyze the formation and registration of Section 8 company
CO3	Outline the concept of LLP and business collaboration
CO4	Gain knowledge on the procedure for obtaining registration and license
CO5	Create awareness about the legal compliances governing business entities

### UNIT I - STARTUPS IN INDIA

**10 Hours**

Types of business organizations – Factors governing selection of an organization – Startups – Evolution – Definition of a Startup – Startup India policy – Funding support and incentives – Indian states with Startup policies – Exemptions for startups – Life cycle of a Startup – Financing options available for Startups – Venture capital financing – IPO – Crowd funding – Incubators - Mudra banks – Successful Startups in India.

### UNIT II – INSTITUTIONS NOT FOR PROFIT AND NGOs

**10 Hours**

Formation and registration of NGOs, namely, Section 8 Company, Trust and Societies included. Section 8 Company, its features, Trust, difference between public trust and private trust, exemptions available to them, more specifically, under the Income Tax Act and formation process.

### **UNIT III - LIMITED LIABILITY PARTNERSHIP AND JOINT VENTURE 15 Hours**

Limited Liability Partnership: Definition – Nature and characteristics – Advantages and disadvantages – Procedure for incorporation – Business collaboration: Definition – Types – Joint venture: Advantages and disadvantages – Types – Joint venture agreement – Successful joint ventures in India – Meaning – Benefits – Formation.

### **UNIT IV - START-UPS AND THEIR REGISTRATION 15 Hours**

Evolution of Startups in India, the Startup India Policy- developments initiated in various States to encourage Startups - the exemptions available to them and the registration process- different kinds of Debt financing and Equity - exemptions given to start ups – procedures involved for incorporation and registration as startups.

### **UNIT V – ENVIRONMENTAL LEGISLATIONS IN INDIA 15Hours**

Environmental Protection Act, 1986: Prevention, control and abatement of environmental pollution- The Water (Prevention And Control of Pollution) Act, 1974: The Central and State Boards for Prevention and Control of Water Pollution - Powers and Functions of Boards - Prevention and Control of Water Pollution - Penalties and Procedure- The Air (Prevention and Control of Pollution) Act, 1981.

#### **Text Books**

- Kailash Thakur, (2007) “*Environment Protection Law and Policy in India*”, 2<sup>nd</sup> Edition, Deep & Deep Publication Pvt.Ltd. New Delhi.
- Avatar Singh, (2015), “*Intellectual Property Law*”, Eastern Book Company.
- Zad N.S and Divya Bajpai, (2022). “*Setting up of Business Entities and Closure*”

#### **Reference Books**

- Setting up of Business Entities and Closure *Module 1, Paper 3, The Institute of Company Secretaries of India*, MP Printers, Noida, 2021.
- The Air (Prevention and Control of Pollution) Act, 1981, Bare Act, 2022 Edition, Universal / Lexis Nexis, Noida.
- Cliff Ennico, (2005) “Small Business Survival Guide Starting Protecting and Securing your Business for Long Term Success”, Adams Media, USA.

#### **E - Resources:**

- [https://www.icsi.edu/media/webmodules/FINAL\\_FULL\\_BOOK\\_of\\_EP\\_SBEC\\_2018.pdf](https://www.icsi.edu/media/webmodules/FINAL_FULL_BOOK_of_EP_SBEC_2018.pdf)
- [https://www.mca.gov.in/MinistryV2/incorporation\\_company.html3](https://www.mca.gov.in/MinistryV2/incorporation_company.html3)
- <https://legislative.gov.in/sites/default/files/The%20Limited%20Liability%20Partnership%20Act,%202008.pdf>
- <https://legislative.gov.in/sites/default/files/A1999-48.pdf> [https://www.indiacode.nic.in/bitstream/123456789/6196/1/the\\_environment\\_protection\\_act%20C1986.pdf](https://www.indiacode.nic.in/bitstream/123456789/6196/1/the_environment_protection_act%20C1986.pdf)

## Course Outcomes

CO.No.	The student will be able to	Blooms Level
CO 1	Recall the legal requirements for company and Compare the various avenues of acquiring finance to setup a business entity.	K1, K2
CO 2	Apply the registration and licensing procedure.	K3
CO 3	Examine the provisions for LLP and joint venture.	K4
CO 4	Appraise the compliance of regulatory framework regarding business environment.	K5
CO 5	Prepare a plan for independent business entity.	K6

## CO - PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	2	3	3
CO-4	3	2	2	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 60%**

**Moderate correlation: 40%**

**Low Correlation: Nil**

## BUSINESS ETHICS AND CORPORATE SUSTAINABILITY PCOO201

**Semester : II**

**Credit : 3**

**Category : Elective III**

**Hours/Week: 4**

**Class & Major: I M.COM**

**Total hours: 52**

## Course Objectives

CO No.	To enable the students
CO 1	Understand the concept and importance of business ethics
CO 2	Enable ethical decision making based on various theories
CO 3	Gain knowledge on moral issues relating to business, marketing, advertising, finance, HR and environmental protection
CO 4	Understand the concepts of corporate sustainability
CO 5	Analyze sustainability information and prepare reports

### UNIT I - INTRODUCTION TO BUSINESS ETHICS

**10 Hours**

Business Ethics- Meaning and Definition of Ethics - Nature of Business Ethics - Role and importance of Business Ethics and values in Business-Causes of unethical behavior- Ethical issues- Business Codes of Conduct.

### UNIT II - MANAGING ETHICAL DILEMMAS

**10 Hours**

Activity analysis; Dilemma vs. decision; Characteristics of ethical dilemmas; Common ethical dilemmas in business; the dilemma resolution process, Business ethics as a strategic response – Business ethics in India



### **UNIT III - APPLICATION OF BUSINESS ETHICS IN DIFFERENT CONTEXTS**

**10 Hours**

The ethics of financial markets; the ethics of consumer protection; advertising ethics and environmental ethics. Ethical Leadership: Personal integrity and self-development; wisdom-based leadership. Challenges of business ethics & corporate leadership - Role of Trade Associations in Business Ethics

### **UNIT IV - CORPORATE SUSTAINABILITY**

**10 Hours**

Corporate Sustainability- Concepts of sustainability- Social – Cultural, Political, Legal Environment and Economic environment – Corporate Governance Significance-importance - features – objectives – principles and need for corporate governance - Reasons for corporate governance failure.

### **UNIT V SUSTAINABILITY REPORTING**

**12 Hours**

Sustainability Reporting- Investors, customers, government and media-Disclosing sustainability information– report and website –Transparency and Accountability-Benefits of Sustainability Reporting, Flavour of GRI, BRR, BRSR.

#### **Text Books**

- Balachandran V and Chandrasekaran V(2020) Corporate Governance Ethics and Social Responsibility, Prentice Hall of India, New Delhi.
- Muraleedharan KP and Satheesh EK (2021). “Fernando’s Business Ethics and Corporate Governance”, 3<sup>rd</sup> Edition. , Pearson India Education Services Pvt.Ltd, Noida.
- John G. Cullen, (2022). “Business, Ethics and Society: Key Concepts, Current Debates and Contemporary Innovations”, Sage Publications Pvt. Ltd, New Delhi.

#### **Reference Books**

- ICSI Study Material, (2016). “Governance, Risk Management, Compliances and Ethics”, New Delhi.
- David Chandler (2016), “Strategic Corporate Social Responsibility: Sustainable Value Creation”,4<sup>th</sup> Edition. Sage Publications Pvt. Ltd, New Delhi.
- Mandal SK (2017), “Ethics in Business and Corporate Governance”,2<sup>nd</sup> Edition, Mc Graw
- Hill Education, India.

#### **E-Resources:**

- <https://www.icsi.edu/media/website/BUSINESS%20MANAGEMENT%20ETHICS%20&%20ENTREPRENEURSHIP.pdf>
- <https://ddceutkal.ac.in/Syllabus/BECG-MBA.pdf>
- <https://sdgs.un.org/topics/desertification-land-degradation-and-drought>
- [https://sdgs.un.org/sites/default/files/documents/1387bp\\_ccInNSDS.pdf](https://sdgs.un.org/sites/default/files/documents/1387bp_ccInNSDS.pdf)
- <https://wedocs.unep.org/handle/20.500.11822/9435>

## Course Outcomes

CO.No.	On completion of the course the student will be able to	Blooms Level
CO 1	Recall the concepts and relate the importance of business ethics, ethical dilemmas, corporate sustainability and reporting.	K1, K2
CO 2	Apply the ethical decision making & sustainability reporting, based on various theories.	K3
CO 3	Analyze the moral issues relating to business codes, strategic response, challenges, sustainability and reporting.	K4
CO 4	Judge the provision of ethical standards, corporate sustainability and reporting and its impact across economic, environment and social realms.	K5
CO 5	Design a plan ethical decision making & corporate sustainability reporting.	K6

### CO - PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	2	3	3
CO-4	3	2	2	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 60%**

**Moderate correlation: 40%**

**Low Correlation: Nil**

## LOGISTICS AND SUPPLY CHAIN MANAGEMENT PCOO202

**Semester : II**

**Credit : 3**

**Category : Elective – IV**

**Hours/Week : 4**

**Class & Major: IM.COM**

**Total hours : 52**

### Course Objectives:

CO. No	To enable the students
CO 1	Identify the primary differences between logistics and supply chain management
CO 2	Understand the individual processes of supply chain management and their Interrelationships within individual company's and across the supply chain.
CO 3	Evaluate the management components of supply chain management
CO 4	Analyze the tools and techniques applied in implementing supply chain management.
CO 5	Create awareness about the professional opportunities in supply chain management.

### UNIT I SUPPLY CHAIN MANAGEMENT

**10 Hours**

Supply Chain Management: Concept, Features, Importance, Process and Barriers of Supply Chain Management – Principles – Supply chain Concept and Types, Channels of Distribution for Industrial Goods and Consumer Goods, Channels of Distribution at Services Level.

**UNIT II – GLOBAL PERSPECTIVES****10 Hours**

Global Supply Chain Networks, Global market forces, Types of global supply chain - Economic effects of supply chains - Customer Perspectives: Customer values, Role of customers and Ways of improving customer services in SCM.

**UNIT III - FRAMEWORK OF LOGISTICS****12 Hours**

Logistics: Introduction – Logistics Management: Concept and Process, Competitive Advantages and Three C’s, - Transport Functions and Participants in Transportation Decisions - Transport Infrastructure- Packaging and Materials Management: Factors influencing Materials Planning, Preservation Safety and Measures of Materials Handling.

**UNIT IV - SCM-WAREHOUSING****10.Hours**

Introduction – Concepts of Warehousing– Types of Warehouse – Functions of Warehousing – Strategic Warehousing, Warehouse Operations, Warehouse Management Systems, Packaging Perspectives, Packaging for Material Handling Efficiency, Materials Handling, Supply Chain Logistics Design:

**UNIT V – SPECIAL ASPECTS OF EXPORT LOGISTICS****10 Hours**

Picking, Packing, Vessel Booking [Less-than Container Load (LCL) / Full Container Load (FCL)], Delivery to distribution centers, distributors and lastly the retail outlets – Import Logistics: Documents Collection - Valuing – Bonded Warehousing – Customs Formalities - Clearing, Distribution to Units.

**Text Books**

- Christopher Martin, (2016).“Logistics and Supply Chain Management ”5<sup>th</sup> Edition, FT Publishing International, India.
- Chopra, Sunil, Meindl, Peter and Kalra, D.V. (2018). Supply Chain Management: Strategy, Planning and Operation; Pearson Education Pvt.Ltd, Noida.

**Reference Books**

- Sahay, B.S. (2018).Supply Chain Management, 2<sup>nd</sup> Edition; Macmillan Publishers India Ballou, R. H. Business Logistics Management. Prentice-Hall Inc.
- Bowersox D.J.,Closs D.J, (2002).Bixby Cooper. M., Supply Chain Logistics Management, 9<sup>th</sup> Edition, McGraw Hill Higher Education, Noida.

**Course Outcomes**

<b>CO. No.</b>	<b>The student will be able to</b>	<b>Cognitive Level</b>
CO1	Recall and summarize the concepts and features of logistics and supply chain management.	K1, K2
CO2	Develop the global and Indian perspectives of logistics and supply chain management.	K3
CO3	Examine changing logistics environment pertaining to material management, warehousing and distribution.	K4
CO4	Explain the strategic warehousing for logistics and supply chain management.	K5
CO5	Develop a competitive logistics and supply chain management for any organization.	K6

**CO - PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	2	3	3
CO-4	3	2	2	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 60%****Moderate correlation: 40%****Low Correlation: Nil**

**PROJECT MANAGEMENT  
PCOD201**

**Semester : II**  
**Category : S E C Displine**  
**Class & Major: IM.COM**

**Credit : 2**  
**Hours/Week: 3**  
**Total Hours: 39**

**Course objectives**

CO.No.	To enable the students
CO 1	Understand the need for Project Management.
CO 2	Familiarize with different techniques of activity planning.
CO 3	Construct Project Planning & Management.
CO 4	Assist project evaluation.
CO 5	Create awareness about special topics in project management.

**UNIT I – INTRODUCTION TO PROJECT MANAGEMENT AND PROJECT SELECTION**  
**8 Hours**

Objectives of Project Management – Importance of Project Management – Types of Projects  
 Project Management Life Cycle – Project Selection Feasibility study: Types of feasibility Steps  
 in feasibility study.

**UNIT II - PROJECT PLANNING AND IMPLEMENTATION** **7 Hours**

Project Scope – Estimation of Project cost – Cost of Capital –Project Representation and  
 Preliminary Manipulations – Basic Scheduling Concepts - Resource Levelling – Resource  
 Allocation.

**UNIT III – PROJECT MONITORING AND CONTROL** **8 Hours**

Setting a baseline – Project management Information System – Indices to monitor progress.  
 Importance of Contracts in projects – Team work in Project Management – Attributes of a good  
 project team – Formation of effective teams – stages of team formation.

**UNIT IV – PROJECT CLOSURE** **7 Hours**

Project evaluation – Project Auditing – Phases of project Audit – Project closure reports  
 Guidelines for close out reports.

**UNIT V – SPECIAL TOPICS IN PROJECT MANAGEMENT** **9 Hours**

Computers, e – markets and their role in Project management – Risk management –  
 Environmental Impact Assessment. Case studies in Project management.

## Text Books

- Lewis, James. (2006). “*The Project Manager’s Desk Reference*” Third edition. New York: McGraw-Hill, 2006.
- Joseph Heagney (2019), “*Fundamentals of Project Management*”, Fifth Edition, Washington DC, AMACOM.

## References

- Greg Horine, (2017) “*Project Management Absolute Beginner’s Guide*”, Pearson Education, United States of America.
- Paul Roberts(2021),“*Absolute Essentials of Project Management*”, Routledge, United Kingdom.

## E - Resources

- <https://www.pmi.org/learning/library/basic-project-management-reference-library-5664>
- <https://opentextbc.ca/projectmanagement/>

## Course Outcomes

CO.No	Upon completion of these course, the students will be able to	Bloom’s Level
CO1	Recall the concepts and relate to project management.	K1, K2
CO2	Construct research hypothesis and determine the procedure for project.	K3
CO3	Distinguish the benefits of various projects.	K4
CO4	Decide attributes of a good project team.	K5
CO5	Develop independent project report avoiding plagiarism.	K6

## CO - PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	2	3	3
CO-4	3	2	2	3	3	3
CO-5	3	3	3	3	3	3

High Correlation: 60%

Moderate correlation: 40%

Low Correlation: Nil

## CAPITAL MARKET PCOM214

Semester: I

Category: Core Industry Module

Class & Major: I M.COM

Credit : 3

Hours/Week: 4

Total Hours: 52

## Course Objectives

CO No.	On completion of the course the student will be able to
CO-1	To expose the students to the world of capital markets.
CO-2	To enable the students to learn the working mechanism of Stock exchanges

CO-3	To make the students understand the regulatory framework of Indian capital markets.
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## UNIT I - INTRODUCTION

**10 Hours**

Financial markets - Definition - Role - Financial Instruments – Indian Financial Market-Global Financial Market-Capital Market -Capital Market Instruments - Types - Preference shares - Equity Shares - Company fixed deposits - Warrants - Debentures and Bonds- Global Debt Instruments.

## UNIT II – REGULATION OF INDIAN CAPITAL MARKET

**10 Hours**

Regulatory Framework- Committees on Regulatory Framework-Management - Powers and functions - Regulatory role - Investor Protection - Insider Trading-Inside information-Connected persons.

## UNIT III - STOCK EXCHANGE

**10 Hours**

History- Meaning - Functions - Stock Exchange Vs Commodity Exchange - Stock Exchange Traders - Regulation of Stock Exchanges - BSE and NSE - World Stock Exchanges –New York, London, Hong Kong and Tokyo Stock Exchanges.

## UNIT IV PRIMARY MARKET AND SECONDARY MARKET

**12 Hours**

NIM Vs Secondary Market - Methods of New Issue -Intermediaries in the new issues market - SE BI Guidelines on Primary Market - Listing - Agreement - Benefits - Consequences of Non-listing - Underwriting - Definition - Types -Mechanics - Benefits - Concept - Characteristics – Process.

## UNIT V - OTCEI

**10 Hours**

Concept - Features - Benefits - OTCE I Vs Other Stock Exchanges - Depository Services- Banks Vs Depository - Demat Account - Electronic Settlement of Trade - Role of CDSL and NSDL – Speculation - Online Stock Trading – Debt Market - Types – Role – Price Determination.

### Text Books

- Gurusamy, Capital Markets, (2014), Vijay Nicole Imprints, Chennai.
- Frank J. Fabozzi. (2000) Franco Modigliani, Capital Markets Institutions and Instruments Prentice Hall. New Delhi.

### Reference Books

- Mwnd Choudhry,(2000)Capital Market Instruments;-*Analysis and Valuation, FT Press,*
- Mahesh Kulkarni & Dr Suhas Kulkarni, (2001) Capital Markets and Financial Services, *Nirali Publications, Mumbai.*
- Rajesh Chakraborty, Sankar D.E, (2011 )Capital Markets in India, *Sage Publications,, New Delhi.*

## E – RESOURCES

- [www.nse.com](http://www.nse.com)[www.bse.com](http://www.bse.com)
- [wxvw.nsd.com](http://www.nse.com)
- [www.globalcapitalmarkets.com](http://www.globalcapitalmarkets.com)[www.mckinsey.com](http://www.mckinsey.com)[www.indiacapitalmarkets.in](http://www.indiacapitalmarkets.in)

## Course Outcomes

CO. No.	On completion of the course the student will be able to	Cognitive Level
CO-1	Recall the fundamental theories and relate it to methodologies and current trends in Indian capital market.	K1, K2
CO-2	Identify implicit beliefs influencing decision-making in capital market scenarios.	K3
CO-3	Construct advanced project management skills in the regulation of Indian capital market.	K4
CO-4	Criticize social concerns in the capital market, including economic disparities, ethical practices, and corporate social responsibility.	K5
CO-5	Discuss ethical principles in capital market, considering complexities in business decision-making in primary and secondary markets.	K6

### CO - PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	2	3	3
CO-4	3	2	2	3	3	3
CO-5	3	3	3	3	3	3

High Correlation: 60%

Moderate correlation: 40%

Low Correlation: Nil

## EXPORT AND IMPORT PROCEDURES

### PCOE101

Semester: I

Category: Non-Major Elective

Class & Major: I M.Com

Credit : 2

Hours/Week: 3

Total Hours: 39

### Course Objectives

CO No.	On completion of the course the student will be able to
CO-1	Identify Risk involved in Export and Import Procedures
CO-2	Obtain knowledge on procedures of export and import transactions
CO-3	Understand the features of export incentive schemes.
CO-4	Analyze the payment methods, risks and various financing strategies
CO-5	Evaluate financial performance of EXIM bank of India.

### UNIT I - INTRODUCTION

8 Hours

Foreign Trade – Meaning – Importance – Domestic Trade versus Foreign Trade. Free Trade – Barriers to trade.

**UNIT II - DOCUMENTATION****7 Hours**

Documentation frame work – Processing of an export order – Export financing methods and methods of payment in international trade – Custom clearance regulation –Pre and post shipment export credits.

**UNIT III – EXPORT AND IMPORT PROCEDURE****8 Hours**

Procedure for procurement through imports – Import financing – Custom Clearance.

**UNIT IV - RISKS****7 Hours**

Credit and Exchange Risk – Marine Insurance – Importance - Insurance covers of Export Credit Guarantee Corporation.

**UNIT V - EXPORT INCENTIVE****9 Hours**

Export Incentive – Duty Draw back Scheme – Duty Exemption Scheme – Tax Incentives.

**Text Books**

- Varshney and Bhattacharya. (2020) International Marketing Management. S. Chand & Sons. New Delhi.
- Cherian, and Jacob, (2018) Export Marketing. Himalayan Publishing House. Chennai.
- Warnen, J. Keegan, (2019) Global Marketing. Prentice Hall of India.

**Reference Books**

- Varshney, R.L. and Bhattacharya, B. (2018) International Marketing Management. Sultan Chand & Sons. New Delhi.
- Hollensen, Svend. (2017) Global Marketing: A decision-oriented approach. Prentice Hall. Harlow. England.
- Bradley Fran, J. (2018) International Marketing Strategy. Prentice Hall. Pearson Education: Harlow. England.

**Course Outcomes**

<b>CO. No.</b>	<b>On completion of the course the student will be able to</b>	<b>Cognitive Level</b>
CO-1	Define the concepts of export and import and relate it to export and import procedures.	K1, K2
CO-2	Apply the export and import regulations.	K3
CO-3	Analyze the various export and import methods.	K4
CO-4	Choose the competitive funding institutions.	K5
CO-5	Develop the organizations and institutions that help foreign trade process.	K6
CO-6	Define the concepts of export and import and relate it to export and import procedures.	K1, K2



**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	2	2
CO-2	3	2	3	2	2	2
CO-3	3	2	3	2	3	3
CO-4	3	2	2	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation: 60%****Moderate correlation: 40%****Low Correlation: Nil****NON – MAJOR ELECTIVE****These courses are offered to all major except M.COM**

Semester	Category	Course Code	Course Title	Contact /Week	Credit
					Min /Max
I	Non Major Elective-I / (SEC)	PCOE101	Export and Import Procedures	3	2

**III & IV EVALUATION COMPONENTS OF CIA**

Semester	Category	Course Code	Course Title	Component III	Component IV
I	Core I/ (DSC)	PCOM109	Business Finance	Assignment	Problem Solving
	Core II/(DSC)	PCOM110	Digital Marketing	Case Study	Assignment
	Core III/(DSC)	PCOM111	Banking and Insurance	Assignment	seminar
	Elective I	PCOO101	Operations Research	Poster presentation	Quiz
	Elective II	PCOO102	Strategic Human Resource Management	Assignment	seminar
	Professional Competency	PCOR110	Advanced Excel	Assignment	Seminar
II	Core IV/(DSC)	PCOM211	Strategic Cost Management	Case study	Seminar
	Core V/(DSC)	PCOM212	Corporate Accounting	Problem Solving	Assignment
	Core VI/(DSC)	PCOM213	Setting up of Business Entities	Case Study	One minute Reflections
	Elective III	PCOO201	Business Ethics and Corporate Sustainability	Assignment	Seminar
	Elective IV	PCOO202	Logistics And Supply Chain Management	Assignment	Seminar
	Core Industry Module-I	PCOM214	Capital Market	Assignment	Seminar

## DEPARTMENT OF PHYSICS

### PREAMBLE

**PG:** Syllabi of Programme offered in Semester I and II along with III and IV Evaluation Components (with Effect from 2023 – 2025 Batch onwards).

### PROGRAMME PROFILE M. Sc. Physics

<b>PSO No</b>	<b>On completion of this programme, the students will be able to</b>
PSO-1	Articulate fundamental and advance concepts, principles and processes underlying physical phenomena in different branches of physical sciences.
PSO-2	Perform the calculations in theoretical physics using qualitative and quantitative reasoning including sophisticated mathematical techniques.
PSO-3	Comprehend, design and construct electronic circuits, Develop the experimental and data analysis skills through a wide range of lab experiments.
PSO-4	Analyze and interpret data collected using appropriate methods, including the use of suitable software and customized worksheets, and relating the conclusions to relevant theories of physics
PSO-5	Conduct independent study to discover and review research articles, select a research topic, strategize, execute and report findings for research projects.
PSO-6	Evaluate the role of Physics in enhancing the life of the people and involve in community building activities.

## PROGRAMME PROFILE M. Sc. Physics

Sem	Part	Category	Course Code	Course Title	Contact Hrs/Week	Credits
I	I	Core Course-I	PPHM107	Mathematical Physics	5	4
		Core Course -II	PPHM108	Classical Mechanics and Relativity	5	4
		Core Practical-I	PPHR102	Practical I	5	4
	II	Elective Course (Generic / <b>Discipline Centric</b> )-I	PPHO101	Energy Physics	5	3
		Elective Course (Generic / <b>Discipline Centric</b> )-II	PPHO102	Linear and Digital ICs and Applications	5	3
	III	Skill Enhancement Course (NME)	--	--	3	2
	IV	Online Course	--	--	2	2
<b>Total</b>					<b>30</b>	<b>22</b>
II	I	Core Course-III	PPHM208	Statistical Mechanics	5	4
		Core Course-IV	PPHM209	Quantum Mechanics –I	5	4
		Core Practical-II	PPHR204	Practical – II	5	4
	II	Elective Course (Generic / <b>Discipline Centric</b> )-III	PPHO201	Non-Linear Dynamics	4	3
		Elective Course (Generic / <b>Discipline Centric</b> )-IV	PPHO202	Solid Waste Management	4	3
	III	Core Industry Module - I	PPHM210	Sewage And Waste Water Treatment And Reuse	4	3
	IV	Skill Enhancement Course –DSE II	PPHD201	Electronics Communication System	3	2
	V	Service Learning (outside class hours)	PPXI201	Energy Audit	--	1
		Internship/Industrial activity/Field visit	PINS201	---	--	2
	<b>Total</b>					<b>30</b>
III	I	Core Course - V	PPHM308	Quantum Mechanics –II	5	4
		Core Course -VI	PPHM309	Condensed Matter Physics	5	4
		Core Practical-III	PPHR304	Practical - III	5	4
	II	Elective Course (Generic / <b>Discipline Centric</b> )-V	PPHO301	Crystal Growth and Thin films	3	3
		Elective Course (Generic /	PPHO302	Physics of Nano Science And Technology	4	3

		<b>Discipline Centric)-VI</b>				
	III	Core Industry Module -II	PPHM310	Medical Physics	4	3
	IV	Skill Enhancement Course / Inter-disciplinary III	PPHI301	Characterization of Materials	4	2
				<b>Total</b>	<b>30</b>	<b>23</b>
IV	I	Core Course -VII	PPHM406	Nuclear and Particle Physics	5	4
		Core Course -VIII	PPHM407	Spectroscopy	5	4
		Core Course -IX	PPHM408	Numerical Methods and Computer Programming	5	4
		Core Project	PPHP402	Project with Viva-Voce	6	4
	II	Elective Course (Generic / <b>Discipline Centric)-VII</b>	PPHO401	Communication Electronics	5	3
	III	Skill Enhancement Course - Professional Competency Skill - IV	PPHC401	Solar Energy Utilization	4	2
	IV	Internship	PINS401	--	--	-/2
				<b>TOTAL</b>	<b>30</b>	<b>21/23</b>
				<b>GRAND TOTAL</b>	<b>120</b>	<b>92/94</b>

### COURSES OFFERED TO OTHER DEPARTMENTS

#### NON-MAJOR ELECTIVE

Semester	Part	Category	Course Code	Course Title	Contact Hour/Week	Credit
						Min/Max
I	IV	SEC I (NME)	PPHE101	Physics For Everyday Life	3	2

# MATHEMATICAL PHYSICS

## PPHM107

<b>Semester</b>	<b>: I</b>	<b>Credit</b>	<b>: 4</b>
<b>Category</b>	<b>: Core I</b>	<b>Hours /Weeks</b>	<b>: 5</b>
<b>Class &amp; Major</b>	<b>: I M.Sc Physics</b>	<b>Total Hours</b>	<b>: 65</b>

### COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Understand mathematical knowledge for the description of physical phenomenon.
CO-2	Express the skills of learning and appreciating Physics through Mathematics.
CO-3	Apply the complex functions are generally supposed to have a domain.
CO-4	Deduce the Fourier series can be defined as a way of representing a periodic function.
CO-5	Explain the mathematical statistics deals with situations which can be described.

### UNIT I: LINEAR VECTOR SPACE

**13 Hours**

Basic concepts – Definitions- examples of vector space – Linear independence - Scalar product- Orthogonality – Stoke’s theorem and application - Gram-Schmidt orthogonalization procedure –linear operators – Dual space- ket and bra notation – orthogonal basis – change of basis – Isomorphism of vector space – projection operator –Eigen values and Eigen functions – Direct sum and invariant subspace – orthogonal transformations and rotation.

### UNIT II: COMPLEX ANALYSIS

**13 Hours**

Review of Complex Numbers -de Moivre’s theorem-Functions of a Complex Variable- Differentiability -Analytic functions- Harmonic Functions- Complex Integration- Contour Integration, Cauchy – Riemann conditions – Singular points – Cauchy’s Integral Theorem and integral Formula - Taylor’s Series - Laurent’s Expansion- Zeros and poles – Residue theorem and its Application: Potential theory - (1) Electrostatic fields and complex potentials - Parallel plates, coaxial cylinders and an annular region (2) Heat problems - Parallel plates and coaxial cylinders.

### UNIT III: MATRICES

**12Hours**

Types of Matrices and their properties, Rank of a Matrix -Conjugate of a matrix - Adjoint of a matrix - Inverse of a matrix - Hermitian and Unitary Matrices -Trace of a matrix- Transformation of matrices

- Characteristic equation - Eigen values and Eigen vectors - Cayley–Hamilton theorem – Diagonalization.

#### **UNIT IV: FOURIER TRANSFORMS & LAPLACE TRANSFORMS**

**13 Hours**

Definitions -Fourier transform and its inverse - Transform of Gaussian function and Dirac delta function -Fourier transform of derivatives - Cosine and sine transforms – Fourier series in the interval  $(0, \infty)$  - Convolution theorem. Application: Diffusion equation: Flow of heat in an infinite and in a semi - infinite medium - Wave equation: Vibration of an infinite string and of a semi - infinite string.

Laplace transform and its inverse - Transforms of derivatives and integrals – Differentiation and integration of transforms - Dirac delta functions - Application - Laplace equation: Potential problem in a semi - infinite strip - Laplace transforms: linearity property, first and second translation property of LT.

#### **UNIT V: DIFFERENTIAL EQUATIONS**

**14 Hours**

Order degree of a differential equation – Linear differential equation of first order and solution - Second order differential equation- Sturm-Liouville’s theory - Series solution with simple examples - Hermite polynomials - Generating function - Orthogonality properties - Recurrence relations – Legendre polynomials - Generating function - Rodrigue formula – Orthogonality properties - Dirac delta function- One dimensional Green’s function and Reciprocity theorem -Sturm-Liouville’s type equation in one dimension & their Green’s function.

#### **TEXT BOOKS:**

- George Arfken and Hans J Weber, (2012), *Mathematical Methods for Physicists – A Comprehensive Guide* (7th edition), Academic press.
- P.K. Chattopadhyay, (2013). *Mathematical Physics* (2<sup>nd</sup> edition), New Age, New Delhi.

#### **REFERENCE BOOKS:**

- P.K. Chattopadhyay (2016). *Mathematical Physics*, New Age International Publishers, New Delhi.
- D. G. Zill and M. R. Cullen. (2006). *Advanced Engineering Mathematics*, 3rd Ed. Narosa, New Delhi.
- B.S. Rajput. (2009) *Mathematical Physics*, Pragati Prakashan, Meerut.
- H.K. Dass, Dr. Rama Verma. (2014). *Mathematical Physics*, New Delhi.
- B.D. Gupta (2006). *Mathematical Physics*, Vikas publishing house 3rd Edition, New Delhi.
- B. D. Gupta (2009). *Mathematical Physics* (4<sup>th</sup> edition), Vikas Publishing House, New Delhi.

## e-RESOURCES

- [www.khanacademy.org](http://www.khanacademy.org)
- [https://youtu.be/LZnRlOA1\\_2I](https://youtu.be/LZnRlOA1_2I)
- <http://hyperphysics.phy-astr.gsu.edu/hbase/hmat.html#hmath>
- <https://archive.nptel.ac.in/courses/115/106/115106086/>

## COURSE OUTCOMES:

CO No	On completion of the course, the students will be able to	Bloom's level
CO-1	Able to real variable analysis and complex analysis.	K1, K2
CO-2	Develop the proficiency to assess integrals involving real variables through the application of the Cauchy Integral Formula and Residue Theorem.	K3
CO-3	Analyze the characteristics of matrices and their different types, as well as the process of diagonalization.	K4
CO-4	Evaluate and discuss the probability rules applicable to various statistical processes and determine the relevant distribution function for a given statistical process.	K5
CO-5	Solve the problems using linear differential equations and Green's function, which appear in various branches of science.	K6

## CO-PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	1	1	3	3
CO-2	3	3	1	1	3	3
CO-3	3	3	1	2	3	3
CO-4	3	3	1	2	3	3
CO-5	3	3	2	2	3	3

High Correlation      -67    Moderate Correlation- 13%    Low Correlation      - 20%

## CLASSICAL MECHANICS AND RELATIVITY PPHM108

Semester	: I	Credit	: 4
Category	: Core II	Hours /Weeks	: 5
Class & Major	: I M.Sc Physics	Total Hours	: 65

## COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Understand fundamentals of classical mechanics.
CO-2	Understand Lagrangian formulation of mechanics and apply it to solve equation of motion.
CO-3	Explore Hamiltonian formulation of mechanics and apply it to solve equation of motion.
CO-4	Learn the theory of small oscillations of a system.

CO-5	Learn the relativistic formulation of mechanics of a system
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**UNIT I: PRINCIPLES OF CLASSICAL MECHANICS** **13 Hours**

Mechanics of a single particle – mechanics of a system of particles – conservation laws for a system of particles – constraints – holonomic & non-holonomic constraints – generalized coordinates – configuration space – transformation equations – principle of virtual work.

**UNIT II: LAGRANGIAN FORMULATION** **14 Hours**

D'Alembert's principle – Lagrangian formalism: constraints – classification - Lagrangian equations of motion for conservative systems – applications: (i) simple pendulum (ii) Atwood's machine (iii) projectile motion.

**UNIT III: HAMILTONIAN FORMULATION** **13 Hours**

Phase space – cyclic coordinates – conjugate momentum – Hamiltonian function – Hamilton as total energy operator – Hamilton variational principle - Hamilton's canonical equations of motion – applications: (i) simple pendulum (ii) one dimensional simple harmonic oscillator (iii) motion of particle in a central force field.

**UNIT IV: SMALL OSCILLATIONS** **12 Hours**

Formulation of the problem – transformation to normal coordinates – frequencies of normal modes – linear triatomic molecule - Small oscillations Eigenvalue problems.

**UNIT V: RELATIVITY** **13 Hours**

Inertial and non-inertial frames – Special theory of relativity - Lorentz transformation equations – length contraction and time dilation – relativistic addition of velocities – Einstein's mass-energy relation – Minkowski's space – four vectors – position, velocity, momentum, acceleration and force in for vector notation and their transformations.

**TEXT BOOKS:**

- H. Goldstein (2002). *Classical Mechanics*, 3rd Edition, Pearson Edu.
- J. C. Upadhyaya (2003). *Classical Mechanics*, Himalaya Publishing. Co. New Delhi.

**REFERENCE BOOKS:**

- M. Spiegel. (2017). *Theory & Problems of Theoretical Mechanics* (McGraw Hill Education.
- S. N. Maithi and D. P. Raychaudhuri. (2006) *Classical Mechanics and General Properties of Matter*. New Age International, Singapore.
- L.P. Kadanoff (2001). *Statistical Physics - Statics, Dynamics and Renormalization*, World Scientific, Singapore.
- N. C. Rana and P.S. Joag. (2001) *Classical Mechanics* - Tata McGraw Hill.

**E-RESOURCES**



- [http://poincare.matf.bg.ac.rs/~zarkom/Book\\_Mechanics\\_Goldstein\\_Classical\\_Mechanics\\_optimized.pdf](http://poincare.matf.bg.ac.rs/~zarkom/Book_Mechanics_Goldstein_Classical_Mechanics_optimized.pdf)
- <https://pdfcoffee.com/classical-mechanics-j-c-upadhyay-2014-editionpdf-pdf-free.html>
- <https://nptel.ac.in/courses/122/106/122106027/>
- <https://ocw.mit.edu/courses/physics/8-09-classical-mechanics-iii-fall-2014/lecture-notes/>
- <https://www.britannica.com/science/relativistic-mechanics>.

### COURSE OUTCOMES:

CO No.	On completion of the course, the students will be able to	Bloom's level
CO-1	Understanding the fundamental principles of the special theory of relativity.	K1, K2
CO-2	Construct the Lagrangian formulation and solve the equations of motion for physical systems.	K3
CO-3	Analyze the concepts of Lagrangian and Hamiltonian mechanics for solving the equations of motion in physical systems.	K4
CO-4	Evaluate and discuss the small oscillations in systems and determine their normal modes of oscillations.	K5
CO-5	Solve orbit problems using the conservation of angular momentum and total energy of the system.	K6

### CO-PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	1	2	3	3
CO-2	3	3	1	2	3	3
CO-3	3	3	1	2	3	3
CO-4	3	3	1	2	3	3
CO-5	3	3	1	3	3	3

**High Correlation - 70% Moderate Correlation- 13% Low Correlation - 17%**

### PRACTICAL – I

#### PPHR102

<b>Semester</b>	<b>: I</b>	<b>Credit</b>	<b>: 4</b>
<b>Category</b>	<b>: Core Practical I</b>	<b>Hours /Weeks</b>	<b>: 5</b>
<b>Class &amp; Major</b>	<b>: I M.Sc Physics</b>	<b>Total Hours</b>	<b>: 65</b>

### COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Understand the concept of mechanical behavior of materials and calculation of same using appropriate equations.
CO-2	Calculate the thermodynamic quantities and physical properties of materials.
CO-3	Analyze the optical and electrical properties of materials.
CO-4	Demonstrate knowledge and comprehension of the basic of physics
CO-5	Develop independent problem solving skills

## Experiments

1. Determination of Young's modulus and Poisson's ratio by Hyperbolic fringes - Cornu's Method
2. B-H loop using Anchor ring
3. Determination of Thickness of the enamel coating on a wire by diffraction
4. Determination of Planck Constant – LED Method
5. Measurement of Conductivity - Four probe method
6. UV-Visible spectroscopy – Verification of Beer-Lambert's law and identification of wavelength maxima – Extinction coefficient
7. Determination of Viscosity of the given liquid – Meyer's disc
8. Study of important electrical characteristics of IC741
9. Study of Binary to Gray and Gray to Binary code conversion
10. V- I Characteristics of different colours of LED
11. Study of attenuation characteristics of Wien's bridge network and design of Wien's bridge oscillator using Op-Amp
12. Construction of square wave Triangular wave generator using IC 741
13. Construction of pulse generator using the IC 741 – application as frequency divider
14. Study of R-S, clocked R-S and D-Flip flop using NAND gates
15. Arithmetic operations using IC 7483- 4-bit binary addition and subtraction
16. Study of J-K, D and T flip flops using IC 7476/7473

## TEXT BOOKS

- Gupta and Kumar (2000), *Practical Physics*, Pragati Prakasan.
- R. Srinivasan K.R Priolkar (1989), *Kit Developed for doing experiments in Physics- Instruction manual*, Indian Academy of Sciences.

## REFERENCE BOOKS

- S.P Singh (2005), *Advanced Practical Physics*, Pragati Prakasan.
- D. Chattopadhyay, C.R Rakshit (2003), *An advanced course in Practical Physics*, New Central Book Agency Pvt. Ltd
- Ramakanth A Gaykwad (2005), *Op-Amp and linear integrated circuit*, Eastern Economy Edition.
- R.S. Sirohi (2005), *A course on experiment with He-Ne Laser*, John Wiley & Sons (Asia) Pvt. Ltd.

## Course Outcome:

CO No	On completion of the course, the students will be able to	Bloom's level
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CO1	Understand the basic concepts of electronic circuits.	K1, K2
CO2	Construct the Meyer's disc with the knowledge of the thermal behavior of materials.	K3
CO3	Analyze the theoretical principles of magnetism through experiments.	K4
CO4	Explain the arc spectrum and applications of lasers.	K2

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	3	2	2	3
CO-2	3	2	3	2	3	3
CO-3	3	3	3	3	3	3
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation - 83% Moderate Correlation- 17% Low Correlation - 0%**

**ENERGY PHYSICS  
PPHO101**

<b>Semester</b>	<b>: I</b>	<b>Credit</b>	<b>: 3</b>
<b>Category</b>	<b>: Elective Core I</b>	<b>Hours /Weeks</b>	<b>: 5</b>
<b>Class &amp; Major</b>	<b>: I M.Sc Physics</b>	<b>Total Hours</b>	<b>: 65</b>

**COURSE OBJECTIVES:**

CO No.	To enable the students
CO-1	Knowledge about various renewable energy sources.
CO-2	Understand the ways of effectively utilizing the oceanic energy.
CO-3	Describes the method of harnessing wind energy and its advantages.
CO-4	Explore the techniques useful for the conversion of biomass into useful energy.
CO-5	Analyze about utilization of solar energy.

**UNIT I: INTRODUCTION TO ENERGY SOURCES**

**13 Hours**

Conventional and non-conventional energy sources and their availability–prospects of Renewable energy sources– Energy from other sources–chemical energy–Nuclear energy– Energy storage and distribution.

**UNIT II: ENERGY FROM THE OCEANS**

**12 Hours**

Energy utilization–Energy from tides–Basic principle of tidal power–utilization of tidal energy – Principle of ocean thermal energy conversion systems.

**UNIT III: WIND ENERGY SOURCES**

**13 Hours**

Basic principles of wind energy conversion–power in the wind–forces in the Blades– Wind energy

conversion–Advantages and disadvantages of wind energy conversion systems (WECS) - Energy storage–Applications of wind energy.

**UNIT IV: ENERGY FROM BIOMASS**

**13 Hours**

Biomass conversion Technologies– wet and dry process– Photosynthesis -Biogas Generation:

Introduction–basic process: Aerobic and anaerobic digestion – Advantages of anaerobic digestion- factors affecting bio digestion and generation of gas- bio gas from waste fuel– properties of biogas-utilization of biogas.

**UNIT V: SOLAR ENERGY SOURCES**

**14 Hours**

Solar radiation and its measurements–solar cells: Solar cells for direct conversion of solar energy to electric powers–solar cell parameter–solar cell electrical characteristics– Efficiency–solar water Heater –solar distillation– solar cooking–solar greenhouse – Solar pond and its applications

**TEXT BOOKS:**

- Thomas L. Floyd and David M. Buchla. (2013), *Analog Fundamentals: A systems approach*, Energy technology.
- Anil K. Maini. (2007), *Digital Electronics: Principles, Devices and Applications*, John Wiley & Sons Ltd.

**REFERENCE BOOKS:**

- John Twidell and Tonyweir (2007), *Renewable energy resources*, Taylor and Francis group, London and New York.
- C.S. Solanki (1999), *Renewal Energy Technologies: A Practical Guide for Beginners* -PHI Learning

**E-RESOURCES**

- <https://www.open.edu/openlearn/ocw/mod/oucontent/view.php?id=2411&printable=1>
- <https://www.nationalgeographic.org/encyclopedia/tidal-energy/>
- <https://www.ge.com/renewableenergy/wind-energy/what-is-wind-energy>
- <https://www.reenergyholdings.com/renewable-energy/what-is-biomass/>
- <https://www.acciona.com/renewable-energy/solar-energy/>

**COURSE OUTCOMES:**

CO No	On completion of the course, the students will be able to	Bloom’s level
CO-1	Label the various form of renewable and non-renewable energy sources.	K1, K2
CO-2	Identify the concepts of oceanic energy and apply them in practical applications.	K3
CO-3	Examine the operation of a windmill and evaluate the benefits of utilizing wind energy.	K4
CO-4	Interpret the results of the aerobic digestion and anaerobic digestion	K5

	process.	
CO-5	Develop new ways to produce energy storing devices effectively.	K6

### CO-PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	1	3	3	3
CO-2	3	2	1	3	3	3
CO-3	3	2	3	3	3	3
CO-4	3	2	1	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation - 77% Moderate Correlation- 13% Low Correlation - 10%**

### LINEAR AND DIGITAL ICs AND APPLICATIONS PPHO102

<b>Semester</b>	<b>: I</b>	<b>Credit</b>	<b>: 3</b>
<b>Category</b>	<b>: Elective Core II</b>	<b>Hours /Weeks</b>	<b>: 5</b>
<b>Class &amp; Major</b>	<b>: I M.Sc Physics</b>	<b>Total Hours</b>	<b>: 65</b>

#### COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Understand the basic building blocks of linear integrated circuits.
CO-2	Apply the linear and non-linear applications of operational amplifiers.
CO-3	Learn the theory and applications of PLL.
CO-4	Explore the concepts of waveform generation and introduce one special function ICs.
CO-5	Exposure to digital IC's

#### UNIT I: INTEGRATED CIRCUITS AND OPERATIONAL AMPLIFIER **11 Hours**

Introduction, Classification of IC's, basic information of Op-Amp 741 and its features, the ideal Operational amplifier, Op-Amp internal circuit and Op-Amp. Characteristics.

#### UNIT II: APPLICATIONS OF OP-AMP **13 Hours**

LINEAR APPLICATIONS OF OP-AMP: Solution to simultaneous equations and differential equations, Instrumentation amplifiers, V to I and I to V converters.

NON-LINEAR APPLICATIONS OF OP-AMP: Sample and Hold circuit, Log and Antilog amplifier, multiplier and divider, Comparators, Schmitt trigger, Multivibrators, Triangular and Square waveform generators.

**UNIT III: ACTIVE FILTERS & TIMER AND PHASE LOCKED LOOPS** **14 Hours**

ACTIVE FILTERS: Introduction, Butterworth filters – 1st order, 2nd order low pass and high pass filters, band pass, band reject and all pass filters.

TIMER AND PHASE LOCKED LOOPS: Introduction to IC 555 timer, description of functional diagram, monostable and astable operations and applications, Schmitt trigger, PLL - introduction, basic principle, phase detector/comparator, voltage controlled oscillator (IC 566), low pass filter, monolithic PLL and applications of PLL

**UNIT IV: VOLTAGE REGULATOR & D to A AND A to D CONVERTERS** **13 Hours**

VOLTAGE REGULATOR: Introduction, Series Op-Amp regulator, IC Voltage Regulators, IC 723 general purpose regulators, Switching Regulator D to A AND A to D CONVERTERS: Introduction, basic DAC techniques -weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, A to D converters -parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC, DAC and ADC Specifications

**UNIT V: CMOS LOGIC, COMBINATIONAL CIRCUITS USING TTL 74XX ICs  
& SEQUENTIAL CIRCUITS USING TTL 74XX ICs** **14 Hours**

CMOS LOGIC: CMOS logic levels, MOS transistors, Basic CMOS Inverter, NAND and NOR gates, CMOS AND-OR-INVERT and OR-AND-INVERT gates, implementation of any function using CMOS logic. COMBINATIONAL CIRCUITS USING TTL 74XX ICs: Study of logic gates using 74XX ICs, Four-bit parallel adder (IC 7483), Comparator (IC 7485), Decoder (IC 74138, IC 74154), BCD to 7-segment decoder (IC7447), Encoder (IC74147), Multiplexer (IC74151), Demultiplexer (IC 74154).SEQUENTIAL CIRCUITS USING TTL 74XX ICs: Flip Flops (IC 7474, IC 7473), Shift Registers, Universal Shift Register (IC 74194), 4- bit asynchronous binary counter (IC 7493).

**TEXT BOOKS**

- D. Roy Choudhury, Shail B. Jain (2012), *Linear Integrated Circuit*, 4th edition, New Age International Pvt. Ltd., New Delhi, India
- Ramakant A. Gayakwad, (2012), *OP-AMP and Linear Integrated Circuits*, 4th edition, Prentice Hall / Pearson Education, New Delhi.

**REFERENCE BOOKS**

- Sergio Franco (1997), *Design with operational amplifiers and analog integrated circuits*, McGraw Hill, New Delhi.
- Gray, Meyer (1995), *Analysis and Design of Analog Integrated Circuits*, Wiley International, New Delhi.

- Malvino and Leach (2005), *Digital Principles and Applications* (5<sup>th</sup> edition), Tata McGraw Hill, New Delhi
- Floyd, Jain (2009), *Digital Fundamentals* (8<sup>th</sup> edition), Pearson Education, New Delhi.
- B.L. Theraja and A.K. Theraja (2004), *A Textbook of Electrical technology*, S. Chand & Co.
- V.K. Mehta and Rohit Mehta (2008), *Principles of Electronics*, S. Chand & Co, 12th Edition.

## E-RESOURCES

- [https://nptel.ac.in/course.html/digital circuits/](https://nptel.ac.in/course.html/digital%20circuits/)
- [https://nptel.ac.in/course.html/electronics/operational amplifier/](https://nptel.ac.in/course.html/electronics/operational%20amplifier/)
- <https://www.allaboutcircuits.com/textbook/semiconductors/chpt-7/field-effect-controlled-thyristors/>
- <https://www.electrical4u.com/applications-of-op-amp/>
- <https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/>

## COURSE OUTCOMES:

CO No	On completion of the course, the students will be able to	Bloom's level
CO-1	Learn the basic concepts of circuit configuration for the design of linear integrated circuits and develop skills to solve associated problems.	K1
CO-2	Illustrate the concepts of designing linear and non-linear application circuits using Op-Amp, and design active filter circuits.	K2
CO-3	Utilize the knowledge of Phase-Locked Loops and develop skills to design simple circuits using IC 555 timer, as well as solve problems related to it.	K3
CO-4	Examine various methods for the development of A/D and D/A converters.	K4
CO-5	Assess the operation of CMOS logic, as well as in combinational and sequential circuits.	K5

Note: K6 level is not applicable.

## CO-PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	1	3	3	3	3
CO-2	3	1	3	3	3	3
CO-3	3	1	3	3	3	3
CO-4	3	1	3	3	3	3
CO-5	3	1	3	3	3	3

**High Correlation - 83%**      **Moderate Correlation- 0%**      **Low Correlation - 17%**

## STATISTICAL MECHANICS

### PPHM208

<b>Semester</b>	<b>: II</b>	<b>Credit</b>	<b>: 4</b>
<b>Category</b>	<b>: Core III</b>	<b>Hours /Weeks</b>	<b>: 5</b>
<b>Class &amp; Major</b>	<b>: I M.Sc Physics</b>	<b>Total Hours</b>	<b>: 65</b>

## COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Understand of thermodynamic potentials and to understand phase transition in thermodynamics
CO-2	Understand the relationship between statistic and thermodynamic quantities
CO-3	Explain the concept of partition function, canonical and grand canonical ensembles
CO-4	Learn the fundamental knowledge about the three types of statistics
CO-5	Explore phase transitions and fluctuation of thermodynamic properties that vary withtime

### UNIT I: PHASE TRANSITIONS

**13 Hours**

Phase Space – ensemble – ensemble average - Thermodynamic potentials - Phase Equilibrium - Gibb's phase rule - Phase transitions and Ehrenfest's classifications –Third law of Thermodynamics. Order parameters – Landau's theory of phase transition - Critical indices - Scale transformations and dimensional analysis.

### UNIT II: STATISTICAL MECHANICS AND THERMODYNAMICS

**12 Hours**

Foundations of statistical mechanics - Specification of states of a system - Micro canonical ensemble - Phase space – Entropy - Connection between statistics and thermodynamics – Entropy of an ideal gas using the micro canonical ensemble - Entropy of mixing and Gibb's paradox.

### UNIT III: CANONICAL AND GRAND CANONICAL ENSEMBLES

**13 Hours**

Introduction – canonical distribution – canonical average Trajectories and density of states - Liouville's theorem - Canonical and grand canonical ensembles - Partition function - Calculation of statistical quantities - Energy and density fluctuations.

### UNIT IV: CLASSICAL AND QUANTUM STATISTICS

**13 Hours**

Density matrix - Statistics of ensembles - Statistics of indistinguishable particles - Maxwell-Boltzmann statistics - Fermi-Dirac statistics – Ideal Fermi gas – Properties of liquid helium I and II - Degeneracy - Bose-Einstein statistics - Plank radiation formula - Ideal Bose gas - Bose-Einstein condensation.

### UNIT V: REAL GAS, ISING MODEL AND FLUCTUATIONS

**14 Hours**

Cluster expansion for a classical gas - Virial equation of state – Calculation of the first Virial coefficient in the cluster expansion - Ising model - Mean-field theories of the Ising model in three, two and one dimensions - Exact solutions in one dimension. Correlation of space-time dependent fluctuations - Fluctuations and transport phenomena - Brownian motion - Langevin's theory -



Fluctuation-dissipation theorem - The Fokker-Planck equation.

### TEXT BOOKS

- Satya Prakash. (2008), *Statistical Mechanics*, Kedar Nath Ram Nath, Meerut.
- S. Chandra and M. K. Sharma (2016), *A Textbook on Statistical Mechanics*, CBS Publisher, New Delhi.
- S. C. Garg, R. M. Bansal and C. K. Ghosh (2013), *Thermal Physics: Kinetic Theory, Thermodynamics and Statistical Mechanics*, McGraw Hill, New Delhi.

### REFERENCE BOOKS

- K. Huang (2002), *Statistical Mechanics*, Taylor and Francis, London
- B. Gupta, H. Roy. (2002), *Thermal Physics*, Books and Allied, Kolkata
- R. K. Pathria and P. D. Beale. (2021) *Statistical Mechanics*, Academic Press, Cambridge.
- B. K. Agarwal and M. Eisner. (2020). *Statistical Mechanics*, New Age International, New Delhi.
- Engel and C. V. D. Broeck. (2001). *Statistical Mechanics of Learning*, Cambridge University Press, Cambridge.
- W. Greiner, L. Neise and H. Stocker. (2001). *Thermodynamics and Statistical Mechanics*, Springer, New York.

### E-RESOURCES

- <https://byjus.com/chemistry/third-law-of-thermodynamics/>
- <https://web.stanford.edu/~peastman/statmech/thermodynamics.html>
- [https://en.wikiversity.org/wiki/Statistical\\_mechanics\\_and\\_thermodynamics](https://en.wikiversity.org/wiki/Statistical_mechanics_and_thermodynamics)
- [https://en.wikipedia.org/wiki/Grand\\_canonical\\_ensemble](https://en.wikipedia.org/wiki/Grand_canonical_ensemble)
- [https://en.wikipedia.org/wiki/Ising\\_model](https://en.wikipedia.org/wiki/Ising_model)

### COURSE OUTCOMES:

CO No	On completion of the course, the students will be able to	Bloom's level
CO-1	Acquire the basic principles of statistical mechanics in physics and identify the parameters used to classify phase transitions.	K1, K2
CO-2	Apply the statistical concepts of entropy and establish its partial derivative with respect to thermodynamic parameters.	K3
CO-3	Explore the canonical and grand canonical ensembles while concurrently interpreting the relationship between thermodynamic variables and the partition function.	K4
CO-4	Determine statistical principles to assess the behavior of ideal Fermi and Bose gases, while also drawing comparisons and distinctions among the three types of statistics.	K5
CO-5	Investigate the fluctuation-induced thermodynamic behavior of gases and employ a model for analysis.	K6

### CO-PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	1	3	3	3
CO-2	3	3	1	3	3	3
CO-3	3	3	1	3	3	3
CO-4	3	3	1	3	3	3
CO-5	3	3	1	3	3	3

High Correlation - 83% Moderate Correlation- 0% Low Correlation - 17%

### QUANTUM MECHANICS – I

#### PPHM209

Semester	: II	Credit	: 4
Category	: Core IV	Hours /Weeks	: 5
Class & Major	: I M.Sc Physics	Total Hours	: 65

#### COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Understand physical principles and the mathematical background important to Quantum mechanical descriptions.
CO-2	Describe the propagation of a particle in a simple, one-dimensional potential.
CO-3	Understand the Schrodinger's equation to obtain eigenvectors and energies for particle in a three-dimensional potential.
CO-4	Explain the mathematical formalism and the significance of constants of motion, and see their relation to fundamental symmetries in nature
CO-5	Learn the Approximation methods like perturbation theory, Variation and WKB Methods for solving the Schrödinger equation.

#### UNIT I: BASIC FORMALISM

13 Hours

Interpretation of the wave function – Time dependent Schrodinger equation – Time independent Schrodinger equation – Stationary states – Ehrenfest's theorem – Linear vector space – Linear operator – Eigen functions and Eigen Values – Hermitian Operator – Postulates of Quantum Mechanics – Simultaneous measurability of observables – General Uncertainty relation.

#### UNIT II: ONE DIMENSIONAL AND THREE-DIMENSIONAL ENERGY EIGEN VALUE PROBLEMS

13 Hours

Square – well potential with rigid walls – Square well potential with finite walls – Square potential barrier – Alpha emission – Bloch waves in a periodic potential – Kronig-penny square – well periodic potential – Linear harmonic oscillator: Operator method – Particle moving in a spherically symmetric potential – System of two interacting particles – Hydrogen atom – Rigid rotator

#### UNIT III: GENERAL FORMALISM

12 Hours

Dirac notation – Equations of motions – Schrodinger representation – Heisenberg representation – Interaction representation – Coordinate representation – Momentum representation – Symmetries and conservation laws – Unitary transformation – Parity and time reversal.

#### **UNIT IV: APPROXIMATION METHODS**

**13 Hours**

Time independent perturbation theory for non-degenerate energy levels – Degenerate energy levels – Stark effect in Hydrogen atom – Ground and excited state – Variation method – Helium atom – WKB approximation – Connection formulae (no derivation) – WKB quantization – Application to simple harmonic oscillator and Anharmonic Oscillator.

#### **UNIT V: ANGULAR MOMENTUM**

**14 Hours**

Eigenvalue spectrum of general angular momentum – Ladder operators and their algebra – Matrix representation – Gordon Coefficients: selection rules – recursion relations-computation of Clebsch-Gordon Coefficients - Spin angular momentum – Addition of angular momenta – CG Coefficients – Symmetry and anti – symmetry of wave functions – Construction of wave-functions and Pauli's exclusion principle.

#### **TEXT BOOKS:**

- P. M. Mathews and K. Venkatesan. (2010), *A Text book of Quantum Mechanics*, (2<sup>nd</sup> edition), Tata McGraw-Hill, New Delhi.
- G. Aruldhas. (2009). *Quantum Mechanics* (2<sup>nd</sup> edition), Prentice Hall of India, New Delhi.
- S.L. Gupta and I.D.Gupta, 1982. *Advanced Quantum Theory and Fields* (1<sup>st</sup> edition), S.Chand& Co., New Delhi.
- Ghatak and S. Lokanathan, 1984, *Quantum Mechanics: Theory and Applications*, (4<sup>th</sup> edition), Macmillan, India.

#### **REFERENCE BOOKS:**

- J. S. Bell, Gottfried and M.Veltman, 2001, *The Foundations of Quantum Mechanics World Scientific*, Singapore.
- E. Merzbacher, 1970, *Quantum Mechanics* (2<sup>nd</sup> edition), John Wiley and Sons, New York.
- V. K. Thankappan, 1985, *Quantum Mechanics*, (2<sup>nd</sup> edition), Wiley Eastern Ltd, New Delhi.
- L. D. Landau and E. M. Lifshitz, 1976, *Quantum Mechanics* (1<sup>st</sup> edition), Pergomon Press, Oxford.
- V. Devanathan, 2011, *Quantum Mechanics* (2<sup>nd</sup> edition), Alpha Science International Ltd, Oxford.

#### **E-RESOURCES**

- [http://research.chem.psu.edu/lxjgroup/download\\_files/chem565-c7.pdf](http://research.chem.psu.edu/lxjgroup/download_files/chem565-c7.pdf)
- [http://www.feynmanlectures.caltech.edu/III\\_20.html](http://www.feynmanlectures.caltech.edu/III_20.html)
- <http://web.mit.edu/8.05/handouts/jaffe1.pdf>
- [https://hepwww.pp.rl.ac.uk/users/haywood/Group\\_Theory\\_Lectures/Lecture\\_1.pdf](https://hepwww.pp.rl.ac.uk/users/haywood/Group_Theory_Lectures/Lecture_1.pdf)

- <https://theory.physics.manchester.ac.uk/~xian/qm/chapter3.pdf>

### COURSE OUTCOMES:

CO No	On completion of the course , the students will be able to	Bloom's level
CO-1	Learn quantum mechanics from linear vector spaces, operators, algebra, and unitary transformations.	K1, K2
CO-2	Apply the Schrödinger equation to solve both one-dimensional and three-dimensional problems.	K3
CO-3	Construct the various representations, space time symmetries and formulations of time evolution.	K4
CO-4	Determine the importance of approximation methods for evaluating energy corrections in quantum mechanical problems.	K5
CO-5	Develop and apply non-commutative algebra in the topics like angular and spin angular momentum, and subsequently, explain spectral line splitting.	K6

### CO-PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	1	3	3	3
CO-2	3	3	1	3	3	3
CO-3	3	3	1	3	3	3
CO-4	3	3	1	3	3	3
CO-5	3	3	1	3	3	3

High Correlation - 83% Moderate Correlation- 0% Low Correlation - 17%

### PRACTICAL – II PPHR204

Semester : II Credit :4  
 Category : Core Practical II Hours /Weeks : 5  
 Class & Major : I M.Sc Physics Total Hours : 65

### COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Understand the concept of mechanical behavior of materials and calculation of same using appropriate equations.
CO-2	Calculate the thermodynamic quantities and physical properties of materials.
CO-3	Analyze the optical and electrical properties of materials.
CO-4	Observe the applications of FET and UJT.
CO-5	Study the different applications of operational amplifier circuits.

### Experiment

1. Determination of Young's modulus and Poisson's ratio by Elliptical fringes - Cornu's Method
2. Determination of Stefan's constant of radiation from a hot body
3. Measurement of Coefficient of linear expansion- Air wedge Method
4. Measurement of Susceptibility of liquid - Quincke's method
5. Hall Effect in Semiconductor. Determine the Hall coefficient, carrier concentration and carrier mobility
6. Interpretation of vibrational spectra of a given material
7. Construction of square wave generator using IC 555 – Study of VCO
8. Construction of Schmidt trigger circuit using IC555 for a given hysteresis – Application as squarer
9. Construction of pulse generator using the IC 555 – Application as frequency divider
10. BCD to Excess- 3 and Excess 3 to BCD code conversion
11. Study of binary up / down counters - IC 7476 / IC7473
12. Shift register and Ring counter and Johnson counter- IC 7476/IC 7474
13. Study of synchronous parallel 4-bit binary up/down counter using IC 74193
14. Study of asynchronous parallel 4-bit binary up/down counter using IC 7493
15. Study of Modulus Counter
16. Construction of Multiplexer and Demultiplexer using ICs.

#### TEXT BOOKS

- Gupta and Kumar (2000), *Practical Physics*, Pragati Prakasan.
- R. Srinivasan K.R Priolkar (1989), *Kit Developed for doing experiments in Physics-* Instruction manual, Indian Academy of Sciences.

#### REFERENCE BOOKS

- D. Chattopadhyay, C.R Rakshit (2000), *An advanced course in Practical Physics*, New Central Book Agency Pvt. Ltd
- S.P Singh (1999), *Advanced Practical Physics*, Pragati Prakasan

#### Course Outcome:

CO No	On completion of the course, the students will be able to	Bloom's level
CO1	Understand the basic concepts of electronic circuits.	K1, K2
CO2	Construct a multiplexer and demultiplexer using integrated circuits.	K3
CO3	The relationship between synchronous and asynchronous parallel 4-bit binary up/down counters using integrated circuits.	K4

CO4	Explain the measurement of the coefficient of linear expansion using the Air Wedge Method.	K2
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**CO-PSO MAPPING:**

	CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	
<b>High - 60%</b>	CO-1	3	2	2	2	2	3	<b>Correlation Moderate</b>
	CO-2	3	2	3	3	2	3	
	CO-3	3	2	3	3	2	3	
	CO-4	3	2	2	3	2	3	
	CO-5	3	2	3	3	3	3	

Correlation- 40%    Low Correlation    - 0%

**NON-LINEAR DYNAMICS**

**PPHO201**

<b>Semester</b>	<b>: II</b>	<b>Credit</b>	<b>: 3</b>
<b>Category</b>	<b>: Elective Core III</b>	<b>Hours /Weeks</b>	<b>: 4</b>
<b>Class &amp; Major</b>	<b>: I M.Sc Physics</b>	<b>Total Hours</b>	<b>: 52</b>

**COURSE OBJECTIVES:**

CO No.	To enable the students
CO-1	Understand the analytical and numerical techniques of nonlinear dynamics.
CO-2	Understand the concepts of various coherent structures.
CO-3	Apply on bifurcations and onset of chaos.
CO-4	Understand the theory of chaos and its characterization.
CO-5	Explore aware of the applications of solitons, chaos and fractals.

**UNIT I: GENERAL 10 Hours**

Linear waves-ordinary differential equations(ODEs)-Partial differential equations (PDEs)- Methods to solve ODEs and PDEs.- Numerical methods – Linear and Nonlinear oscillators-Nonlinear waves-Qualitative feature

**UNIT II: COHERENT STRUCTURES 12 Hours**

Linear and Nonlinear dispersive waves - Solitons – KdB equation – Basic theory of KdB equation –Ubiquitous soliton equations – AKNS Method, Backlund transformation, Hirotabilinearization method, Painleve analysis - Perturbation methods- Solitons in Optical fibres - Applications.

**UNIT III: BIFURCATIONS AND ONSET OF CHAOS 10 Hours**

Bifurcation theory – Local and global bifurcation - One dimensional flows – Two dimensional flows – Three dimensional autonomous systems and chaos - Lyapunov exponents – Torus -Phase plane

– Limit cycles – Simple bifurcations – Discrete Dynamical system – Strange attractors – Routes to chaos.

## UNIT V APPLICATIONS

**10 Hours**

Soliton based communication systems – Soliton based computation – Synchronization of chaos – Chaos based communication – Cryptography – Image processing – Stochastic – Resonance – Chaos based computation – Time Series analysis.

### TEXT BOOKS:

- M. Lakshmanan and S. Rajasekar, 2003, *Nonlinear Dynamics: Integrability, Chaos and Patterns*. Springer.
- Strogatz, Steven H, 2014, *Nonlinear Dynamics and Chaos: With Applications to Physics, Biology, Chemistry, and Engineering*. West view Press.

### REFERENCE BOOKS:

- C. Misbah. 2017, *Complex Dynamics and Morphogenesis: An Introduction to Nonlinear Science*, Springer.
- S. Wolfram, 2002. *A New Kind of Science*, Wolfram Media Inc.,
- H. G. Schuster, 2005, *Deterministic Chaos: An Introduction*, Wiley-VCH,
- S.Wiggins, 2003, *Introduction to Applied Nonlinear Dynamical Systems and Chaos*. Springer.

### E-RESOURCES

- <https://www.digimat.in/nptel/courses/video/108106135/L06.html>
- <http://digimat.in/nptel/courses/video/115105124/L01.html>
- <https://www.digimat.in/nptel/courses/video/108106135/L01.html>
- <http://complex.gmu.edu/neural/index.html>
- <https://cnls.lanl.gov/External/Kac.php>

### COURSE OUTCOMES:

CO No	On completion of the course, the students will be able to	Bloom's level
CO-1	Acquire knowledge of both analytical and numerical methods available for solving various nonlinear systems.	K1, K2
CO-2	Identify the different types of coherent structures and elucidate their significance in the realms of science and technology.	K3
CO-3	Compare simple and complex bifurcations, as well as the routes to chaos.	K4
CO-4	Evaluate different oscillators, characterize chaos, and study fractals.	K5
CO-5	Improve the practical applications in telecommunication, employ chaos in cryptography and computations, and discuss diverse applications of fractals.	K6

## CO-PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	3	3	3
CO-2	3	3	2	3	3	3
CO-3	3	3	2	2	3	3
CO-4	3	3	2	2	3	3
CO-5	3	3	2	2	3	3

**High Correlation - 73% Moderate Correlation- 0% Low Correlation - 27%**

## SOLID WASTE MANAGEMENT

### PPHO202

<b>Semester</b>	<b>: II</b>	<b>Credit</b>	<b>: 3</b>
<b>Category</b>	<b>: Elective Core IV</b>	<b>Hours /Weeks</b>	<b>: 4</b>
<b>Class &amp; Major</b>	<b>: I M.Sc Physics</b>	<b>Total Hours</b>	<b>: 52</b>

### COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Understand basic knowledge in solid waste management procedures
CO-2	Explain industry exposure and be equipped to take up a job.
CO-3	Develop entrepreneurial skills.
CO-4	Analyze the status of solid waste management in the nearby areas.
CO-5	Examine the importance of healthy practices in waste management's.

### UNIT I: SOLID WASTE MANAGEMENT 12 Hours

Introduction - Definition of solid waste - Types – Hazardous Waste: Resource conservation and Renewal act – Hazardous Waste: Municipal Solid waste and non-municipal solid waste.

### UNIT II: SOLID WASTE CHARACTERISTICS 10 Hours

Solid Waste Characteristics: Physical and chemical characteristics - SWM hierarchy - factors affecting SW generation

### UNIT III: TOOLS AND EQUIPMENT 10 Hours

Tools and equipment - Transportation - Disposal techniques - Composting and land filling technique

### UNIT IV: ECONOMIC DEVELOPMENT 10 hours

SWM for economic development and environmental protection Linking SWM and climate change and marine litter.



**UNIT V: INDUSTRIAL VISIT & PROFESSIONAL COMPONENTS****10 hours**

SWM Industrial visit – data collection and analysis - presentation Expert Lectures, Online Seminars - Webinars on Industrial Interactions/Visits, Competitive Examinations, Employable and Communication Skill Enhancement, Social Accountability and Patriotism.

**TEXT BOOKS:**

- McGraw Hill., 2002, *Handbook of Solid Waste Management (2<sup>nd</sup> edition)*, George Tchobanoglous,
- B. BHosett, 2006, *Prospects and Perspectives of Solid Waste Management*, Age International (P) Ltd.,

**REFERENCE BOOKS:**

- D. Bhide, *Solid Waste Management*. Indian National Scientific Documentation Centre, New Delhi Edition 1983.
- D. L. Manjunath, *Environmental Studies*. Pearson Education Publication, New Delhi, 2006.
- K. Sasikumar, *Solid Waste Management*. PHI learning, New Delhi, 2009.

**E-RESOURCES**

- <https://www.meripustak.com/Integrated-Solid-Waste-Management-Engineering-Principles-And-Management-Issues-125648>
- <https://testbook.com/learn/environmental-engineering-solid-waste-management/>
- [https://www.meripustak.com&gclid=Cj0KCQjwuuKXBhCRARIsA-gM0iVpismAJN93CHA1sX6NuNeOKLXfQJ\\_jxHCOVH3QXjJ1iACq30KofoaAmFsEALw\\_wcB](https://www.meripustak.com&gclid=Cj0KCQjwuuKXBhCRARIsA-gM0iVpismAJN93CHA1sX6NuNeOKLXfQJ_jxHCOVH3QXjJ1iACq30KofoaAmFsEALw_wcB)
- <https://images.app.goo.gl/tYiW2gUPfS2cxdD28>
- <https://amzn.eu/d/5VUSTDI>

**COURSE OUTCOMES:**

CO No	On completion of the course, the students will be able to	Bloom's level
CO-1	Understand the nature of solid waste management.	K1, K2
CO-2	Develop entrepreneurial skills.	K3
CO-3	Categorize and oversee the state of solid waste in the surrounding areas.	K4
CO-4	Evaluate the decision to pursue a relevant job by acquiring industry exposure.	K5
CO-5	Generate ideas for fostering awareness and encouraging active participation in the efficient management of solid wastes in the local environment.	K6

**CO-PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	1	3	3	3
CO-2	3	2	1	3	3	3
CO-3	3	2	1	3	3	3
CO-4	3	1	2	3	3	3
CO-5	3	1	2	3	3	3

**High Correlation - 67% Moderate Correlation- 17% Low Correlation - 16%**

**SEWAGE AND WASTE WATER TREATMENT AND REUSE**

**PPHM201**

**Semester : I**

**Credit : 3**

**Category : Core Industry Module - I**

**Hours/Week : 4**

**Class &Major : I M.Sc Physics**

**Total Hours: 52**

**COURSE OBJECTIVES:**

<b>CO No.</b>	<b>To enable the students</b>
CO 1	Acquire basic knowledge in sewage and waste water Treatment procedures
CO 2	Understand industry exposure and be equipped to take up job.
CO 3	To harness entrepreneurial skills.
CO 4	Analyze the status of sewage and waste water management in the nearby areas.
CO 5	Sensitize the importance of healthy practices in waste water management.

**UNIT I: RECOVERY & REUSE OF WATER**

**10 Hours**

Recovery & Reuse of water from Sewage and Waste water: Methods of recovery: Flocculation - Sedimentation - sedimentation with coagulation - Filtration - sand filters - pressure filters - horizontal filters - vector control measures in industries - chemical and biological methods of vector eradication

**UNIT II: DISINFECTION**

**10 Hours**

Disinfection: Introduction to disinfection and sterilization: Disinfectant - UV radiation - Chlorination - Antisepsis - Sterilant - Aseptic and sterile -Bacteriostatic and Bactericidal - factors affecting disinfection.

**UNIT III: CHEMICAL DISINFECTION**

**10 Hours**

Chemical Disinfection: Introduction - Theory of Chemical Disinfection - Chlorination Other Chemical Methods - Chemical Disinfection Treatments Requiring - Electricity - Coagulation/Flocculation Agents as Pretreatment - Disinfection By-Products(DBPs)

**UNIT IV: PHYSICAL DISINFECTION**

**10 Hours**

Physical Disinfection: Introduction - Ultraviolet Radiation - Solar Disinfection - Heat Treatment - Filtration Methods - Distillation - Electrochemical Oxidation Water Disinfection by Microwave Heating.

**UNIT V: INDUSTRIAL VISIT & PROFESSIONAL COMPONENTS**

**12 Hours**

Industrial visit – data collection and analysis - presentation -Expert Lectures, Online Seminars - Webinars on Industrial Interactions/Visits, Competitive Examinations, Employable and Communication

Skill Enhancement, Social Accountability and Patriotism.

**TEXT BOOKS**

- Drinking water and disinfection technique, Anirudhha Balachandra. CRC press (2013)
- Design of Water and Wastewater Treatment Systems (CV-424/434), Shashi Bushan, Jain .Bros (2015)
- Integrated Water Resources Management, Sarbhukan M M, CBS PUBLICATION (2013)

**REFERENCE BOOKS**

- Handbook of Water and Wastewater Treatment Plant Operations, Frank. R Spellman, CRC Press, 2020
- Wastewater Treatment Technologies, Mritunjay Chaubey, Wiley, 2021.
- Metcalf and Eddy, Wastewater Engineering, 4th ed., McGraw Hill Higher Edu., 2002

**E RESOURCES.**

- [https://www.google.co.in/books/edition/Drinking\\_Water\\_DisinfectionTechniques/HVbNBQAAQBAJ?hl=en](https://www.google.co.in/books/edition/Drinking_Water_DisinfectionTechniques/HVbNBQAAQBAJ?hl=en)
- <https://www.meripustak.com/Integrated-Solid-Waste-Management-Engineering-Principles-And-Management-Issues-125648?>
- [.https://www.meripustak.com&gclid=Cj0KCQjwuuKXBhCRARIsACgM0iVpismAJN93CHA1sX6NuNeOKLXfQJjxHCOVH3QXjJ1iACq30KofoaAmFsEALw\\_wcB](https://www.meripustak.com&gclid=Cj0KCQjwuuKXBhCRARIsACgM0iVpismAJN93CHA1sX6NuNeOKLXfQJjxHCOVH3QXjJ1iACq30KofoaAmFsEALw_wcB)

**COURSE OUTCOMES:**

CO No	On completion of the course, the students will be able to	Bloom’s level
CO-1	Summarize the basic in the field of sewage and waste water treatment.	K1, K2
CO-2	Identifying the techniques involved in the sewage and waste water treatment.	K3
CO-3	Categorize and supervise the state of solid waste in the surrounding areas.	K4
CO-4	Assess the decision to pursue a relevant job by gaining industry exposure.	K5
CO-5	Develop ideas to promote awareness and encourage active participation in the efficient management of solid waste in the local environment.	K6

**CO-PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	1	1	3	3	3
CO-2	3	1	1	3	3	3
CO-3	3	1	1	3	3	3
CO-4	3	1	2	3	3	3
CO-5	3	1	2	3	3	3

High Correlation - 67% Moderate Correlation- 6% Low Correlation - 27%

**ELECTRONICS COMMUNICATION SYSTEM  
PPHD201**

Semester : II  
 Category : Skill Enhancement Course II  
 Class & Major : I M.Sc Physics

Credit : 2  
 Hours/Week : 3  
 Total Hours : 39

**Course Objectives:**

CO No.	To enable the students
CO 1	Understand basic role of Electromagnetic Waves.
CO 2	Apply the Production, Reception and Transmission of AM & FM.
CO 3	Analyze the Existence of AM & FM in Communication System.
CO 4	Divide the concepts of Electromagnetic Waves and their Applications.
CO 5	Comprehend the role of Modulated waves in Communication Systems.

**UNIT - I PROPAGATION OF RADIO WAVES**

**7 Hours**

Introduction to EM waves – Reflection and refraction of radio waves at the surface of the earth – Ground wave propagation - Sky wave propagation – Space wave propagation.

**UNIT - II AM GENERATION & TRANSMISSION**

**8 Hours**

Need for modulation – Amplitude modulation – Frequency Spectrum of the AM Wave - Modulation Index – Power relations in the AM Wave – AM generation – AM Transmitter.

**UNIT- III FM GENERATION & TRANSMISSION**

**8 Hours**

Frequency Modulation - Frequency Spectrum of the FM Wave – Effect of Noise – Wide Band & Narrow Band FM-FM Generation – FM Transmitter.

**UNIT -IV AM & FM RECEPTION**

**8 Hours**

AM Receiver – TRF Receiver – Super Heterodyne Receiver – Image Frequency Rejection – FM Receiver – Amplitude Limiter – De-Emphasis – FM Detection – Balanced Slope Detector – Phase Discriminator – Ratio Detector.

**UNIT -V PULSE MODULATION**

**8 Hours**

PAM Modulation & Detection – PWM Modulation & Detection – PPM Modulation & Detection – Quantization & Quantization Error – PCM Modulation & Detection.

**TEXT BOOKS**

- Wayne, T., 2012, *Electronic Communication Systems*. (4<sup>th</sup> edition.). Pearson Education India.
- Kennedy, G. Bernard, D. Prasanna, S.R.M. 2012, *Electronic Communication Systems*. (6<sup>th</sup> edition.). McGraw Hill Education India.

**REFERENCE BOOKS**

- Louis, E. Frenzel. (2015). *Principles of Electronic Communication Systems*.(4<sup>th</sup> Ed.). McGraw Hill.
- Simon, H. (2007). *Communication Systems*. (2<sup>nd</sup> Ed.). Wiley.

## E-RESOURCES

- <https://www.amazon.in/Kennedys-Electronic-Communication-Systems-Kennedy/dp/0071077820>
- <https://soaneemrana.org/onewebmedia/ELECTRONICS%20COMMUNICATION%20SYSTEM%20BY%20GEORGE%20KENNEDY.pdf>

## COURSE OUTCOMES:

CO No.	On completion of the course, the student will be able to	Bloom's level
CO-1	Acquire knowledge on propagation of radio waves.	K1, K2
CO-2	Develop the generation and transmission of Amplitude Modulation and Frequency Modulation.	K3
CO-3	Examine the operations of Frequency Modulation.	K4
CO-4	Evaluate the performance of an AM receiver.	K5
CO-5	Formulate Pulse Amplitude modulation and detection.	K6

## CO-PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	1	3	3	2	3
CO-2	3	1	3	3	2	3
CO-3	3	1	3	3	2	3
CO-4	3	1	3	3	3	3
CO-5	3	1	3	3	3	3

High Correlation - 73% Moderate Correlation- 10% Low Correlation - 17%

## PHYSICS FOR EVERYDAYLIFE PPHE101

Semester : I

Category : Skill Enhancement Course (NME)

Class & Major : All PG (Except PG Physics)

Credit : 2

Hours/Week : 3

Total Hours : 39

## COURSE OBJECTIVES:

CO No.	To enable the students
CO 1	Understand basics behind the Mechanical objects.
CO 2	Apply the Physics in Optical Instruments.
CO 3	Analyze the Basic Concepts of Home Appliances.
CO 4	Acquire Knowledge about the Solar Devices and its Application.
CO 5	Comprehend the role of Indian Physicist and their Contribution.

## UNIT-I MECHANICAL OBJECTS

8 Hour

Spring scales – bouncing balls –roller coasters – bicycles –rockets and space travel.

## UNIT-II OPTICAL INSTRUMENTS AND LASER

8 Hour

Vision corrective lenses – polaroid glasses – UV protective glass – polaroid camera – colour photography – holography and laser.

**UNIT-III PHYSICS OF HOME APPLIANCES**

**8 Hour**

Bulb – fan – hair drier – television – air conditioners – microwave ovens – vacuum cleaners

**UNIT-IV SOLAR ENERGY**

**8 Hour**

Solar constant – General applications of solar energy – Solar water heaters – Solar Photo – voltaic cells – General applications of solar cells.

**UNIT-V INDIAN PHYSICIST AND THEIR CONTRIBUTIONS**

**7 Hour**

C.V. Raman, HomiJehangir Bhabha, Vikram Sarabhai, Subrahmanyam Chandrasekhar, Venkatraman Ramakrishnan, Dr. APJ Abdul Kalam and their contribution to science and technology.

**TEXT BOOKS**

- The Physics in our Daily Lives, Umme Ammara, Gugucol Publishing, Hyderabad, 2019.
- For the love of physics, Walter Lawin, Free Press, New York, 2011.

**E-RESOURCES**

- [https://books.google.co.in/books/about/Physics\\_in\\_Everyday\\_Life\\_Scholar\\_s\\_Choic.html?id=YxNGrgEACAAJ&redir\\_esc=y](https://books.google.co.in/books/about/Physics_in_Everyday_Life_Scholar_s_Choic.html?id=YxNGrgEACAAJ&redir_esc=y)
- <https://betterread.com.au/book-search/search.do?authorName=%22D%20Henderson%22&txtQuery=%22D%20Henderson%22&searchBy=author>

**COURSE OUTCOMES:**

CO No.	On completion of the course, the student will be able to	Bloom’s level
CO1	Recall the concepts of Rockets and Space travel.	K1, K2
CO2	Identify the role of glasses and lenses in optics and laser systems.	K3
CO 3	Tests for the functioning model of home appliances	K4
CO 4	Explain the applications of solar energy	K5
CO 5	Generate innovative ideas for scientific instruments, focusing on features inspired by Indian physicists	K6

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	1	3	2	3	3
CO-2	3	1	3	2	3	3
CO-3	3	1	3	2	3	3
CO-4	3	1	3	3	3	3
CO-5	3	2	3	3	3	3

**High Correlation - 73% Moderate Correlation- 14% Low Correlation – 13%**

### III AND IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component-III	Component-IV
I	Core-I	PPHM107	Mathematical Physics	Assignment	Problem Solving
	Core-II	PPHM108	Classical Mechanics and Relativity	Oral Presentation	Seminar
	Elective Core-I	PPHO101	Energy Physics	Poster Presentation	Seminar
	Elective Core - II	PPHO102	Linear and Digital ICs and Applications	Assignment	Seminar
	Skill Enhancement Course (NME)	PPHE101	Physics For Everyday Life	Seminar	Assignment
II	Core-IV	PPHM208	Statistical Mechanics	Seminar	Poster Presentation
	Core-V	PPHM209	Quantum Mechanics –I	Seminar	Seminar
	Core Elective - III	PPHO201	Non-Linear Dynamics	Poster Presentation	Seminar
	Core Elective-IV	PPHO202	Solid Waste Management	Seminar	Poster Presentation
	Core Industry Module - I	PPHM201	Sewage And Waste Water Treatment And Reuse	PPT	Seminar
	Skill Enhancement Course II	PPHD201	Electronics Communication System	Seminar	Assignment

## DEPARTMENT OF CHEMISTRY

### PREAMBLE

**UG :** Programme Profile and the Syllabi of Courses Offered in Semester I and II Along with III and IV Evaluation Components (with Effect from 2023 – 2026 Batch onwards).

**PG:** Syllabi of Programme offered in Semester I and II along with III and IV Evaluation Components (with Effect from 2023 – 2025 Batch onwards).

### PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO No.	Upon completion of these courses the students will be able to
PSO-1	Understand the fundamental concepts in Organic, Inorganic, Physical, Theoretical, Nano, Bioinorganic, Polymer and Forensic Chemistry.
PSO-2	Identify and Estimate the component of organic and Inorganic chemical using classical and modern methods, and to determine the physical properties of compounds.
PSO-3	Predict the structures of compounds, separate and characterize them and understand the mechanism of reactions of chemical compounds and their synthesis through Practical & Project.
PSO-4	Apply chemical techniques relevant to academia and industry, generic skills and global competencies to complete the competitive World
PSO-5	Demonstrate importance of Advanced Material, pharmaceutical Drug and polymer material and Devise chemical processes with Green approach in Society needs.
PSO-6	Develop problem solving abilities for successful career in pharmaceuticals, chemical industry, teaching, research, environmental monitoring, product quality, consumer goods industry, food products, cosmetics industry etc.

### B.Sc CHEMISTRY PROGRAMME PROFILE

Semester	Part	Category	Course Code	Course Title	Contact Hrs/Week	Min/Max
I	I	Tamil/	UTAL110	General Tamil-I	5	3
		Hindi/	UHIL101	Hindi-I		
		French	UFRL101	French-I		
	II	English	UENL111	General English-I	5	3
		Core Course I	UCHM112	General Chemistry –I	5	4
	III	Core Course II	UCHR113	Quantitative Inorganic Estimation (titrimetric) and Inorganic Preparations	5	4
		Elective Course - GE I	UMAA120	Allied Mathematics for Chemistry-I	4	3
	IV	SEC- Foundation Course	UCHF101	Foundation Course	2	2
		SEC-I /NME-I			2	2
AECC/Soft Skill-I		USKS103	Communicative English	2	2	
<b>Total</b>					<b>30</b>	<b>23</b>



II	I	Tamil/ Hindi/ French	UTAL210 UHIL201 UFRL201	General Tamil-II Hindi-II French-II	5	3
	II	English	UENL211	General English-II	5	3
	III	Core Course III	UCHM207	General Chemistry –II	5	4
		Core Practical IV	UCHR208	Qualitative Organic Analysis and preparation of Organic Compounds	5	4
		Elective Course GE II	UMAA224	Allied Mathematics for Chemistry-II	4	3
		Internship	UINS201		-	-/2
	IV	SEC-II/NME-II			2	2
		SEC III/DS I	UCHD201	Cosmetic and Personal Grooming	2	2
		AECC/Soft Skill – II	USKS203	Soft Skill –II	2	2
	V	Extension Activity (Outside class hours)			-	1/2
VI	Value Added Course			-	-/2	
<b>Total</b>					<b>30</b>	<b>24/29</b>
III	I	Tamil/ Hindi/ French	UTAL310 UHIL301 UFRL301	General Tamil-III Hindi-III French-III	5	3
	II	English	UENL311	General English-III	5	3
	III	Core Course V	UCHM309	General Chemistry –III	4	4
		Core Practical VI	UCHR310	Qualitative Inorganic Analysis	3	3
		Elective Course - GE -III	UPHA301	Allied physics-I	3	3
		Elective Course – GE Practical I	UPHR302	Allied physics Practical-I	2	1
	IV	SEC IV / DS II	UCHD301	Pesticide Chemistry	2	2
		SEC V / ( Entrepreneurial)	UCHU302	Entrepreneurial skills in Chemistry	2	1
		AECC/Soft Skill – III	USKS301	Soft Skill-III	2	2
		Value Education			2	2
<b>Total</b>					<b>30</b>	<b>24</b>
IV	I	Tamil/ Hindi/ French	UTAL410 UHIL401 UFRL401	General Tamil-IV Hindi-IV French-IV	5	3
	II	English	UENL411	General English-IV	5	3
	III	Core Course VII	UCHM409	General Chemistry –IV	5	4
		Core Practical VIII	UCHR410	Physical Chemistry Practical- I	3	3
		Elective Course - GE IV	UPHA401	Allied Physics-II	3	2
		Allied Practical IV	UPHR402	Allied Physics Practical-II	3	2
		Internship	UINS401		-	-/2
	IV	NME - Online	UONL401		2	2

		Course				
		SEC VII /DS III	UCHD401	Forensic Science	2	2
		AECC/Soft Skill-IV	USKS401	Soft Skill-IV	2	2
		Extension Activity/Physical Education			-	-/2
	V	Value Added Course (Outside class hours)			-	-/2
				<b>Total</b>	<b>30</b>	<b>23/29</b>
V	III	Core Course IX	UCHM513	Organic Chemistry I	5	4
		Core Course X	UCHM514	Inorganic Chemistry I	5	4
		Core Course XI	UCHM515	Physical Chemistry I	5	4
		Core XII Project	UCHP501	Project with viva voce	4	4
		Elective Course - DS V	UCHO516	Biochemistry	5	3
		Elective Course DS VI	UCHO517	Industrial Chemistry	4	3
	IV	Environmental Studies			2	2
				<b>Total</b>	<b>30</b>	<b>24</b>
VI	III	Core Course XIII	UCHM618	Organic Chemistry -II	5	4
		Core Course XIV	UCHM619	Inorganic Chemistry - II	5	4
		Core Course XV	UCHM620	Physical Chemistry -II	5	4
		Core Course XVI	UCHM621	Physical Chemistry Practical II	3	2
		Elective Course - DS VII	UCHO607	Fundamentals of Spectroscopy	4	2
		Elective Course – DS VIII	UCHO608	Pharmaceutical Chemistry	4	3
		Internship	UINS601		-	-/2
	Comprehensive Viva-voce	UCHM605	Comprehensive Viva-voce	-	1	
	IV	Professional Competency Skill	UCHC601		4	2
		Extension Activity/Physical Education			-	-/2
V	Value Added Course (Outside class hours)			-	-	
				<b>Total</b>	<b>30</b>	<b>22/26</b>
				<b>Grand Total</b>	<b>180</b>	<b>140/155</b>

**LIST OF COURSES OFFERED TO OTHER DEPARTMENTS**

**ALLIED AND ALLIED OPTIONAL COURSES**

Semester	Part	Category	Course Code	Course Title	Contact Hrs per week	Credits
I	III	Allied- I	UCHA105	Chemistry for biological sciences I	4	3
I	III	Allied Practical-I	UCHR106	Volumetric Analysis	3	2
II	III	Allied- II	UCHA204	Chemistry for biological Sciences II	4	3
II	III	Allied Practical-II	UCHR205	Organic Analysis	3	2
III	III	Allied-I	UPHA301	Chemistry for physical sciences I	4	3
III	III	Allied Practical-I	UCHR302	Volumetric Analysis	3	2
IV	III	Allied-II	UPHA401	Chemistry for physical Sciences II	4	3
IV	III	Allied Practical-II	UCHR402	Organic Analysis	3	2

**NON- MAJOR ELECTIVE COURSES**

Semester	Part	Category	Course Code	Course Title	Contact Hrs per Week	Credits
						Min/Max
I	IV	Non major Elective	UCHE101	Role of Chemistry in daily life	2	2
II	IV	Non major Elective	UCHE209	Dairy Chemistry	2	2

**Extra Credit Earning Provision**

Semester	Category	Course Code	Course Title	Contact Hrs per Week	Credits
					Min/Max
II	Core	UINS201	Internship	30/60 Hours	1/2
IV	Core	UINS401	Internship	30/60 Hours	1/2
VI	Core	UINS601	Internship	30/60 Hours	1/2
IV	Core	UCHS601	Green Chemistry		1

## GENERAL CHEMISTRY-I

UCHM112

Semester : I  
Category : Core Course-I  
Class & Major : I B.Sc., Chemistry

Credit : 04  
Hours/Week : 05  
Total Hours : 65

### COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Understand the Structure of Atoms and Rules Involved in it
CO-2	Gain Knowledge about the Basic Concepts of Elements and their Properties.
CO-3	Acquire about the various types of Chemical Bonding and their Characteristics.
CO-4	Predict basic concepts in Organic Chemistry
CO-5	Learn Solid State and its Concept.

### UNIT –I: Atomic structure and Quantum chemistry

15 Hours

Quantum numbers n, l, m and s – Pauli's exclusion principle – Energy distribution and orbitals - Hund's rule of maximum multiplicity - Aufbau's principle – Electronic configuration of elements - Stability of Half-filled and completely filled orbitals. Shapes of s, p, d and f orbitals. Planck's Quantum theory of radiation - Photoelectric Effect – Compton Effect - Wave mechanical concept of the atom - de Broglie's relationship – Davisson and Germer experiment - Wave nature of electron - Heisenberg's Uncertainty Principle. Schrodinger wave equation (Without derivation) - Significance of wave functions  $\psi$  and  $\psi^2$ .  
Numerical problems involving the core concepts.

### UNIT-II: Periodicity of Elements

15 Hours

Classification of elements – General characteristics of s, p, d and f- Block elements – Effective Nuclear Charge-Shielding or Screening Effect-Slater Rules-Variation of Effective Nuclear Charge in Periodic Table. Definition and Periodicity of the following properties – Atomic radii and Ionic radii - Factors affecting the Atomic radii and Ionic radii. Ionisation potential, Electron affinity and Electronegativity – Factors affecting the Ionisation potential, Electron affinity and Electronegativity – Pauling scale – Mulliken electronegativity scale – Applications of Electronegativity regarding the Bonding nature. Trends in periodic table and applications in predicting and explaining the chemical behavior.

**UNIT-III: Chemical bonding****12 Hours**

**Ionic bond** - Conditions for the formation of ionic bond - General properties – Energetics of formation of NaCl from Na<sup>+</sup> and Cl<sup>-</sup> - Hydration energy, Lattice energy and their applications – Born-Haber cycle - Polarisation of ions- Fajan's rule - Transition from ionic to covalent character.

**Covalent bond** - Conditions for the formation of covalent bond - General properties -Polarity of bonds - Orbital overlap - Bond lengths and Bond energies - Hybridisation -Sigma and Pi bonds - VSEPR theory - Geometries of BeCl<sub>2</sub>, BF<sub>3</sub>, NH<sub>3</sub>, CH<sub>4</sub>, SF<sub>4</sub>, ICl<sub>2</sub> -, H<sub>2</sub>O, PCl<sub>5</sub>, ClF<sub>3</sub>, XeF<sub>6</sub>, SF<sub>6</sub> and IF<sub>7</sub> molecules - Partial ionic character of covalent bond - Percentage of ionic character from dipole moment and electronegativity difference.

**Molecular Orbital theory** – Bonding and Anti-bonding orbitals - Relative order of Energies of molecular orbitals - MO diagram of H<sub>2</sub>, He<sub>2</sub>, O<sub>2</sub>, O<sub>2</sub><sup>+</sup>, O<sub>2</sub><sup>-</sup>, N<sub>2</sub>, F<sub>2</sub>, HF and CO - Bond Order - Stability and Magnetic properties of the molecules - Comparison of VB and MO theories. Hydrogen bonding-types, examples and effect on properties.

**UNIT-IV: Basic concepts in Organic Chemistry and Electronic effects****13 Hours**

Types of bond cleavage – heterolytic and homolytic; arrow pushing in organic reactions; reagents & substrates; types of reagents - electrophiles, nucleophiles, free radicals; Reaction intermediates – carbanions, carbocations, carbenes, arynes and nitrynes. Inductive effect - reactivity of alkyl halides, acidity of halo acids, basicity of amines; inductomeric and electromeric effects.

Resonance – resonance energy, conditions for resonance - acidity of phenols, basicity of aromatic amines, stability of carbonium ions, carbanions and free radicals. Hyper conjugation - stability of alkenes, bond length, orienting effect of methyl group, dipole moment of aldehydes and nitromethane. Types of organic reactions - addition, substitution, elimination and rearrangements.

**UNIT-V: Solid State****10 Hours**

Packing of atoms (Bcc, Ccp and Hcp) - Theories of Bonding - Electron gas, Pauling and band theories. Structure of alloys - Interstitial solid solutions - Hume- Rothery rule - Crystal defects in Stoichiometric and non-Stoichiometric compounds. Semi-conductors - extrinsic and Intrinsic - N-Type and P-Type - Composition, structure and uses in electronic industry

### Text Books

- Madan, R. D. (2019). *Modern Inorganic Chemistry*. (3<sup>rd</sup> Ed.). S. Chand and Company Ltd. New Delhi.
- Bahl B S, Arul Bhal, (2003), *Advanced Organic Chemistry*, 3rd ed., S.Chand and Company, New Delhi.

### Reference Books

- Puri, B.R. Sharma, L.R. and Khalia, K. C. (2020). *Principles of Inorganic chemistry*. (3<sup>rd</sup> Ed.). Vishal Publishing Co. India.
- Tuli, G.D. Satya Prakash. Basu, S.K. and Madan, R.D. (2006). *Advanced Inorganic Chemistry* (Vol. I & II). S. Chand. New Delhi.
- R. T. Morrison and R. N. Boyd, (1992). *Organic Chemistry*, 6<sup>th</sup> Edition, Print ice-Hall of India Limited, New Delhi.
- Lee, J.D. (1991). *Concise Inorganic Chemistry*. (4<sup>th</sup> Ed.). ELBS. London.

### E- Resources

- <https://guides.lib.wayne.edu/chemistry>

### COURSE OUTCOMES:

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Recall the concepts of periodicity of elements, Heisenberg's Uncertainty principle and atomic theory.	K1
CO-2	Understand the basic concepts of organic, inorganic and physical chemistry.	K2
CO-3	Identify the covalent bond properties such as Polarity of bonds, Orbital overlap, bond lengths and bond energies, hybridization.	K3
CO-4	Compare and contrast the types of organic reactions - addition, substitution, elimination and rearrangements.	K4
CO-5	Distinguish between the crystal defects in stoichiometric and non-stoichiometric compounds.	K4

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	1	0	0	0
CO 2	3	2	1	1	1	0
CO 3	3	3	2	2	2	1
CO 4	3	3	3	3	2	2
CO 5	3	3	3	3	3	2

High Correlation : 43.3 %      Moderate correlation: 26.7%      Low Correlation : 16.7%  
No Correlation : 13.3%

**QUANTITATIVE INORGANIC ESTIMATION (TITRIMETRIC) AND INORGANIC PREPARATIONS**  
**UCHR113**

<b>Semester</b>	<b>: I</b>	<b>Credit</b>	<b>: 04</b>
<b>Category</b>	<b>: Core Practical-I/DSC Practical -I</b>	<b>Hours/Week</b>	<b>: 05</b>
<b>Class &amp; Major</b>	<b>: I B.Sc., Chemistry</b>	<b>Total Hours</b>	<b>: 65</b>

**COURSE OBJECTIVES:**

<b>CO No.</b>	<b>To enable the students</b>
CO-1	Understanding the Laboratory safety
CO-2	Infer Handling glasswares
CO-3	Calculate the Normality and molarity
CO-4	Predict the Quantitative estimation
CO-5	Preparation of inorganic compounds

**Unit-I: Chemical Laboratory Safety in Academic Institutions**

**15 Hours**

Introduction - importance of safety education for students, common laboratory hazards, assessment and minimization of the risk of the hazards, prepare for emergencies from uncontrolled hazards; concept of MSDS; importance and care of PPE; proper use and operation of chemical hoods and ventilation system; fire extinguishers-types and uses of fire extinguishers, demonstration of operation; chemical waste and safe disposal.

**Common Apparatus Used in Quantitative Estimation (Volumetric)**

Description and use of burette, pipette, standard flask, measuring cylinder, conical flask, beaker, funnel, dropper, clamp, stand, wash bottle, watch glass, wire gauge and tripod stand.

**Principle of Quantitative Estimation (Volumetric)**

Equivalent weight of an acid, base, salt, reducing agent, oxidizing agent; concept of mole, molality, molarity, normality; primary and secondary standards, preparation of standard solutions; theories of acid-base, redox, complexometric, iodimetric and iodometric titrations; indicators – types, theory of acid–base, redox, metal ion and adsorption indicators, choice of indicators.

**Unit-II: Quantitative Estimation (Volumetric)**

**25 Hours**

1. Preparation of standard solution, dilution from stock solution

**Permanganometry**

1. Estimation of sodium oxalate using standard ferrous ammonium sulphate

### **Dichrometry**

1. Estimation of ferric alum using standard dichromate (external indicator)
2. Estimation of ferric alum using standard dichromate (internal indicator)

### **Iodometry**

1. Estimation of copper in copper sulphate using standard dichromate

### **Argentimetry**

1. Estimation of chloride in barium chloride using standard sodium chloride/ Estimation of chloride in sodium chloride (Volhard's method)

## **UNIT-III**

**25 Hours**

### **Complexometry**

1. Estimation of hardness of water using EDTA

### **Estimations**

1. Estimation of iron in iron tablets
2. Estimation of ascorbic acid.

### **Preparation of Inorganic compounds-**

1. Potash alum
2. Tetrammine copper (II) sulphate
3. Hexammine cobalt (III) chloride
4. Mohr's Salt

### **Text Books**

- Venkateswaran, V.; Veeraswamy, R.; Kulandivelu, A.R. (1997). *Basic Principles of Practical Chemistry*, 2<sup>nd</sup> ed.; Sultan Chand & Sons: New Delhi.
- Nad, A. K.; Mahapatra, B.; Ghoshal, A. (2007). *An advanced course in Practical Chemistry*, 3<sup>rd</sup> ed.; New Central Book Agency: Kolkata.

### **Reference Books**

- Mendham, J.; Denney, R. C.; Barnes, J. D.; Thomas, M.; Sivasankar, B. (2000). *Vogel's Text book of Quantitative Chemical Analysis*, 6<sup>th</sup> ed.; Pearson Education Ltd: New Delhi.
- Thomas, A.O. (2005). *Practical Chemistry*. Scientific Book Center. Cannanore. 2<sup>nd</sup> Ed.. Kerala.

### **E-Resources**

- <http://www.federica.unina.it/agraria/analytical-chemistry/volumetric-analysis>



- <https://chemdictionary.org/titration-indicator/>

### COURSE OUTCOMES:

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Recite the basic information of laboratory safety and uses of glass wares.	K1
CO-2	Interpret the titrations of acid-base, redox, complexometric, iodimetric and iodometric titrations.	K2
CO-3	Explain the principles involved in Permanganometry, Argentimetry, Dichrometry and Complexometry.	K3
CO-4	Estimate the concentrations of unknown solutions in different normality.	K4
CO-5	Prepare the inorganic compounds of potash alum and Mohr's salt.	K5

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	1	0	0	0
CO 2	3	3	2	1	1	0
CO 3	3	3	2	2	2	1
CO 4	3	3	3	3	2	2
CO 5	3	3	3	3	3	3

High Correlation : 50% Moderate Correlation: 23.3% Low Correlation : 13.4%  
 No Correlation : 13.3%

### FOUNDATION COURSE UCHF101

Semester : I Credit : 02  
 Category : Foundation Course FC Hours/Week : 02  
 Class & Major : I B.Sc., Chemistry Total Hours : 26

### COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Understand the basic Concepts in Chemistry
CO-2	Gain Knowledge about the Basic Concepts of Periodicity
CO-3	Remember the Fundamental particles of nucleus
CO-4	Predict the Nomenclature of Organic compounds
CO-5	Acquire about the various types of Thermodynamics processes

### UNIT-I: Basic Concepts in Chemistry

6 Hours

Atomic mass and Molecular mass– Mole concept – Molar volume. Oxidation and reduction – Oxidation number and valency - Variable valency - Equivalent mass. Methods of expressing

concentration: Weight percentage, molality, molarity, normality, formality, mole fraction, ppm and millimoles.

Numerical Problems related to basic concepts.

#### **UNIT II: Periodicity**

**5 Hours**

Periodic law and arrangement of elements in the periodic table, IUPAC nomenclature and group number, horizontal, vertical, and diagonal relationships in the periodic table.

#### **UNIT III: Nuclear Chemistry**

**5 Hours**

Fundamental particles of nucleus, isobars, isotones and isomers – Differences between chemical reactions; fusion and fission – Radioactive series, group displacement law – Mass defect.

#### **UNIT IV Classification and Nomenclature of Organic Compounds**

**5 Hours**

Classification of organic compounds-Rules of IUPAC system of nomenclature of organic compounds such as alkanes, alkenes, alkynes, cycloalkanes, bicycle alkanes, alkyl halides, alcohols and phenols-Aldehydes, ketones, carboxylic acids and its derivatives, amines, nitro compounds. (Both aliphatic and aromatic).

#### **UNIT V: Law of Thermodynamics**

**5 Hours**

Definition of certain terms - system, surrounding, reversible and irreversible processes - Limitations of I law, Need for II Law - Different Statements of II. Law - Entropy- Definition, Unit and change of entropy for phase transformation, 'Free energy - nature of process in terms of free energy and entropy-Statement of Third Law.

#### **Text Books**

- Madan, R. D. (2019). Modern Inorganic Chemistry. (3<sup>rd</sup> Ed.). S. Chand and Company Ltd. New Delhi.
- Puri, B. R. and Sharma, L. R. Principles of Physical Chemistry, 38<sup>th</sup>.; Vishal Publishing Company: Jalandhar, 2002

#### **Reference Books**

- Lee, J.D. (1991). Concise Inorganic Chemistry. (4<sup>th</sup> Ed.). ELBS. London.
- Morrison, R. N. & Boyd, R. N. *Organic Chemistry*, (6<sup>th</sup> Ed.). Dorling Kindersley Pvt. Ltd. India.
- Carey, F. A. (2008). *Organic Chemistry*, (7<sup>th</sup> Ed.). Tata McGraw Hill. United States.
- Puri, B.R. Sharma, L.R. and Khalia, K. C. (2020). *Principles of Inorganic chemistry*. (33<sup>rd</sup>

Ed.). Vishal Publishing Co. India.

- Tuli, G.D. Satyaprakash. Basu, S.K. and Madan, R.D. (2006). *Advanced Inorganic Chemistry* (Vol. I & II). S. Chand. New Delhi.

### COURSE OUTCOMES:

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Define the terms of thermodynamic system, surrounding, reversible and irreversible process.	K1
CO-2	Classify the organic compounds such as alkanes, alkenes, alkynes, cycloalkanes, bicycle alkanes, alkyl halides, alcohols and phenols.	K2
CO-3	Calculate the weight percentage, molality, molarity, normality, mole fraction, ppm and millimoles for given substances.	K3
CO-4	Relate the chemical reactions of fusion, fission and Radioactive series.	K3
CO-5	Analyze the group number, horizontal, vertical, and diagonal relationships in the periodic table.	K4

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	1	1	0	0	0
CO 2	3	2	2	1	0	0
CO 3	3	3	2	1	0	0
CO 4	3	3	2	1	0	0
CO 5	3	3	3	2	2	2

High Correlation : 30%      Moderate Correlation : 23.3%      Low Correlation : 16.7%  
 No Correlation : 30 %

### ROLE OF CHEMISTRY IN DAILY LIFE

#### UCHE101

Semester : I

Category : SEC-1 (NME)

Class & Major : I B.Sc.,

Credit : 02

Hours/Week : 02

Total Hours : 26

### COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Understand the importance of chemistry in our daily life
CO-2	Gain the Knowledge of building materials in chemistry
CO-3	Identify cosmetics and soaps in chemistry

<b>CO-4</b>	Learn the food production in chemistry
<b>CO-5</b>	Familiarize chemistry in drugs and swimming pool

### **UNIT – I – General Survey of Chemicals**

**6 Hours**

General survey of chemicals used in everyday life. Air - components and their importance; photosynthetic reaction, air pollution, green - house effect and the impact on our life style. Water- Sources of water, qualities of potable water, soft and hard water, methods of removal of hardness-water pollution.

### **UNIT-II - Building Materials**

**5 Hours**

Building materials - cement, ceramics, glass and refractories - definition, composition and application only. Plastics - polythene, PVC, bakelite, polyesters, melamine-formaldehyde resins - preparation and uses only

### **UNIT-III – Cosmetics**

**5 Hours**

**Cosmetics** – tooth paste, face powder, shampoos, nail polish, perfumes - general formulation and preparations - possible hazards of cosmetic use.

Soaps-Synthetic surfactants and their mode of actions. Bleach - chlorine, sodium perborate. Washing in machines - solid and liquid laundry detergents - compositions, surfactants and their potentiation.

### **UNIT-IV – Fertilizers**

**5 Hours**

Chemicals in food production – fertilizers - need, natural sources; urea, NPK fertilizers and superphosphate. Fuel – classification - solid, liquid and gaseous; nuclear fuel examples and uses.

### **UNIT-V Drugs and Swimming Pool**

**5 Hours**

Pharmaceutical drugs - analgesics and antipyretics - paracetamol and aspirin. Explosives - classification and examples. Chlorination of swimming pools - Effect of ph - Measuring the amount of chlorine in water - Super chlorination - Effect of sunlight on chlorine.

### **Text Books**

- Jayashree Ghosh (2012). *A textbook of pharmaceutical chemistry* by, S Chand publishing,.
- S. Vaithyanathan (2006), *Text book of Ancillary Chemistry*; Priya Publications, Karur.

### **Reference Books**

- Karukstis, Kerry K. And Van Hecke, Gerald R.( (2003).) *Chemistry Connections, the Chemical Basis of Everyday Phenomena*, Harcourt/Academic Pres.s Atkins, Peter: Atkins' (2003). *Molecules*, Cambridge University Press, 2<sup>nd</sup> Edition.

### **Course Outcomes:**

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Understand the importance of chemistry in our daily life.	K1
CO-2	Infer the synthetic surfactants of soaps and their mode of actions.	K2
CO-3	Select the fertilizers like urea, NPK, and superphosphates used in agriculture field.	K3
CO-4	Identify the drugs used in pharmaceuticals such as antipyretics and analgesics.	K3
CO-5	Detect the amount of chlorine in swimming pool and the effect of sunlight on chlorine.	K4

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	1	0	0	0
CO 2	3	2	1	0	0	0
CO 3	3	3	2	2	1	1
CO 4	3	3	3	2	1	1
CO 5	3	3	3	3	2	2

High Correlation : 36.7%    Moderate correlation: 23.3 %    Low Correlation : 20%  
 No Correlation : 20%

## GENERAL CHEMISTRY-II

### UCHM207

Semester : II  
 Category : Core Course III  
 Class & Major : I B.Sc., Chemistry

Credit : 04  
 Hours/Week : 05  
 Total Hours : 65

### COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Understand the concepts of acids bases
CO-2	Remember the properties of s block elements
CO-3	Summarize the properties of p block elements
CO-4	Identify the applications of hydrocarbons
CO-5	Explain the aromatic electrophilic substitution reaction

### UNIT-I: Acids, bases and Ionic equilibria

12 hours

Concepts of Acids and Bases - Arrhenius concept, Bronsted-Lowry concept, Lewis concept; Relative strengths of acids, bases and dissociation constant; dissociation of poly basic acids, ionic product of water, pH scale, pH of solutions; Degree of dissociation, common ion effect, factors

affecting degree of dissociation; Buffer solutions – types, mechanism of buffer action in acid and basic buffer, Henderson-Hasselbalch equation; Salt hydrolysis - salts of weak acids and strong bases, weak bases and strong acids, weak acids and weak bases - hydrolysis constant, degree of hydrolysis and relation between hydrolysis constant and degree of hydrolysis; Solubility product - determination and applications.

Numerical problems involving the core concepts.

### **UNIT –II: Chemistry of s Block Elements**

**12 Hours**

**Alkali metals** - Li, Na, K, Rb and Cs - Occurrence - Comparative study of Elements with respect to Oxides, Halides, Hydroxides and Carbonates - Exceptional property of Lithium - Diagonal Relationship of Li with Mg.

**Alkaline earth metals** - Be, Mg, Ca, Sr and Ba - Occurrence – Comparative study of the elements with respect to Oxides, Hydroxides, Halides, Sulphates and Carbonates - Exceptional property of Beryllium - Diagonal relationship of Be with Al - Comparison of Alkaline Earth Metals with Alkali Metals.

### **UNIT III: Chemistry of p- Block Elements (Group 13, 14 & 15)**

**11 Hours**

**Boron family** - Group discussion – Anomalous behaviour of Boron - Diagonal Relationship between Boron and Silicon - Electron deficiency and Electron acceptor behaviour of Boron trihalides - Bonding in Diborane (Hydrogen bridge structure) - Preparation, Properties, structure and Uses of Borazine,  $\text{NaBH}_4$ ,  $\text{LiAlH}_4$  and boron nitride.

**Carbon family** – Group study - Comparative study of Elements with respect to Valency, Oxides, Halides, Hydrides and Oxyacids - Catenation – Comparison of Properties of Carbon and Silicon – Silicates - Classification and Structure - Silicones- Preparation, Properties and Uses.

**Nitrogen family** - Group study - Comparative study of N, P, As, Sb and Bi with respect to Oxides, Oxyacids, Halides and Hydrides – Hydrazine and Hydroxylamine - Hydrazoic acid – Preparation and uses of  $\text{NaBiO}_3$ .

### **UNIT-IV: Hydrocarbon Chemistry-I**

**11 Hours**

**Petroproducts:** Fractional distillation of petroleum; cracking, isomerisation, alkylation, reforming and uses.

**Alkanes:** Nomenclature, isomerism and preparation (with special reference to Grignard, Wurtz, and Kolbe's reaction). Halogenation of alkanes- reaction and mechanism.

**Cycloalkanes:** Nomenclature, Relative stability of cycloalkanes, Bayer's strain theory and its

limitations.

**Alkenes;** Nomenclature, general methods of preparation – Mechanism of  $\beta$  - elimination reactions – E1 and E2 mechanism - factors influencing – stereochemistry – orientation – Hofmann and Saytzeff rules. Reactions of alkenes – addition reactions – mechanisms – Markownikoff's rule.

**Alkynes;** Nomenclature; general methods of preparation, properties and reactions; acidic nature of terminal alkynes and acetylene.

#### **UNIT-V: Hydrocarbon Chemistry – II**

**11 Hours**

**Benzene:** Source, structure of benzene, stability of benzene ring, molecular orbital picture of benzene, aromaticity, Huckel's  $(4n+2)$  rule and its applications. Electrophilic substitution reactions - General mechanism of aromatic electrophilic substitution - nitration, sulphonation, halogenation, Friedel-Craft's alkylation and acylation.

**Polynuclear Aromatic hydrocarbons:** Naphthalene – nomenclature, Haworth synthesis; physical properties, reactions – electrophilic substitution reaction, nitration, sulphonation, halogenation, Friedel – Crafts acylation & alkylation, preferential substitution at- position – reduction, oxidation – uses. Anthracene – synthesis by Elbs reaction.

#### **Text Books**

- Madan R D, Sathya Prakash, (2003), Modern Inorganic Chemistry, 2nd ed., S.Chand and Company, New Delhi.
- Bahl B S, Arul Bhal, (2003), Advanced Organic Chemistry, 3rd ed., S.Chand and Company, New Delhi.

#### **Reference Books**

- Puri, B.R. Sharma, L.R. and Khalia, K. C. (2020). *Principles of Inorganic chemistry*. (33<sup>rd</sup> Ed.). Vishal Publishing Co. India.
- Tuli, G.D. Satyaprakash. Basu, S.K. and Madan, R.D. (2006). *Advanced Inorganic Chemistry* (Vol. I & II). S. Chand. New Delhi.
- Lee, J.D. (1991). *Concise Inorganic Chemistry*. (4<sup>th</sup> Ed.). ELBS. London.
- R. T. Morrison and R. N. Boyd, (1992). *Organic Chemistry*, 6<sup>th</sup> Edition, Prentice-Hall of India Limited, New Delhi.

#### **E- Resources**

- <https://guides.lib.wayne.edu/chemistry>

**COURSE OUTCOMES:**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Explain the concept of acids, bases and ionic equilibria;	K1
CO-2	Discuss the periodic properties of s - block elements	K2
CO-3	Classify the p block element and their properties	K3
CO-4	Explain theories of basic hydrocarbons	K4
CO-5	Assess the application of electrophilic substitution reaction	K5

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	1	1	0	0
CO 2	3	3	1	1	0	0
CO 3	3	3	2	2	1	1
CO 4	3	3	1	1	1	1
CO 5	3	3	2	2	0	0

**High Correlation : 30%      Moderate Correlation: 16.7 %      Low Correlation : 33.3%**  
**No Correlation : 20%**

**QUALITATIVE ORGANIC ANALYSIS AND PREPARATION OF ORGANIC COMPOUNDS****UCHR208**

**Semester : II**  
**Category : Core Practical-IV**  
**Class & Major: I -B.Sc., Chemistry**

**Credit : 04**  
**Hours/Week : 05**  
**Total Hours : 65**

**COURSE OBJECTIVES:**

CO No.	To enable the students
CO-1	Gain the knowledge of laboratory safety
CO-2	Understand the handling glass wares
CO-3	Analysis of organic functional groups
CO-4	Classify and preparation of organic compounds
CO-5	Study about rearrangement and hydrolysis

**UNIT-I****15 Hours**

Safety rules, symbols and first-aid in chemistry laboratory Basic ideas about Bunsen burner, its operation and parts of the flame. Chemistry laboratory glassware –basis information and uses.



## UNIT II

20 Hours

### Qualitative Organic Analysis

Preliminary examination, detection of special elements - nitrogen, Sulphur and halogens. Aromatic and aliphatic nature, Test for saturation and unsaturation, identification of functional groups using solubility tests

### Confirmation of functional groups

1. monocarboxylic acid, dicarboxylic acid
2. monohydric phenol, polyhydric phenol
3. aldehyde, ketone, ester
4. carbohydrate (reducing and non-reducing sugars)
5. primary, secondary, tertiary amine
6. monoamide, diamide, thioamide
7. anilide, nitro compound
8. Preparation of derivatives for functional group

## UNIT –III: Preparation of Organic Compounds (any five of the following)

20 Hours

1. Nitration - picric acid from Phenol
2. Halogenation - p-bromo acetanilide from acetanilide
3. Oxidation - benzoic acid from Benzaldehyde
4. Microwave assisted reactions in water:
5. Methyl benzoate to Benzoic acid
6. Salicylic acid from Methyl Salicylate
7. Rearrangement - Benzil to Benzilic Acid
8. Hydrolysis of benzamide to Benzoic Acid

### Separation and Purification Techniques (Not for Examination)

1. Purification of organic compounds by crystallization (from water / alcohol) and distillation
2. Determination of melting and boiling points of organic compounds.  
**Steam distillation** - Extraction of essential oil from citrus fruits/eucalyptus leaves.

### Chromatography (any one) (Group experiment)

10 Hours

1. Separation of amino acids by Paper Chromatography
2. Thin Layer Chromatography - mixture of sugars / plant pigments /permanganate dichromate.
3. Column Chromatography - extraction of carotene, chlorophyll and xanthophyll from leaves /separation of anthracene - anthracene picrate.
4. Electrophoresis – Separation of amino acids and proteins. (**Demonstration**)
5. Isolation of casein from milk/Determination of saponification value of oil or fat/Estimation of acetic acid from commercial vinegar. (Any one Group experiment)(4,5 & 6–not for ESE)

#### Text Books

- Venkateswaran, V.; Veeraswamy, R.; Kulandaivelu, A.R. (2012) *Basic Principles of Practical Chemistry*, 2<sup>nd</sup> ed.; Sultan Chand: New Delhi.
- Furniss, B. S.; Hannaford, A. J.; Smith, P. W. G.; Tatchell, A.R. *Vogel's Textbook of Practical Organic Chemistry*, 5<sup>th</sup> ed.; Pearson: India, 1989.

#### Reference Books

- Thomas, A.O. (2005). *Practical Chemistry*, Scientific Book Center, Cannanore, Kerala.
- Vogel's . (2009). *Text Book of Practical Organic Chemistry*. Longman. London.
- Manna, A.K.(2018) *Practical Organic Chemistry*, Books and Allied: India.
- Gurtu, J. N; Kapoor, R. (1987) *Advanced Experimental Chemistry (Organic)*, Sultan Chand:New Delhi,.

#### E-Resource

- <https://www.vlab.co.in/broad-area-chemical-sciences>

#### COURSE OUTCOMES:

CONo.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Recognize the physical state, odour, color and solubility of the given organic compound.	K1
CO-2	Compare and contrast the acids, amines, amides, phenols, aldehydes and ketones from organic compound.	K2
CO-3	Identify the presence of special elements and functional groups in an unknown organic compound performing a systematic analysis.	K3
CO-4	Illustrate the purification techniques of column chromatography, TLC, and isolation methods.	K3
CO-5	Prepare the organic compounds by nitration, halogenations, hydrolysis and microwave assisted method.	K4

## CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	1	0	0
CO 2	3	3	2	1	0	0
CO 3	3	3	1	1	0	0
CO 4	3	3	3	2	1	1
CO 5	3	3	3	2	1	1

**High Correlation : 40%**      **Moderate correlation: 13.3%**      **Low Correlation : 26.7%**  
**No Correlation : 20 %**

## DAIRY CHEMISTRY

### UCHE209

**Semester : II**  
**Category : SEC-2 NME**  
**Class &Major: I UG**

**Credit : 02**  
**Hours/Week : 02**  
**Total Hours : 26**

### COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Understand the Chemistry of milk and milk products
CO-2	Apply the Knowledge in Processing of milk
CO-3	Preservation and formation of milk product
CO-4	Evaluate the Standardized milk and toned milk
CO-5	Summarize the Fermented and other Milk Products

### UNIT I-Composition of Milk

**5 Hours**

Milk-definition-general composition of milk- constituents of milk - lipids, proteins, carbohydrates, vitamins and minerals - physical properties of milk - color, odour, acidity, specific gravity, viscosity and conductivity -Factors affecting the composition of milk - adulterants, preservatives with neutralizer-examples and their detection- estimation of fat, acidity and total solids in milk.

### UNIT II-Processing of Milk

**5 Hours**

Microbiology of milk - destruction of micro - organisms in milk, physical – chemical changes taking place in milk due to processing - boiling, pasteurization – types of pasteurization -Bottle, Batch and HTST (High Temperature Short Time) – Vacuum pasteurization – Ultra High Temperature Pasteurization.

**UNIT III-Major Milk Products****5 Hours**

Cream - definition - composition - chemistry of creaming process - gravitational and centrifugal methods of separation of cream - estimation of fat in cream. Butter - definition - composition - theory of churning – desi butter - salted butter, estimation of acidity and moisture content in butter. Ghee - major constituents - common adulterants added to ghee and their detection - rancidity-definition - prevention - antioxidants and synergists - natural and synthetic.

**UNIT IV-Special Milk****5 Hours**

Standardized milk - definition - merits - reconstituted milk - definition - flow diagram of manufacture - Homogenized milk - flavored milk – vitaminised milk - toned milk - Incitation milk- Vegetable toned milk - humanized milk -condensed milk - definition, composition and nutritive value.

**UNIT V-Fermented and other Milk Products****6 Hours**

Fermented milk products – fermentation of milk - definition, conditions, cultured milk - definition of culture - example, conditions - cultured cream, butter milk - Bulgarian milk - acidophilus milk – Yoheer Indigeneous products- khoa and Chena definition - Ice cream -definition- percentage composition-types-ingredients-manufacture of ice-cream, stabilizers- emulsifiers and their role- milk powder- definition- need for making milk powder- drying process- types of drying.

**Text Books**

- M.P. Mathur, D. Datta Roy, P. Dinakar (2008). *Text book of dairy chemistry*, 1<sup>st</sup> edition, Indian Council of Agricultural Research.
- Saurav Singh, Daya (2013) *A Text book of dairy chemistry*, 1<sup>st</sup> edition, Publishing house.
- P. L. Choudhary (2021). *Text book of dairy chemistry* Bio-Green book publishers.

**Reference Books:**

- Robert Jenness and S. Patom, (2005). *Principles of Dairy Chemistry*, S.Wiley, New York.
- F.P.Wond (2006). *Fundamentals of Dairy Chemistry*, Springer, Singapore.
- K. S. Rangappa and K.T. Acharya (1974), *Indian Dairy Products*, Asia Publishing House New Delhi
- P.F.Fox and P.L.H. Mc Sweeney, *Dairy Chemistry and Biochemistry*, Springer, Second edition, 2016.

**COURSE OUTCOMES:**

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Define the milk, cream, fermented milk, condensed milk, and standardized milk.	K1
CO-2	Differentiate the Vacuum pasteurization and Ultra High Temperature Pasteurization for milk processing.	K2
CO-3	Identify the composition, constituents and physical properties of milk.	K3
CO-4	Categorize the milk products such as ice cream, buttermilk and milk powder.	K4
CO-5	Examine the nutritive value of Homogenized, flavored, vitaminised, toned, Incitation, Vegetable toned, humanized and condensed milk.	K4

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	1	1	0
CO 2	3	3	3	2	1	1
CO 3	3	3	3	3	1	1
CO 4	3	3	3	2	2	1
CO 5	3	3	3	2	2	1

**High Correlation : 50%    Moderate correlation : 20%    Low Correlation : 26.7%**  
**No Correlation : 3.3%**

**COSMETICS AND PERSONAL GROOMING****UCHD201**

**Semester : II**  
**Category : SEC-3**  
**Class &Major : I B.Sc., Chemistry**

**Credit : 02**  
**Hours/Week: 02**  
**Total Hours: 26**

**COURSE OBJECTIVES:**

CO No.	To enable the students
CO-1	Understand and learning the skin care.
CO-2	Apply knowledge of hair care
CO-3	Summarize the dental care treatment
CO-4	Predict basic concepts in beauty treatment
CO-5	Learn cosmetic preparations.

## **UNIT -I Skin care**

**5 Hours**

Nutrition of the skin, skin care and cleansing of the skin; face powder – ingredients; creams and lotions – cleansing, moisturizing all purpose, shaving and sunscreen (formulation only); Gels – formulation and advantages; astringent and skin tonics – key ingredients, skin lightness, depilatories.

## **UNIT II- Hair care & Dental care**

**5 Hours**

**Hair care:** Shampoos – types – powder, cream, liquid, gel – ingredients; conditioner – types – ingredients

**Dental care:** Tooth pastes – ingredients – mouth wash

## **UNIT – III: Make up Base**

**5 Hours**

Make up Base – foundation – types – ingredients; lipstick, eyeliner, mascara, eye shadow, concealers, rouge

## **Unit IV -Beauty treatments**

**5 Hours**

Facials - types – advantages – disadvantages; face masks – types; bleach - types – advantages– disadvantages; shaping the brows; eyelash tinting; perming – types; hair coloring and dyeing ; permanent waving – hair straightening; wax – types – waxing; pedicure, manicure - advantages –disadvantages.

## **UNIT-V**

**6 Hours**

### **Practical – Cosmetics Preparations**

- Preparation of Lip Balm
- Preparation of herbal face creams using natural resources
- Preparation of shampoo
- Preparation of hair oil

### **Text Books**

- “Thankamma Jacob, (1997) Foods, drugs and cosmetics – A consumer guide, Macmillan publication, London.

### **Reference Books**

- Wilkinson J B E and Moore R J, (1997) Harry’s cosmeticology, 7th ed., Chemical Publishers,

London.

- George Howard, (1987) Principles and practice of perfumes and cosmetics, Stanley Therones, Chettenham

**Website and e-learning source:**

- <http://www.khake.com/page75.html>
- [Net.foxsm/list/284](http://Net.foxsm/list/284)

**COURSE OUTCOMES:**

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	List out the beauty treatments of facial, shaping the brows, hair coloring, pedicure and manicure.	K1, K2
CO-2	Identify the ingredients of lipstick, eyeliner, mascara, eye shadow, and concealers.	K3
CO-3	Classify the shampoos and conditioners for hair care treatment.	K4
CO-4	Criticize the permanent waving and hair straightening for hair grooming.	K5
CO-5	Design the herbal face creams and shampoos using natural resources.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	1	1	0	0
CO 2	3	3	2	1	1	1
CO 3	3	3	1	1	1	1
CO 4	3	3	3	1	1	0
CO 5	3	3	3	2	2	2

High Correlation : 40%      Moderate correlation : 13.3%      Low Correlation : 36.7%  
No Correlation : 10%

**CHEMISTRY FOR BIOLOGICAL SCIENCES I**

**UCHA105**

Semester : I  
Category : Allied  
Class & Major: I B.Sc., Biochemistry

Credit: 02  
Hours/ week: 03  
Total Hours: 39

**COURSE OBJECTIVES:**

CO No	To enable the students
CO-1	Understand the basics of atomic orbitals, chemical bonds, hybridization and fundamentals of Nuclear chemistry
CO-2	Gain Knowledge about the Basic Concepts industrial chemistry.
CO-3	Acquire about the fundamental of basic organic chemistry
CO-4	Predict basic concepts in importance of specialty drugs
CO-5	Learn separation and purification techniques

**UNIT I: Chemical Bonding and Nuclear Chemistry****8 Hours**

**Chemical Bonding:** Molecular Orbital Theory-bonding, antibonding and non-bonding orbitals. MO diagrams for Hydrogen, Helium, Nitrogen; discussion of bond order and magnetic properties.

**Nuclear Chemistry:** Fundamental particles - Isotopes, Isobars, Isotones and Isomers- Differences between chemical reactions and nuclear reactions-. Nuclear fission and nuclear fusion-Radioactive Decay-Radioactive Elements-General Characteristics of Radioactive Decay-Decay Kinetics-Decay Constant-Half Life-Mean Life Period- Applications of radioisotopes – carbon dating, rock dating and medicinal applications.

**UNIT-II: Industrial Chemistry****7 Hours**

**Fuels:** Fuel gases, Natural gas, water gas, semi water gas, carbureted water gas, producer gas, CNG, LPG and oil gas (manufacturing details not required).

**Silicones:** Synthesis, properties and uses of silicones.

**Fertilizers:** Urea, ammonium sulphate, potassium nitrate NPK fertilizer, superphosphate, triple superphosphate.

**UNIT-III: Fundamental Concepts in Organic Chemistry****8 Hours**

**Hybridization:** Orbital overlap hybridization and geometry of CH<sub>4</sub>, C<sub>2</sub>H<sub>4</sub>, C<sub>2</sub>H<sub>2</sub> and C<sub>6</sub>H<sub>6</sub>. **Polar effects:** Inductive effect and consequences on K<sub>a</sub> and K<sub>b</sub> of organic acids and bases, electromeric, mesomeric, hyper conjugation and steric-examples and explanation. **Reaction mechanisms:** Types of reactions- aromaticity-aromatic electrophilic substitution; nitration, halogenation, Friedel-Craft's alkylation and acylation. **Heterocyclic compounds:** Preparation, properties of pyrrole and pyridine.



**UNIT-IV: Drugs and Specialty Chemicals****8 Hours**

Definition, structure and uses: Antibiotics viz., Penicillin, Chloramphenicol and Streptomycin; Anesthetics viz., Chloroform and ether; Antipyretics viz., aspirin, paracetamol and ibuprofen; Artificial Sweeteners viz., saccharin, Aspartame and cyclamate; Organic Halogen compounds viz., Freon, Teflon.

**UNIT-V: Analytical Chemistry****8 Hours**

Introduction qualitative and quantitative analysis. Principles of volumetric analysis. Separation and purification techniques: extraction, distillation and crystallization. Chromatography: principle and application of column, paper and thin layer chromatography.

**Text Books**

- V.Veeraiyan, (2009). *Textbook of Ancillary Chemistry*; first edition, High mount publishing house, Chennai.
- Arun Bahl, B.S.Bahl, (2012). *Advanced Organic Chemistry*; twenty third edition, S.Chand and Company, New Delhi.
- P.L.Soni, H.M.Chawla, (2007). *Text Book of Inorganic Chemistry*; twenty ninth edition, Sultan Chand & sons, New Delhi.

**Reference Books**

- P.L.Soni, Mohan Katyal, (2007). *Text book of Inorganic chemistry*; twentieth edition, Sultan Chand and Company, New Delhi,
- B.K, Sharma, (2014). *Industrial Chemistry*, sixteenth edition, GOEL publishing house, Meerut.
- Jayashree gosh, (2006). *Fundamental Concepts of Applied Chemistry*; 2<sup>nd</sup> Edition Sultan & Chand.

**COURSE OUTCOMES:**

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Recall the fundamental concepts of Isotopes, Isobars, Isotones and Isomers.	K1
CO-2	Explain the consequences of electro-meric, meso-meric, hyper-conjugation and steric effects.	K2
CO-3	Apply the purification techniques of extraction, distillation, crystallization and chromatography for qualitative and quantitative analysis.	K3
CO-4	Analyze the biological role of transition metals, amino-acids and Nucleic acids.	K4
CO-5	Categorize the various types of fuels like natural, water, semi water, carbureted water, producer, CNG, LPG and oil gas.	K4

## CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	1	1	0	0
CO 2	3	2	1	1	0	0
CO 3	3	3	1	1	0	0
CO 4	3	3	2	1	1	0
CO 5	3	3	2	1	1	1

**High Correlation** : 26.7% **Moderate correlation** : 13.3% **Low Correlation** : 36.7%  
**No Correlation** : 23.3 %

## VOLUMETRIC ANALYSIS

### UCHR106

**Semester** : I  
**Category** : Allied Practical  
**Class &Major**: I B.Sc., Biochemistry

**Credit**: 02  
**Hours/ week**: 03  
**Total Hours**: 39

### COURSE OBJECTIVES:

CO No	To enable the students
CO-1	Understand the basics concept in preparation of solutions.
CO-2	Apply knowledge about practical experience of volumetric analysis
CO-3	Illustrate the estimation of Acids and salts
CO-4	Optimize the estimation of magnesium using Ethylene diamine tetraacetic acid
CO-5	Design the estimation of ferrous ion using diphenyl amine as indicator

## VOLUMETRIC ANALYSIS

1. Estimation of sodium hydroxide using standard sodium carbonate.
2. Estimation of hydrochloric acid using standard oxalic acid.
3. Estimation of ferrous sulphate using standard Mohr's salt.
4. Estimation of oxalic acid using standard ferrous sulphate.
5. Estimation of potassium permanganate using standard sodium hydroxide.
6. Estimation of magnesium using EDTA.
7. Estimation of ferrous ion using diphenyl amine as indicator.

### Text Books

- V.Venkateswaran, R.Veerasingam, A.R.Kulandaivelu, (1997). *Basic Principles of*

*Practical Chemistry*; Second edition, Sultan Chand & sons.

### COURSE OUTCOMES:

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Explain the use of standard flask and volumetric pipettes, burette for volumetric analysis	K1
CO-2	Apply the formula to prepare normality, molarity, molality of solution in volumetric analysis.	K2
CO-3	Analyze the end point of acid base and redox titration.	K3
CO-4	Estimate the amount of acid and inorganic ions titrated with reference.	K4
CO-5	Categorize the acid base titration, complexometric and redox titration for a given unknown compound.	K4

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	1	1	0	0
CO 2	3	3	2	1	1	0
CO 3	3	3	2	1	1	0
CO 4	3	3	2	2	2	0
CO 5	3	3	3	2	2	1

High Correlation : 33.3% Moderate correlation : 26.7% Low Correlation : 23.3%  
No Correlation : 16.7%

## CHEMISTRY FOR BIOLOGICAL SCIENCES II

UCHA204

Semester : II Credit : 03  
Category : Allied Hours/Week : 04  
Class & Major : I B.Sc., Biochemistry Total Hours : 52

### COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Understand the nomenclature of coordination compounds and
CO-2	Gain the knowledge of carbohydrates.
CO-3	Remember the amino Acids and Essential elements of biosystem
CO-4	Interpret the fundamentals of electrochemistry
CO-5	Impart the fundamentals of photochemistry

## **UNIT-I Co-ordination Chemistry and Water Technology**

**8 Hours**

**Co-ordination Chemistry:** Definition of terms - IUPAC Nomenclature- Werner's theory - EAN rule - Pauling's theory – Postulates - Applications to  $[\text{Ni}(\text{CO})_4]$ ,  $[\text{Ni}(\text{CN})_4]^{2-}$ ,  $[\text{Co}(\text{CN})_6]^{3-}$  Chelation - Biological role of Hemoglobin and Chlorophyll (elementary idea) -Applications in qualitative and quantitative analysis.

**Water Technology:** Hardness of water, determination of hardness of water using EDTA method, zeolite method-Purification techniques –BOD and COD.

## **UNIT-II Carbohydrates**

**8 Hours**

Classification, preparation and properties of glucose and fructose. Discussion of open chain ring structures of glucose and fructose. Glucose-fructose interconversion. Preparation and properties of sucrose, starch and cellulose

## **UNIT-III Amino Acids and Essential elements of bio system**

**8 Hours**

Classification - preparation and properties of alanine, preparation of dipeptides using Bergmann method - Proteins- classification – structure - Colour reactions – Biological functions – nucleosides -nucleotides – RNA and DNA – structure. Essentials of trace metals in biological system-Na, Cu, K, Zn, Fe, Mg.

## **UNIT-IV Electrochemistry**

**7 Hours**

Galvanic cells - Standard hydrogen electrode - calomel electrode - standard electrode potentials -electrochemical series. Strong and weak electrolytes - ionic product of water -pH,pKa, pKb. Conductometric titrations - pH determination by colorimetric method – buffer solutions and its biological applications - electroplating - Nickel and chrome plating – Types of cells -fuel cells-corrosion and its prevention

## **UNIT-V Photochemistry**

**8 Hours**

Grothus - Drapper's law and Stark-Einstein's law of photochemical equivalence, Quantum yield - Hydrogen -chloride reaction. Phosphorescence, fluorescence, chemiluminescence and photosensitization and photosynthesis (definition with examples).

### **Text Books**

- V.Veeraiyan, (2009), *Textbook of Ancillary Chemistry*; first edition, High mount publishing house, Chennai.
- Samuel Glasstone (2018), *an Introduction to Electrochemistry*, 4<sup>th</sup> Ed, Read Books Ltd.

### Reference Books

- S.Vaithyanathan, (2006). *Text book of Ancillary Chemistry*; Priya Publications, Karur,.
- Arun Bahl, B.S. Bahl (2012), *Advanced Organic Chemistry*; S.Chand and Company, New Delhi, twenty third edition.
- P.L.Soni, Mohan Katyal, (2007). *Text book of Inorganic chemistry*; twentieth edition, Sultan Chand and Company, New Delhi.
- B.R.Puri, L.R.Sharma, M.S.Pathania (2018), *Text book Physical Chemistry*; forty seventh edition, Vishal Publishing Co., New Delhi.

### COURSE OUTCOMES:

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Understand the cognizance on amino acids and essential elements present in the biological system.	K1
CO-2	Illustrates the postulates of Werner's Theory, Pauling's theory and EAN rule.	K2
CO-3	Utilize the technique of colorimetric method to determine the pH of the solution.	K3
CO-4	Analyze the open chain ring structures of glucose and fructose.	K4
CO-5	Classify the radioactive and non radioactive decay from photochemistry.	K4

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	1	0	0	0
CO 2	3	2	2	1	0	0
CO 3	3	3	1	2	1	0
CO 4	3	3	3	2	2	1
CO 5	3	3	3	3	2	1

Higher Correlation : 36.6%      Moderate Correlation: 23.3 %      Low Correlation : 20%  
No Correlation : 20%

### ORGANIC ANALYSIS UCHR205

Semester : II  
Category : Allied Practical  
Class & Major: I B.Sc., Biochemistry

Credit : 02  
Hours/ Week : 03  
Total Hours : 39

### COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Identification of organic functional groups.
CO-2	Determination of elements in organic compounds.
CO-3	Different types of organic compounds with respect to their properties.
CO-4	Differentiate the aliphatic and aromatic compound
CO-5	Distinguish – Saturated and unsaturated compounds.

## SYSTEMATIC ANALYSIS OF ORGANIC COMPOUNDS

The analysis must be carried out as follows:

- Functional group tests [phenol, acids (mono & di) aromatic primary amine, amides (mono & di), aldehyde and glucose].
- Detection of elements (N, S, Halogens).
- To distinguish between aliphatic and aromatic compounds.
- To distinguish – Saturated and unsaturated compounds.

### Reference Books

- V.Venkateswaran, R.Veerasingam, A.R.Kulandaivelu, (1997). *Basic Principles of Practical Chemistry*; Second edition, Sultan Chand & sons.

### COURSE OUTCOMES:

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Explain the physical state, odour, color and solubility of the given Organic compound.	K1, K2
CO-2	Relate the types of organic compounds with respect to solubility nature.	K3
CO-3	Identify and Analyze the functional group present in given organic compound.	K4
CO-4	Detect the presence of special elements and functional group in an unknown organic compound performing a systematic analysis.	K5
CO-5	Choose a derivative with respect to the identified functional group.	K6

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	1	1	0
CO 2	3	3	3	2	1	1
CO 3	3	3	3	3	1	1
CO 4	3	3	3	2	2	1
CO 5	3	3	3	2	2	1

High Correlation : 43.3%      Moderate Correlation: 20 %      Low Correlation : 26.7%  
No Correlation : 10%

### III and IV Evaluation Component

Semester	Course code	Course title	Component III	Component IV
I	UCHM112	General Chemistry - I	Modal Preparation	Assignment
I	UCHF100	Foundation Course	Case Study	Assignment
I	UCHE101	Role of chemistry in everyday life	Group discussion	Chart Preparation
I	UCHA105	Chemistry for biological sciences- I	Quiz	Assignment
II	UCHM207	General chemistry- II	Model Preparation	Aptitude test
II	UCHE209	Dairy Chemistry	Chart Preparation	Assignment
II	UCHE210	Cosmetics and personal grooming	Chart Preparation	Grooming Experiment
II	UCHA204	Chemistry for biological sciences - II	Aptitude test	Group discussion

## PG PROGRAMME – M.Sc CHEMISTRY

### PREAMBLE

**PG:** Syllabi of Programme offered in Semester I and II along with III and IV Evaluation Components (with Effect from 2023 – 2025 Batch onwards).

### PROGRAMME SPECIFIC OUTCOME

PSO No.	Upon completion of these courses the students will be able to
<b>PSO 1</b>	Apply the knowledge acquired about chemical reactions and their mechanisms to design new synthetic pathway.
<b>PSO 2</b>	Design and synthesize new compounds, which have potential applications in Industry and Medicine.
<b>PSO 3</b>	Carry out experiments and analysis in the area of organic analysis, estimation, separation, inorganic semi micro analysis, preparation
<b>PSO4</b>	Deduce the structure of compounds using various characterization techniques
<b>PSO 5</b>	Acquire the ability to synthesize, separate and characterize compounds using laboratory and instrumentation techniques.

### COURSE PROFILE M. Sc. Chemistry

Sem	Part	Category	Course Code	Course Title	Contact Hrs /Week	Credits
I	I	Core Course-I	PCHM117	Organic Reaction Mechanism-I	5	4
		Core Course-II	PCHM118	Structure And Bonding In Inorganic Compounds	5	4
		Core Course Practical-III	PCHR121	Organic Chemistry Practical	5	4
		Elective Core-I	PCHO119	Nanomaterials and Nanotechnology	5	3
		Elective Core -II	PCHO120	Molecular Spectroscopy	5	3
	II	Skill Enhancement Course/NME			3	2
		Online Course	PONL101	-	2	2
<b>Total</b>					<b>30</b>	<b>22</b>
II	I	Core Course -IV	PCHM210	Organic reaction mechanism-II	5	4
		Core Course -V	PCHM211	Physical Chemistry-I	5	4
		Core Course Practical-VI	PCHR214	Inorganic Chemistry Practical	5	4
		Core Industry Module	PCHM212	Chemistry In Agriculture	4	3



		Elective Course -III	PCHO212	Green Chemistry	4	3
		Elective Course -IV	PCHO213	Material Science	4	3
	II	Skill Enhancement Course ( Discipline Specific)	PCHD201	Chemistry in consumer product	3	2
		Service Learning	PCHX201	Vermicomposting	-	1
		Internship/Industrial Training/Field Visit	PINS201			2
		<b>Total</b>			<b>30</b>	<b>26</b>
	I	Core Course -VII	PCHM304	Organic synthesis and Photochemistry	5	4
		Core Course -VIII	PCHM305	Coordination Chemistry-I	5	4
		Core Course Practical –IX	PCHR307	Physical Chemistry Practical	5	4
		Core Industry Module	PCHM308	Industrial Chemistry	4	3
		Elective Course - V	PCHO306	Pharmacognosy and Photochemistry	4	3
		Elective Course - VI	PCHO307	Chemistry In Food Preservation	3	3
	II	SEC (Inter Disciplinary)	PCHI302	Characterization of Materials	4	2
		<b>Total</b>			<b>30</b>	<b>23</b>
	I	Core Course -X	PCHM415	Coordination Chemistry-II	5	4
		Core Course -XI	PCHM416	Physical Chemistry-II	5	4
		Core Course -XII	PCHR417	Analytical Instrumentation technique Practical	5	4
		Core Project - XIII	PCHP401	Core Project with viva voce	6	4
		Elective Course -VI	PCHO418	Polymer Chemistry	5	3
	II	SEC(Professional skill)	PCHD401	Professional Competency	4	2
		Internship	PINS401			-/2
		<b>Total</b>			<b>30</b>	<b>21/23</b>
		<b>Total</b>			<b>120</b>	<b>92/94</b>

### NON- MAJOR ELECTIVE COURSES

Semester	Part	Category	Course Code	Course Title	Contact Hrs per Week	Credits
						Min/Max
I	II	Non major Elective	PCHE105	Computational Chemistry	3	2

**ORGANIC REACTION MECHANISM-I**  
**PCHM117**

**Semester : I**  
**Category : Core Course I/CC1**  
**Class & Major: I M.Sc., Chemistry**

**Credit : 04**  
**Hours / Week: 05**  
**Total hours : 65**

**COURSE OBJECTIVES:**

CO No.	To enable the students
CO-1	Understand the feasibility and the mechanism of various organic reactions.
CO-2	Comprehend the techniques in the determination of reaction mechanisms.
CO-3	Apply the concept of stereochemistry involved in organic compounds.
CO-4	Correlate and appreciate the differences involved in the various types of organic reaction mechanisms.
CO-5	Design feasible synthetic routes for the preparation of organic compounds.

**UNIT-I: Methods of Determination of Reaction Mechanism**

**12 Hours**

Reaction intermediates, the transition state, Reaction coordinate diagrams, Thermodynamic and kinetic requirements of reactions: Hammond postulate. Methods of determining mechanism: non-kinetic methods - product analysis, determination of intermediates-isolation, detection, and trapping. Cross-over experiments, isotopic labelling, isotope effects and stereo chemical evidences. Kinetic methods - relation of rate and mechanism. Effect of structure on reactivity: Hammett and Taft equations. Linear free energy relationship, partial rate factor, substituent and reaction constants.

**UNIT-II: Aromatic and Aliphatic Electrophilic Substitution**

**15 Hours**

**Aromatic and Aliphatic Electrophilic Substitution:** Aromaticity: Aromaticity in benzenoid, non-benzenoid, heterocyclic compounds and annulenes. Aromatic electrophilic substitution: Typical reactions to be studied - nitration, halogenation, sulphonation, alkylation, acylation and diazonium coupling. Orientation and reactivity (ortho, meta and para directing groups) of di- and polysubstituted phenol, nitrobenzene and halobenzene. Formylation reactions - Gatterman, Gatterman-Koch, Vilsmeier-Hack and Reimer-Tieman reactions. Aliphatic electrophilic substitution Mechanisms: S<sub>E</sub>1, S<sub>E</sub>2 and S<sub>E</sub>i-Mechanism and evidences.

**UNIT-III: Aromatic and Aliphatic Nucleophilic Substitution**

**12 Hours**

Aromatic nucleophilic substitution: Mechanisms - S<sub>N</sub>Ar, S<sub>N</sub>1 and Benzyne mechanisms - Evidences - Reactivity, Effect of structure, leaving group and attacking nucleophile. Reactions:

Oxygen and Sulphur-nucleophiles, Bucherer and Rosenmund reactions, von Richter, Sommelet-Hauser and Smiles rearrangements.  $S_N1$ , ion pair,  $S_N2$  mechanisms and evidences. Aliphatic nucleophilic substitutions at an allylic carbon, aliphatic trigonal carbon and vinyl carbon.  $S_N1$ ,  $S_N2$ ,  $S_{Ni}$ , and  $S_{E1}$  mechanism and evidences, Swain- Scott, Grunwald-Winstein relationship - Ambident nucleophiles.

#### **UNIT-IV: Stereochemistry-I**

**15 Hours**

Introduction to molecular symmetry and chirality – axis, plane, center, alternating axis of symmetry. Optical isomerism due to asymmetric and dissymmetric molecules with C, N, S based chiral centers. prochirality, enantiotopic and diastereotopic atoms, groups, faces, axial and planar chirality, chirality due to helical shape, methods of determining the configuration. Racemic modifications: D, L system, Cram's and Prelog's rules: R, S-notations, pro R, pro S, side phase and re phase Cahn-Ingold-Prelog rules, absolute and relative configurations. Configurations of spiranes, cyclooctene, helicene, bi naphthyls, ansa and cyclophanic compounds, exo-cyclic alkylidene-cycloalkanes. Topicity and prostereoisomerism, Criteria for optical purity: asymmetric synthesis, destruction. Stereoselective and stereospecific synthesis.

#### **UNIT-V: Stereochemistry-II**

**11 Hours**

Conformation and reactivity of acyclic systems, intramolecular rearrangements, neighbouring group participation, chemical consequence of conformational equilibrium - Curtin-Hammett Principle. Stability of five and six-membered rings: mono-, di- and polysubstituted cyclohexanes, conformation and reactivity in cyclohexane systems. Fused and bridged rings: bicyclic, poly cyclic systems, decalins and Brett's rule. Optical rotation and optical rotatory dispersion, conformational asymmetry, ORD curves, octant rule, configuration and conformation, Cotton effect, axial haloketone rule and determination of configuration.

#### **Text Books**

- J. March and M. Smith, (2001). *Advanced Organic Chemistry*, 5th ed., John-Wiley and Sons.
- P.S. Kalsi, (2015). *Stereochemistry of carbon compounds*, 8<sup>th</sup>edn, New Age International Publishers.

#### **Reference Books**

- F.A. Carey and R.J. Sundberg, (2007) . *Advanced Organic Chemistry Part-A and B*, 5<sup>th</sup> Edn, Kluwer Academic/ Plenum Publishers.
- E.L. Eliel, (2000). *Stereochemistry of Carbon Compounds*, Tata-Mc Graw Hill.
- I.L. Finar, (2004). *Organic chemistry, Vol-1*, 6<sup>th</sup>ed., Pearson Education Asia.

- P.Y. (2013). Bruice, *Organic Chemistry*, 7<sup>th</sup> edn., Prentice Hall,.
- R.T. Morrison, R.N. Boyd, S.K. Bhattacharjee (2010). *Organic Chemistry*, 7<sup>th</sup> edn. Pearson Education.
- D. Nasipuri, (2005) *Stereochemistry of Organic Compounds*, 2<sup>nd</sup> ed., New Age Publishers.

#### E-Resources

- <https://sites.google.com/site/chemistryebookscollection02/home/organic-chemistry/organic>
- <https://www.organic-chemistry.org/>

#### COURSE OUTCOMES:

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Classify aromaticity, Nucleophilic, electrophonic substitution and Stereochemistry of organic compound.	K1, K2
CO-2	Solve the problem to formation and detection of reaction intermediates of organic reactions.	K3
CO-3	Analyze the reaction mechanism of Aromatic and aliphatic Substitution reaction and stereochemistry of organic compounds.	K4
CO-4	Evaluate the kinetic and non-kinetic methods to predict the mechanism of reactions.	K5
CO-5	Develop and synthesize new organic compounds by correlating the stereochemistry of organic compounds.	K6

#### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	1	1
CO 2	3	3	3	2	2	1
CO 3	3	3	3	3	2	1
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

**High Correlation : 66.7% Moderate Correlation : 20% Low Correlation : 13.3%**

### STRUCTURE AND BONDING IN INORGANIC COMPOUNDS

#### PCHM118

Semester : I  
 Category : Core Course II / CC2  
 Class & Major : I M.Sc., Chemistry

Credit : 04  
 Hours/Week : 05  
 Total Hours : 65

**COURSE OBJECTIVES:**

CO No.	To enable the students
CO-1	Determine the structural properties of main group compounds and clusters.
CO-2	Gain fundamental knowledge on the structural aspects of ionic crystals.
CO-3	Familiarize various diffraction and microscopic techniques
CO-4	Study the effect of point defects and line defects in ionic crystals.
CO-5	Evaluate the structural aspects of solids.

**UNIT-I: Structure of Main Group Compounds and Clusters****12 Hours**

VB theory – Effect of lone pair and electronegativity of atoms (Bent's rule) on the geometry of the molecules; Structure of silicates - applications of Paulings rule of electrovalence - isomorphous replacements in silicates – ortho, meta and pyro silicates – one dimensional, two dimensional and three-dimensional silicates. Structure of silicones, Structural and bonding features of B-N, S-N and P-N compounds; Poly acids – types, examples and structures; Borane cluster: Structural features of closo, nido, arachano and klado; carboranes, hetero and metalloboranes; Wade's rule to predict the structure of borane cluster; main group clusters – zintl ions and mno rule.

**UNIT-II: Solid State Chemistry – I****15 Hours**

Ionic crystals: Packing of ions in simple, hexagonal and cubic close packing, voids in crystal lattice, Radius ratio, Crystal systems and Bravis lattices, Symmetry operations in crystals, glide planes and screw axis; point group and space group; Solid state energetics: Lattice energy – Born-Lande equation - Kapustinski equation, Madelung constant.

**UNIT-III: Solid State Chemistry – II****12 Hours**

Structural features of the crystal systems: Rock salt, zinc blende & wurtzite, fluorite and anti-fluorite, rutile and anatase, cadmium iodide and nickel arsenide; Spinels -normal and inverse types and perovskite structures. Crystal Growth methods: From melt and solution (hydrothermal, sol-gel methods) – principles and examples.

**UNIT-IV: Techniques in Solid State Chemistry****15 Hours**

X-ray diffraction technique: Bragg's law, Powder diffraction method – Principle and Instrumentation; Interpretation of XRD data – JCPDS files, Phase purity, Scherrer formula, lattice constants calculation; Systematic absence of reflections; Electron diffraction technique – principle, instrumentation and application. Electron microscopy – difference between optical and electron

microscopy, theory, principle, instrumentation, sampling methods and applications of SEM and TEM.

### UNIT-V: Band Theory and Defects in Solids

11 Hours

Band theory – features and its application of conductors, insulators and semiconductors, Intrinsic and extrinsic semiconductors; Defects in crystals – point defects (Schottky, Frenkel, metal excess and metal deficient) and their effect on the electrical and optical property, laser and phosphors; Linear defects and its effects due to dislocations.

#### Text Books

- A R West, (2014). *Solid state Chemistry and its applications*, 2<sup>nd</sup> Edition (Students Edition), John Wiley & Sons Ltd.
- L Smart, E Moore, (2012). *Solid State Chemistry – An Introduction*, 4<sup>th</sup> Edition, CRC Press,

#### Reference Books

- D. F. Shriver, P. W. Atkins and C.H. Langford; (2001), *Inorganic Chemistry*; 3<sup>rd</sup> ed.; Oxford University Press: London.
- D. F. Shriver, P. W. Atkins and C.H. Langford; (2001), *Inorganic Chemistry*; 3<sup>rd</sup> ed.; Oxford University Press: London.
- F.A. Cotton, G. Wilkinson, C.A. Murillo and M. Bochmann, (1988) *Advanced Inorganic Chemistry*; 6<sup>th</sup> ed.; Wiley Interscience: New York,.
- P.W. Atkins, T. Overton, d. Rourke, M. Weller and F. Armstrong; Shriver & Atkins (2006) *Inorganic Chemistry*, 4<sup>th</sup> ed. Oxford University Press.

#### E-Resources

- [https://web.mit.edu/5.03/www/readin\\_hedral\\_boranes/006\\_cluster\\_bonding.pdf](https://web.mit.edu/5.03/www/readin_hedral_boranes/006_cluster_bonding.pdf)
- [https://www2.chemis.msu.edu/courses/cem151/cha\\_24lect\\_2009.pdf](https://www2.chemis.msu.edu/courses/cem151/cha_24lect_2009.pdf)
- [https://shodh.an.inflibnet.ac.in/bitstream/10603/49536/7/07\\_chapter%2020.pdf](https://shodh.an.inflibnet.ac.in/bitstream/10603/49536/7/07_chapter%2020.pdf)
- [https://shodh.an.inflibnet.ac.in/bitstream/10603/10166/12/12\\_chapter%20Z%20.pdf](https://shodh.an.inflibnet.ac.in/bitstream/10603/10166/12/12_chapter%20Z%20.pdf)
- <https://dfs.semanticscholar.org/542e/c1756289402589af1437b6c691a3393d1183.pdf>
- [https://ocw.mit.edu/courses/3-091-introduction-to-solid-state-chemistry-fall-2018/video\\_galleries/lecture-videos/](https://ocw.mit.edu/courses/3-091-introduction-to-solid-state-chemistry-fall-2018/video_galleries/lecture-videos/)

#### COURSE OUTCOMES:

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Recall the basic concept of solid state and clusters in inorganic chemistry	K1&K2
CO-2	Choose the techniques for characterization of solid state compound	K3
CO-3	Compare the structural features of the cluster and crystal systems	K4
CO-4	Evaluate the nature of silicate, conductor and insulators and semiconductors	K5
CO-5	Design of Metal-inorganic clusters and crystal.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	1	1	1
CO 2	3	3	3	2	2	1
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

**High Correlation : 63.3% Moderate correlation : 23.3% Low Correlation : 13.4%**

**ORGANIC CHEMISTRY PRACTICAL  
PCHR121**

**Semester : I**

**Credit : 04**

**Category : Core Course Practical-III / CC3**

**Hours/Week : 05**

**Class & Major : I M.Sc., Chemistry**

**Total Hours : 65**

**COURSE OBJECTIVES:**

CO No.	To enable the students
CO-1	Understand the concept of separation, qualitative analysis and preparation of organic compounds.
CO-2	Develop analytical skill in the handling of chemical reagents for separation of binary and ternary organic mixtures.
CO-3	Analyze the separated organic components systematically and derivatize them suitably.
CO-4	Construct suitable experimental setup for the organic preparations involving two stages.
CO-5	Experiment different purification and drying techniques for the compound processing.

**UNIT-I: SEPARATION AND ANALYSIS****25 Hours**

Analysis of two component mixture. Separation and systematic analysis of the separated two individual components.

**UNIT-II: Estimations ( Any Two Estimation from the following)****25 Hours**

- a) Estimation of Phenol (bromination)
- b) Estimation of Aniline (bromination)
- c) Estimation of Ethyl methyl ketone (iodimetry)
- d) Estimation of Glucose (redox)
- e) Estimation of Amino group (acetylation)

**UNIT-III: TWO STAGE PREPARATIONS****15 Hours**

**Any Six preparations from the following:**

- 1) p-nitroacetanilide from Aniline (Acetylation and Nitration)
- 2) Acetylsalicylic acid from methyl salicylate (Hydrolysis and Acetylation)
- 3) 1,3,5-tribromo benzene from aniline (Bromination, Diazotisation and Hydrolysis)
- 4) p-Bromoacetanilide from aniline (Acetylation and Bromination)
- 5) p-Bromoaniline from acetanilide (Bromination and Hydrolysis)
- 6) m-Nitrobenzoic acid from methyl benzoate. (Nitration and Hydrolysis)
- 7) p-Nitroaniline from acetanilide (Nitration and Hydrolysis)
- 8) Bezanilide from benzophenone (Rearrangement)
- 9) m-Nitrobenzoic acid from benzaldehyde (Oxidation and Nitration)

#### Text Books

- Dr.Gnanaprasam.N.S and Ramamoorthy.G, (2008), *Organic Chemistry Lab Manual*, S.Viswanathan printers & Publishers Pvt. Ltd.
- Glasstone.S, (2010), *Statistical Thermodynamics*, Affiliated East West Press, New Delhi.

#### Reference Books

- Thomas .A.O, (2005), *Practical Chemistry*, Scientific Book Center, Cannanore.
- Vogel's, (2009), *Text Book of Practical Organic Chemistry*, Longman, London.

#### COURSE OUTCOMES:

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Outline the basic principles of qualitative analysis, organic separation and preparation.	K1&K2
CO-2	Apply the knowledge to the organic analysis to find the functional group carbonyl compound, carboxylic acid, ester, amide and nitro..	K3
CO-3	Analyze the estimation of bromination, acetylation, rodox and iodometry from volumetric method	K4
CO-4	Separate and Evaluate the binary compound Mixture from qualitative method	K5
CO-5	Formulate a method of separation, analysis of organic mixtures and design suitable procedure for organic preparations.	K6

#### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	2	1	1
CO 2	3	3	3	3	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

**High Correlation : 66.7% Moderate correlation : 26.7% Low Correlation : 6.6%**



**NANOMATERIALS AND NANOTECHNOLOGY**  
**PCHO119**

**Semester : I**  
**Category : Core Elective - I**  
**Class & Major : I M.Sc., Chemistry**

**Credit : 03**  
**Hours/Week : 05**  
**Total Hours : 65**

**COURSE OBJECTIVES:**

CO No.	To enable the students
CO-1	Understand the advanced concepts of pharmaceutical chemistry.
CO-2	Recall the principle and biological functions of various drugs.
CO-3	Train the students to know the importance as well the consequences of various drugs.
CO-4	Gain knowledge on the various analysis and techniques.
CO-5	Familiarize on the drug dosage and its structural activities.

**UNIT-I: Basics of Nano Chemistry**

**12 Hours**

Introduction of nanomaterials and nanotechnologies, Introduction-role of size, classification-0D, 1D, 2D, 3D. Synthesis-Bottom –Up, Top–Down, consolidation of Nano powders. Features of nanostructures, Background of nanostructures. Techniques of synthesis of nanomaterials, Tools of the nanoscience. Applications of nanomaterials and technologies.

**UNIT-II: Special Nanomaterials**

**15 Hours**

Bonding and structure of the nanomaterials, Predicting the Type of Bonding in a Substance crystal structure. Metallic nanoparticles, Surfaces of Materials, Nanoparticle Size and Properties. Synthesis- Physical and chemical methods - inert gas condensation, arc discharge, laser ablation, sol-gel, solvothermal and hydrothermal-CVD-types, metallo organic, plasma enhanced, and low-pressure CVD. Microwave assisted and electrochemical synthesis.

**UNIT-III: Properties of materials**

**12 Hours**

Mechanical properties of materials, theories relevant to mechanical properties. Techniques to study mechanical properties of nanomaterials, adhesion and friction, thermal properties of nanomaterials Nanoparticles: gold and silver, metal oxides: silica, iron oxide and alumina - synthesis and properties.

**UNIT IV: Nanostructured materials Characterization Techniques**

**12 Hours**

X-ray diffraction (XRD), SEM, EDAX, TEM, FTIR, UV-Visible spectrophotometer, Laser Raman Spectroscopy, Differential Scanning Calorimeter (DSC), Differential Thermal Analyzer (DTA), Thermo gravimetric Analysis (TGA), TEM, X-ray Photoelectron Spectroscopy (XPS),

Atomic force microscopy (AFM), BET analyzer.

### **UNIT V: Industrial Applications of Nanotechnology**

**11 Hours**

Applications of Nano-adsorbents and photo catalysts for water and waste water treatment – Nanoparticles for degradation of solvents and organic compounds – Nanotechnology in Textiles, Cosmetics, Defence, Agriculture, and Food industry, Bio-Medical Engineering.

#### **Text Books**

- S.Mohan and V. Arjunan, (2016), Principles of Materials Science, MJP Publishers.
- Cao, G., & Wang, Y. (2011). Nanostructures and nanomaterials: synthesis, properties and applications (2<sup>nd</sup> edition.). World Scientific.

#### **Reference Books**

- S.Mohan and V. Arjunan, Principles of Materials Science, MJP Publishers, 2016.
- Altmann, J., & Routledge. (2006). Military Nanotechnology: Potential Applications and Preventive Arms Control. Taylor and Francis Group.
- Kuzma, J., & VerHage, P. (2006). Nanotechnology in agriculture and food production. Woodrow Wilson International Centre.
- Brown, P. J. & Stevens, K. (2007). Nanofibers and Nanotechnology in Textiles. Cambridge: Wood head Publishing Limited.
- James F. Shackelford and Madanapalli K. Muralidhara, (2007), Introduction to Materials Science for Engineers. 6th ed., PEARSON Press.

#### **E-Resources**

- <http://xrayweb.chem.ou.edu/notes/symmetry.html>.
- <http://www.upti.ac.in/classroom-content/data/unit%20cell.pdf>.

#### **COURSE OUTCOMES:**

<b>CO No.</b>	<b>On completion of the course, the students will be able to</b>	<b>Bloom's Level</b>
CO-1	Explain about the Nanoscience and nanotechnology	K1&K2
CO-2	Choose appropriate synthesis technique to synthesize quantum nanostructures of desired size, shape and surface properties.	K3
CO-3	Correlate properties of nanostructures with their size, shape and surface characteristics.	K4
CO-4	Prepare, analyse and Evaluate the nanomaterial with suitable techniques.	K5
CO-5	Appreciate enhanced sensitivity of nonmaterial based sensors and their novel applications in industry.	K6

## CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	1	1	1	1
CO 2	3	3	3	2	2	1
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

High Correlation : 66.7% Moderate correlation : 16.7% Low Correlation : 16.6%

## MOLECULAR SPECTROSCOPY PCHO120

Semester : I  
Category : Core Elective - II  
Class & Major : I M.Sc., Chemistry

Credit : 03  
Hours/Week : 05  
Total Hours : 65

### COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Understand the influence of rotation and vibrations on the spectra of the polyatomic molecules.
CO-2	Study the principle of Raman spectroscopy, ESR spectroscopy, EPR spectroscopy and fragmentation patterns in Mass spectroscopy.
CO-3	Identify the significance of Franck-Condon principle to interpret the selection rule, intensity and types of electronic transitions.
CO-4	Interpret the first and second order NMR spectra in terms of splitting and coupling patterns using correlation techniques such as COSY, HETCOR, NOESY.
CO-5	Remember the structural elucidation of molecules using different spectral techniques.

### UNIT-I: Rotational and Raman Spectroscopy

12 Hours

**Rotational and Raman Spectroscopy:** Rotational spectra of diatomic and polyatomic molecules. Intensities of rotational spectral lines, effect of isotopic substitution. Non-rigid rotators. Classical theory of the Raman effect, polarizability as a tensor, polarizability ellipsoids, quantum theory of the Raman effect, Pure rotational Raman spectra of linear and asymmetric top molecules, Stokes and anti-Stokes lines. Vibrational Raman spectra, Raman activity of vibrations, rule of mutual exclusion, rotational fine structure-O and S branches, Polarization of Raman scattered photons.

### UNIT-II: Vibrational Spectroscopy

15 Hours

Vibrations of molecules, harmonic and anharmonic oscillators- vibrational energy expression, energy level diagram, vibrational wave functions and their symmetry, selection rules, expression for

the energies of spectral lines, computation of intensities, hot bands, effect of isotopic substitution. Diatomic vibrating rotor, vibrational-rotational spectra of diatomic molecules, P, R branches, breakdown of the Born-Oppenheimer approximation. Vibrations of polyatomic molecules – symmetry properties, overtone and combination frequencies. Influence of rotation on vibrational spectra of polyatomic molecule, P, Q, R branches, parallel and perpendicular vibrations of linear and symmetric top molecules.

### **UNIT-III: Electronic Spectroscopy**

**12 Hours**

**Electronic Spectroscopy:** Electronic spectroscopy of diatomic molecules, Frank-Condon principle, dissociation and predissociation spectra.  $\pi \rightarrow \pi^*$ ,  $n \rightarrow \pi^*$  transitions and their selection rules. **Photoelectron Spectroscopy:** Basic principles, photoelectron spectra of simple molecules, X-ray photoelectron spectroscopy (XPS). **Lasers:** Laser action, population inversion, properties of laser radiation, examples of simple laser systems..

### **UNIT-IV: NMR Spectroscopy**

**15 Hours**

**NMR Spectroscopy:** Chemical shift, Factors influencing chemical shifts: electronegativity and electrostatic effects; Mechanism of shielding and deshielding. Spin systems: First order and second order coupling of AB systems, Simplification of complex spectra. Spin-spin interactions: Homonuclear coupling interactions - AX, AX<sub>2</sub>, AB types. Vicinal, germinal and long-range coupling-spin decoupling. Nuclear Overhauser effect (NOE), Factors influencing coupling constants and Relative intensities. <sup>13</sup>C NMR and structural correlations, Satellites. Brief introduction to 2D NMR – COSY, NOESY. Introduction to <sup>31</sup>P, <sup>19</sup>F NMR.

### **UNIT-V: Mass Spectrometry**

**11 Hours**

**Mass Spectrometry:** Ionization techniques- Electron ionization (EI), chemical ionization (CI), desorption ionization (FAB/MALDI), electrospray ionization (ESI), isotope abundance, molecular ion, fragmentation processes of organic molecules, deduction of structure through mass spectral fragmentation, high resolution. Effect of isotopes on the appearance of mass spectrum.

### **Text Books**

- C. N. Banwell and E. M. McCash, (2000). Fundamentals of Molecular Spectroscopy, 4th Ed., Tata McGraw Hill, New Delhi.
- W. Kemp, (1987). Applications of Spectroscopy, English Language Book Society.

- D. H. Williams and I. Fleming, (1988). Spectroscopic Methods in Organic Chemistry, 4th Ed., Tata McGraw-Hill Publishing Company, New Delhi.

#### Reference Books:

- R. M. Silverstein and F. X. Webster, (2003). Spectroscopic Identification of Organic Compounds, 6th Ed., John Wiley & Sons, New York.
- A. Rahman, Nuclear Magnetic Resonance-Basic Principles, (1986). Springer-Verlag, New York.
- K. Nakamoto, (1997). Infrared and Raman Spectra of Inorganic and coordination Compounds, PartB: 5th ed., John Wiley& Sons Inc., New York.
- J. A. Weil, J. R. Bolton and J. E. Wertz, (1994). Electron Paramagnetic Resonance; Wiley Interscience,.

#### E-Resources

- [https://onlinecourses.nptel.ac.in/noc20\\_cy08/preview](https://onlinecourses.nptel.ac.in/noc20_cy08/preview)
- <https://www.digimat.in/nptel/courses/video/104106122/L14.html>

#### COURSE OUTCOMES:

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Understand the importance of rotational and Raman spectroscopy.	K1&K2
CO-2	Apply the knowledge in Vibrational spectroscopic techniques in diatomic and polyatomic molecules.	K3
CO-3	Examine the different electronic spectra of simple molecules using electronic spectroscopy.	K4
CO-4	Evaluate the Spectral data for organic and inorganic molecule from NMR, <sup>13</sup> C NMR, 2D NMR – COSY, NOESY, 31P, 19F NMR and ESR spectra.	K5
CO-5	Design the structure of organic molecules using NMR, Mass Spectrometry, EPR and Mossbauer Spectroscopy techniques.	K6

#### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	1	1	1
CO 2	3	3	3	2	2	1
CO 3	3	3	3	3	3	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

**High Correlation : 66.7% Moderate correlation: 20% Low Correlation : 13.3%**

**COMPUTATIONAL CHEMISTRY**  
**PCHE105**

**Semester : I**  
**Category : SEC 1/NME**  
**Class & Major : I M.Sc., Chemistry**

**Credit : 02**  
**Hours/Week: 03**  
**Total Hours : 39**

**COURSE OBJECTIVES:**

CO No.	To enable the students
CO-1	Determine the structural properties of molecular mechanics calculations.
CO-2	Gain fundamental knowledge on the Geometry Optimization Techniques.
CO-3	Familiarize various Conceptual DFT
CO-4	Study the effect of point applications potential of Machine learning in Chem.
CO-5	Understand the molecular docking and ADMET analysis.

**UNIT: I Molecular Mechanics**

**8 Hours**

Classical Force Field Methods - Postulates of Quantum Mechanics and measurement - Born-Oppenheimer approximation - Molecular Hamiltonian - Concept of the Potential Energy Surface.

**UNIT: II Quantum Mechanics**

**8 Hours**

Semiempirical - ab initio Quantum Mechanics - Hartree-Fock Self-Consistent Field equations - Geometry Optimization Techniques - Frequency Analysis - Electron Correlation and Configuration Interaction.

**UNIT: III Density Functional Theory**

**8 Hours**

DFT - Fermi hole, Exchange-Correlation potential and Kohn-Sham method - Conceptual DFT - Computation of Molecular Properties - QM/MM and ONIOM methods - Introduction to TDDFT - Carr-Parinello molecular dynamics.

**UNIT: IV Information of Drug Discovery**

**8 Hours**

Applications potential of Machine learning in Chem- & Bioinformatics – Representations of Molecular Structures - Characterizing 2D structures with Descriptors and Fingerprints - Searching 2D Chemical Databases - 3D visualization tools.

**UNIT: V In-Silico Molecular Docking and Admet Studies**

**7 Hours**

3D Methods - Pharmacophore Modeling and alignment - ADMET Models (Pre ADMET and Swiss ADMET online software analysis - Structure Based Methods (Auto Docking Tools Learning) docking and scoring – Pass server prediction Methods.

### Text Books

- Errol G. Lewars, (2003). *Computational Chemistry: Introduction to the Theory and Applications of Molecular and Quantum Mechanics*, Kluwer Academic Publishers.
- Johann Gasteiger, Thomas Engel, (2003). *Chemo informatics: A Textbook*, Wiley-VCH.

### Reference Books

- N. Sukumar, (2013) *A Matter of Density: Exploring the Electron Density Concept in the Chemical, Biological, and Materials Sciences*, John Wiley, Hoboken, NJ, Jürgen.
- Bajorath (2004), *Chemo informatics and Computational Chemical Biology*, Methods in Molecular Biology, Humana Press.

### E-Resources

- [https://chem.libretexts.org/Bookshelves/Physical\\_and\\_Theoretical\\_Chemistry\\_Textbook\\_Maps/Physical\\_Chemistry\\_\(LibreTexts\)/09%3A\\_Chemical\\_Bonding\\_in\\_Diatomic\\_Molecules/9.01%3A\\_The\\_BornOppenheimer\\_Approximation\\_Simplifies\\_the\\_Schrodinger\\_Equation\\_for\\_Molecules](https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Physical_Chemistry_(LibreTexts)/09%3A_Chemical_Bonding_in_Diatomic_Molecules/9.01%3A_The_BornOppenheimer_Approximation_Simplifies_the_Schrodinger_Equation_for_Molecules)
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9145410/>
- <http://www.swissadme.ch/>

### COURSE OUTCOMES:

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Recall the basic concepts in molecular mechanics in chemistry.	K1,K2
CO-2	Apply the knowledge of computational chemistry to molecular, Quantum Mechanics and drug discovery	K3
CO-3	Analyze the organic drug molecule from Density Functional Theory and Silico molecular docking.	K4
CO-4	Evaluate the information of drug discovery.	K5
CO-5	Design the pharmacophore Modeling and ADMET studies.	K6

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	1	1	1	1
CO 2	3	3	3	2	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

**High Correlation : 63.3% Moderate correlation : 23.3% Low Correlation : 13.4%**

**ORGANIC REACTION MECHANISM-II**  
**PCHM210**

Semester : II  
Category : Core Course-IV / CC4  
Class & Major: I M.Sc., Chemistry

Credit : 04  
Hours / Week : 05  
Total hours : 65

**COURSE OBJECTIVES:**

CO No.	To enable the students
CO-1	Understand the concept of aromaticity in benzenoid, non-benzenoid, heterocyclic and annulene compounds.
CO-2	Understand the mechanism involved in various types of organic reactions with evidences.
CO-3	Understand the applications of synthetically important reagents.
CO-4	Correlate the reactivity between aliphatic and aromatic compounds.
CO-5	Design synthetic routes for synthetically used organic reactions.

**UNIT-I: Elimination and Free Radical Reactions:**

**12 Hours**

Mechanisms: E2, E1, and E1cB mechanisms. Syn- and anti-eliminations. Orientation of the double bond: Hoffmann and Saytzeff rules. Reactivity: Effect of substrate, attacking bases, leaving group and medium. Stereochemistry of eliminations in acyclic and cyclic systems, pyrolytic elimination. Long lived and short-lived radicals – Production of radicals by thermal and photochemical reactions, Detection and stability of radicals, characteristics of free radical reactions; polymerization, addition, halogenations, aromatic substitutions, rearrangements. Reactivity: Reactivity on aliphatic, aromatic substrates, reactivity in the attacking radical, effect of solvent.

**UNIT-II: Reduction and Oxidation Reactions in Organic Synthesis**

**15 Hours**

**Reductions:** Synthetic importance of Clemensen and Wolf-Kishner reductions and its Modifications, Birch reduction, MPV reduction, Bouveault Blanc reduction.

**Hydride transfer reagents:** NaBH<sub>4</sub>, LiAlH<sub>4</sub>, DIBAL-H, and Bu<sub>3</sub>SnH

**Oxidation:** Oxidation of organic compounds with reagent based on SeO<sub>2</sub>, DDQ, Jones reagent, oxalyl chloride (Swern oxidation), Dess-Martin reagent, and Etard reagent, acetic anhydride in oxidizing alcohols. Hydroxylations with – OsO<sub>4</sub>, KMnO<sub>4</sub>, Prevost and Woodward. Epoxidation (per oxides/per acids), Sharpless epoxidation.

**UNIT-III: Rearrangements:**

**12 Hours**

A detailed study of the mechanism of the following rearrangements with suitable examples:



**Rearrangements to electron deficient carbon:** Pinacol-Pinacolone (examples other than tetramethyl ethylene glycol) and semi-pinacolone rearrangements-applications and stereochemistry, Wolff, Wagner-Meerwein, Demjanov, dienone-phenol rearrangements.

**Rearrangements to electron deficient oxygen:** Favorskii, Stevens, Fries and Photo Fries rearrangement, Von Richter rearrangements.

**Intramolecular rearrangements** – Claisen, Cope, oxy-Cope, Benzidine rearrangements.

**Rearrangements to electron deficient nitrogen:** Hofmann, Curtius, Schmidt, Lossen, Beckmann rearrangements.

**UNIT-IV: Addition to Carbon-Carbon and Carbon-Hetero Multiple bonds** **15 Hours**

(a) **Addition to carbon-carbon multiple bonds-** Addition reactions involving electrophiles, nucleophiles, free radicals, carbenes and cyclic mechanisms-Orientation and reactivity, hydrogenation of double and triple bonds, Michael reaction, addition of oxygen and Nitrogen.

(b) **Addition to carbon-hetero atom multiple bonds:** Mannich reaction, Wittig reaction, Stereochemical aspects of addition reactions. Addition of Grignard reagents, organozinc and organolithium reagents to carbonyl and unsaturated carbonyl compounds. Mechanism of condensation reactions involving enolates –Stobbe reactions.

**UNIT-V: Reagents and Modern Synthetic Reactions:** **11 Hours**

Lithium diisopropylamine (LDA), Azobisisobutyronitrile (AIBN), Sodium cyano borohydride ( $\text{NaBH}_3\text{CN}$ ), *meta*-Chloro perbenzoic acid (m-CPBA), Diazobicyclo[5.4.0]undec-7-ene (DBU), *N*-bromosuccinimide (NBS), Trifluoroacetic acid (TFA), Diazomethane and Zn-Cu,  $\text{NaIO}_4$ , Pyridinium chlorochromate (PCC), Pyridinium dichromate (PDC), Wilkinson's catalyst, Peterson Synthesis, Suzuki coupling, Heck reaction.

**Text Books**

- J. March and M. Smith, (2001). *Advanced Organic Chemistry*, 5th ed., John-Wiley and Sons.
- P. S. Kalsi, (2015). *Stereochemistry of carbon compounds*, 8<sup>th</sup>edn, New Age International Publishers.

**Reference Books**

- P. Y. Bruice, (2013), *Organic Chemistry*, 7<sup>th</sup>edn., Prentice Hall.
- R. T. Morrison, R. N. Boyd, S. K. Bhattacharjee (2010), *Organic Chemistry*, 7<sup>th</sup> edn., Pearson Education.
- L. F. Fieser and M. Fieser, (2000), *Organic Chemistry*, Asia Publishing House, Bombay.

## E-Resources

- <https://sites.google.com/site/chemistryebookscollection02/home/organicchemistry/organic>
- <https://www.organic-chemistry.org/>

## COURSE OUTCOMES:

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Compare the addition, elimination and Substitution reaction	K1,K2
CO-2	Apply the require reagent for reduction and oxidation reaction.	K3
CO-3	Analyze the mechanism of rearrangement reaction.	K4
CO-4	Predict the suitable reagents for the conversion of selective organic compounds.	K5
CO-5	Design new routes to synthesis organic compounds.	K6

## CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	1	1
CO 2	3	3	3	2	2	1
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

**High Correlation : 66.7% Moderate correlation: 23.3% Low Correlation : 10%**

## PHYSICAL CHEMISTRY-I PCHM211

Semester : II  
Category : Core Course V / CCV  
Class & Major: I M.Sc., Chemistry

Credit : 04  
Hours / Week : 05  
Total hours : 65

## COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Recall the fundamentals of thermodynamics and the composition of partial molar quantities.
CO-2	Understand the classical and statistical approach of the functions
CO-3	Compare the significance of Maxwell-Boltzman, Fermi-Dirac and Bose-Einstein
CO-4	Correlate the theories of reaction rates for the evaluation of thermodynamic parameters.
CO-5	Study the mechanism and kinetics of reactions.

## UNIT-I: Classical Thermodynamics:

**12 Hours**

Partial molar properties-Chemical potential, Gibb's-Duhem equation-binary and ternary systems. Determination of partial molar quantities. Thermodynamics of real gases - Fugacity-

determination of fugacity by graphical and equation of state methods-dependence of temperature, pressure and composition. Thermodynamics of ideal and non-ideal binary mixtures, Duhem - Margulus equation applications of ideal and non-ideal mixtures. Activity and activity coefficients-standard states.

**UNIT-II: Statistical thermodynamics:**

**15 Hours**

Introduction of statistical thermodynamics, concepts of thermodynamic and mathematical probabilities-distribution of distinguishable and non-distinguishable particles. Assemblies, ensembles, canonical particles. Maxwell - Boltzmann, Fermi Dirac & Bose-Einstein Statistics- comparison and applications. Partition functions-evaluation of translational, vibrational and rotational partition functions for monoatomic, diatomic and polyatomic ideal gases. Thermodynamic functions in terms of partition functions-calculation of equilibrium constants. Statistical approach to Thermodynamic properties: pressure, internal energy, entropy, enthalpy, Gibb's function, Helmholtz function residual entropy, Heat capacity of mono and di atomic gases-ortho and para hydrogen. Heat capacity of solids-Einstein and Debye models.

**UNIT-III: Irreversible Thermodynamics:**

**12 Hours**

Theories of conservation of mass and energy entropy production in open systems by heat, matter and current flow, force and flux concepts. Onsager theory-validity and verification- Onsager reciprocal relationships. Electro kinetic and thermo mechanical effects-Application of irreversible thermodynamics to biological systems.

**UNIT-IV: Kinetics of Reactions:**

**15 Hours**

Theories of reactions-effect of temperature on reaction rates, collision theory of reaction rates, Uni molecular reactions -Lindeman and Christiansen hypothesis- molecular beams ,collision cross sections, effectiveness of collisions, Potential energy surfaces. Transition state theory- -applications of ARRT to reactions between atoms and molecules, time and true order-kinetic parameter evaluation. Homogeneous catalysis- acid- base catalysis-mechanism of acid base catalyzed reactions-Bronsted catalysis law, enzyme catalysis-Michelis-Menton catalysis.

**UNIT-V: Kinetics of complex and fast reactions:**

**11 Hours**

Kinetics of complex reactions, reversible reactions, consecutive reactions, parallel reactions, chain reactions. Chain reactions-chain length, kinetics of  $H_2 - Cl_2$  &  $H_2 - Br_2$  reactions (Thermal and Photochemical reactions). Study of fast reactions-relaxation methods- temperature and pressure jump

methods electric and magnetic field jump methods -stopped flow flash photolysis methods and pulse radiolysis. Kinetics of polymerization-free radical, cationic, anionic polymerization - Polycondensation.

### Text Books

- J. Rajaram and J.C. Kuriacose, (1986.). *Thermodynamics for Students of Chemistry*, 2nd edition, S.L.N.Chand and Co., Jalandhar.
- J. Rajaram and J.C. Kuriokose, (2011). *Kinetics and Mechanisms of chemical transformation*, M acmillan India Ltd, Reprint -.

### Reference Books

- I.M. Klotz and R.M. Rosenberg, (1972). *Chemical thermodynamics*, 6th edition, W.A. Benjamin Publishers, California.
- M.C. Gupta, *Statistical Thermodynamics*, (1995).New Age International, Pvt. Ltd., New Delhi.
- K.J. Laidler,( 2013). *Chemical Kinetics*, 3rd edition, Pearson, Reprint .
- Gurdeep Raj, (2011.) *Phase rule*, Goel Publishing House,

### E-Resources

- <https://nptel.ac.in/courses/104/103/104103112/>
- <https://bit.ly/3tL3GdN>

### COURSE OUTCOMES:

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Explain the classical and statistical concepts of thermodynamics.	K1,K2
CO-2	Choose and correlate the thermodynamic concepts to study the kinetics of chemical reactions.	K3
CO-3	Analyze the thermodynamics of real and ideal gases and fugacity.	K4
CO-4	Evaluate the conservation of mass, entropy production in open systems and kinetics of complex reaction.	K5
CO-5	Elaborate the kinetics of polymerization and irreversible reaction.	K6

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	2	1	1
CO 2	3	3	3	2	2	1
CO 3	3	3	3	3	3	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

**High Correlation : 66.7% Moderate correlation : 23.3% Low Correlation : 10%**

**INORGANIC CHEMISTRY PRACTICAL**  
**PCHR214**

Semester : II  
Category : Core Course VI / CC VI  
Class & Major: I M.Sc., Chemistry

Credit : 04  
Hours / Week : 05  
Total hours : 65

**COURSE OBJECTIVES:**

CO No.	To enable the students
CO-1	Understand and enhance the visual observation as an analytical tool for the quantitative estimation of ions.
CO-2	Recall the principle and theory in preparing standard solutions.
CO-3	Train the students for improving their skill in estimating the amount of ion accurately present in the solution
CO-4	Estimate metal ions, present in the given solution accurately without using instruments.
CO-5	Determine the amount of ions, present in a binary mixture accurately.

**UNIT-I: Analysis of mixture of cations:**

**25 Hours**

Analysis of a mixture of four cations containing two common cations and two rare cations. Cations to be tested.

Group-I : W, Tl and Pb.

Group-II : Se, Te, Mo, Cu, Bi and Cd.

Group-III : Tl, Ce, Th, Zr, V, Cr, Fe, Ti and U.

Group-IV : Zn, Ni, Co and Mn.

Group-V : Ca, Ba and Sr.

Group-VI : Li and Mg.

**UNIT-II: Preparation of metal complexes:**

**25 Hours**

Preparation of any four inorganic complexes following:

1. Preparation of trithioureacopper(I)sulphate
2. Preparation of potassium trioxalate chromate(III)
3. Preparation of tetramminecopper(II) sulphate
4. Preparation of Reineck's salt
5. Preparation of hexathioureacopper(I) chloridedihydrate
6. Preparation of *cis*-Potassium tri oxalate diaquachromate(III)
7. Preparation of sodium trioxalatoferrate(III)
8. Preparation of hexathiourealead(II) nitrate

**UNIT-III: Complexometric Titration:****15 Hours**

1. Estimation of zinc, nickel, magnesium, and calcium.
2. Determination of manganese in the presence of iron.
3. Determination of nickel in the presence of iron.

**Text Books**

- Jeya Rajendran, Microanalytical (2021). *Techniques in Chemistry: Inorganic Qualitative Analysis*, United global publishers.
- *Vogel's Text book of Inorganic Qualitative Analysis*, 4th ed., ELBS, London.

**Reference Books**

- G. Pass, and H. Sutcliffe, (1965). *Practical Inorganic Chemistry*; Chapman Hall,.
- W. G. Palmer,(1954). *Experimental Inorganic Chemistry*; Cambridge University Press.

**COURSE OUTCOMES:**

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Identify the anions and cations present in a mixture of inorganic salts.	K1,K2
CO-2	Apply the principles of semi micro qualitative analysis to categorize acid radicals and basic radicals.	K3
CO-3	Analyze the qualitatively cation and anion radicals by suitable confirmatory tests and spot tests.	K4
CO-4	Determine the nickel and magnesium in the presence of iron through titration method.	K5
CO-5	Develop inorganic metal complex using simple method.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	2	1
CO 2	3	3	3	3	2	2
CO 3	3	3	3	3	3	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

**High Correlation : 83.3% Moderate Correlation : 13.3% Low Correlation : 3.4%**

## CHEMISTRY IN AGRICULTURE

### PCHM212

Semester : II  
Category : Core Industry Module  
Class & Major: I M.Sc., Chemistry

Credit : 03  
Hours / Week : 04  
Total hours : 52

#### COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Recall the different types of fertilizers.
CO-2	Classify the classification of manures.
CO-3	Understand the usage of pesticides.
CO-4	Learn the importance of fungicide and herbicide.
CO-5	Create an aware of different soils.

#### UNIT – I Fertilizers

11 Hours

Effect of Nitrogen, potassium and phosphorous on plant growth – commercial method of preparation of urea, triple superphosphate. Complex fertilizers and mixed fertilizers – their manufacture and composition. Secondary nutrients – micronutrients – their function in plants.

#### UNIT – II Manures

8 Hours

Bulky organic manures – Farm yard manure – handling and storage. Oil cakes. Blood meal – fish manures.

#### UNIT – III Pesticides and Insecticides

11 Hours

Pesticides – classification of Insecticides, fungicides, herbicides as organic and inorganic – general methods of application and toxicity. Safety measures when using pesticides. Insecticides: Plant products – Nicotine, pyrethrin – Inorganic pesticides – borates. Organic pesticides – D.D.T. and BHC.

#### UNIT – IV Fungicides and Herbicides

11 Hours

Fungicide: Sulphur compounds, Copper compounds, Bordeaux mixture. Herbicides: Acaricides – Rodenticides. Attractants – Repellants. Preservation of seeds.

#### UNIT – V SOILS

11 Hours

Classification and properties of soils –soil water, soil temperature, soil minerals, soil acidity and soil testing.

### Textbooks

- Ahluwalia, V.K. and Kidwai, M.R. (2005), *New Trends in Green Chemistry*, Anamalaya Publishers.
- K. De, (2017). *Environmental Chemistry*, New Age Publications.

### Reference Books

- Anastas, P.T. and Warner, J.K. (1998). *Oxford Green Chemistry -Theory and Practical*, University Press.
- Cann, M.C. and Connely, M.E. (2000). *Real-World Cases in Green Chemistry*, American Chemical Society, Washington.

### E-Resources

- <https://www.organic-chemistry.org/>
- <https://www.studyorgo.com/summary.php>

### COURSE OUTCOMES:

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Compare the basic component present in fertilizers and manures	K1,K2
CO-2	Apply the knowledge of Pesticides, Insecticides, Fungicides and Herbicides	K3
CO-3	Analyze the characteristics of different Fertilizers.	K4
CO-4	Evaluate the water, temperature, minerals, acidity from different soil	K5
CO-5	Illustrate the importance of types of herbicides and preservation of seeds	K6

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	2
CO 2	3	3	3	3	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

**High Correlation : 70% Moderate Correlation : 30% Low Correlation : 0%**



**GREEN CHEMISTRY**  
**PCHO212**

Semester : II  
Category : Core Elective III  
Class & Major: I M.Sc., Chemistry

Credit : 03  
Hours / Week : 04  
Total hours : 52

**COURSE OBJECTIVES:**

CO No.	To enable the students
CO-1	Recite the principles of green chemistry.
CO-2	Understand the green solutions for chemical energy storage and conversion.
CO-3	Apply the green solutions for industrial production of Petroleum and Petrochemicals.
CO-4	Determine solutions for pollution prevention in Industrial chemical and fuel production, Automotive industry and Shipping industries.
CO-5	Analyze the green solutions for industrial production of Surfactants, Organic and inorganic chemicals.

**UNIT-I: Introduction of Green Chemistry**

**10 Hours**

Introduction- Need for Green Chemistry. Goals of Green Chemistry. Limitations/of Green Chemistry. Chemical accidents, terminologies, International green chemistry organizations and twelve principles of Green Chemistry with examples.

**UNIT-II: Reagents in Green Chemistry**

**10 Hours**

Choice of starting materials, reagents, catalysts and solvents in detail, Green chemistry in day today life. Designing green synthesis-green reagents: dimethyl carbonate. Green solvents: Water, Ionic liquids-criteria, general methods of preparation, effect on organic reaction. Supercritical carbon dioxide- properties, advantages, drawbacks and a few examples of organic reactions in scCO<sub>2</sub>. Green synthesis-adipic acid and catechol.

**UNIT-III: Catalysis in Green Chemistry**

**11 Hours**

Environmental pollution, Green Catalysis-Acid catalysts, Oxidation catalysts, Basic catalysts, Polymer supported catalysts-Poly styrene aluminum chloride, polymeric super acid catalysts, Poly supported photosensitizers.

**UNIT-IV: Applications in Green Chemistry**

**11 Hours**

Phase transfer catalysis in green synthesis-oxidation using hydrogen peroxide, crown ethers-esterification, saponification, anhydride formation, Elimination reaction, Displacement reaction. Applications in organic synthesis.

**UNIT-V: Microwave Induced and Ultrasound Assisted Green Synthesis****10 Hours**

Micro wave induced green synthesis-Introduction, Instrumentation, Principle and applications. Sonochemistry – Instrumentation, Cavitation theory - Ultra sound assisted green synthesis and Applications.

**Textbooks**

- Ahluwalia, V.K. and Kidwai, M.R. (2005), New Trends in Green Chemistry, Anamalaya Publishers.
- K. De, (2017). Environmental Chemistry, New Age Publications.

**Reference Books**

- Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker, 2001
- Ryan, M.A. and Tinnesand, M., (2002). *Introduction to Green Chemistry*, American Chemical Society Washington,

**E-Resources**

- <https://www.organic-chemistry.org/>
- <https://www.studyorgo.com/summary.php>

**COURSE OUTCOMES:**

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Explain the twelve principal of green chemistry.	K1,K2
CO-2	Develop the various green techniques to apply the chemical industries and in laboratory.	K3
CO-3	Analyze Environmental pollution from Green Catalysis-Acid catalysts, Oxidation catalysts, Basic catalysts.	K4
CO-4	Evaluate the Characteristic of PTC, ionic liquid, microwave and ultrasonic assisted organic synthesis.	K5
CO-5	Design and synthesize new organic solvent and reagent by green methods.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	1	1
CO 2	3	3	3	3	2	2
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

**High Correlation : 70% Moderate Correlation : 23.3% Low Correlation : 6.7%**

**MATERIAL SCIENCE**  
**PCHO213**

**Semester : II**  
**Category : Core Elective IV**  
**Class & Major: I M.Sc., Chemistry**

**Credit : 03**  
**Hours / Week : 04**  
**Total hours : 52**

**COURSE OBJECTIVES:**

CO No.	To enable the students
CO-1	Understand the crystal structure, growth methods and X-ray scattering.
CO-2	Explain the optical, dielectric and diffusion properties of crystals.
CO-3	Recognize the basis of semiconductors, superconductivity materials and magnets.
CO-4	Study the synthesis, classification and applications of nanomaterials.
CO-5	Learn about the importance of materials used for renewable energy conversion.

**UNIT-I: Crystallography:**

**11 Hours**

Symmetry - unit cell and Miller indices -crystal systems - Bravais lattices - point groups and space groups - X-ray diffraction-Laue equations-Bragg's law-reciprocal lattice and its application to geometrical crystallography. Crystal structure–powder and single crystal applications. Electron charge density maps, neutron diffraction-method and applications

**UNIT-II: Crystal growth methods:**

**11 Hours**

Nucleation– equilibrium stability and metastable state. Single crystal – Low and high temperature, solution growth– Gel and sol-gel. Crystal growth methods-nucleation–equilibrium stability and metastable state. Single crystal–Low and high temperature, solution growth– Gel and sol-gel. Melt growth-Bridgeman-Stockbarger, Czochralski methods. Flux technique, physical and chemical vapour transport.

**UNIT-III: Properties of crystals:**

**10 Hours**

Optical studies - Electromagnetic spectrum (qualitative) refractive index – reflectance – transparency, translucency and opacity. Types of luminescence – photo-, electro-, and injection luminescence, LEDs – organic, Inorganic and polymer LED materials - Applications. Dielectric studies- Polarisation - electronic, ionic, orientation, and space charge polarisation. Effect of temperature. dielectric constant, dielectric loss. Types of dielectric breakdown–intrinsic, thermal, discharge, electrochemical and defect breakdown.

**UNIT-IV: Special Materials:**

**10 Hours**

Superconductivity: Meissner effect, Critical temperature and critical magnetic Field, Type I

and II superconductors, BCS theory-Cooper pair, Applications. Soft and hard magnets – Domain theory Hysteresis Loop-Applications. Magneto and giant magneto resistance. Ferro, ferri and antiferromagnetic materials-applications, magnetic parameters for recording applications. Ferro-, Piezo-, and pyro electric materials – properties and applications.

**UNIT-V: Materials for Renewable Energy Conversion:**

**10 Hours**

Solar Cells: Organic, bilayer, bulk heterojunction, polymer, perovskite based. Solar energy conversion: lamellar solids and thin films, dye-sensitized photo voltaic cells, coordination compounds anchored onto semiconductor surfaces - Ru(II) and Os(II) polypyridyl complexes. Photochemical activation and splitting of water, CO<sub>2</sub> and N<sub>2</sub>. Manganese based photo systems for water-splitting. Complexes of Rh, Ru, Pd and Pt - photochemical generation of hydrogen from alcohol.

**Text Books**

- S. Mohan and V. Arjunan, (2016). *Principles of Materials Science*, MJP Publishers.
- Arumugam, (2007). *Materials Science*, Anuradha Publications.

**Reference Books**

- M.G. Arora, (2001). *Solid State Chemistry*, Anmol Publications, New Delhi,.
- R.K. Puri and V.K. Babbar, (2001). *Solid State Physics*, S Chand and Company Ltd.
- C. Kittel, (1966). *Solid State Physics*, John-Wiley and sons, NY.
- H.P. Meyers, (1998). *Introductory Solid State Physics*, Viva Books Private Limited.

**E-Resources**

- <http://xrayweb.chem.ou.edu/notes/symmetry.html>.
- <http://www.uptti.ac.in/classroom-content/data/unit%20cell.pdf>.
- <https://bit.ly/3QyVg2R>

**COURSE OUTCOMES:**

CO No.	On completion of the course, the students will be able to	Bloom's Level
CO-1	Understand and recall the synthesis and characteristics of crystal structures, semiconductors, nanomaterials and renewable energy materials.	K1,K2
CO-2	Choose the Gel and sol-gel, Melt growth-Bridgeman-Stockbarger, Czochralski methods for solution to Crystal growth for relevant material.	K3
CO-3	Analyze and identify new materials for energy applications.	K4
CO-4	Evaluate the structure of crystal, piezoelectric and pyroelectric materials, nanomaterials, hard and soft magnets, superconductors, solar cells, electrodes, LED.	K5
CO-5	Design and develop new optical materials with improved property for energy applications.	K6

## CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	2	1	1
CO 2	3	3	3	2	2	1
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

**High Correlation : 63.3%    Moderate Correlation : 26.7%    Low Correlation : 10%**

## CHEMISTRY IN CONSUMER PRODUCTS

### PCHD201

**Semester : II**

**Credit : 02**

**Category : SEC-2**

**Hours/Week : 03**

**Class & Major : I M.Sc. CHEMISTRY**

**Total Hours : 39**

### COURSE OBJECTIVES:

CO No.	To enable the students
CO-1	Understand the basic knowledge in Saponification
CO-2	Provide the practical training to the students in Detergent preparation
CO-3	Recognize the basis of ingredients in shampoo.
CO-4	Study the synthesis of skin products.
CO-5	Learn about the importance of Consumer Products.

### UNIT I: Soaps

**8 Hours**

Saponification of oils and fats. Manufacture of soaps. Formulation of toilet soaps. Different ingredients used. Their functions. Medicated soaps. Herbal soaps. Mechanism of action of soap. Soft soaps. Shaving soaps and creams. ISI specifications. Testing procedures/ limits.

### UNIT 2: Detergents

**8 Hours**

- a. Anionic detergents:** Manufacture of LAB (linear alkyl benzene). Sulphonation of LAB – preparation of acid slurry. Different ingredients in the formulation of detergent powders and soaps. Liquid detergents. Foam boosters. AOS (alpha olefin sulphonates).
- b. cationic detergents:** examples. Manufacture and applications.
- c. Non-ionic detergents:** examples. Manufacture of ethylene oxide condensate.

**UNIT 3: Shampoos****8 Hours**

Manufacture of SLS and SLES. Ingredients. Functions. Different kinds of shampoos –anti-dandruff, anti-lice, herbal and baby shampoos. Hair dye. Manufacture of conditioners. Coco betaines or coco diethanolamides – ISI specifications. Testing procedures and limits.

**UNIT 4: Skin Preparations****8 Hours**

Face and skin powders. Ingredients, functions. Different types. Snows and face creams. Chemical ingredients used. Anti perspirants. Sun screen preparations. UV absorbers. Skin bleaching agents. Depilatories. Turmeric and Neem preparations. Vitamin oil. Nail polishes: nail polish preparation, nail polish removers. Article removers. Lipsticks, roughes, eyebrow pencils. Ingredients and functions – hazards. ISI specifications.

**UNIT 5: Marketing. Licensing****7 Hours**

Leading firms, brand names, choosing the right product. Packing regulations. Marketing .Licensing – drug license – legal aspects. GMP – ISO 9000/12000 – consumer education .Evaluation of the product – advertisements.

**Text books**

- Cussler, E.L. and Moggridge, G.D, (2011). *Chemical product design*. Cambridge University Press,.
- Lapkin, A. and Constable, D. eds., (2008). *Green chemistry metrics: measuring and monitoring sustainable processes* Chichester: Wiley.

**Reference books**

- Gobala Rao.S , (1998).Outlines of chemical technology, Affiliated East West press,
- Kafaro, (1995).Wasteless chemical processing, Mir publishers.
- Sawyer.W, (2000.).Experimental cosmetics ,Dover publishers, New York.
- Sell, C.S. (2006). *The chemistry of fragrances: from perfumer to consumer*. Royal Society of Chemistry.

**E-Resources**

- <https://byjus.com/chemistry/saponification/>
- <https://patentimages.storage.googleapis.com/00/7b/79/328cef17fc1d52/EP0633309A1.pdf>

**COURSE OUTCOMES:**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Classify chemicals for preparation Soaps, Detergents, Shampoos and Skin Care product.	K1,K2
CO-2	Integrate Different ingredients in the formulation of detergent powders.	K3
CO-3	Analyze and identify Manufacture of Shampoos and conditioners.	K4
CO-4	Evaluate and report the validity of Soaps, Shampoos and skin care product.	K5
CO-5	Design and develop new consumer products like soap, shampoos, and skin product with brand names.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	2	2	1
CO 2	3	3	3	2	2	2
CO 3	3	3	3	3	3	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

**High Correlation : 73.3% Moderate Correlation : 23.4% Low Correlation : 3.3%**

**CHEMISTRY IN CONSUMER PRODUCTS****PCHE204**

**Semester : II**

**Credit : 02**

**Category : SEC2/NME**

**Hours/Week : 03**

**Class & Major : I M.Sc.**

**Total Hours : 39**

**COURSE OBJECTIVES:**

CO No.	To enable the students
CO-1	Understand the basic knowledge in Saponification
CO-2	Provide the practical training to the students in Detergent preparation
CO-3	Recognize the basis of ingredients in shampoo.
CO-4	Study the synthesis of skin products.
CO-5	Learn about the importance of Consumer Products.

**UNIT I: Soaps****8 Hours**

Saponification of oils and fats. Manufacture of soaps. Formulation of toilet soaps. Different ingredients used. Their functions. Medicated soaps. Herbal soaps. Mechanism of action of soap. Soft soaps. Shaving soaps and creams. ISI specifications. Testing procedures/ limits.

**UNIT 2: Detergents****8 Hours**

**a. Anionic detergents:** Manufacture of LAB (linear alkyl benzene). Sulphonation of LAB – preparation of acid slurry. Different ingredients in the formulation of detergent powders and soaps. Liquid detergents. Foam boosters. AOS (alpha olefin sulphonates).

**b. cationic detergents:** examples. Manufacture and applications.

c. Non-ionic detergents: examples. Manufacture of ethylene oxide condensate.

**UNIT 3: Shampoos****8 Hours**

Manufacture of SLS and SLES. Ingredients. Functions. Different kinds of shampoos – anti-dandruff, anti-lice, herbal and baby shampoos. Hair dye. Manufacture of conditioners. Coco betaines or coco diethanolamides – ISI specifications. Testing procedures and limits.

**UNIT 4: Skin Preparations****8 Hours**

Face and skin powders. Ingredients, functions. Different types. Snows and face creams. Chemical ingredients used. Anti perspirants. Sun screen preparations. UV absorbers. Skin bleaching agents. Depilatories. Turmeric and Neem preparations. Vitamin oil. Nail polishes: nail polish preparation, nail polish removers. Article removers. Lipsticks, roughes, eyebrow pencils. Ingredients and functions – hazards. ISI specifications.

**UNIT 5: Marketing. Licensing****7 Hours**

Leading firms, brand names, choosing the right product. Packing regulations. Marketing .Licensing – drug license – legal aspects. GMP – ISO 9000/12000 – consumer education .Evaluation of the product – advertisements.

**Text books**

- Cussler, E.L. and Moggridge, G.D, (2011). *Chemical product design*. Cambridge University Press,.
- Lapkin, A. and Constable, D. eds., (2008). *Green chemistry metrics: measuring and monitoring sustainable processes* Chichester: Wiley.

**Reference books**

- Gobala Rao.S , (1998).Outlines of chemical technology, Affiliated East West press,
- Kafaro, (1995).Wasteless chemical processing, Mir publishers.
- Sawyer.W, (2000.).Experimental cosmetics ,Dover publishers, New York.
- Sell, C.S. (2006). *The chemistry of fragrances: from perfumer to consumer*. Royal Society of Chemistry.

**E-Resources**

- <https://byjus.com/chemistry/saponification/>



- <https://patentimages.storage.googleapis.com/00/7b/79/328cef17fc1d52/EP0633309A1.pdf>

### COURSE OUTCOMES:

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Understand ISI specifications. Testing procedures /limits.	K1
CO-2	Integrate Different ingredients in the formulation of detergent powders.	K1
CO-3	Analyze and identify Manufacture of conditioners.	K3
CO-4	Explain the importance of Sun screen preparations.	K4
CO-5	Design and develop new materials with brand names.	K5

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	1	1	1
CO 2	3	2	2	2	2	1
CO 3	3	3	3	2	3	3
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3

**High Correlation : 63.3% Moderate Correlation : 23.4% Low Correlation : 3.3%**

### III & IV EVALUATION COMPONENTS OF CIA

Semester	Course code	Course title	Component III	Component IV
I	PCHM117	Organic reaction mechanism-I	Mechanism Writing	Case Study
I	PCHM118	Structure and bonding in inorganic compounds	Modal Preparation	Chart presentation
I	PCHO119	Nano materials and Nanotechnology	Assignment	Seminar
I	PCHO120	Molecular spectroscopy	Group Discussion	Structure prediction
I	PCHE207	Computational chemistry	Problem Solving	Structure draw
II	PCHM210	Organic reaction mechanism- II	Mechanism Writing	Structure draw
II	PCHM211	Physical chemistry-I	Problem solving	Assignment
II	PCHO212	Green chemistry	Chart Preparation	Seminar
II	PCHO213	Material Science	Chart Preparation	Seminar

## PG & RESEARCH DEPARTMENT OF BIOCHEMISTRY

### PREAMBLE:

UG: Programme profile & the syllabi of courses offered in semester I and II along with III and IV evaluation components (with effect from 2023 – 2026 batch onwards).

PG: Programme profile & the syllabi of courses offered in semester I and II along with III and IV evaluation components (with effect from 2023 – 2025 batch onwards).

### PROGRAMME PROFILE OF B.Sc., BIOCHEMISTRY

#### PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO No.	On completion of this programme, students will be able to
PSO-1	Understand fundamental principles and concepts of biochemistry, including the structure and function of biomolecules present in living cells.
PSO-2	Acquire proficiency in laboratory techniques commonly used in biochemistry, including cell biology, chromatography, spectroscopy, biochemical analysis etc.,
PSO-3	Inculcate the basic concepts of Biochemistry, fundamental biochemical Principles and their applications in a systematic, methodological and scientific, evidence-based process.
PSO-4	Relate the applications of biochemistry in biotechnology and pharmaceutical industries, including the development of new drugs and biotechnological processes in securing a successful career and pursue higher studies.
PSO-5	Communicate scientific ideas and findings effectively through written reports, oral presentations, and other forms of scientific communication.
PSO-6	Develop problem solving and analytical skills through case studies, research projects, experimentation, internship, experiential learning and hands-on-experience.

## PROGRAMME PROFILE OF B.Sc., BIOCHEMISTRY

Semester	Part	Category	Course code	Course Title	Hours per week	Credit
I	I	Language	UTAL110/ UHIL102/ UFRL102	General Tamil I / Hindi I / French I	5	3
	II	English	UENL111	General English I	5	3
	III	Core I / DSC - I	UBCM109	Nutritional Biochemistry	4	3
		Core Practical I / DSC Practical - I	UBCR104	Nutritional Biochemistry Practical	3	3
		Allied I / GE I	UCHA105	Chemistry for Biological Science I	4	3
	IV	Allied Practical I / GE – I	UCHR106	Volumetric Analysis I	3	2
		SEC-Foundation Course	UBCF101	Fundamentals of Biochemistry	2	2
		SEC – I/ NME I			2	2
		AECC / Soft Skill – 1	USKS103	Communicative English	2	2
<b>TOTAL</b>					<b>30</b>	<b>23</b>
II	I	Language	UTAL210/ UHIL201/ UFRL201	General Tamil II / Hindi II / French II	5	3
	II	English	UENL211	General English II	5	3
	III	Core II / DSC - II	UBCM204	Cell Biology	4	3
		Core practical II / DSC Practical II	UBCR203	Cell Biology Practical	3	3
		Allied II / GE - II	UCHA204	Chemistry for Biological Science II	4	3
		Allied Practical II	UCHR205	Organic Analysis II	3	2
	IV	Internship	UINS201	Internship / Industrial training	-	-/2
		SEC II/ NME II			2	2
		DC I / SEC I	UBCD201	First Aid	2	2
		AECC / Soft Skill – II			2	2
	V	Extension (Outside class Hours)			--	1/2
VI	Value Added Course (Outside class Hours)			--	-/2	
<b>TOTAL</b>					<b>30</b>	<b>24/29</b>
III	I	Language	UTAL310/ UHIL301/ UFRL301	General Tamil III / Hindi III / French III	5	3
	II	English	UENL311	General English III	5	3
	III	Core III / DSC - III	UBCM306	Biomolecules	3	3
		Core Practical III / DSC Practical - III	UBCR303	Biomolecules Practical	3	3
		Allied III/ GE -III	UMBA301	Allied Microbiology	3	3
		Allied Practical III / GE III	UMBR302	Allied Microbiology Practical	3	2

	IV	SEC III / Entrepreneurial	UBCU301	Medical Laboratory Technology	2	1	
		SEC IV	UBCD302	Biomedical Instrumentation	2	2	
		AECC / Soft Skill III			2	2	
		Value Education			2	2	
<b>TOTAL</b>					<b>30</b>	<b>24</b>	
IV	I	Language	UTAL410/ UHIL401/ UFRL401	General Tamil IV / Hindi IV / French IV	5	3	
		II	English	UENL411	General English IV	5	3
	III	Core IV / DSC – IV		UBCM405	Biochemical Techniques	4	3
		Core practical IV		UBCR403	Biochemical Techniques Practical	3	3
		Allied IV/ GE –IV		UMAA406	Biostatistics	4	3
		Allied Practical IV		UMAR401	Biostatistics Practical	3	2
	IV	Internship		UINS401	Internship / Industrial training	-	-/2
		NME III/SEC III			Online Course	2	2
		AECC / Soft Skill IV				2	2
	V	SEC/DSC		UBCD401	Basics of Forensic Science	2	2
Extension (Outside class Hours)				--	-/2		
VI	Value Added Course (Outside class Hours)				--	-/2	
<b>TOTAL</b>					<b>30</b>	<b>23/29</b>	
V	III	Core V /DSC – V		UBCM509	Enzymes	5	4
		Core VI /DSC – VI		UBCM510	Intermediary Metabolism	5	4
		Core VII / DSC – VII		UBCM511	Clinical Biochemistry	4	4
		Core practical V		UBCR502	Clinical Biochemistry Practical	6	3
		Core Elective – I / DSE – I		UBCO503	Immunology	4	3
				UBCO504	Research Methodology		
	Project		UBCP601	Project	4	4	
IV	Environmental Studies				2	2	
<b>TOTAL</b>					<b>30</b>	<b>24</b>	
VI	III	Core VIII / DSC – VIII		UBCM608	Molecular Biology	6	4
		Core IX/ DSC – IX		UBCM609	Human Physiology	6	4
		Core Practical VI		UBCR603	Hematology & Urine Analysis	3	4
		Core Elective – II / DSE – II		UBCO608	Biotechnology	5	3
				UBCO609	Bio infomatics		
		Core Elective – III / DSE – III		UBCO610	Plant Biochemistry & Plant Therapeutics	6	4
				UBCO611	Pharmaceutical Biochemistry		
	Core X/ DSC X		UBCM604	Comprehensive Viva Voce	-	1	
	IV	Internship		UINS601	Internship	-	-/2
		Soft Skill/ SEC		UBCC601	Professional Competency Skill	4	2
Extension activity/ Physical Education/NCC			Extension activity/ Physical Education/NCC	-	-/2		
VI	Value Added Course				-	-	
<b>TOTAL</b>					<b>30</b>	<b>22/26</b>	
<b>GRAND TOTAL</b>					<b>180</b>	<b>140/ 155</b>	

**COURSES OFFERED TO OTHER DEPARTMENTS  
NON MAJOR ELECTIVES (NME)**

Semester	Part	Category	Course code	Course Title	Contact Hour/Week	Credit
I	IV	Non Major Elective	UBCE101	Nutrition & Health	2	2
			UBCE102	Medicinal Diet		
II	IV	Non Major Elective	UBCE211	Lifestyle Diseases	2	2

**ALLIED COURSES**

Semester	Part	Category	Course code	Course Title	Contact Hour/Week	Credit
I	III	Allied	UBCA102	Allied Biochemistry	4	3
			UBCR102	Allied Biochemistry Practical	3	2
II	III	Allied	UBCA201	Allied Biochemistry	4	3
			UBCR201	Allied Biochemistry Practical	3	2

**EXTRA CREDIT EARNING PROVISION (ONLY FOR INTERESTED STUDENTS)**

Semester	Part	Course Code	Course Title	Duration	Min/Max Credit
II	III	UBCI201	Internship	30 / 60 Hours	1/2
IV	III	UBCI401	Internship	30 / 60 Hours	1/2
VI	III	UBCI601	Internship	30 / 60 Hours	1/2
V	III	UBCS501	Self Study Paper Experimentation	--	2
III	III	--	Online Course	Min 8 Weeks	2

**NUTRITIONAL BIOCHEMISTRY  
(UBCM109)**

**Semester : I**  
**Category : Core I**  
**Class & Major : I B.Sc Biochemistry**

**Credits : 3**  
**Hours / week : 4**  
**Total Hours : 52**

**COURSE OBJECTIVES:**

CO No.	To enable the students to
CO-1	Create awareness about the role of nutrients in maintaining proper health
CO-2	Understand the nutritional significance of carbohydrates, lipids and proteins.
CO-3	Understand the importance of a balanced diet.
CO-4	Study the effect of additives, emulsifiers, and flavours enhancing substances in food.
CO-5	Study the significance of nutraceuticals and functional foods.

**UNIT I : CONCEPTS OF FOOD AND NUTRITION.****10 Hours**

Basic food groups-energy yielding, body building and functional foods. Modules of energy. Calorific and nutritive value of foods. Measurement of Calories by bomb calorimeter. Basal metabolic rate (BMR) - definition, determination of BMR and factors affecting BMR. Respiratory quotient (RQ) of nutrients and factors affecting the RQ. SDA-definition and determination.

**UNIT II: IMPORTANCE OF NUTRITION****10 Hours**

Physiological role and nutritional significance of carbohydrates, lipids and protein. Evaluation of proteins by nitrogen balance method- Biological value of proteins- Digestibility coefficient, Protein Energy Ratio and Net Protein Utilization. Protein energy malnutrition – Kwashiorkar and Marasmus, Obesity-Types and preventive measures.

**UNIT III : FOOD GROUPS****10 Hours**

Balanced diet, example of low and high cost balanced diet- for infants, children, adolescents, adults and elderly people. ICMR classification of five food groups and its significance food pyramid. Junk foods- definition and its adverse effects.

**UNIT IV : FOOD ADDITIVES & FOOD PRESERVATIVES:****10 Hours**

Natural and artificial sweeteners, antimicrobials. Food colors, flavors, anti-caking agent, antioxidants. Safety assessment of food additives, emulsifying agents and buffering agents.

**UNIT V : NUTRACEUTICALS AND FUNCTIONAL FOODS****12 Hours**

Definition, properties and function of Nutraceuticals, food Supplements, dietary supplements prebiotics and probiotics, and functional Foods. Vitamins and minerals - classification, sources and RDA (Tabulation).

### Text books

- Gaile Moe, Danita Kelley, Jacqueline Berning and Carol Byrd-Bredbenner (2013), *Wardlaw's Perspectives in Nutrition: A Functional Approach*. McGraw-Hill, Inc., NY, USA.
- M.Swaminadhan (2000) *Principles of Nutrition and Dietics*. Bappco.
- Tom Brody (2008). *Nutritional Biochemistry (2<sup>nd</sup> ed)*, Academic press, USA

### Reference Books

- Garrow, JS, James WPT and Ralph A (2000). *Human nutrition and dietetics (10<sup>th</sup> ed)* Churchill Livingstone.
- Andreas M. Papas (2010). *Antioxidant Status, Diet, Nutrition, and Health (1<sup>st</sup> ed)* CRC
- Branen, A.L., Davidson PM & Salminen S. 2001. *Food Additives*. 2nd Ed. Marcel Dekker.
- Gerorge, A.B. 1996. *Encyclopedia of Food and Color Additives*. Vol. III. CRC Press.
- Fatih Yildiz (Editor) (2010), *Advances in food biochemistry*, CRC Press, Boca Raton, USA,
- *Food biochemistry & food processing*, Y.H. Hui (Editor), Blackwell Publishing, Oxford, UK, 2006.
- Geoffrey Campbell-Platt (2009), *Food Science and Technology*. Wiley-Blackwell, UK.

### E- Resources

- <http://old.noise.ac.in/SecHmscicour/english/LESSON O3.pdf>
- <https://study.com/academy/lesson/energy-yielding-nutrients-carbohydratesfat-protein.html>
- <https://www.nhsinform.scot/healthy-living/food-and-nutrition/eatingwell/vitamins-and-minerals>.

### Course Outcomes

CO No	On completion of this course, students will be able to	Bloom's Level
CO-1	Define and differentiate the macronutrients (carbohydrates, proteins, and fats) and micronutrients (vitamins and minerals).	K1, K2
CO-2	Apply nutritional biochemistry principles to interpret and evaluate dietary recommendations to real-world scenarios.	K3
CO-3	Analyze and compare nutritional content of different food items, role of food preservatives in extending shelf life and preventing foodborne illnesses.	K4
CO-4	Interpret and analyze nutritional data to make dietary recommendations for managing disease.	K5
CO-5	Design and conduct basic experiments related to nutritional biochemistry concepts.	K6

### CO – PSO MAPPING

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO-1	3	2	2	1	1	1
CO-2	3	2	2	2	1	1
CO-3	3	2	2	2	2	1
CO-4	3	2	2	2	3	2
CO-5	3	3	3	3	3	3

**High correlation : 37%**      **Moderate correlation: 43%**      **Low correlation : 20%**

## NUTRITIONAL BIOCHEMISTRY PRACTICAL (UBCR104)

<b>Semester</b>	<b>: I</b>	<b>Credits</b>	<b>: 3</b>
<b>Category</b>	<b>: Core Practical I</b>	<b>Hours / week</b>	<b>: 3</b>
<b>Class &amp; Major</b>	<b>: I B.Sc Biochemistry</b>	<b>Total Hours</b>	<b>: 39</b>

### COURSE OBJECTIVES:

CO	To enable the students to
CO-1	Impart hands on training in the estimation of various constituents by titrimetric method.
CO-2	Prepare the biochemical constituents from various sources.
CO-3	Determine and estimate the micronutrient & extract lipids.

### TITRIMETRY

**15 Hours**

1. Estimation of ascorbic acid in a citrus fruit.
2. Estimation of calcium in milk .
3. Estimation of glucose by Benedict's method in honey.
4. Estimation of phosphorous (Plant source) eg: banana peel / sunflower / pumpkin seeds.
5. Estimation of chloride by Mohr's method.

### BIOCHEMICAL PREPARATIONS

**15 Hours**

Preparation of the following substances and its qualitative tests

6. Lecithin from egg yolk.
7. Starch from potato.
8. Casein and Lactalbumin from milk.

### GROUP EXPERIMENT

**9 Hours**

9. Preparation of nutritive foods (solid & liquid)
10. Preparation of vegetable curries and fruit salad.

### Text books

- J. Jayaraman, *Laboratory manual in Biochemistry*, (2011) 2nd edition, NewAge International Publishers,
- David T. Plummer, (2001), *An Introduction to Practical Biochemistry*, Tata McGraw - Hill Publishing, 3rd edition Company Limited.

### Reference books

- Sadasivam S and Manickam A, *Biochemical Methods*, New Age International Publishers, 4<sup>th</sup> edition.
- M.S. Swaminathan, *Essentials of Food and Nutrition*, Vol. I & II.



- Bowman and Robert M. (2006). *Present Knowledge in Nutrition*. 9th edition, International Life Sciences Publishers.
- Indrani TK. (2003). *Nursing Manual of Nutrition and Therapeutic Diet*, 1st edition Jaypee Brothers medical publishers.
- Martha H. and Marie A. (2012). *Biochemical, Physiological, and Molecular Aspects of Human Nutrition*. 3rd edition. Chand Publishers.

#### E- Resources

- <https://www.elsevier.com/journals/clinical-biochemistry/0009-9120/guide-for-authors>
- <http://rajswashya.nic.in/RHSDP%20Training%20Modules/Lab.%20Tech/Biochemistry/Dr.%20Jagarti%20Jha/Techniques%20In%20Biochemistry%20Lab.pdf>  
.https://dspace.cuni.cz/bitstream/handle/20.500.11956/111493/Clinical\_biochemistrypdf.pdf?sequence=1&isAllowed=y
- [https://dspace.cuni.cz/bitstream/handle/20.500.11956/111493/Clinical\\_biochemistrypdf.pdf?sequence=1&isAllowed=y](https://dspace.cuni.cz/bitstream/handle/20.500.11956/111493/Clinical_biochemistrypdf.pdf?sequence=1&isAllowed=y)

#### Course Outcomes

CO	On completion of this course, students will be able to	Bloom's Level
CO1	Estimate the important biochemical constituents in the food samples.	K4
CO2	Estimate the micronutrients (Cl & P) in test samples.	K4
CO3	Determine the ash and moisture content of the food samples	K4
CO4	Extract oil from its sources	K5

## FUNDAMENTALS OF BIOCHEMISTRY (UBCF101)

<b>Semester</b>	<b>: I</b>	<b>Credits</b>	<b>: 2</b>
<b>Category</b>	<b>: Foundation Course</b>	<b>Hours / Week:</b>	<b>2</b>
<b>Class &amp; Major</b>	<b>: I B.Sc Biochemistry</b>	<b>Total Hours</b>	<b>: 26</b>

#### COURSE OBJECTIVES:

CO No.	To enable the students to
CO-1	Understand the importance and scope of Biochemistry.
CO-2	Study the properties of water and units of measurement of solutes in solution.
CO-3	Gain knowledge about biological molecules and its significance.
CO-4	Familiarize the laws of thermodynamics and biological buffers.
CO-5	Aware about the quality control practices and biosafety measures followed in the laboratory.

**UNIT - I OVERVIEW OF BIOCHEMISTRY****5 Hours**

History and Scope of Biochemistry, Importance of Biochemistry and its applications in various fields. Cells – types, Subcellular organelles.

**UNIT - II PROPERTIES OF WATER & CONCENTRATION UNITS****5 Hours**

Structure and Properties of water & Structure of matter - atomic structure, molecular structure; Bonding – Ionic, Covalent, Hydrogen, Coordinate and Vander walls interaction and chemical reactions; Units of measurements of solutes in solution - Normality, Molality, Molarity, Osmolarity, Ionic strength, Percentage and mole fraction.

**UNIT - III BIOMOLECULAR CHEMISTRY****5 Hours**

Definition & Importance of Carbohydrates, Amino acids, Proteins, Lipids, Nucleic Acids, Enzymes, Vitamins and Hormones.

**UNIT - IV BIOENERGETICS & BIOLOGICAL BUFFERS****6 Hours**

Laws of thermodynamics - Zero, First and Second Law, oxidation and reduction reaction, redox potential and energy transfer. Inorganic compounds - Salts, Ions, Acids and Bases; pH, biological buffers and their significance.

**UNIT - V QUALITY CONTROL PRACTICES AND BIOSAFETY****5 Hours**

Precision, accuracy, specificity, sensitivity, percentage error and quality control for laboratory methods. Calibration of volumetric - pipette, burette and SMF.

Do's and Don'ts in the laboratory, Automation and Instrumentation used in Laboratory, Laboratory associated infections, first aid, Biological hazards and Biosafety.

**Text Books**

- Gupta, P.K. (2005). *A Text-book of Cell and Molecular Biology*. Rastogi Publications. Meerut. India.
- Ambika Shanmugam, (2016). *Fundamentals of Biochemistry*. Published by Author, 8<sup>th</sup> ed.,

**Reference Books**

- Campbell, M.K. (2006). *Biochemistry*. Philadelphia. Saunders College Publishing.
- Marshal, V. C. (2005). *Major Chemical Hazard*. Chichester. United Kingdom. Ellis Horwood Ltd.
- Raghavan, K. V. & Khan, A.A. (2012). *Methodologies in Hazard Identification and Risk Assessment*. Manual by CLRI.
- Sadasivam, S. and Manickam, A. (2008). *Biochemical Methods*. New age International (P) Ltd.

**E- Resources:**

- <https://epgp.inflibnet.ac.in/>

- [Biochemistry-book-U-Satyanarayanaebook/dp/B07F9QHV6Z?asin=B07F9QHV6Z&revisionId=&format=2&depth=1](https://www.amazon.com/dp/B07F9QHV6Z?asin=B07F9QHV6Z&revisionId=&format=2&depth=1)
- <https://www.amazon.com/dp/B0725LHWPB?tag=uid1020&asin=B0725LHWPB&revisionId=f5f49437&format=1&depth=1>

### COURSE OUTCOMES:

CONo	On completion of this course, students will be able to	Bloom's Level
CO-1	Identify and describe the structure and function of key biomolecules, including proteins, nucleic acids, lipids, and carbohydrates.	K1
CO-2	Understand the principles governing bioenergetics and role of buffers in maintaining pH.	K2
CO-3	Integrate the knowledge of various cellular processes to understand the overall functioning of a cell.	K3
CO-4	Explain the principles of enzyme catalysis and understand how enzymes regulate biochemical reactions.	K3
CO-5	Effectively communicate scientific concepts of biochemistry and biosafety measures in laboratories, both orally and in writing.	K4

### CO – PSO MAPPING

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO-1	3	2	2	1	1	1
CO-2	3	1	1	1	1	1
CO-3	3	2	2	1	1	1
CO-4	3	2	2	2	1	1
CO-5	3	3	3	3	3	3

High correlation : 33%      Moderate correlation: 23%      Low correlation : 44%

## CELL BIOLOGY (UBCM204)

Semester : II

Credits : 3

Category : Core II

Hours / week : 4

Class & Major : I B.Sc Biochemistry

Total Hours : 52

### COURSE OBJECTIVES:

CO NO	To enable the students to
CO-1	Provide basic understanding of architecture of cells and its organelles.
CO-2	Understand the organization of prokaryotic and eukaryotic genome.
CO-3	Educate on the structural organization of bio membrane and transport mechanism.
CO-4	Impart knowledge on cell cycle, cell division and basics of cells
CO-5	Familiarize the concept of mechanism of cell-cell interactions

**UNIT I: ARCHITECTURE OF CELLS****10 Hours**

Structural organization of prokaryotic and eukaryotic cells microbial, plant and animal cells. The ultrastructure of nucleus, mitochondria, RER, SER, golgi apparatus, lysosome, peroxisome and their functions

**UNIT II: CYTOSKELETON & CHROMOSOMES****12 Hours**

Cytoskeleton - microfilament, microtubules and intermediary filament - structure, composition and functions. Organization of Genome - prokaryotic and eukaryotic genome. Organization of chromatin – histones, nucleosome concept, formation of chromatin structure. Special types of chromosomes – lamp brush chromosomes, polytene chromosomes.

**UNIT III: BIOMEMBRANES****10 Hours**

Structural organization of bilipid layer model and basic functions- transport across cell membranes - uniport, symport and antiport. Passive and active transport.

**UNIT IV: CELL CYCLE****10 Hours**

Definition and Phases of Cell cycle - Cell division - Mitosis and Meiosis and its significance, Cancer cells - definition, types and characteristics of cancer cells.

**UNIT V: EXTRACELLULAR MATRIX****10 Hours**

Collagen, laminin, fibronectin and proteoglycans - structure and biological role. Types and functions of gap junctions.

**Text books**

- Arumugam.N, (2019), *Cell Biology*, Saras publication. (10ed, paperback).
- Devasena.( 2012), *T.CellBiology*.Oxford UniversityPressIndia-ISBN:9780198075516, 0198075510.
- Bruce Alberts and Dennis Bray (2013), *Essential Cell Biology* (4<sup>th</sup>ed). Garland Science.

**Reference books**

- S.C.R. (2008), *Cell Biology*. Newage Publishers -ISBN-10: 8122416888/ISBN-13: 978-8122416886.
- Cooper, G.A.*The Cell: A Molecular Approach*. Sinauer Associates, Inc -ISBN10: 0878931066 / ISBN 13: 9780878931064, 2013
- E.M.F.,D.R, (2006), *Cell and Molecular Biology*. Lippincott Williams & Wilkins Philadelphia - ISBN: 0781734932 9780781734936.
- Lodish H.A ,Berk C.A, Kaiser M, Krieger M.P, Scott A, Bretscher H, Ploegh and Matsudaira. (2007). *Molecular Cell Biology*, 6th Edition, WH. Freeman Publishers, New York, USA.

## E- Resources

- <https://nicholls.edu/biol-ds/bio1155/Lectures/Cell%20Biology.pdf>
- <https://www.medicalnewstoday.com/article/320878.php>
- <https://biologydictionary.net/cell>

## Course Outcomes:

CO No	On completion of this course, students will be able to	Bloom's Level
CO-1	Identify and describe the structures of prokaryotic and eukaryotic cells.	K1
CO-2	Explain the processes of membrane transport, including diffusion, osmosis, and active transport.	K2
CO-3	Describe the stages of the cell cycle (G1, S, G2, M) and the processes of mitosis and meiosis.	K2
CO-4	Explain how cells communicate and interact with their environment.	K3
CO-5	Simplify the cell biology principles to analyze and solve problems.	K4

## CO – PSO MAPPING

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO-1	3	2	2	1	1	1
CO-2	3	1	1	1	1	1
CO-3	3	1	2	2	1	1
CO-4	3	2	2	2	2	2
CO-5	3	3	3	2	2	2

High correlation : 23% Moderate correlation: 40% Low correlation : 37%

## CELL BIOLOGY PRACTICAL (UBCR203)

Semester : II Credits : 3  
Category : Core Practical II Hours / week : 3  
Class & Major : I B.Sc Biochemistry Total Hours : 39

## COURSE OBJECTIVES:

CO NO	To enable the students to
CO-1	Learn the parts of microscope
CO-2	Investigate the cells under microscope
CO-3	Image the cells using different stains
CO-4	Identify the cells, organelles and stages of cell division
CO-5	Identify the spotters

## I MICROSCOPY AND STAINING TECHNIQUES

15 Hours

1. Study the parts of light and compound microscope
2. Preparation of Slides.
3. Examination of prokaryotic and eukaryotic cell
4. Visualization of animal and plant cell by methylene blue
5. Visualization of nuclear fraction by acetocarmine stain
6. Staining and visualization of mitochondria by Janus green stain

## II GROUP EXPERIMENT

15 Hours

7. Identification of different stages of mitosis in onion root tip.
8. Identification of different stages of meiosis in onion bulb.

## III SPOTTERS

9 Hours

9. a) **Cells:** Nerve, plant and Animal cell
- b) **Organelles:** Mitochondria, Chloroplast, Endoplasmic reticulum,
- c) **Mitosis stages**–Prophase, Anaphase, Metaphase, Telophase

## Reference books

- Rickwood, D and J.R.Harris, (1996) *Cell Biology: Essential Techniques*, Johnwikey.
- Davis, J.M. (1994) *Basic Cell culture: A practical approach*, IRL.
- Ganesh M.K. and Shivashankara A.R. (2012). *Laboratory Manual for Practical Biochemistry* Jaypee publications, 2ndEdn.
- Debarati Das, (2017), *Essential practical handbook of Cell biology, Genetics and Microbiology -A Practical manual-*, cademic publishers, ISBN, 9789383420599, 1<sup>st</sup>. Edition
- Dr.Venugupta, (2018), *Cell biology Practical*, ISBN8193651219, Prestige publisher.
- De Robertis, (1999), *Cell and Molecular biology*, 8th edition, 1st June.

## E- Resources

- <http://amrita.olabs.edu.in/?sub=79&brch=18&sim=237&cnt=1>
- <https://www.microscopemaster.com/organelles.html>
- <https://www.pdfdrive.com/biochemistry-books.htm>
- [http://medcell.med.yale.edu/histology/cell\\_lab.php#:~:text=The%20electron%20microscope%20is%20necessary,and%20small%20granules%20and%20vesicles.](http://medcell.med.yale.edu/histology/cell_lab.php#:~:text=The%20electron%20microscope%20is%20necessary,and%20small%20granules%20and%20vesicles.)
- <http://amrita.olabs.edu.in/?sub=79&brch=18&sim=237&cnt=1>
- <https://www.khanacademy.org/science/ap-biology/heredity/meiosis-and-geneticdiversity/a/phases-of-meiosis>
- <https://www.microscopemaster.com/organelles.html>
- <https://www.pdfdrive.com/biochemistry-books.html>

## Course Outcomes

CO No.	On completion of this course, students will be able to	Bloom's Level
CO1	Identify and label the different parts of microscope.	K1
CO2	Preparation of Slides for the examination of prokaryotic and eukaryotic cells.	K3
CO3	Identify the stages of mitosis & meiosis microscopically.	K1
CO4	Visualize nucleus and mitochondria by staining methods	K3
CO5	Identify the spotters of cells, organelles and stages of cell division	K1

## FIRST AID

### UBCD201

Semester : II  
Category : DC I / SEC I  
Class & Major : I B.Sc Biochemistry

Credit : 2  
Hours/ Week : 2  
Total Hours : 26

### COURSE OBJECTIVES:

CO No.	To enable the students to
CO-1	Provide knowledge on the basics of first aid.
CO-2	Perform first aid during various respiratory issues.
CO-3	Demonstrate the first aid to treat injuries
CO-4	Learn the first aid techniques to be given during emergency
CO-5	Familiarize the first aid during poisoning.

#### UNIT I:

**6 Hours**

Aims and important rules of first aid, dealing with emergency, types and content of a first aid kit. First aid technique – Dressing and Bandages, fast evacuation technique, transport techniques.

#### UNIT II:

**5 Hours**

Basics of Respiration – CPR, first aid during difficult breathing, drowning, choking, strangulation and hanging, swelling within the throat, suffocation by smoke or gases and asthma.

#### UNIT III:

**5 Hours**

Common medical aid- first aid for wounds, cuts, head, chest, abdominal injuries, shocks, burns, amputations, fractures, dislocation of bones.

#### UNIT IV:

**5 Hours**

First aid related to unconsciousness, stroke, fits, convulsions- seizures, epilepsy

**UNIT V:****5 Hours**

First aid in poisonous bites (Insects and snakes), honey bee stings, animal bites, disinfectant, acid and alkali poisoning.

**Text books**

- Dr. Gauri Goel, Dr. Kumkum Rajput, Dr. Manjul Mungali *First aid and health* ISBN-978-93-92208-19-5
- Indian First Aid Manual-<https://www.indianredcross.org/publications/FA-manual.pdf> Red Cross First Aid/CPR/AED Instructor Manual

**E-Resources**

- <https://www.redcross.org/take-a-class/first-aid/first-aid-training/first-aid-online>
- <https://www.firstaidforfree.com/>

**Course Outcomes**

CO No.	On completion of the course, students will be able to	Bloom's Level
CO-1	Recall the rules governing first aid, common medical aid procedures and appropriate first aid responses.	K1
CO-2	Recognize the signs and symptoms of shock and apply appropriate first aid measures to manage and alleviate shock.	K2
CO-3	Understand and explain the common first aid techniques on various emergency situations.	K2
CO-4	Apply important rules of first aid in simulated emergency scenarios and execute appropriate first aid measures.	K3
CO-5	Demonstrate leadership in emergency situations, coordinating assistance from others if available.	K4

**CO – PSO MAPPING**

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO-1	3	2	2	1	1	1
CO-2	3	2	2	2	1	1
CO-3	3	2	2	2	1	1
CO-4	3	3	3	2	1	1
CO-5	3	3	3	3	3	3

**High correlation : 40%      Moderate correlation: 30%      Low correlation : 20%**

**LIFESTYLE DISEASES****UBCE211**

**Semester : II**  
**Category : NME/SEC**  
**Class & Major : I UG**

**Credit: 2**  
**Hours/Week: 2**  
**Total Hours: 26**



**COURSE OBJECTIVES:**

CO No.	To enable the students to
CO-1	Create awareness on lifestyle diseases among adolescents
CO-2	List out the lifestyle diseases
CO-3	Explain the common lifestyle diseases and their prevention
CO-4	Acquaint the disorder associated with women's health.
CO-5	Impart life skills so as to prevent lifestyle diseases.

**UNIT I: LIFESTYLE DISEASES:****5 Hours**

Definition, Factors contributing to lifestyle diseases – Physical inactivity, Poor food habits, disturbed biological clock, sleep deprivation

**UNIT II: TOP LIFESTYLE DISEASES:****5 Hours**

Top lifestyle diseases (Any 5) Impact of Lifestyle diseases on family, society and economy of country.

**UNIT III: COMMON LIFESTYLE DISEASES:****6 Hours**

Causes, symptoms, types, preventive measures and treatment of Obesity, cardiovascular diseases, diabetes and cancer.

**UNIT IV: WOMEN'S LIFESTYLE DISEASES:****5 Hours**

Polycystic Ovarian Disease, Infertility, Breast and cervical cancer and Osteoporosis.

**UNIT V: PREVENTION OF LIFESTYLE DISEASES:****5 Hours**

Balanced diet, sufficient intake of water, physical activity, sleep-wake cycle, stress management and meditation.

**Textbooks:**

- James M R, 2013 *Lifestyle Medicine, 2<sup>nd</sup> Edition, CRC Press.*
- Akira Miyazaki, 2008 *New Frontiers in Lifestyle- Related Disease, Springer,*

**Reference books:**

- Steyn K, *Life style and related risk factors for chronic diseases*
- Willett WC, *Prevention of chronic disease by means of diet and lifestyle.*
- Kumar M & R. Kumar. *Guide to prevention of lifestyle diseases. Deep & Deep publications*

### E- Resources

- <https://youtu.be/jDdL2bMQXfE>
- <https://youtu.be/7WnpSB14nDM>
- <https://youtu.be/ollz9MqtW-U>

### COURSE OUTCOMES:

CO No	On completion of the course, students will be able to	Bloom's Level
CO-1	Identify and recall the important lifestyle disease and their impact on health.	K1
CO-2	Explain the characteristics, causes and risk factors associated with top 5 lifestyle diseases and those specifically affecting women.	K2
CO-3	Identify the causes, risk factors and preventive strategies related to lifestyle disease.	K3
CO-4	Analyze and compare the effectiveness of different preventive strategies for lifestyle diseases.	K4
CO-5	Discuss the psychosocial impact of lifestyle diseases on individuals and communities.	K4

### CO – PSO MAPPING

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO-1	3	2	2	1	1	1
CO-2	3	2	2	1	1	1
CO-3	3	2	2	1	1	1
CO-4	3	2	2	2	1	1
CO-5	3	3	3	3	3	3

**High correlation : 33% Moderate correlation: 30% Low correlation : 37%**

### III & IV EVALUATION COMPONENTS OF CIA

Sem ester	Category	Course Code	Course Title	Component III	Component IV
I	Core I / DSC - I	UBCM109	Nutritional Biochemistry	Diet Chart Preparation	Case Study
	Foundation Course	UBCF101	Fundamentals of Biochemistry	Model Preparation	Open book test
	Non Major Elective	UBCE101	Nutrition & Health	Diet Chart Preparation	Case Study
		UBCE102	Medicinal Diet	Diet Chart Preparation	Debate - pros & cons of Medicinal Diet
II	Core II / DSC - II	UBCM204	Cell Biology	Album Preparation	Assignment
	DC I / SEC I	UBCD201	First Aid	Case Study	Seminar
	Non Major Elective	UBCE211	Life Style Diseases	Open book test	Case Study

## PROGRAMME PROFILE OF M.Sc., BIOCHEMISTRY

### PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO No.	On completion of this programme, students will be able to
PSO-1	Acquire in-depth knowledge in courses like cell biology, enzymology, biotechnology, metabolism, endocrinology, immunology, genetics, genetic engineering and clinical biochemistry.
PSO-2	Detect various disorders and identify the defect in the metabolic pathways and evaluate solutions for metabolic disorders by applying the knowledge of metabolism.
PSO-3	Undertake biochemical experiments using classical and modern instruments of biochemistry & molecular biology, record and interpret the results, draw conclusions.
PSO-4	Explore the leadership skills to manage projects in multidisciplinary and interdisciplinary courses and develop skills beyond the syllabus as an individual to become a successful entrepreneur through PG Service learning.
PSO-5	Instil knowledge and awareness on professional ethics, bioethical and health issues, intellectual property rights and become life-long learner through professional courses such as IPR, biosafety and bioethics
PSO-6	Develop research experience by identifying the problem, analyse, interpret and draw conclusions on social cause through innovative PG project in adherence to ethical standards.

Semester	Category	Course code	Course title	Contact Hours / Week	Credit
					Min/Max
I	Core I	PBCM111	Basics of Biochemistry	5	4
	Core Elective I	PBCO101	Biochemical and Molecular Biology Techniques	5	3
	Core Elective II	PBCO102	Physiology and Cell Biology	5	3
	Core Practical I	PBCR104	Laboratory Course in Cell Biology, Biochemistry and Biochemical Techniques	10	8
	Skill Enhancement Course - NME	---	Non Major Elective	3	2
	Online Course	---	NPTEL	2	2
<b>TOTAL</b>				<b>30</b>	<b>22</b>
II	Core II	PBCM211	Enzymology	5	4
	Core Industry - III	PBCM212	Clinical Biochemistry	4	3
	Core Elective III	PBCO201	Cellular Metabolism	4	3
	Core Elective IV	PBCO202	Bioinformatics	4	3
	Core Practical II	PBCR204	Laboratory Course in Immunology and Enzymology	10	8
	Skill Enhancement Course- DSC	PBCD201	Advanced Immunology	3	2
	Service Learning	PBCX201	Service Learning	-	1

	(Outside the class room)				
	Internship/Industrial training/Field visit	PINS201	-	-	2
<b>TOTAL</b>				<b>30</b>	<b>26</b>
III	Core IV	PBCM307	Molecular Biology	5	4
	Core Industry V	PBCM308	Industrial Microbiology	4	3
	Core Elective V	PBCO301	Gene Editing, Cell and Gene Therapy	4	3
	Core Elective VI	PBCO302	Molecular Endocrinology & Signaling	3	3
	Core Practical III	PBCR303	Laboratory Course in Clinical Biochemistry and Molecular Biology	10	8
	Skill Enhancement Course/ Interdisciplinary	PBCI301	Pharmaceutical Biochemistry	4	2
<b>TOTAL</b>				<b>30</b>	<b>23</b>
IV	Core VI	PBCM405	Basics of Genomics & Proteomics	5	4
	Core VII	PBCM406	Biochemical Toxicology	5	4
	Core VIII	PBCM407	Biosafety, Lab Safety & IPR	5	4
	Core Elective VII	PBCO401	Biotechnology	5	3
	Project	PBCP401	Project	6	4
	Skill Enhancement Course / Professional Competency Skill	PBCC401	NET/SET for Life Science	4	2
	Internship/Industrial training/Field visit	PINS401	-	-	-/2
<b>TOTAL</b>				<b>30</b>	<b>21/23</b>
<b>GRAND TOTAL</b>				<b>120</b>	<b>92/94</b>

**COURSES OFFERED TO OTHER DEPARTMENTS  
NON MAJOR ELECTIVES (NME)**

Semester	Category	Course code	Course Title	Contact Hour/Week	Credit
I	Elective V NME – I	PBCE105	Nutritional Biochemistry	3	3
		PBCE106	Basic Lifestyle Diseases and its Therapeutic Strategies		

**BASICS OF BIOCHEMISTRY  
PBCM111**

**Semester : I**  
**Category : Core I**  
**Class & Major : I M.Sc Biochemistry**

**Credit : 4**  
**Hours/ Week : 5**  
**Total Hours : 65**

## COURSE OBJECTIVES

CO No.	To enable the students to
CO-1	Understand the importance and scope of Biochemistry.
CO-2	Acquire knowledge about significance of carbohydrates in biological processes.
CO-3	Aware about the structure, properties and biological significance of lipids in the biological system.
CO-4	Learn about the concepts of protein structure and their significance in biological processes and comprehend the role of membrane components with their biological significance.
CO-5	Gain knowledge about the structure and functional roles of nucleic acids in the biological system

### UNIT - I CARBOHYDRATES

**13 Hours**

Carbohydrates- classification, structure (configurations and conformations, anomeric forms) function and properties of monosaccharides, mutarotation, disaccharides and oligosaccharides with suitable examples. Polysaccharides - homopolysaccharides (starch, glycogen, cellulose, inulin, dextrin, agar, pectin, dextran). Heteropolysaccharides - glycosaminoglycans– source, structure, functions of hyaluronic acid, chondroitin sulphates, heparin, keratan sulphate. Glycoproteins - proteoglycans. O-Linked and N-linked glycoproteins. Biological significance of glycan, blood group polysaccharides. Bacterial cell wall (peptidoglycans, teichoic acid) and plant cell wall carbohydrates.

### UNIT - II LIPIDS

**13 Hours**

Lipids – classification of lipids, structure, properties and functions of fatty acids, triacylglycerols, phospholipids, glycolipids, sphingolipids and steroids – biological importance. Eicosanoids - classification, structure and functions of prostaglandins, thromboxanes and leukotrienes. Lipoproteins – classification, structure, transport (endogenous and exogenous Pathway) and their biological significance.

### UNIT-III AMINO ACIDS AND PROTEINS

**13 Hours**

Overview of amino acids - classification, structure and properties of amino acids and their biological role. Non-protein amino acids and their biological significance - proteins – classification based on composition, structure and functions. Primary, secondary, super secondary (motifs) (helix-turn-helix, helix-loop-helix,  $\beta$ - $\alpha$ - $\beta$  motif - Rossmann fold, Greek key - tertiary and quaternary structure of proteins. Structural characteristics of collagen and hemoglobin. Determination of amino acid sequence. Chemical synthesis of a peptide, forces involved in stabilization of protein structure. Ramachandran plot. Folding of proteins.

## UNIT- IV MEMBRANE PROTEINS

13 Hours

Membrane proteins - types and their significance. Cytoskeleton proteins - actin, tubulin, intermediate filaments. Biological role of cytoskeletal proteins. Membrane structure-fluid mosaic model.

## UNIT-V NUCLEIC ACIDS

13 Hours

Nucleic acids – types and forms (A, B, C and Z) of DNA. Watson-Crick model-primary, secondary and tertiary structures of DNA. Triple helix and quadruplex DNA. Mitochondrial and chloroplast DNA. DNA supercoiling (calculation of Writhe, linking and twist number). Determination of nucleic acid sequences by Maxam Gilbert and Sanger's methods. Forces stabilizing nucleic acid structure. Properties of DNA and RNA. C-value, C-value paradox, Cot curve. Structure and role of nucleotides in cellular communications. Major and minor classes of RNA, their structure and biological functions.

### Text Books

- Nelson DL, Cox MM, (2017) *Lehninger Principles of Biochemistry*, 7th Ed. Freeman Publishers, New York.
- Voet D et al. (2016) *Fundamentals of Biochemistry: life at the molecular level* 5th Ed. Wiley Publishers, New Jersey.
- Rodwell VW et al. (2018), *Harper's Illustrated Biochemistry*, 31 Ed. McGraw-Hill Education, New York.
- Berg JM et al. (2023) *Biochemistry* 10th Ed. Macmillan Education, London.

### Reference Books

- Blackburn et al. (2006), *Nucleic acids in Chemistry and Biology*. Royal Soc Chem, London.
- Jeremy M et al (2015), *Biochemistry*, 8<sup>th</sup> Ed. Freeman Publishers, New York.

### E- Resources (Online)

- [https://bio.libretexts.org/Bookshelves/Biochemistry/Book%3A\\_Biochemistry](https://bio.libretexts.org/Bookshelves/Biochemistry/Book%3A_Biochemistry)
- <https://www.thermofisher.com/in/en/home/life-science/protein-biology/>
- <https://www.open.edu/openlearn/science-maths-technology/science/biology/nucleic-acids-and-chromatin/content-section-3.4.2>
- <https://www.genome.gov/genetics-glossary/Cell-Membrane>
- <https://nptel.ac.in/content/storage2/courses/102103012/pdf/mod3.pdf>

## COURSE OUTCOMES

CO No.	On completion of the course, students will be able to	Bloom's Level
CO-1	Identify and describe the structure and function of key biomolecules, including proteins, nucleic acids, lipids, and carbohydrates.	K1, K2
CO-2	Explain the structure and function of biological membranes.	K3
CO-3	Describe the levels of protein structure and their relationship to function.	K4
CO-4	Integrate knowledge from different areas of biochemistry to understand the holistic functioning of living organisms.	K5
CO-5	Demonstrate advanced topics in biomolecular sciences, including the classification, structures, functions, and biological roles of biomolecules.	K6

## CO – PSO MAPPING

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO-1	3	2	2	1	1	1
CO-2	3	2	2	2	1	1
CO-3	3	2	2	2	2	2
CO-4	3	3	3	2	2	2
CO-5	3	3	3	3	3	3

High correlation : 40% Moderate correlation: 43% Low correlation : 17%

## BIOCHEMICAL AND MOLECULAR BIOLOGY TECHNIQUES PBCO101

Semester : I  
Category : Core Elective I  
Class & Major : I M.Sc Biochemistry

Credit : 3  
Hours/ Week : 5  
Total Hours : 65

## COURSE OBJECTIVES

CO No.	To enable the students to
CO-1	Understand the various techniques used in biochemical investigation and microscopy
CO-2	Explain chromatographic techniques and their applications
CO-3	Learn about the electrophoretic techniques
CO-4	Comprehend the spectroscopic techniques and demonstrate their applications in biochemical investigations
CO-5	Acquire knowledge on radio labelling techniques and centrifugation

## UNIT 1 MICROSCOPY, BIOSENSORS AND CELL CULTURE

13 Hours

General approaches to biochemical investigation, cell culture techniques and microscopic techniques. Organ and tissue slice technique, cell distribution and homogenization techniques, cell

sorting, and cell counting, tissue culture techniques. Cryopreservation. Biosensors- principle and applications. Principle, working and applications of light microscope, dark field, phase contrast and fluorescent microscope. Electron microscope- principle, instrumentation of TEM and SEM, specimen preparation and applications-shadow casting, negative staining and freeze fracturing.

## **UNIT II CHROMATOGRAPHY**

**13 Hours**

Basic principles of chromatography- adsorption and partition techniques. Chiral chromatography and counter current chromatography. Adsorption chromatography – hydroxy apatite chromatography and hydrophobic interaction chromatography. Affinity chromatography, gas liquid chromatography- principle, instrumentation, column development, detectors and applications. high pressure liquid chromatography- principle, instrumentation, delivery pump, sample injection unit, column packing, development, detection and application. Reverse HPLC.

## **UNIT III ELECTROPHORESIS**

**13 Hours**

General principles of electrophoresis, supporting medium, factors affecting electrophoresis, isoelectric focusing-principle, ampholyte, development of pH gradient and application. PAGE-gel casting-horizontal, vertical, slab gels, sample application, detection-staining using CBB, silver, fluorescent stains. SDS PAGE-principle and application in molecular weight determination principle of disc gel electrophoresis, 2D PAGE, electrophoresis of nucleic acids-agarose gel electrophoresis of DNA, pulsed field gel electrophoresis- principle, apparatus, application. microchip electrophoresis and 2D electrophoresis.

## **UNIT IV SPECTROSCOPY**

**13 Hours**

Basic laws of light absorption- principle, instrumentation and applications of UV-visible, IR, ESR, NMR, mass spectroscopy. Turbidimetry and Nephelometry. Luminometry (luciferase system, chemiluminescence). X - ray diffraction. Atomic absorption spectroscopy - principle and applications - Determination of metals using AAS.

## **UNIT V RADIOISOTOPE TECHNIQUES AND CENTRIFUGATION**

**13 Hours**

Nature of radioactivity-detection and measurement of radioactivity, methods based upon ionisation (GM counter) and excitation (scintillation counter), autoradiography and applications of radioactive isotopes, biological hazards of radiation and safety measures in handling radioactive isotopes. Basic principles of centrifugation. Preparative ultracentrifugation - differential centrifugation, density gradient centrifugation. Analytical ultracentrifugation - molecular weight



determination.

### Text Books

- Hofmann A, Clokie, SS (2018) *Wilson and Walker's Principles and techniques of Biochemistry and Molecular Biology* 8<sup>th</sup> Ed. Cambridge University Press, Cambridge, UK.
- Upadhyay U, Nath S (2010) *Biophysical chemistry principles and techniques* Himalaya Publishers, New Delhi.
- Boyer R (2009) *Modern Experimental Biochemistry*, 3<sup>rd</sup> Ed, Pearson Education, Inc. New York.
- Robyt JF, White BJ (2015) *Biochemical techniques theory and practice* CBS Publishers, New Delhi.

### Reference Books

- Freifelder DM (1983) *Physical Biochemistry - Applications to Biochemistry and Molecular Biology*, 2<sup>nd</sup> Ed, WH Freeman Publishers, New York.
- Lampman P, Vyvyan K (2015) *Introduction to spectroscopy*, 5<sup>th</sup> Ed Cengage Learning, Boston.

### E- Resources (Online)

- <http://ecoursesonline.iasri.res.in/course/view.php?id=282>
- <https://www.academia.edu/41290495/>
- [https://www.edouniversity.edu.ng/oerrepository/articles/techniques\\_in\\_biochemical\\_research](https://www.edouniversity.edu.ng/oerrepository/articles/techniques_in_biochemical_research)
- [https://www.researchgate.net/publication/336210597Fundamentals\\_of\\_Biochemical\\_Methods](https://www.researchgate.net/publication/336210597Fundamentals_of_Biochemical_Methods)
- [https://www.su.se/polopoly\\_fs/1.622041.1660576721!/columnholder/](https://www.su.se/polopoly_fs/1.622041.1660576721!/columnholder/)

## COURSE OUTCOMES

CO No.	On completion of the course, students will be able to	Bloom's Level
CO-1	Understand the principles and develop proficiency in various biochemical and molecular biology techniques.	K1 & K2
CO-2	Apply critical thinking to analyze and synthesis information using laboratory techniques to solve complex scientific problems	K3
CO-3	Design and evaluate advanced experimental protocol incorporating techniques to address complex Scientific challenges.	K4
CO-4	Analyze and contribute to the advancement of knowledge by applying innovative approaches and methodologies in techniques within research field.	K5
CO-5	Developing and contributing to the broader scientific field of biochemical techniques through research publications, presentation and discussions.	K6

## CO – PSO MAPPING

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO-1	3	3	2	2	1	1
CO-2	3	3	2	2	2	1
CO-3	3	3	3	3	2	2
CO-4	3	3	3	3	2	2
CO-5	3	3	3	3	3	3

**High correlation : 60% Moderate correlation: 30% Low correlation: 10%**

# PHYSIOLOGY AND CELL BIOLOGY

## PBCO102

**Semester** : I  
**Category** : Core Elective II  
**Class & Major** : I M.Sc Biochemistry

**Credit** : 3  
**Hours/ Week** : 5  
**Total Hours** : 65

### COURSE OBJECTIVES

CO No.	To enable the students to
CO-1	Understand the functions and activities of organs, tissues or cells and of physical and chemical phenomena involved in human body
CO-2	Know about the physiological functions of the human system
CO-3	Educate about the imbalances in acid-base, fluid and electrolytes
CO-4	Impart knowledge on the process of cell division
CO-5	Educate about salient features of digestive and respiratory systems

### UNIT I CELL JUNCTIONS AND CELL CYCLE

**13 Hours**

Major classes of cell junctions- anchoring, tight and gap junctions. Major families of cell adhesion molecules (CAMs)- cadherins, integrins. Types of tissues. Epithelium- organisation and types. The basement membrane. Cell cycle- mitosis and meiosis, cell cycle-phases and regulation. Cell death mechanisms- an overview-apoptosis, necrosis.

### UNIT II REPRODUCTIVE SYSTEM

**13 Hours**

Reproductive system- sexual differentiation and development; sperm transport, sperm capacitation, semen analyses and acrosome reaction. Clinical relevance of female reproductive physiology- menstrual cycle, pregnancy and menopause. Fertilisation and infertility issues. Hormones -Classification, and Its Functions

### UNIT III DIGESTIVE SYSTEM

**13 Hours**

Digestive system- structure and functions of different components of digestive system, digestion and absorption of carbohydrates, lipids and proteins, role of bile salts in digestion and absorption, mechanism of HCl formation in stomach, role of various enzymes and hormones involved in digestive system. Composition of blood, lymph and CSF.

### UNIT IV RESPIRATORY SYSTEM

**13 Hours**

Respiratory system-gaseous transport and acid-base homeostasis. Mechanism of the movement of O<sub>2</sub> and CO<sub>2</sub> through lungs, arterial and venous circulation. Bohr effect, oxygen and

carbon dioxide binding haemoglobin. Maintenance of pH by cellular and intracellular proteins. Phosphate and bicarbonate buffers, metabolic acidosis and alkalosis. Respiratory acidosis and alkalosis. Regulation of fluid and electrolyte balance.

## UNIT V NERVOUS SYSTEM AND MUSCULAR CONTRACTION

13 Hours

Sensory transduction, nerve impulse transmission- nerve cells, synapses, reflex arc structure, resting membrane potential, Nernst equation, action potential, voltage gated ion-channels, impulse transmission, neurotransmission, neurotransmitter receptors, synaptosomes, synaptotagmin, rod and cone cells in the retina, changes in the visual cycle, photochemical reaction and regulation of rhodopsin, odour receptors, learning and memory. Chemistry of muscle contraction – actin and myosin filaments, theories involved in muscle contraction, mechanism of muscle contraction, energy sources for muscle contraction.

### Text Books

- Nelson DL, Cox MM, (2017) *Lehninger Principles of Biochemistry*, 7th Ed. Freeman Publishers, New York.
- Lodish H et al, (2016), *Molecular Cell Biology*, 8<sup>th</sup> Ed. Freeman, New York.
- Rodwell VW et al. (2018), *Harper's Illustrated Biochemistry*, 31 Ed. McGraw-Hill Education, New York.

### Reference Books

- Barrett KE et al. (2019), *Ganong's Review of Medical Physiology*, 26<sup>th</sup> Ed, McGraw Hill, New York.
- Graaf and Rees (2010), *Schaum's Easy Outline of Human Anatomy and Physiology*. 2<sup>nd</sup> Ed. McGraw Hill, New York.
- Brubaker AP (2018) *A textbook of human physiology* Palala Press, London.
- Hall JE, Hall ME (2020) *Guyton and Hall Textbook of medical physiology*, Elsevier Health Science, Amsterdam.

### e -Resources (Online)

- <https://www.genome.gov/genetics-glossary/Cell-Cycle>
- <https://my.clevelandclinic.org/health/diseases/16083-infertility-causes>
- <https://www.webmd.com/heartburn-gerd/reflux-disease>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5760509/>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3249628/>

### COURSE OUTCOMES

CO No.	On completion of the course, students will be able to	Bloom's Level
CO-1	Understand the fundamental principles of cellular physiology, including cell membrane transport and cell signaling.	K1 & K2

CO-2	Apply physiological concepts to analyze and solve problems related to human health and function.	K3
CO-3	Integrate knowledge from different physiological systems to understand how they work together to maintain homeostasis.	K4
CO-4	Explain the advancement in physiology and cell biology in nurturing the scientific research fields.	K5
CO-5	Innovate and contribute to the expansion of knowledge by developing methodologies and applications in the field of physiology and cell biology.	K6

### CO – PSO MAPPING

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO-1	3	2	2	1	1	1
CO-2	3	2	2	1	1	1
CO-3	3	3	3	2	2	2
CO-4	3	3	3	2	2	2
CO-5	3	3	2	3	3	3

**High correlation : 43%      Moderate correlation: 37%      Low correlation: 20%**

## LABORATORY COURSE IN CELL BIOLOGY, BIOCHEMISTRY AND BIOCHEMICAL TECHNIQUES PBCR104

**Semester : I**  
**Category : Core Practical I**  
**Class & Major: I M.Sc., Biochemistry**

**Credit : 8**  
**Hours/ Week : 10**  
**Total Hours : 130**

### COURSE OBJECTIVES

CO No.	To enable the students to
CO-1	Apprehend wider knowledge about principles and techniques to be employed for the estimation of biomolecules
CO-2	Inculcate knowledge of various isolation and purification techniques of biomolecules
CO-3	Perform spectrophotometric estimations to quantify important metabolites and minerals
CO-4	Perform staining of cell cultures.
CO-5	Measure mitotic index

#### Cell Biology

1. Microscopic examination of epithelial cells Staining of cell observations under microscope
2. Tissue culture techniques: surface sterilization techniques. Cell count

#### Biochemistry

##### *Biochemical studies and estimation of macromolecules*

1. Isolation and estimation of glycogen from liver
2. Isolation and estimation of DNA from animal tissue
3. Isolation and estimation of RNA from yeast

4. Purification of polysaccharides – starch and assessment of its purity

#### ***UV absorption studies***

1. Denaturation of DNA and absorption studies at 260 nm
2. Denaturation of protein and absorption studies at 280 nm

#### ***Colorimetric estimations***

1. Estimation of pyruvate
2. Estimation of tryptophan

#### ***Estimation of minerals***

1. Estimation of calcium by titration method
2. Estimation of iron by Ramsay method.

#### ***Plant biochemistry***

1. Qualitative analysis – phytochemical screening(flavonoid, alkaloids, phenols and sugars)
2. Quantitative analysis – estimation of flavonoid/ total phenols
3. Separation of plant pigments by chromatography

### **Biochemical Techniques**

#### ***Group experiments (any two)***

1. Fractionation of sub-cellular organelles (*any two*) by differential centrifugation – mitochondria and nucleus
2. Identification of the separated sub-cellular fractions using marker enzymes (any one)
3. Separation and identification of lipids by thin layer chromatography
4. Separation of plant pigments from leaves by column chromatography
5. Identification of sugars by paper chromatography
6. Identification of amino acids by paper chromatography

#### **Text Books**

- Shankara SYM et al. (2013) *A laboratory manual for practical biochemistry* 2<sup>nd</sup> Ed. Jaypee brothers medical publishers (P) Ltd. New Delhi.
- Davey J, Lord M (2005) *Essential cell biology: a practical approach* 4<sup>th</sup> Ed. Oxford University Press, London
- Plummer DT, (2017), *An introduction to Practical Biochemistry*, 3<sup>rd</sup> Ed, Tata McGraw Hill, New Delhi.

#### **Reference Books**

- Sadasivam S, Manickam A (2018) *Biochemical methods*, New Age International Publishers, New Delhi.
- Chavan SA et al. (2019) *A guide to chromatography techniques* 1<sup>st</sup> Ed. Notion press, Chennai.
- Agarwal S, Khan S (2019) *Advanced lab practices in biochemistry and molecular biology*, Wiley India, Bengaluru.

### e -Resources (Online)

- [https://www.researchgate.net/publication/313745155\\_Practical\\_Bio\\_chemistry](https://www.researchgate.net/publication/313745155_Practical_Bio_chemistry)
- <https://doi.org/10.1186/s13020-018-0177-x>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5368116/>
- <https://www.life.illinois.edu/biochem/455/Lab%20exercises/2Photometry/>
- <https://ijpsr.com/bft-article/determination-of-total-flavonoid-and-phenol>
- <https://skyfox.co/wp-content/uploads/2020/12/Practical-Manual-of-Biochemistry.pdf>

### COURSE OUTCOMES

CO No.	On completion of the course the student will be able to
CO-1	Independently undertake qualitative and quantitative analysis of biomolecules
CO-2	Acquire knowledge in the UV absorption studies of DNA and protein
CO-3	Inculcate skills in the qualitative analysis of phytochemicals
CO-4	Identify cell types from tissues under microscope
CO-5	Undertake isolation of subcellular organelles

## NUTRITIONAL BIOCHEMISTRY PBCE105

Semester : I  
Category : NME-I  
Class & Major : I M.Sc., Biochemistry

Credit : 2  
Hours/ Week : 3  
Total Hours : 39

### COURSE OBJECTIVES

CO No.	To enable the students to
CO1	Understand basic concepts involved in growth, health, nutrition, physiology and metabolism
CO2	Discuss the concepts and applications of nutrition in correlation with biochemistry
CO3	Define nutritional needs in healthy individuals and modification of diet during illness
CO4	Aware about the diseases arises due to malnutrition.
CO5	Study about the managerial facts of nutrition in diseases.

### UNIT I BASIC CONCEPTS

**7 Hours**

Nutrition - Food groups and balanced diet. Novel foods. Calorific value of foods: Direct and indirect calorimetry. Empty calories. Basal metabolic rate: Factors affecting BMR. SDA and physical activity. Calculation of day's energy requirement. Assessment of nutritional status. Lactose

intolerance. Nutritional requirement and biochemical changes in different physiological states -infancy, pregnancy, and ageing. Sports nutrition.

## **UNIT II ELEMENTS OF NUTRITION**

**8 Hours**

Plant and animal sources of simple and complex carbohydrates, fats and proteins and their requirement. Biological significance, deficiency and toxicity of macronutrients and micronutrients. Role of dietary fibre. Protein sparing action of carbohydrates and fats. Essential amino acids. Essential fatty acids. Effects of naturally occurring food toxins, preservatives, additives, alcohol and tobacco on health.

## **UNIT III VITAMINS AND MINERALS**

**8 Hours**

Vitamins and minerals- dietary sources, classification, biochemical functions, requirements. Vitamin B complex as coenzyme. Nutritional significance of dietary calcium, phosphorus, magnesium, iron, iodine, zinc and copper.

## **UNIT IV MALNUTRITION**

**8 Hours**

Diseases arising due to protein - calorie malnutrition and undernutrition (kwashiorkor and marasmus), prevention of malnutrition. Deficiency diseases associated with vitamin B complex, vitamin C and A, D, E and K vitamins - mineral deficiency diseases - aetiology, sign and symptoms and dietary supplementation. Enrichment and fortification (vitamins and minerals)

## **UNIT V NUTRITION IN DISEASES**

**8 Hours**

Nutrition in diseases - aetiology, signs and symptoms, treatment and dietary management during fever (typhoid and malaria) and infectious diseases (COVID-19), jaundice, hyperacidity (ulcer), atherosclerosis, hypertension, kidney diseases and diabetes in adults. Starvation and obesity. Interrelationship of nutrition, infection, immunity and poverty

### **Text Books**

- McWilliams M (2012) *Food fundamentals* 10<sup>th</sup> Ed. Pearson, London.
- Bender DA (2003) *Nutritional biochemistry of the vitamins* 2<sup>nd</sup> Ed. Cambridge University Press, Cambridge.
- Malik D et al. (2023) *Textbook of nutritional biochemistry* Springer Nature, Singapore.
- Manjeshwar PR (2014) *Textbook of nutrition and biochemistry* 5<sup>th</sup> Ed. PR Publishers, New Delhi.

### **E- Resources (Online)**

- <https://www.jmedscindmc.com/article.asp?issn=1011/>
- <https://www.researchgate.net/figure/Relationship-between-malnutrition/>

- [https://en.wikipedia.org/wiki/Novel\\_food](https://en.wikipedia.org/wiki/Novel_food)
- <https://www.chemicalsafetyfacts.org/preservatives/>
- <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/>

### COURSE OUTCOMES

CO No.	On completion of the course, students will be able to	Bloom's Level
CO1	Understand the basic concepts of nutrition, malnutrition and factors contributing different manifestations.	K1, K2
CO2	Apply knowledge of basic nutrition ad plan balanced dietary patterns and propose strategies for prevention and intervention of malnutrition.	K3
CO3	Analyze the dietary patterns and nutrient intake for an individual and recognize factors influencing disease progression.	K4
CO4	Determine the basic nutrition concepts and elements to design personalized dietary plans for managing various disease.	K5
CO5	Discuss the effects of different strategy in addressing vitamin and mineral deficiency, implications for malnutrition in the management and prevention of diseases.	K6

### CO – PSO MAPPING

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO-1	3	2	2	1	1	1
CO-2	3	2	2	2	1	1
CO-2	3	3	2	2	1	1
CO-4	3	2	2	3	3	3
CO-5	3	3	3	3	3	3

High correlation : 47%      Moderate correlation: 30%      Low correlation : 23%

## ENZYMOLGY

### PBCM211

Semester : II

Credit : 4

Category : Core II

Hours/ Week : 5

Class &Major : I M.Sc Biochemistry

Total Hours : 65

### COURSE OBJECTIVES

CO No.	To enable the students to
CO-1	Introduction to the theory and practice of enzymology
CO-2	Inculcate knowledge on mechanisms of catalysis and factors affecting catalysis will be understood
CO-3	Impart knowledge on the kinetics of enzyme catalysed reactions in the absence and presence of inhibitors
CO-4	Develop knowledge on different techniques of enzyme immobilisation
CO-5	Explicate about designer enzymes



## **UNIT I ENZYME CATALYSIS**

**13 Hours**

Introduction to enzymes and features of catalysis: a short history of the discovery of enzymes and how they became powerful biochemical tools. Holoenzyme, apoenzyme, cofactors, coenzyme, prosthetic groups, classification and nomenclature, specificity of enzyme action-group specificity, absolute specificity, substrate specificity, stereochemical specificity. Active site, identification of amino acids at the active site-trapping of ES complex, identification using chemical modification of amino acid side chains and by site-directed mutagenesis. Mechanisms of enzyme catalysis: acid-base catalysis, covalent catalysis, electrostatic catalysis, metal ion catalysis, proximity and orientation effects, Low barrier H-bonds, structural flexibility. Mechanism of action of chymotrypsin

## **UNIT II ENZYME PURIFICATION**

**13 Hours**

Enzyme techniques: Isolation and purification of enzymes - Importance of enzyme purification, methods of purification- choice of source, extraction, fractionation methods-based on size or mass (centrifugation, gel filtration); based on polarity (ion-exchange chromatography, electrophoresis, isoelectric focusing, hydrophobic interaction chromatography); based on solubility (change in pH, change in ionic strength); based on specific binding sites (affinity chromatography), choice of methods, Criteria of purity of enzymes. Enzyme units - Katal, IU. Measurement of enzyme activity - discontinuous, continuous, coupled assays; stopped flow method and its applications. Isoenzymes and their separation by electrophoresis with special reference to LDH

## **UNIT III ENZYME KINETICS I**

**13 Hours**

Thermodynamics of enzyme action, activation energy, transition-state theory, steady-state kinetics and pre-steady-state kinetics. Single substrate enzyme catalyzed reactions -assumptions, Michaelis-Menten and Briggs-Haldane kinetics, derivation of Michaelis-Menten equation. Double reciprocal (Lineweaver-Burk) and single reciprocal (Eadie-Hofstee) linear plots, their advantages and limitations. Analysis of kinetic data- determination of  $K_m$ ,  $V_{max}$ ,  $k_{cat}$  and their physiological significance, Importance of  $k_{cat}/K_m$ . Enzyme inhibition: Irreversible inhibition. Reversible inhibition-competitive, uncompetitive, non-competitive, mixed and substrate inhibition. Michaelis-Menten equation in the presence of competitive, uncompetitive and non-competitive inhibitors. Graphical analysis - diagnostic plots for the determination of inhibition type. Therapeutic use of enzyme inhibitors-aspirin, statins (irreversible inhibitors), methotrexate (competitive inhibitor), etoposide (non-competitive inhibitor), camptothecin (uncompetitive inhibitor).

## UNIT IV ENZYME KINETICS II

13 Hours

Allosteric enzymes: cooperativity, MWC and KNF models of allosteric enzymes, Sigmoidal kinetics taking ATPase as an example. Regulation of amount and catalytic activity by - extracellular signal, transcription, stability of mRNA, rate of translation and degradation, compartmentation, pH, temperature, substrate concentration, allosteric effectors, covalent modification. Regulation of glycogen synthase and glycogen phosphorylase. Feedback inhibition-sequential, concerted, cumulative, enzyme-multiplicity with examples.

## UNIT V ENZYME TECHNOLOGY

13 Hours

Immobilization of enzymes – methods - reversible immobilization (adsorption and affinity binding), Irreversible immobilization (covalent coupling, entrapment and microencapsulation, crosslinking, advantages and disadvantages of each method, Properties of immobilized enzymes. Designer enzymes- ribozymes and deoxyribozymes, abzymes, synzymes. Enzymes as therapeutic agents-therapeutic use of asparaginase and streptokinase. Application of enzymes in industry-industrial application of rennin, lipases, lactases, invertase, pectinases and papain.

### Text Books

- Palmer T, Bonner PL (2008) *Enzymes* 2<sup>nd</sup> Ed. Horwood Publishing Ltd. Cambridge, UK.
- Buchholz K. et al. (2012) *Biocatalysts and Enzyme Technology* 2<sup>nd</sup> Ed. Wiley-Blackwell, New Jersey, USA
- Pandey A et al. (2010) *Enzyme Technology* Springer, Berlin, Germany.
- Nelson DL, Cox MM (2017) *Lehninger Principles of Biochemistry* 7<sup>th</sup> Ed. Freeman, New York, USA
- Balasubramanian D et al. (2004) *Concepts in Biotechnology* 2<sup>nd</sup> Ed. Cambridge University Press, Cambridge, UK

### Reference Books

- Dixon M, Webb DC (2014) *Enzymes* 2<sup>nd</sup> Ed. Elsevier, Amsterdam, Netherlands.
- Smith JE (2009) *Biotechnology* 5<sup>th</sup> Ed. Cambridge University Press, Cambridge, UK.
- Warton CW (2013) *Molecular enzymology* Springer, Berlin.
- Murphy A (2022) *Practical enzymology*, Murphy and Moore Publishing, New York.

### e -Resources (Online)

- <https://ocw.mit.edu/high-school/biology/exam-prep/chemistry-of-life/enzymes/>
- [https://onlinecourses.swayam2.ac.in/cec20\\_bt20/preview](https://onlinecourses.swayam2.ac.in/cec20_bt20/preview)
- <https://mooc.es/course/enzymology/>
- <https://dth.ac.in/medical/courses/biochemistry/block-1/1/index.php>
- <https://www.lecturio.com/medical-courses/enzymes-and-enzyme-kinetics.course#/>
- <https://www.nature.com/articles/nrd.2017.219>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4934206/>

## COURSE OUTCOMES

CO No.	On completion of the course, students will be able to	Bloom's Level
CO-1	Understand and define enzymes and understand their role as biological catalysts.	K1/K2
CO-2	Apply advanced techniques for the identification of amino acids at the active site, in the context of current research challenges.	K3
CO-3	Analyze the structural components of enzymes by using various enzyme techniques.	K4
CO-4	Evaluate the regulatory mechanism to propose research on the regulation of enzyme and catalytic activity.	K5
CO-5	Create multidisciplinary knowledge, of enzyme and catalytic activity.	K6

## CO – PSO MAPPING

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO-1	3	2	2	2	1	1
CO-2	3	2	2	2	1	1
CO-3	3	3	3	2	2	2
CO-4	3	3	3	2	2	3
CO-5	3	3	3	3	3	3

High correlation : 50%      Moderate correlation: 37%      Low correlation: 13%

## CLINICAL BIOCHEMISTRY PBCM212

Semester : II  
Category : Core Industry I  
Class & Major: I M.Sc. Biochemistry

Credit : 3  
Hours/Week : 4  
Total Hours : 52

## COURSE OBJECTIVES

CO No.	To enable the students to
CO-1	Educate about the details of inherited disorders
CO-2	Inculcate knowledge on the etiopathogenesis, symptoms and complications of metabolic and hormonal disorders and the relevant diagnostic markers
CO-3	Emphasize the diagnostic significance of serum enzymes in different pathologies and other laboratory investigations of diagnostic importance
CO-4	Conceive the role of inherited genes in inborn errors of metabolism and methodologies pertaining to <i>in utero</i> diagnosis and postnatal screening
CO-5	Get updated about electrolyte and hormonal imbalances and the biochemical tests to diagnose them

## **UNIT I MOLECULAR BASIS OF DISEASES I**

**11 Hours**

Genetic diseases. Elementary details of chromosomal disorders (Down syndrome, Klinefelter's syndrome), monogenic disorders (autosomal dominant, autosomal recessive, sex-linked). Multifactorial diseases.

Role of tissues and hormones in blood glucose homeostasis. Diabetes mellitus: classification, metabolic abnormalities, diagnosis, acute (diabetic ketoacidosis, HONK coma) and long term (nephropathy, neuropathy, retinopathy, diabetic foot) complications, management. Hypoglycemia- classification, clinical manifestations, diagnosis and management.

## **UNIT II MOLECULAR BASIS OF DISEASES II**

**11 Hours**

Atherosclerosis: risk factors, biochemical findings and management. Cancer - Differences between benign and malignant tumours. Growth characteristics of cancer cells. Morphological and biochemical changes in tumour cells. Tumor markers- oncofetal proteins, hormones, enzymes, tumor-associated antigens. Agents causing cancer (radiation, viruses and chemicals). Multistage carcinogenesis. Mechanisms of protooncogene activation. Functions of protooncogenes and tumor suppressor genes. Role of p53.

## **UNIT III LIVER DISORDERS**

**10 Hours**

Structure and function of the liver. Metabolism of bilirubin. Excretory, synthetic, detoxification and metabolic liver function tests. Plasma enzymes in liver disease. Jaundice- retention, regurgitation, neonatal. Inherited hyperbilirubinemias. Causes, consequences, biochemical findings and management of hepatitis, cirrhosis and gallstones.

## **UNIT IV GASTROINTESTINAL AND RENAL DISORDERS**

**10 Hours**

Gastric function tests. Peptic ulcer: pathogenesis, biochemical findings and management. Pancreatic and intestinal function tests. Causes, biochemical findings and consequences of pancreatitis, cystic fibrosis and malabsorption.

Kidney function tests. Collection and preservation of urine. Normal and abnormal constituents of urine. Tests for abnormal constituents in urine. Pathogenesis, biochemical findings and management of glomerulonephritis, renal failure, nephrotic syndrome and nephrolithiasis.

## **UNIT V MOLECULAR DIAGNOSIS AND THERAPEUTICS**

**10 Hours**

Composition and analysis of CSF. Diagnostic kits. Prenatal and neonatal screening for genetic disorders. DNA diagnostic systems - probes. RFLP and PCR in disease diagnosis. Viral diagnostics: immunodiagnosis, molecular diagnosis. SNP-based diagnosis. Therapeutic agents from

nonrecombinant and recombinant organisms. Antivirals and antiretrovirals. Drug delivery and targeting. Gene therapy: gene delivery systems, *ex vivo* and *in vivo* strategies, gene therapy for single-gene disorders, cancer and AIDS. Antisense and siRNA therapy. Nanotherapy. Stem cell therapy.

### Text Books

- Varley H et al. (2006) *Practical clinical biochemistry* 6<sup>th</sup> Ed. CBS Publishers, New Delhi.
- Mayne PD et al. (1994) *Clinical chemistry in diagnosis and treatment* 6<sup>th</sup> Ed. ELBS, Warsaw.
- Marshall WJ et al. (2016) *Clinical chemistry* 8<sup>th</sup> Ed. Mosby Publishers, Missouri.

### Reference Books

- Rodwell VW et al. (2018) *Harper's illustrated biochemistry* 31<sup>st</sup> Ed. McGraw Hill, New York.
- Glick BR et al. (2010) *Molecular biotechnology: principles and applications of recombinant DNA* 4<sup>th</sup> Ed. ASM Press, Washington.
- Burtis CA (2018) *Tietz textbook of clinical chemistry and molecular diagnostics* 8<sup>th</sup> Ed. Saunders Publishers, Philadelphia.
- Kasper EL (2015) *Harrison's principles of internal medicine* 19<sup>th</sup> Ed. McGraw Hill, New York.
- Sood R (2019) *Textbook of clinical biochemistry*, CBS Publishers, New Delhi.

### e- Resources (Online)

- <https://www.aacc.org/science-and-research/clinical-chemistry>
- DOI: 10.7860/NJLM/2016/22587:2173
- <https://doi.org/10.2147/JMDH.S286679>
- <https://diabetesjournals.org/clinical/article/40/1/10/139035/>
- <http://www.ngsp.org/>
- <https://www.researchgate.net/publication/335830829>
- <https://labpedia.net/quality-control-of-the-clinical-laboratory/>
- <https://journals.sagepub.com/doi/full/10.1016/j.jala.2008.12.001>
- <https://doi.org/10.1016/B978-0-12-407821-5.00004-8>
- <https://www.westgard.com/cli.htm>
- <https://www.labroots.com/webinar/bio-rad-unity-solution-molecular-quality-control-data->

### COURSE OUTCOMES

CO No.	On completion of the course, students will be able to	Bloom's Level
CO-1	Remember and explain the role of clinical biochemistry in disease diagnosis and management.	K1/K2
CO-2	Correlate biochemical findings with clinical conditions and disease states.	K3
CO-3	Analyze the advance experimental methodologies in investigating and contributing to the development of research in clinical field.	K4

CO-4	Evaluate the principles of recent advancements in diagnosis and therapy in the field of clinical biochemistry.	K5
CO-5	Elaborate and explain the applications of diseases of the major organs and systems in functional tests for diagnosis and treatment.	K6

### CO – PSO MAPPING

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO-1	3	2	2	1	1	1
CO-2	3	2	2	1	1	1
CO-3	3	3	3	2	2	2
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

High correlation : 57%      Moderate correlation: 23%      Low correlation : 20%

## CELLULAR METABOLISM PBCO201

Semester : II  
 Category : Core Elective III  
 Class & Major : I M.Sc. Biochemistry

Credit : 3  
 Hours/Week : 4  
 Total Hours : 52

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Familiarize on blood glucose homeostasis
CO-2	Provide an insight into the metabolic pathway of glycogen, glycoprotein, mucopolysaccharide and peptidoglycan with clinical correlation wherever required
CO-3	Inculcate knowledge on nucleotide metabolism and disorders associated with it
CO-4	Provide a platform to understand the versatile role of PLP in amino acid degradation, formation of specialised products and disorders associated with ammonia detoxification
CO-5	Educate on heme and sulphur metabolism with associated clinical manifestation

### UNIT I BIOENERGETICS AND BIOLOGICAL OXIDATION

**10 Hours**

Free energy and entropy, endergonic and exergonic reactions Phosphoryl group transfers and ATP. Enzymes involved in redox reactions. The electron transport chain - organization of respiratory chain complexes and electron flow.

Oxidative phosphorylation - electron transfer reactions in mitochondria.  $F_1F_0$  ATPase - structure and mechanism of action. The chemiosmotic theory. Inhibitors of respiratory chain and oxidative phosphorylation - poisons, uncouplers and ionophores. Regulation of oxidative phosphorylation.

Mitochondrial transport systems - ATP/ADP exchange, malate/glycerophosphate shuttle, creatine-phosphate shuttle.

## **UNIT II CARBOHYDRATE METABOLISM**

**11 Hours**

Overview of glycolysis and gluconeogenesis- regulation. The citric acid cycle and regulation. The pentose phosphate pathway and uronic acid pathway. Metabolism of glycogen and regulation. Glycogen storage diseases. Galactosemia. Fructose intolerance and fructosuria. The glyoxylate cycle. Cori cycle.

Photosynthesis- photosynthetic apparatus, light reaction, cyclic and noncyclic photophosphorylation. Dark reaction- Calvin cycle, Hatch-Slack pathway. Photorespiration. Starch biosynthesis and degradation.

## **UNIT III LIPID METABOLISM**

**11 Hours**

Oxidation of fatty acids - role of carnitine in fatty acid transport,  $\alpha$ ,  $\beta$  and  $\omega$ -oxidation. Metabolism of ketone bodies. Biosynthesis of fatty acids - Fatty acid synthase complex - regulation of lipogenesis. Metabolism of triglycerides, phospholipids and sphingolipids. Cholesterol - biosynthesis, regulation, transport and excretion. Metabolism of prostaglandins - COX

## **UNIT IV AMINO ACID AND PORPHYRIN METABOLISM**

**10 Hours**

Biosynthesis of nonessential amino acids (any two). Catabolism of amino acid nitrogen-transamination, deamination, ammonia formation and the urea cycle. Catabolism of carbon skeletons of amino acids. Conversion of amino acids to special products. Disorders of amino acid metabolism- phenylketonuria, alkaptonuria, albinism, and maple syrup urine disease. Biosynthesis and degradation of porphyrins and heme. Porphyrrias.

## **UNIT V METABOLISM OF PURINES AND PYRIMIDINES AND METABOLIC INTEGRATION**

**10 Hours**

Metabolism of purines- *de novo* and salvage pathways for biosynthesis. Purine catabolism. Biosynthesis and catabolism of pyrimidines. Regulation of purine and pyrimidine metabolism. Hyperuricemia and gout. Hypouricemia. Oroticaciduria.

### **Text Books**

- Plummer DT (2006) *An introduction to practical biochemistry* 3<sup>rd</sup> Ed. Tata McGraw Hill Pvt. Ltd. New Delhi.
- Voet D, Voet JG, Pratt CW (2018) *Fundamentals of biochemistry* 5<sup>th</sup> Ed. Wiley, New York.
- Rodwell VW et al. (2018) *Harper's illustrated biochemistry* 31<sup>st</sup> Ed. McGraw Hill, New York.

- Nelson DL, Cox MM, (2017) *Lehninger Principles of Biochemistry*, 7th Ed. Freeman Publishers, New York

### Reference Books

- Frayn KN (2013) *Metabolic regulation. A human perspective* 3<sup>rd</sup> Ed. Wiley-Blackwell, New Jersey.
- Berg JM et al. (2023) *Biochemistry* 10<sup>th</sup> Ed. Macmillan Education, London.
- Kuchel PW et al. (2011) *Schaum's outline of biochemistry* 3<sup>rd</sup> Ed. McGraw Hill, New York.

### e- Resources (Online)

- <https://www.embopress.org/doi/full/10.1038/msb.2013.19>
- <https://people.wou.edu/~guralnl/450Glycogen%20metabolism.pdf>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3243375/>
- [https://www.researchgate.net/publication/334458898\\_Urea\\_Cycle](https://www.researchgate.net/publication/334458898_Urea_Cycle)
- [https://www.researchgate.net/publication/51233381\\_Heme\\_biosynthesis](https://www.researchgate.net/publication/51233381_Heme_biosynthesis)
- <https://www.researchgate.net/publication/349746691>

### COURSE OUTCOMES

CO No.	On completion of the course, students will be able to	Bloom's Level
CO-1	Define cellular metabolism and understand the interconnection between catabolic and anabolic pathways in the overall functioning of cells.	K1, K2
CO-2	Apply knowledge of bioenergetics and biological oxidation to predict the energy in from various metabolic reactions.	K3
CO-3	Analyze the regulatory mechanisms governing bioenergetics and oxidation process within a cell and integration of various metabolic pathways.	K4
CO-4	Evaluate and interpret innovative insights by synthesizing information across bioenergetics, oxidation and diverse metabolic pathways.	K5
CO-5	Critically assess theories in bioenergetics and metabolic pathways and propose innovative concepts for metabolic integration	K6

### CO – PSO MAPPING

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO-1	3	2	2	2	1	1
CO-2	3	2	2	1	1	1
CO-3	3	2	2	2	1	1
CO-4	3	3	3	2	2	2
CO-5	3	3	3	3	3	3

High correlation : 40%      Moderate correlation: 37%      Low correlation : 23%



# ADVANCED IMMUNOLOGY

## PBCD201

**Semester : II**  
**Category : Core Elective IV**  
**Class & Major : I M.Sc Biochemistry**

**Credit : 2**  
**Hours/ Week : 3**  
**Total Hours : 39**

### COURSE OBJECTIVES

CO No.	To enable the students to
CO-1	Master about Immune Cell Types, Antigens and Antibodies
CO-2	Comprehend the Features of Types of Immunity and Vaccines
CO-3	Gain Knowledge on Antibody Diversity and Transplantation
CO-4	Elucidate about Hypersensitivity and Tumor Immunology
CO-5	Inculcate Detailed Knowledge on Immunotechniques

### UNIT I IMMUNE CELL TYPES, ANTIGENS AND ANTIBODIES

**8 Hours**

Central and peripheral lymphoid organs. Bone marrow, thymus. Lymph node, spleen and mucosal associated lymphoid tissue. Cells of the lymphoreticular system. T-Cells, B-Cells, mononuclear phagocytes, dendritic cells, granulocytes, NK cells, mast cells. Antigens definition antigenicity, antigenic determinants, haptens and epitopes. Antibodies - structure, classification and functions Complement system- components, nomenclature, activation of complement, classical pathway and alternate pathway. Biological functions of complement.

### UNIT II TYPES OF IMMUNITY AND VACCINES

**8 Hours**

Types of immunity - innate and acquired immunity, Antigen recognition - T-cell and B-cell receptor complexes, antigen processing and presentation pathways. Interaction of T and B-cells. Immunological memory, Effector mechanisms: phagocytosis, cell mediated cytotoxicity, antibody dependent cell mediated cytotoxicity. Vaccines-killed, attenuated organisms, toxoids, recombinant vaccines, subunit vaccines, DNA vaccines.

### UNIT III ANTIBODY DIVERSITY AND TRANSPLANTATION

**8 Hours**

Antibody diversity - mechanisms contributing to diversity- somatic recombination, rearrangement and generation of antibody diversity. Class switching. MHC complex- gene organisation - HLA genes class I and II antigens. Histocompatibility testing. MHC and disease association. Transplantation-types - Graft versus host reactions. Immunosuppressive agents. Clonal selection theory.

### UNIT IV HYPERSENSITIVITY, IMMUNE DISORDERS AND TUMOR IMMUNOLOGY

**8 Hours**

Hypersensitivity - Definition and classification - type I to type V (brief account only). Autoimmunity and autoimmune disease - SLE. AIDS- pathogenesis, diagnosis and treatment. Tumor immunology - immune surveillance, tumor antigens, immune response to tumors.

## UNIT V IMMUNOTECHNIQUES

**7 Hours**

Immunochemical techniques - production of antibodies - polyclonal and monoclonal antibodies. Applications of Mab. Immunoprecipitation, RIA, ELISA, fluorescence immune-assay, immunohistochemistry, immunoelectrophoresis, immunoblotting. Complement fixation test.

### Text Books

- Punt J, Stranford S (2018) *Kuby Immunology* 8th Ed. WH Freeman & Co, New York.
- Abbas AK et al. (2018) *Cellular and Molecular Immunology* 9th Ed. Elsevier, Berlin.
- Murphy KM et al. (2017) *Janeway's Immunology: the immune system* 8th Ed. Garland Science, New York.
- Coico R, Sunshine G (2015) *Immunology: A short Course* 7th Ed. Wiley, New Jersey.

### Reference Books

- Delves, PJ et al. (2017) *Roitt's Essential Immunology*, 13th Ed. Willey-Blackwell Sci. New Jersey.
- Flajnik M (2022) *Paul's fundamental immunology* 8<sup>th</sup> Ed. LWW Publishers, Philadelphia.
- Abbas A et al. (2021) *Cellular and molecular immunology* 10<sup>th</sup> Ed. Elsevier, Amsterdam.

### E- Resources (Online)

- <https://apps.who.int/iris/bitstream/handle/10665/58891/WHO/>
- [https://hmmcollege.ac.in/uploads/3\\_Immunology.pdf](https://hmmcollege.ac.in/uploads/3_Immunology.pdf)
- <http://www.helmberg.at/immunology.pdf>
- <https://booksite.elsevier.com/samplechapters/9780443073267/9780443073267.pdf>
- <https://aacijournal.biomedcentral.com/articles/10.1186/s13223-018-0278-1>

## COURSE OUTCOMES

CO No.	On completion of the course, students will be able to	Bloom's Level
CO1	Relate and recall various immune cell types, antigens and antibodies, types of immunity, vaccines, antibody diversity, hypersensitivity reactions, immune disorders, tumor immunology, and immunotechniques.	K1 & K2
CO2	Develop the ability to critically evaluate situations, make informed decisions, and propose solutions based on an in-depth understanding of advanced immunological concepts.	K3
CO3	Analyze and integrate knowledge of immune cell types, antigens, antibodies, types of immunity, vaccines, antibody diversity, transplantation, hypersensitivity, immune disorders, tumor immunology, and immunotechniques.	K4
CO4	Interpret by proposing groundbreaking theories, methodologies, or applications within the field of Advanced Immunology.	K5

<b>CO5</b>	Elaborate the ability to integrate diverse concepts, design comprehensive research projects, and contribute original insights to the advancement of knowledge in immunological sciences.	K6
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**CO – PSO MAPPING**

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO-1</b>	3	2	2	1	1	1
<b>CO-2</b>	3	2	2	1	1	1
<b>CO-3</b>	3	3	3	1	1	1
<b>CO-4</b>	3	3	3	1	2	2
<b>CO-5</b>	3	3	3	2	3	3

**High correlation : 36.7% Moderate correlation: 56.6% Low correlation : 06.7%**

**LABORATORY COURSE IN IMMUNOLOGY AND ENZYMOLOGY  
PBCR204**

**Semester : II**  
**Category : Core Practical II**  
**Class & Major : I M.Sc Biochemistry**

**Credit : 8**  
**Hours/ Week : 10**  
**Total Hours : 130**

**COURSE OBJECTIVES**

CO No.	To enable the students to
CO-1	Apprehend wider knowledge about technique of blood grouping
CO-2	Inculcate knowledge of antigen-antibody interaction
CO-3	Perform antigen/antibody reaction by ELISA
CO-4	Isolate enzyme from biological sources
CO-5	Measure activity and specific activity of enzyme

**Immunology (any five)**

1. Blood grouping and Rh typing
2. Radial immunodiffusion
3. Double diffusion
4. Agglutination, rosette formation and complement fixation
5. Preparation of antisera
6. Immunoelectrophoresis (demonstration)
7. ELISA (demonstration)

**Enzymology**

***Alkaline phosphatase***

1. Isolation of alkaline phosphatase from goat kidney

2. Determination of activity of alkaline phosphatase ( $p^H$ , temperature,  $K_m$ , Activity)
3. Effect of activators and inhibitors on the activity of alkaline phosphatase

*Assay of enzymes*

1. Salivary amylase
2. Urease

**Text Books**

- Shankara SYM et al. (2013) *A laboratory manual for practical biochemistry* 2<sup>nd</sup> Ed. Jaypee brothers medical publishers (P) Ltd. New Delhi.
- Davey J, Lord M (2005) *Essential cell biology: a practical approach* 4<sup>th</sup> Ed. Oxford University Press, London
- Plummer DT, (2017), *An introduction to Practical Biochemistry*, 3<sup>rd</sup> Ed, Tata McGraw Hill, New Delhi.
- Sadasivam S, Manickam A (2018) *Biochemical methods*, New Age International Publishers, New Delhi.
- Chavan SA et al. (2019) *A guide to chromatography techniques* 1<sup>st</sup> Ed. Notion press, Chennai.
- Murphy A (2022) *Practical enzymology*, Murphy and Moore Publishing, New York.

**E- Resources (Online)**

- [https://www.researchgate.net/publication/313745155\\_Practical\\_Bio\\_chemistry](https://www.researchgate.net/publication/313745155_Practical_Bio_chemistry)
- <https://doi.org/10.1186/s13020-018-0177-x>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5368116/>
- <https://www.life.illinois.edu/biochem/455/Lab%20exercises/2Photometry/>
- <https://ijpsr.com/bft-article/determination-of-total-flavonoid-and-phenol>
- <https://skyfox.co/wp-content/uploads/2020/12/Practical-Manual-of-Biochemistry.pdf>

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Classify and identify human blood groups and Rh factor	K1, K2 & K4
CO-2	Demonstrate Ag-Ab interaction in vitro by immunoprecipitation and electrophoresis	K1 – K4
CO-3	Analyse quantitatively antigen-antibody reaction by ELISA	K1, K2 & K4
CO-4	Isolate enzymes from biological sources	K1 – K4, K6
CO-5	Undertake the effect of inhibitors on enzyme activity	K1 – K4, K6

**BIOINFORMATICS  
PBCD201**

**Semester : II**  
**Category : SEC/DSC**  
**Class & Major: I PG**

**Credit: 2**  
**Hours/Week: 3**  
**Total Hours: 39**

## COURSE OBJECTIVES:

CO No.	To enable the students to
CO-1	Understand the basic concept bioinformatics and its significance in biological data analysis
CO-2	Able to understand the different biological databases.
CO-3	Overview about the biological macromolecular structures.
CO-4	Become familiar with a variety of currently available genomic and proteomic databases
CO-5	Learn how to compare and analyze biological sequences

### UNIT-I: HISTORY OF BIOINFORMATICS:

**8 Hours**

History of Bioinformatics - Objectives and scope of Bioinformatics Fields related to Objectives, scope, genome mapping as a source of Bioinformatics, Search Engines.

### UNIT – II: BIOLOGICAL DATABASES:

**8Hours**

DNA, RNA and Proteins. Online resources for Bioinformatics – Biological Databases – NCBI, Genbank, EMBL, Swissprot, PDB. Executing search and retrieval of data. Sequence alignment – Multiple sequence alignment – Pairwise alignment.

Lab Demo Class: NCBI, EMBL and PDB.

### UNIT- III: GENE SEQUENCING TOOLS:

**7 Hours**

Gene sequencing tools traditional methods – Maxam and Gilbert’s method, Sanger’s sequencing – structure prediction tools – Nucleic acid and protein structure prediction – Gene and protein expression analysis – similarity search databases – FASTA, BLAST. Analysis of Phylogeny - Phylogenetic tree construction.

Lab Demo Class: FASTA and BLAST.

### UNIT – IV: MOLECULAR DOCKING TOOLS:

**8 Hours**

Structure based drug discovery – Molecular docking of novel compounds – SAR and QSAR, Introduction to Simulation softwares in biology – Autodock, ADMET.

Lab Demo Class: AUTODOCK and ADMET.

### UNIT – V: VISUALIZATION TOOLS AND APPLICATIONS OF BIOINFORMATICS:

**8 Hours**

Protein structure visualization tools – RasMol, HEX, Argus Lab Swiss PDB Viewer - Structure Classification, alignment and analysis – SCOP, CATH, FSSP, UNIX. Medicine, Agriculture, Environmental monitoring - Emerging areas in bioinformatics.

Lab Demo Class: RasMol, HEX, Argus Lab Swiss PDB Viewer.

**TEXT BOOKS:**

- Manoj Kumar, (2020), *Introduction to Bioinformatics*, Notion press.
- Shoba Ranganathan, Kenta Nakai, Christian Schonbach (2018), *Encyclopedia of Bioinformatics and Computational Biology: ABC of Bioinformatics*, Elsevier
- Hamid R Arabnia, Quoc Nam Tran Emerging (2015), *Trends in Computational Biology, Bioinformatics, and Systems Biology: Algorithms and Software Tools (Emerging Trends in Computer Science and Applied Computing) Morgan Kaufmann; 1st Edition*

**REFERNCE BOOKS:**

- Andres D Baxevanis and Francis Quellette B F, (2016). *Bioinformatics – a Practical guide to the analysisof genes and proteins*, Willey publication, New Delhi.
- Arthur M. Lesk, (2006). *Introduction to Bioinformatics Second Edition*, Oxford University press, UK.
- Jerry Gu, Phlip E Bowrne, (2009). *Structural Bioinformatics*, Willey- blockwell publication, New Delhi.

**E- Resources:**

- [www.pubmed](http://www.pubmed)
- [www.ncbi.nlm.org](http://www.ncbi.nlm.org)
- [www.fasta](http://www.fasta)
- [www.blast](http://www.blast)

**COURSE OUTCOMES**

<b>CO No.</b>	<b>On completion of the course, To enable the students to</b>	<b>Bloom's Level</b>
<b>CO1</b>	Explain the role of historical developments in shaping the field of bioinformatics and identifying biological databases and their significances.	K1, K2
<b>CO2</b>	Apply bioinformatics approaches to solve real world biological problems and analyze data generated from diverse sources.	K3
<b>CO3</b>	Analyze the structure and content of biological databases, assessing their strength and limitations.	K4
<b>CO4</b>	Evaluate novel approaches for combining gene sequencing, molecular docking and visualization tools in integrating work flows.	K5
<b>CO5</b>	Develop the diverse applications of bioinformatics in the context of contemporary scientific practices.	K6

## CO – PSO MAPPING

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO-1	3	2	2	1	1	1
CO-2	3	2	2	1	1	1
CO-2	3	3	2	2	2	2
CO-4	3	3	2	2	2	2
CO-5	3	3	3	3	3	3

**High correlation : 40% Moderate correlation: 40% Low correlation: 20%**

## III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
I	Core I	PBCM111	Basics of Biochemistry	e-Poster presentation	PPT Presentation
	Core II/ DSC II	PBCM112	Biochemical and Molecular Biology Techniques	Model	PPT Presentation
	Core Elective I	PBCM113	Physiology and Cell Biology	Chart presentation	Model
	Elective V NME-I	PBCE105	Nutritional Biochemistry	e-Poster presentation	Chart presentation
II	Core IV	PBCM211	Cellular Metabolism	e-Poster presentation	Model
	Core V	PBCM212	Clinical Biochemistry	Case study	e- Quiz
	Core Elective III	PBCM213	Enzymology	e-Poster presentation	Group Discussion
	Intra Department Elective IV	PBCI201	Advanced Immunology	e-Poster presentation	Model
	SEC/DSC	PBIA201	Bioinformatics	Assignment	Seminar

## PG & RESEARCH DEPARTMENT OF MATHEMATICS

### PREAMBLE

**UG:** Programme profile for I to VI Semester and the syllabi of courses offered in semester I and II along with III and IV Evaluation Components (with effect from 2023-2026) batch onwards.

**PG:** Programme Profile for I to IV Semester and the Syllabi of Courses offered in the I and II Semester along with Evaluation Components III & IV (with effect from 2023-2025) batch Onwards)

### PROGRAMME SPECIFIC OUTCOMES

PSO No.	Upon completion of the Programme, the students will be able to
PSO-1	Understand the fundamentals of Pure and Applied Mathematics and think possibilities for problems and find alternate solutions.
PSO-2	Demonstrate mathematical thoughts and ideas clearly and concisely to others by effective communication
PSO-3	Apply Mathematics in real life situations aiming at service to the society.
PSO-4	Analyze mathematical systems utilizing rich experiences that encourage independent, nontrivial, constructive exploration in mathematics.
PSO-5	Determine professional and ethical responsibility that has an impact on their higher studies and Professional career.
PSO-6	Develop sound mathematics knowledge to take competitive exams and get placed

### PROGRAMME PROFILE B.Sc. (MATHEMATICS)

Semester	Part	Category	CourseCode	CourseTitle	Contact Hours/week	Credit
						Min/Max
I	I	Tamil/Hindi/French	UTAL110/ UHIL101/ UFRL101	General Tamil-I/ Hindi-I/ French-I	5	3
	II	English	UENL111	General English - I	5	3
	III	Core Course I	UMAM110	Algebra and Trigonometry	4	4
		Core Course II	UMAM112	Differential Calculus	5	4
		Major Allied I	UMAA121	MathematicalStatistics	5	3
	IV	SEC Foundation Course	UMAF101	Bridge Mathematics	2	2
		Skill Enhancement Course (NME)	-	-	2	2
		Ability Enhancement Compulsory Course(AECC 1) Soft Skill-1	USKS103	Soft Skill	2	2
				<b>Total</b>	<b>30</b>	<b>23</b>



II	I	Tamil/Hindi/French	UTAL210/ UHIL201/ UFRL201	General Tamil-II/ Hindi-II/ French-II	5	3
	II	English	UENL211	General English - II	5	3
	III	Core Course III	UMAM210	Analytical Geometry (Two & Three Dimensions)	5	4
		Core Course IV	UMAM212	Integral Calculus	5	4
		Major Allied II	UPHA202	Allied Physics	4	3
		Internship	UINS201			1/2
	IV	Skill Enhancement Course (Discipline / Subject Specific)	UMAD201	Computational Mathematics	2	2
		Skill Enhancement Course (NME II)	-	-	2	2
		Ability Enhancement Compulsory Course(AECC 1) Soft Skill-II	USKS203	Soft Skill	2	2
	V	Extension Activity/ Physical Education (Outside class hours)			-	1/2
VI	Value Added Course (Outside class hours)			-	2	
<b>Total</b>					<b>30</b>	<b>24/29</b>
III	I	Tamil/Hindi/French	UTAL310/ UHIL301/ UFRL301	General Tamil-III/ Hindi-III/ French-III	5	3
	II	English	UENL311	General English - III	5	3
	III	Core Course V	UMAM310	Vector Calculus and Applications	4	4
		Core Course VI	UMAM312	Differential Equations and Applications	4	4
		Major Allied III	UCSA307	Programming Language with Python	4	3
	IV	Skill Enhancement Course (Discipline / Subject Specific)	UMAD311	Statistics with R Programming	2	2
		Skill Enhancement Course (Entrepreneurship)	-	-	2	1
		Value Education	-	-	2	2
		Ability Enhancement Compulsory Course(AECC 1) Soft Skill-III	-	-	2	2
	<b>Total</b>					<b>30</b>
IV	I	Tamil/Hindi/French	UTAL410/ UHIL401/ UFRL401	General Tamil-IV/ Hindi-IV/ French-IV	5	3

	II	English	UENL411	General English - I	5	3
	III	Core Course VII	UMAM408	Industrial Statistics	5	4
		Core Course VIII	UMAM410	Elements of Mathematical Analysis	5	4
		Major Allied IV	UMAA412	Integral Transforms & Z Transform	4	3
		Internship	UINS401	-	-	-/2
	IV	Skill Enhancement Course (Discipline / Subject Specific)	UMAD401	Computing Mathematics	2	2
		NME-online course	-	-	2	2
		Ability Enhancement Compulsory Course (AECC 1) Soft Skill-IV			2	2
	V	Extension Activity/ Physical Education (60 Hours Compulsory)	-	-	-	-/2
	VI	Value Added Course, (Outside class hours)	-	-	-	-/2
	<b>Total</b>					<b>30</b>
V	III	Core Course IX	UMAM516	Abstract Algebra	5	4
		Core Course X	UMAM517	Real Analysis	5	4
		Core Course XI	UMAM518	Discrete Mathematics	5	4
		Core Elective V	UMAM519	Introduction to Machine Learning-Theory & Practical	5	3
		Core Elective VI	UMAM520	Optimization Techniques	4	3
		Core Course XII	UMAP601	Project	4	4
	IV	Environmental Studies			2	2
<b>Total</b>					<b>30</b>	<b>24</b>
VI	III	Core Course (XIII)	UMAM619	Linear Algebra	5	4
		Core Course (XIV)	UMAM620	Complex Analysis	5	4
		Core Course (XV)	UMAM621	Mechanics	5	4
		Core Elective VII	UMAM622	Programming Language with C++ with Practical	5	3
		Core Elective VIII	UMAM623	Graph Theory	6	4
		Internship	UINS601	Internship	-	-/2
	IV	Professional Competency Skill	-	-	4	2

		Comprehensive Viva - voce		-	-	1
	V	Extension Activity			-	-/2
	VI	Value Added Course			-	-
				<b>Total</b>	<b>30</b>	<b>22/26</b>
				<b>Grand Total</b>	<b>180</b>	<b>140/155</b>

### EXTRACREDIT EARNING PROVISION

Semester	Part	Category	Course code	Course Title	Contact Hours/week	Credit	
						Min	Max
II	III	Self Study paper	UMAI201	Summer Internship	-	-	1
IV	III	Self Study paper	UMAI401	Summer Internship	-	-	1
VI	III	Self Study paper	UMAS601 UMAS602 UMAS603 UMAS604	Fourier Transforms Simulation Number Theory Project	2	-	2

### BRIDGE MATHEMATICS

#### UMAF101

**Semester : I**  
**Category : Core XII/ DSC (XII)**  
**Class & Major : I B.Sc Mathematics**

**Credits : 2**  
**Hours/Week : 2**  
**Total Hours : 26**

#### Course Objectives

CO No.	To enable the students
CO-1	Define the basic concepts of Vector spaces, linear transformations and Matrix Algebra.
CO-2	Explain the vector space, subspace and basis for a vector space.
CO-3	Identify the linear combinations of vectors in $R^n$ and identify sets of vectors that are linearly independent.
CO-4	Compare eigen values and eigen vectors, and systems of linear ordinary differential equations.
CO-5	Develop on the algebra of matrices in order to solve applied and theoretical problems.

**UNIT-I ALGEBRA****5 Hours**

Algebra: Binomial theorem, General term, middle term, problems based on these concepts

**UNIT-II SEQUENCE AND SERIES****5 Hours**

Sequences and series (Progressions). Fundamental principle of counting. Factorial n..

**UNIT-III PERMUTATIONS AND COMBINATIONS****5 Hours**

Permutations and combinations, Derivation of formulae and their connections, simple applications, combinations with repetitions, arrangements within groups, formation of groups.

**UNIT-IV TRIGONOMETRY****6 Hours**

Trigonometry: Trigonometric Functions, Introduction to trigonometric ratios, proof of  $\sin(A+B)$ ,  $\cos(A+B)$ ,  $\tan(A+B)$  formulae, multiple and sub multiple angles,  $\sin(2A)$ ,  $\cos(2A)$ ,  $\tan(2A)$  etc., transformations sum into product and product into sum formulae, inverse trigonometric functions, sine rule and cosine rule.

**UNIT-V CALCULUS****5 Hours**

Calculus: Limits, standard formulae and problems, differentiation, first principle, uv rule, u/v rule, methods of differentiation, application of derivatives, integration - product rule and substitution method..

**TextBook**

- NCERT class XI and XII text books.
- Any State Board Mathematics text books of class XI and XII.

**e-Resources**

- <https://nptel.ac.in>

**Course Outcomes:**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Find and Illustrate the binomial theorem to expansions of any $(x + y)^n$ .	K1 & K2
CO-2	Identify the various sequences and series and the principle of counting.	K3
CO-3	Apply the principle of counting to solve the problems on permutations and combinations.	K4

CO-4	Explain various trigonometric ratios and find them for different angles, including sum of the angles, multiple and sub multiple angles, etc. Also, they can solve the problems using the transformations.	K5
CO-5	Develop the limit and derivative of a function at a point, the definite and indefinite integral of a function. Find the points of min/max of a function.	K6

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	2
CO 2	3	3	3	3	3	3
CO 3	3	3	3	3	3	2
CO 4	3	3	3	2	2	3
CO 5	3	3	3	3	3	2

High Correlation: 83% Moderate Correlation : 17% Low Correlation: 0%

## ALGEBRA & TRIGONOMETRY UMAM110

Semester : I  
Category : Core  
Class & Major: I B.Sc Mathematics

Credits : 4  
Hours/Week : 5  
Total Hours :65

### Course Objectives

CO No.	To enable the students
CO-1	Recall the Binomial, Exponential and Logarithmic series.
CO-2	Identify the Skew-Hermitian matrices, Orthogonal and Unitary Matrices.
CO-3	Solve the techniques in Successive Differentiation.
CO-4	Discover the Trigonometric series and its applications.
CO-5	Evaluate hyperbolic function and their properties.

### UNIT-I ROOTS OF POLYNOMIALS

**13 Hours**

Reciprocal Equations-Standard form-Increasing or decreasing the roots of a given equation-Removal of terms, approximate solutions of roots of polynomials by Horner's method – related problems. (Demo from DESMOS Software).

### UNIT-II ALGEBRA

**13 Hours**

Summation of Series: Binomial– Exponential –Logarithmic series (Theorems without proof) – Approximations - related problems.

### UNIT-III MATRIX

**13 Hours**

Characteristic equation –Eigen values and Eigen Vectors-Similar matrices - Cayley – Hamilton Theorem (Statement only) - Finding powers of square matrix, Inverse of a square matrix up to order 3, Diagonalization of square matrices - related problems.

**UNIT-IV TRIGONOMETRY****13 Hours**

Expansions of  $\sin nx$ ,  $\cos nx$  in powers of  $\sin x$ ,  $\cos x$  - Expansion of  $\tan nx$  in terms of  $\tan x$ ,  
 Expansions of  $\cos^n x$ ,  $\sin^n x$ ,  $\cos^m x \sin^n x$  –Expansions of  $\tan(x_1+x_2+\dots+x_n)$ -Expansions of  $\sin x$ ,  
 $\cos x$  and  $\tan x$  in terms of  $x$  - related problems.

**UNIT-V HYPERBOLIC FUNCTIONS****13 Hours**

Hyperbolic functions-Formula involving Hyperbolic functions- – Relation between circular and hyperbolic functions -Expansion of  $\sinh x$ ,  $\cosh x$ ,  $\tanh x$  in powers of  $x$ -Inverse hyperbolic functions, Logarithm of complex quantities, Summation of trigonometric series - related problems.

**Text Book**

- Manicavachagom Pillay, T. K. Natarajan, T. and Ganapathy, K.S. (2004). *Algebra Volume I & II*. S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai.
- Narayanan, S. and Manicavachagom Pillay, T.K. (2004). *Trigonometry*. S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai.

**Reference Books**

- David C. Lay.( 2007). *Linear Algebra and its Applications*, 3rd Ed., Pearson Education Asia, Indian Reprint.
- G.B. Thomas and R.L. Finney. (2005). *Calculus*, 9th Ed., Pearson Education, Delhi.
- C.V.Durell and A. Robson. (2003). *Advanced Trigonometry*, Courier Corporation.
- J.Stewart, L. Redlin, and S. Watson.(2012) *Algebra and Trigonometry*, Cengage Learning.

**E- Resources**

- <https://nptel.ac.in/syllabus/111106053/>

**Course Outcomes:**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Define and Classify reciprocal equations	K1 & K2
CO-2	Identify the sum of binomial, exponential and logarithmic series	K3
CO-3	Discover Eigen values, eigen vectors, verify Cayley – Hamilton theorem and diagonalizable a given matrix.	K4
CO-4	Determine the powers and multiples of trigonometric functions in terms of sine and cosine.	K5
CO-5	Improve the relationship between circular and hyperbolic functions and the summation of trigonometric series.	K6

## CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	2	2	3	2	2	3
CO 3	2	3	2	2	2	2
CO 4	3	3	3	3	3	3
CO 5	2	3	3	3	3	3

High Correlation: 67% Moderate Correlation : 33% Low Correlation: 0%

## DIFFERENTIAL CALCULUS

### UMAM112

Semester	:I	Credit	: 4
Category	:Core	Hours/Week	: 5
Class &Major:	I B.ScMathematics	TotalHours	:65

### Course Objectives:

CO No.	To enable the students
CO-1	Relate the concepts of Functions, Limits, Derivative, Continuous and Inverse Trigonometrically Functions.
CO-2	Explain the relationship between the function and the notion of Derivative.
CO-3	Solve Problems with continuous change in quantities.
CO-4	Compare the ideas of Continuity and Differentiability.
CO-5	Develop the Algebraic Equations and Inequalities.

### UNIT-I SUCCESSIVE DIFFERENTIATION

13 Hours

Introduction (Review of basic concepts) – The  $n^{th}$  derivative – Standard results – Fractional expressions – Trigonometrical transformation –The  $n^{th}$  derivatives of the products of the powers of sines and cosines- Formation of equations involving derivatives – Leibnitz formula for the  $n^{th}$  derivative of a product – Feynman’s method of differentiation.

### UNIT-II PARTIAL DIFFERENTIOATION

13 Hours

Partial derivatives – Successive partial derivatives – Function of a function rule – Total differential coefficient – A special case –Composite functions-Differentiation of Composite functions- Implicit Functions.

### UNIT-III PARTIAL DIFFERENTIOATION (CONTINUED)

13 Hours

Homogeneous functions – Partial derivatives of a function of two variables – Maxima and Minima of functions of two variables - Lagrange’s method of undetermined multipliers.

**UNIT-IV ENVELOPE****13 Hours**

Definition-Determination of Envelope-Method of finding the envelope – Another definition of envelope – Envelope of family of curves which are quadratic in the parameter.

**UNIT-V CURVATURE****13 Hours**

Definition of Curvature – Circle, Radius and Centre of Curvature – Evolutes and Involutives – Radius of Curvature in Polar Co-ordinates.

**TextBooks**

- Thomas Finney, (2014). *Calculus and Analytic Geometry* (13<sup>th</sup>Edn.). Addison –Wesley. India.

**ReferenceBooks**

- H. Anton, I. Birens and S. Davis.( 2002). *Calculus*, John Wiley and Sons, Inc.
- G.B. Thomas and R.L. Finney. (2010). *Calculus*, Pearson Education.
- M.J. Strauss, G.L. Bradley and K. J. Smith. (2007). *Calculus*, 3rd Ed., Dorling Kindersley (India) P. Ltd. (Pearson Education), Delhi.
- Tom. M. Apostol, (1966). *Calculus Volume –I*(Second Edn. ).
- R. Courant and F. John. (1989). *Introduction to Calculus and Analysis* (Volumes I & II), Springer- Verlag, New York, Inc.

**Course Outcomes:**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Recall and Classify the fundamental concepts of derivatives and their standard results.	K1 & K2
CO-2	Utilize the concept of successive partial derivatives and their applications.	K3
CO-3	Examine the method of undetermined multipliers to solve constrained optimization problems.	K4
CO-4	Deduct the method of finding envelopes to specific families of curves.	K5
CO-5	Improve the concepts of circle, radius, and center of curvature.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	3	2	3
CO 2	3	2	3	2	2	3
CO 3	2	3	2	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	1	2	3	3

**High Correlation: 63% Moderate Correlation : 34% Low Correlation : 3%**



## MATHEMATICAL STATISTICS

UMAA121

Semester : I  
Category : Allied  
Class & Major : IB.Sc Mathematics

Credit : 3  
Hours/Week : 5  
Total Hours : 65

### Course Objectives:

CO No.	To enable the students
CO-1	Define the concepts of sample space and events in probability theory.
CO-2	Understand and state the concepts of expected values and moments for random variables.
CO-3	Solve the correlation and regression concepts to analyze relationships between variables.
CO-4	Compare binomial, Poisson, normal, and uniform distributions to solve probability problems.
CO-5	Judge the advantages and limitations of different distributions for specific applications.

### UNIT-I PROBABILITY

13 Hours

Concept of sample space- Events- Definition of Probability (Classical, Statistical & Axiomatic) - Addition and Multiplication laws of Probability- Independence- Conditional Probability- Baye's theorem- Simple Problems.

### UNIT-II RANDOM VARIABLES

13 Hours

Random Variables (Discrete and Continuous) Distribution function-Expected values and Moments – Moment generating function – Probability generating function - Examples.

### UNIT-III CORRELATION AND REGRESSION

13 Hours

Concepts of bivariate distributions – Correlation and Regression – Linear Prediction – Rank Correlation coefficient – Concepts of partial and multiple correlation coefficients – Simple problems.

### UNIT-IV DISTRIBUTIONS

13 Hours

Standard Distributions – Binomial – Poisson – Normal – Uniform distributions.

### UNIT-V DISTRIBUTIONS [CONTINUED]

13 Hours

Geometric – Exponential – Gamma – Beta distributions – Inter relationship between distributions.

### TextBooks

- Gupta, S.C. & Kapoor, V.K. (2008). *Fundamentals of Mathematical Statistics*. Sultan & Sons. New Delhi.

### ReferenceBooks

- S.C.Gupta & V.K.Kapoor. (2008). *Elements of Mathematical Statistics*, Sultan Chand & Sons, New Delhi.
- Hogg R.V. & Craig A.T. (1988). *Introduction to Mathematical Statistics*, McMillan.

- Mood A.M. & Graybill F.A. & Boes D.G. (1974). *Introduction to theory of Statistics*, McGraw Hill.
- Snedecor G.W. & Cochran W.G. (1967). *Statistical Methods*, Oxford and IBH.

**Course Outcomes:**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Define and explain the basic concepts of Mathematical Statistics	K1 & K2
CO-2	Identify the Statistical Characteristics, Discrete and Continuous Distributions and their properties.	K3
CO-3	Categorize the Laws of Probability to Concrete Problems.	K4
CO-4	Compare the Concepts of Probability and Statistics.	K5
CO-5	Improve a good knowledge of various Concepts of Probability.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	2	3
CO 3	2	3	2	2	2	2
CO 4	3	3	3	3	3	3
CO 5	2	3	3	3	3	3

**High Correlation: 77% Moderate Correlation : 23% Low Correlation: 0%**

**ANALYTICAL GEOMETRY (Two & Three Dimensions)**

**UMAM210**

<b>Semester</b>	<b>:II</b>	<b>Credit</b>	<b>: 4</b>
<b>Category</b>	<b>:Core XV</b>	<b>Hours/Week</b>	<b>: 5</b>
<b>Class &amp; Major</b>	<b>:I B.Sc Mathematics</b>	<b>Total Hours</b>	<b>:65</b>

**Course Objectives:**

CO No.	To enable the students
CO-1	Define the concepts of pole, polar, and conjugate points/lines.
CO-2	Demonstrate the equations of various geometric figures in polar coordinates.
CO-3	Make use of the knowledge of planes and orthogonal projection to solve problems involving spatial relationships.
CO-4	Classify the concept of the angle between a line and a plane.
CO-5	Determine the implications of orthogonality and angles of intersection between spheres in various contexts.

**UNIT-I POLE**

**13 Hours**

Pole, Polar - conjugate points and conjugate lines – diameters – conjugate diameters of an ellipse - semi diameters- conjugate diameters of hyperbola.

**UNIT-II POLAR COORDINATES**

**13 Hours**

Polar coordinates: General polar equation of straight line – Polar equation of a circle given

a diameter, Equation of a straight line, circle, conic – Equation of chord, tangent, normal. Equations of the asymptotes of a hyperbola.

**UNIT-III PLANES**

**13 Hours**

System of Planes-Length of the perpendicular–Orthogonal projection.

**UNIT-IV LINES**

**13 Hours**

Representation of line–angle between a line and a plane – co – planar lines–shortest distance between two skew lines –length of the perpendicular–intersection of three planes.

**UNIT-V SPHERE**

**13 Hours**

Equation of a sphere-general equation-section of a sphere by a plane-equation of the circle-tangent plane- angle of intersection of two spheres- condition for the orthogonality- radical plane.

**TextBooks**

- Manickavachagom Pillay, T.K. & Natarajan, T. (2004).*Analytical Geometry(Three Dimensions)*. S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai.

**ReferenceBooks**

- William F. Osgood and William C. Graustein.(2016).*Plane and Solid Analytic Geometry*, Macmillan Company, NewYork.
- G.B. Thomas and R. L. Finny.(2010). *Calculus and Analytical Geometry*, Pearson Publication, 9<sup>th</sup> Edition.
- Robert C. Yates.(1961)*Analytic Geometry with Calculus*, Prentice Hall, Inc., New York.
- Earl W. Swokowski and Jeffery A. Cole.(2010)*Algebra and Trigonometry with Analytic Geometry*, Twelfth Edition, Brooks/Cole, Cengage Learning, CA, USA.
- William H. McCrea. (2006).*Analytical Geometry of Three Dimensions*, Dover Publications, Inc, New York.
- John F. Randelph. (1969).*Calculus and Analytic Geometry*, Wadsworth Publishing Company, CA, USA.
- Ralph Palmer Agnew. (1962). *Analytic Geometry and Calculus with Vectors*, McGraw-Hill Book Company, Inc. New York.

**Course Outcomes:**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Recall and relate the Fundamental aspects of Conics, Straight Lines, Sphere and Cone.	K1 & K2
CO-2	Identify the various Concepts of Analytical Solid Geometry.	K3
CO-3	Categorize the Geometrical Problems of Curves, Straight Lines, Cone and Sphere.	K4
CO-4	Compare the equations, properties of the Sphere, Cone and Cylinder.	K5
CO-5	Improve the Arithmetical and Geometric Operations involving Vectors in the Plane.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	2
CO 2	3	3	3	3	3	3
CO 3	3	3	3	3	3	2
CO 4	3	3	3	2	2	3
CO 5	3	3	3	3	3	2

**High Correlation: 77% Moderate Correlation : 17% Low Correlation: 6%**

**INTEGRAL CALCULUS****UMAM212**

**Semester :II**

**Credit : 4**

**Category :Core**

**Hours/Week : 5**

**Class &Major :I B.ScMathematics**

**Total Hours :65**

**CourseObjectives:**

CO No.	To enable the students
CO-1	Define reduction formulas and their types.
CO-2	Explain the process of evaluating double integrals.
CO-3	Solve triple integrals to solve volume and surface area problems involving three-dimensional shapes.
CO-4	Examine the properties of beta and gamma functions to determine their relevance in various scenarios.
CO-5	Justify the effectiveness of using integral calculus to model and solve complex real-world scenarios.

**UNIT-I REDUCTION FORMULAE****13 Hours**

Reduction formulae -Types, integration of product of powers of algebraic and trigonometric functions, integration of product of powers of algebraic and logarithmic functions - Bernoulli's formula, Feynman's technique of integration.

**UNIT-II MULTIPLE INTEGRALS****13 Hours**

Multiple Integrals - definition of double integrals - evaluation of double integrals – double integrals in polar coordinates - Change of order of integration.

**UNIT-III TRIPLE INTEGRALS****13 Hours**

Triple integrals –applications of multiple integrals - volumes of solids of revolution - areas of curved surfaces–change of variables - Jacobian.

**UNIT-IV BETA AND GAMMA FUNCTIONS****13 Hours**

Beta and Gamma functions – infinite integral - definitions–recurrence formula of Gamma functions – properties of Beta and Gamma functions- relation between Beta and Gamma functions - Applications.

**UNIT-V-APPLICATIONS****13 Hours**

Geometric and Physical Applications of Integral calculus.

**TextBooks**

- Thomas Finney, (2014). *Calculus and Analytic Geometry* (13thEdn.). Addison – Wesley. India.
- H. Anton, I. Birens and S. Davis. (2002). *Calculus*, John Wiley and Sons, Inc..

**ReferenceBooks**

- G.B. Thomas and R.L. Finney. (2007). *Calculus*, Pearson Education.
- P. Dyke. (2001) *An Introduction to Laplace Transforms and Fourier Series*, Springer Undergraduate Mathematics Series, (second edition).

**CourseOutcomes:**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Recall and explain the knowledge of algebraic and trigonometric functions	K1 & K2
CO-2	Utilize the Concepts of Beta and Gamma Functions.	K3
CO-3	Discover double and triple integrals.	K4
CO-4	Determine the Basics of Integration and their Applications.	K5
CO-5	Develop Knowledge on Applications of Definite Integrals.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	3	3	2	3
CO 2	3	2	2	2	3	3
CO 3	3	2	3	3	3	3
CO 4	2	3	3	3	3	2
CO 5	2	3	2	3	2	2

**High Correlation: 60% Moderate Correlation: 40% Low Correlation: 0%****COMPUTATIONAL MATHEMATICS****UMA211**

**Semester :II**  
**Category :SEC**  
**Class &Major :IB.ScMathematics**

**Credit : 2**  
**Hours/Week : 2**  
**TotalHours :26**

**Course Objectives:**

CO No.	To enable the students
CO-1	Define the concepts of numerical series and their patterns.
CO-2	Summarize the concepts of number, ranking, and time sequence tests.
CO-3	Build the techniques to assign values to digits and make equations meaningful.
CO-4	Categorize the patterns in coded messages to decode information.

CO 5	Evaluate the effectiveness of different approaches in solving number puzzles and uncovering patterns.
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**UNIT-I** **5Hours**

Numerical series-Distance and Direction sense Test.

**UNIT-II** **5 Hours**

Mathematical Operations-Number, Ranking & Time Sequence Test.

**UNIT-III** **5 Hours**

Assign Artificial Values to Mathematical Digit-Inserting Correct Mathematical sign.

**UNIT-IV** **5Hours**

Human relation-Coding & Decoding

**UNIT-V** **6Hours**

Analogy-Number coding- Number Puzzle.

**TextBooks**

- R.S. Aggarwal. (2003)*Objective Arithmetic*, S. Chand and Company Ltd., New Delhi.

**ReferenceBooks**

- Parveen Kumar. (2020). *Arithmetic for Competitive Exam*. S D Publications.
- Dinesh Khattar. (2019). *Quantitative Aptitude for Competitive Examinations*. Pearson. India.

**Course Outcomes:**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Recall and explain the Knowledge of Numerical Series.	K1 & K2
CO-2	Identify the concept of Mathematical operations and number ranking.	K3
CO-3	Discover the artificial values to mathematical digit.	K4
CO-4	Deduct the Concepts of human relation, coding and decoding.	K5
CO-5	Improve the number coding and number puzzle.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	2	2	3	2	1	3
CO 3	2	3	3	3	3	3
CO 4	3	3	1	3	3	3
CO 5	2	3	3	3	3	3

**High Correlation: 77% Moderate Correlation : 17% Low Correlation: 6%**

### III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	CourseCode	CourseTitle	Component-III	Component-IV
I	MajorCore(I)/C C(I)	UMAM109	Algebra and Trigonometry	Problem solving	Assignment
I	MajorCore(II)/ CC(II)	UMAM110	Differential Calculus	Assignment	Problem solving
I	Elective-I(GE)	UMAA118	Mathematical Statistics	Problem solving	Assignment
I	Foundation Course	UMAF101	Bridge Mathematics	Assignment	Problem solving
II	MajorCore(III) / CC(III)	UMAM209	Analytical Geometry (Two & Three Dimensions)	Assignment	Problem solving
II	MajorCore(IV) / CC(VI)	UMAM210	Integral Calculus	Problem solving	Assignment
II	Skill Enhancement Course (Discipline / Subject Specific)	UMAM211	Computational Mathematics	Problem solving	Assignment

### PG & RESEARCH DEPARTMENT OF MATHEMATICS

#### PROGRAMMESPECIFICOUTCOMES (PSO)

PSO No.	Upon completion of the Programme, the students will be able to
PSO-1	Gain knowledge an advanced models and methods of Mathematics.
PSO-2	Understand the societal and ethical responsibilities of the professionals in their respective discipline.
PSO-3	Inculcate the habit of self-learning throughout life, through self- paced and self-directed learning aimed at personal development.
PSO-4	Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges
PSO-5	Deduct deep and advanced learning on topics in pure and applied mathematics, empowering the students to do research.
PSO-6	Create the proficiency for the preparation of National level Competitive Examination

**PROGRAMME PROFILE M.Sc. (MATHEMATICS)**

Sem	Part	Category	Course Code	Course Title	Contact Hours/Week	Credit
						Min/Max
I	I	Major Core I	PMAM111	Algebraic structures	5	4
		Major Core II	PMAM112	Real Analysis I	5	4
		Major Core III	PMAM113	Ordinary Differential Equations	5	4
	II	Elective I (DSE)	PMAM114	Graph Theory and Applications	5	3
		Elective II (DSE)	PMAM115	Fuzzy Sets and their Applications	5	3
	III	SEC I (NME)	-	-	3	2
	IV	Online Course	PONL101	-	2	2
			<b>TOTAL</b>	<b>30</b>	<b>22</b>	
II	I	Major Core IV	PMAM212	Advanced Algebra	5	4
		Major Core V	PMAM213	Real Analysis II	5	4
		Major Core VI	PMAM214	Partial Differential Equations	5	4
	II	Elective III (DSE)	PMAM215	Mathematical Statistics	4	3
		Elective IV (DSE)	PMAM216	Artificial Intelligence and Machine Learning	4	3
	III	Core Industrial Module	PMAM217	Mathematical Finance and Financial Management	4	3
	IV	SEC II (Discipline Specific)	PMAD201	Research Tools and Techniques	3	2
	V	Internship	PINS201	-	30 hours/60 hours	2
Service Learning		PMAX201/ PMAX202	Mathematics for High School Students/Elementary Mathematics for Higher Secondary Students	(8 Days)	1	
			<b>TOTAL</b>	<b>30</b>	<b>26</b>	
III	I	Major Core VII	PMAM315	Complex Analysis	5	4
		Major Core VIII	PMAM316	Probability Theory	5	4
		Major Core IX	PMAM317	Topology	5	4
	III	Core Industrial Module	PMAM320	Core Industrial Module	4	3
	II	Elective V (DSE)	PMAM318	Algebraic Number Theory	3	3
		Elective VI (DSE)	PMAM319	Industrial Operations Research	4	3
	IV	SEC III -Inter Disciplinary	PMAI301	Advanced Behavioral Finance	4	2
			<b>TOTAL</b>	<b>30</b>	<b>23</b>	
IV	I	Major Core X	PMAM411	Functional Analysis	5	4
		Major Core XI	PMAM412	Differential Geometry	5	4
		Major Core XII	PMAM413	Mechanics	5	4
		Major Core XIII	PMAM402	Project with viva voce	6	4



	II	Elective VII(DSE)	PMAM414	Resource Management Techniques	5	3
	III	Professional Competency Skills(SEC)	PMAC401	Problem Solving in Advanced Mathematics	4	2
	IV	Internship	-	-	-	-/2
<b>TOTAL</b>					<b>30</b>	<b>21/23</b>
<b>GRAND TOTAL</b>					<b>120</b>	<b>92/94</b>

### COURSES OFFERED OTHER DEPARTMENT

#### NON MAJOR ELECTIVE FOR PG

Semester	Category	CourseCode	Course Title	Contact Hours/week	Credit
I	NonMajorElective	PMAE101	Mathematical Documentation Using LaTeX	3	2

#### EXTRACREDITEARNINGPROVISION

Semester	Category	Course code	CourseTitle	Hours/week	Credit
					Min/Max
III	Self-StudyPaper	PMAS301	DifferenceEquation	2	-/1
		PMAS302	CombinatorialAnalysis	2	-/1

### ALGEBRAIC STRUCTURES

#### PMAM111

**Semester : I** **Credit :4**  
**Category :Core I** **Hours/Week :5**  
**Class&Major:IM.ScMathematics** **Total Hours :65**

#### Course Objectives:

CO No.	To enable the students
CO-1	Recall and relate the concept of Sylow's theorem, direct products and finite Abelian groups.
CO-2	Identify the Jordan Form and rational canonical form.
CO-3	Classify vector spaces and modules.
CO-4	Determine the roots of the polynomials and the Galois theory.
CO-5	Construct the matrices, canonical forms and triangular forms of linear transformation.

#### UNIT-I SYLOW'S THEOREM

**13 Hours**

Another Counting Principle - Class equation for finite groups and its applications - Sylow's theorems First, Second and Third Proof.

#### UNIT-II ABELIAN GROUPS

**13 Hours**

Solvable groups - Direct products - Finite abelian groups- Modules –Galois groups over the rationals

**UNIT-III LINEAR TRANSFORMATION****13 Hours**

Characteristic Roots –Matrices-Canonical forms –Triangular form - Nilpotent transformations.

**UNIT-IV JORDAN FORM****13 Hours**

Jordan form - rational canonical form.

**UNIT-V TRACE AND TRANSPOSE****13 Hours**

Trace and transpose - Hermitian, unitary, normal transformations, real quadratic form.

**TextBook**

- Herstein.N.(2013).*Topics in Algebra*. Wiley Eastern Limited. New Delhi.

**ReferenceBooks**

- M.Artin (1991).*Algebra*. Prentice Hall of India.
- P.B.Bhattacharya, S.K.Jain, and S.R.Nagpaul (1997).*Basic Abstract Algebra* (II Edition) Cambridge University Press., (Indian Edition)
- I.S.Luther and I.B.S.Passi, *Algebra*,(1999) Vol. I –Groups(1996). Vol. II Rings, Narosa Publishing House , New Delhi.
- D.S.Malik, J.N. Mordeson and M.K.Sen. (1997).*Fundamental of Abstract Algebra*, McGraw Hill (International Edition), New York.

**Course Outcomes:**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Define the basic counting principle and explain the Sylow's theorems and Sylow subgroups	K1, K2
CO-2	Identify similar Transformations, invariant subspace, and invariants of linear transformation.	K3
CO-3	Categorize Jordan, canonical form, Jordan blocks, rational canonical form, and companion matrix of polynomial.	K4
CO-4	Evaluate transpose of a matrix and the properties of trace.	K5
CO-5	Formulate new problems that involve trace and transpose operations.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	1	1	3	3
CO 2	3	3	2	2	3	3
CO 3	3	3	2	3	3	3
CO 4	3	3	3	2	3	3
CO 5	3	3	3	1	2	3

**High Correlation : 73.33% Moderate Correlation : 16.66% Low Correlation : 10%**

**REAL ANALYSIS I**  
**PMAM112**

<b>Semester</b>	: I	<b>Credits</b>	:4
<b>Category</b>	: Core II	<b>Hours/Week</b>	:5
<b>Class&amp;Major</b>	: I M.ScMathematics	<b>TotalHours</b>	:65

**Course Objectives:**

CO No.	To enable the students
CO-1	Recall the Knowledge of Sequences and Series of real numbers.
CO-2	Explain the concept of Sequences and Series.
CO-3	Illustrate the Metric Spaces and differentiate the sets and functions.
CO-4	Examine the series of Real numbers.
CO-5	Create the Continuous functions at a point on the real line.

**UNIT-I FUNCTIONS OF BOUNDED VARIATION 13 Hours**

Introduction - Properties of monotonic functions - Functions of bounded variation - Total variation - Additive property of total variation - Total variation on  $[a, x]$  as a function of  $x$  - Functions of bounded variation expressed as the difference of two increasing functions - Continuous functions of bounded variation. Absolute and conditional convergence-Real and imaginary parts of a complex series-Test for convergence of series with positive terms- - Dirichlet's test and Abel's test - Rearrangement of series - Riemann's theorem on conditionally convergent series.

**UNIT-II STIELTJES INTEGRAL 13 Hours**

Introduction - Notation - The definition of the Riemann - Stieltjes integral - Linear Properties - Integration by parts- Change of variable in a Riemann - Stieltjes integral - Reduction to a Riemann Integral – Euler's summation formula - Monotonically increasing integrators, Upper and lower integrals - Additive and linearity properties of upper, lower integrals - Riemann's condition - Comparison theorems.

**UNIT-III THE RIEMANN-STIELTJES INTEGRAL 13 Hours**

Integrators of bounded variation-Sufficient conditions for the existence of Riemann-Stieltjes integrals-Necessary conditions for the existence of RS integrals- Mean value theorems - integrals as a function of the interval – Second fundamental theorem of integral calculus-Change of variable -Second Mean Value Theorem for Riemann integral- Riemann-Stieltjes integrals depending on a parameter- Differentiation under integral sign-Lebesgue criteriaon for existence of Riemann integrals-Complex valued Riemann - Stieltjes integral.

**UNIT-IV INFINITE AND POWER SERIES 13 Hours**

**Infinite Series and Infinite Product:** Double sequences - Double series - Rearrangement theorem for double series - A sufficient condition for equality of iterated series - Multiplication of series – Cesaro summability - Infinite products-Euler product for the Riemann Zeta function.

**Power series** - Multiplication of power series - The Taylor's series generated by a function - Bernstein's theorem – The Binomial series-Abel's limit theorem - Tauber's theorem.

## UNIT-V SEQUENCES OF FUNCTIONS

**13 Hours**

Pointwise convergence of sequences of functions - Examples of sequences of real - valued functions - Uniform convergence and continuity - Cauchy condition for uniform convergence - Uniform convergence of infinite series of functions - Riemann - Stieltjes integration – Non-uniform Convergence and Term-by-term Integration - Uniform convergence and differentiation - Sufficient condition for uniform convergence of a series – Uniform convergence and double sequence-Mean convergence.

### TextBook

- Tom M.Apostol.(1974). *Mathematical Analysis*, 2<sup>nd</sup> Edition, Addison-Wesley Publishing Company Inc. New York.

### ReferenceBooks

- Bartle, R.G. (1976).*Real Analysis*, John Wiley and Sons Inc.
- Rudin,W. (1976). *Principles of Mathematical Analysis*, 3<sup>rd</sup> Edition. McGraw Hill Company, New York.
- Malik,S.C. and Savita Arora.(1991).*Mathematical Analysis*, Wiley Eastern Limited.New Delhi.
- Sanjay Arora and Bansi Lal.(1991).*Introduction to Real Analysis*, Satya Prakashan, New Delhi.
- Gelbaum, B.R. and J. Olmsted. (1964).*Counter Examples in Analysis*, Holden day, San Francisco.
- A.L.Gupta and N.R.Gupta.(2003).*Principles of Real Analysis*, Pearson Education, (Indian print).

### Course Outcomes:

CO No.	On completion of the course , the student will be able to	Bloom's Level
CO-1	Define and explain the concept of Riemann-Stieltjes integral and its properties.	K1, K2
CO-2	Solve the problems on step function, upper function, Lebesgue function and their integrals.	K3
CO-3	Categorize the functions of bounded variation and Rectifiable Curves.	K4
CO-4	Justify various mathematical proofs using the properties of Lebesgue integrals and establish the Levi monotone convergence theorem.	K5
CO-5	Formulate the concept and properties of inner products, norms and measurable functions.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	2	2	1
CO 2	3	3	3	2	2	1
CO 3	3	3	3	3	3	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

High Correlation : 73.33%    Moderate Correlation : 16.67%    Low Correlation: 6.67%

**ORDINARY DIFFERENTIAL EQUATIONS****PMAM113**

Semester : I

Credits :4

Category :Core III

Hours/Week :5

Class&amp;Major :I M.ScMathematics

Total Hours :65

**Course Objectives:**

CO No.	Toenable thestudents
CO-1	Recall the definition of second-order homogeneous equations and identify initial value problems.
CO-2	Explain the concepts of linear dependence and independence in the context of second-order homogeneous equations.
CO-3	Solve the methods for reducing the order of a homogeneous equation.
CO-4	Examine the properties and applications of Bessel functions in the context of differential equations.
CO-5	Determine the method of successive approximations, the Lipschitz condition, and the convergence of successive approximations in relation to the existence theorem for solutions.

**UNIT-I SECOND ORDER HOMOGENEOUS EQUATIONS****13 Hours**

Second order homogeneous equations-Initial value problems-Linear dependence and independence-Wronskian and a formula for Wronskian-Non-homogeneous equation of order two.

**UNIT-II HOMOGENEOUS AND NON-HOMOGENEOUS EQUATION****13 Hours**

Homogeneous and non-homogeneous equation of order n –Initial value problems- Equations with real constants-Annihilator method to solve non-homogeneous equation- Algebra of constant coefficient operators.

**UNIT-III INITIAL VALUE PROBLEMS****13 Hours**

Initial value problems -Existence and uniqueness theorems – Solutions to solve a non-homogeneous equation – Wronskian and linear dependence – reduction of the order of a homogeneous equation – homogeneous equation with analytic coefficients-The Legendre equation.

**UNIT-IV EULER EQUATION****13 Hours**

Euler equation – Second order equations with regular singular points –Exceptional cases – Bessel Function.

**UNIT-V EXISTENCE AND UNIQUENESS OF SOLUTIONS TO FIRST ORDER EQUATIONS****13 Hours**

Existence and uniqueness of solutions to first order equations: Equation with variable separated – Exact equation – method of successive approximations – the Lipschitz condition – convergence of the successive approximations and the existence theorem.

**TextBook**

- E.A.Coddington.(1987).*A introduction to ordinary differential equations* (3<sup>rd</sup> Printing) Prentice-Hall of India Ltd., New Delhi.

**ReferenceBooks**

- Williams E. Boyce and Richard C. DI Prima.( 1967).*Elementary differential equations and boundary value problems*, John Wiley and sons, New York.
- George F Simmons.(1974).*Differential equations with applications and historical notes*, TataMcGraw Hill, New Delhi.
- N.N. Lebedev.(1965).*Special functions and their applications*, Prentice Hall of India, New Delhi.
- W.T. Reid.(1971).*Ordinary Differential Equations*, John Wiley and Sons, New York.
- M.D.Raisinghania.(2001).*Advanced Differential Equations*, S.Chand& Company Ltd. New Delhi.
- B.Rai,D.P.Choudary and H.I. Freedman.(2002).*A Course in Ordinary Differential Equations*, Narosa Publishing House, New Delhi.

**Course Outcomes:**

CO No.	On completion of the course , the student will be able to	Bloom's Level
CO-1	Recall and relate the various theoretical ideas in differential equations.	K1, K2
CO-2	Develop the physical phenomena modeled by differential equations and dynamical systems.	K3
CO-3	Classify the solutions using appropriate methods and give examples.	K4
CO-4	Determine the qualitative behavior of solutions of systems of differential equations	K5
CO-5	Elaborate Green's function for boundary value problems.	K6

## CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	2
CO 2	3	3	3	3	2	2
CO 3	2	3	3	3	3	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	3

High Correlation : 70% Moderate Correlation : 30% Low Correlation : 0%

## GRAPH THEORY AND APPLICATIONS PMAM114

Semester : I  
Category : Elective I  
Class&Major : I M.Sc Mathematics

Credits : 3  
Hours/Week : 5  
Total Hours : 65

### Course Objectives:

CO No.	Toenable thestudents
CO-1	Recall and explain the basic concepts of graph theory.
CO-2	Identify the graphs on connectedness and components.
CO-3	Classify the concepts of Hamiltonian graphs.
CO-4	Explain the concept of matching in bipartite graphs.
CO-5	Design the directed graph by colouring.

### UNIT-I GRAPHS

13 Hours

Definitions: Directed and undirected graphs. Hand shaking property and its problems. Real life applications Applications- Konigsberg bridge problem, Utility problem and travelling salesman problem. Definitions: Walks, trail, paths, Circuits,Cycles, Sub graphs, Induced and Spanning subgraphs, Connected graphs and Complement of a graph-Problems. Euler graphs and Hamiltonian graphs (no theorems) problems. Operations on graphs and Isomorphism of two graphs, problems.

### UNIT-II TREES

13 Hours

Definitions: Trees, Spanning trees, Some Properties of trees(no proof). Rooted and binary tree. Finding all the spanning trees of a graph and Spanning trees in a weighted graph. Traversal of Binary Tree, Pre-order and Post-order Traversal. Prefix codes, optimal tree. Cut – sets. Cut – sets in a graph. Fundamental Circuits and Cut – sets, Network Flows. Max- flow Mincut Theorem ( Statement only) and problems.

### UNIT-III PLANAR GRAPHS

13 Hours

Planar Graphs. Kuratowski's graphs. Different representation of planar graph. Detection

of planar graphs. Euler's polyhedral formula (No proof). Geometrical Dual( no theorems) problems. Adjacency matrix, Incidence matrix, Sub-matrices of Incidence matrix, Circuit matrix, Fundamental circuit matrix and rank of Circuit matrix. Cut – set matrix. All matrices with both undirected and directed graphs. Problems on Network.

#### UNIT-IV CHROMATIC NUMBER

**13 Hours**

Definition of Chromatic number. Chromatic Partitioning. Chromatic Polynomial. Finding Chromatic polynomial by Decomposition Theorem and by Multiplication Theorem (without Proofs). Dominating set. Minimal Dominating set. Domination number. Independent dominating set. Finding minimal dominating sets. Some applications of domination theory.

#### UNIT-V APPLICATIONS

**13 Hours**

Computer representation of a graph. Algorithm on spanning trees: Kruskal's and Prim's Algorithm. Shortest path algorithms: Shortest path from a specified vertex to another specified vertex by Dijkstra's algorithm, Shortest path between all pairs of vertices. Floyd-Warshall's algorithm (Only Problems). Graphs in switching and coding Theory. Contact networks, analysis of contact networks, synthesis of contact networks, Sequential switching networks. Electrical network analysis, Kirchhoff's current and voltage networks, Loop currents and node voltages, LRC networks with independent sources.

#### TextBook

- NarasinghDeo. (2009). *Graph Theory with applications to engineering and computer Science*, Edition, Printice hall of India Private Limited.
- Vasudev C. (2006). *Graph Theory with Applications*. New Age International Private Limited; First Edition

#### ReferenceBooks

- GeirAgnarsson and Raymond Greenlaw.(2009). *Graph Theory, Modeling, Applications and Algorithms*, 1st Edition, Pearson Education, Inc, New Delhi.
- John Clark and Holton D.A.( 2001). *A First Look at Graph Theory*, Edition, Allied Publishers,.
- Ralph P. Grimaldi.(2006) *Discrete and Combinatorial Mathematics*, 5th Edition , Pearson.

#### Course Outcomes:

CO No.	On completion of the course , the student will be able to	Bloom's Level
CO-1	Define and explain the Graph, sub graph their representations, degree and algebraic operations.	K1, K2
CO-2	Identify the Connected graphs, weighted graphs and shortest paths.	K3



CO-3	Compare the concepts of Trees Characterizations, spanning tree, minimum spanning trees.	K4
CO-4	Determine the concepts of graphs and the mathematical models using graphs.	K5
CO-5	Construct mathematical models of real world problems	K6

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	2
CO 2	3	3	3	3	2	2
CO 3	2	3	3	3	1	2
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	1

High Correlation : 63.33% Moderate Correlation : 30% Low Correlation : 6.67%

## FUZZY SETS AND THEIR APPLICATIONS

### PMAM115

Semester : I

Credit :3

Category :Elective II

Hours/Week :5

Class&Major :I M.ScMathematics

Total Hours :65

### Course Objectives:

CO No.	To enable the students
CO-1	Find the bases and dimension of vector spaces.
CO-2	Relates the linear transformation with matrices
CO-3	Solve the polynomial ideals and commutative rings.
CO-4	Discover the triangulation and diagonalization for matrix manipulations.
CO-5	Deduct the inverse of matrices using determinants.

### UNIT-I CLASSICAL SETS AND FUZZY SETS

13 Hours

From Classical Sets To Fuzzy Sets, Fuzzy Sets Verses Crisp Sets: Fuzzy sets: Basic types – Fuzzy sets: Basic Concepts –Additional Properties of  $\alpha$  – cuts Extension Principle for fuzzy set

### UNIT-II OPERATIONS ON FUZZY SETS

13 Hours

Operations On Fuzzy Sets: Types of operations– Fuzzy complements- Fuzzy Intersections: t-Norms – Fuzzy Unions: t-Conorms - Combinations of Operations.

### UNIT-III FUZZY ARITHMETIC

13 Hours

Fuzzy Arithmetic: Fuzzy numbers - Linguistic variables - Arithmetic operations on intervals – Arithmetic operations on Fuzzy numbers.

### UNIT-IV FUZZY RELATIONS

13 Hours

Fuzzy Relations: Binary Fuzzy Relations – Binary Relations on a Single Set – Fuzzy Equivalence Relations – Fuzzy Compatibility Relations –Fuzzy Ordering Relations – Fuzzy

Morphisms.

## UNIT-V FUZZY DECISION MAKING

13 Hours

Fuzzy Decision Making: Individual decision making – Multiperson Decision Making- Ranking methods – Fuzzy Linear programming.

### TextBook

- George J. Klir and Bo Yuan.(2005).*Fuzzy sets and Fuzzy Logic Theory and Applications*, Prentice Hall of India.

### ReferenceBooks

- H.J. Zimmermann.(1991).*Fuzzy Set Theory and its Applications*, Allied Publishers Limited.
- M. Ganesh. (2006).*Introduction to Fuzzy sets and Fuzzy logic*, Prentice Hall of India, New Delhi.

### Course Outcomes:

CO No.	On completion of the course , the student will be able to	Bloom's Level
CO 1	Recall and explain the concepts of classical sets and fuzzy sets.	K1, K2
CO 2	Identify the operations on fuzzy sets in t-norms and t-conorms.	K3
CO 3	Function on the linguistic variables and fuzzy arithmetic operations.	K4
CO 4	Compare the Fuzzy binary relations and fuzzy equivalence relations.	K5
CO 5	Develop the individual and multiperson decision making.	K6

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	2
CO 2	3	3	2	3	2	2
CO 3	2	3	3	3	3	2
CO 4	3	2	3	1	3	2
CO 5	3	3	3	3	1	3

High Correlation : 56.66% Moderate Correlation : 36.66% Low Correlation : 6.67%

## ADVANCED ALGEBRA

PMAM212

Semester : II

Credits :4

Category :Core IV

Hours/Week :5

Class&Major :I M.ScMathematics

TotalHours :65

### Course Objectives:

CO No.	To enable the students
CO-1	Define of the fundamental principles of extension fields and their implications, including the transcendence of the constant 'e'.
CO-2	Explain the Galois theory concepts to solve complex problems involving field extensions and polynomial equations, showcasing proficiency in the application

	of theoretical knowledge.
CO-3	Compare the intricate relationships and properties of polynomial roots, critically assessing their significance in various mathematical contexts.
CO-4	Deduct the characteristics and significance of finite fields, critically examining the implications of Wedderburn's theorem on finite division rings within the context of abstract algebra.
CO-5	Elaborate various solvability theorems, including solvability by radicals and Frobenius' theorem, to devise solutions for intricate mathematical problems and demonstrate the integration of different mathematical concepts.

**UNIT-I FIELDS** **13 Hours**  
Extension fields – Transcendence of  $e$ .

**UNIT-II POLYNOMIALS** **13 Hours**  
Roots or Polynomials.- More about roots

**UNIT-III GALOIS THEORY** **13Hours**  
Elements of Galois theory.

**UNIT-IV FINITE FIELDS** **13Hours**  
Finite fields - Wedderburn's theorem on finite division rings.

**UNIT-V SOLVABILITY BY RADICALS** **13Hours**  
Solvability by radicals - A theorem of Frobenius - Integral Quaternions and the Four - Square theorem

**TextBook**

- I.N. Herstein. (1975). *Topics in Algebra* (II Edition) Wiley Eastern Limited, New Delhi.

**ReferenceBooks**

- M.Artin. (1991). *Algebra*, Prentice Hall of India.
- P.B.Bhattacharya, S.K.Jain, and S.R.Nagpaul.(1997) *Basic Abstract Algebra* (II Edition) Cambridge University Press. (Indian Edition)
- I.S.Luther and I.B.S.Passi,(1999) *Algebra*, Vol. I –Groups(1996); Vol. II *Rings*, Narosa Publishing House , New Delhi
- D.S.Malik, J.N. Mordeson and M.K.Sen.(1997). *Fundamental of Abstract Algebra*, McGraw Hill (International Edition), New York.

**Course Outcomes**

CO No.	On completion of the course , the student will be able to	Bloom's Level
CO-1	Recall and explain the fundamental concepts of extension fields and the basic elements of Galois theory.	K1, K2
CO-2	Solve the extension fields and finite fields problems.	K3
CO-3	Compare the relationship between roots, polynomials and the solvability by radicals.	K4
CO-4	Determine the Frobenius' theorem based problems in the context of solvability by radicals.	K5

CO-5	Develop the connections between integral quaternions and the Four-Square theorem.	K6
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### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	1
CO 2	3	3	3	2	3	2
CO 3	3	3	3	3	3	2
CO 4	2	3	3	3	3	2
CO 5	2	2	3	3	3	3

High Correlation : 63.33% Moderate Correlation : 33.33% Low Correlation : 3.33%

### REAL ANALYSIS II PMAM213

Semester : II

Credits : 4

Category : Core V

Hours/Week : 5

Class&Major : I M.Sc Mathematics

TotalHours : 65

### Course Objectives:

CO No.	To enable the students
CO-1	Recall the theory of Sequences and Series, Continuity, Differentiation and Integration.
CO-2	Explain the Fundamental properties of the real numbers.
CO-3	Develop analytical Skills in constructing rigorous Mathematical Arguments.
CO-4	Discover the convergence of sequence of functions in real life situations.
CO-5	Formulate the functions of Bounded Variation, Riemann's localization theorem, Convergence and its variations.

### UNIT-I MEASURE ON THE REAL LINE

13 Hours

Lebesgue Outer Measure - Measurable sets - Regularity - Measurable Functions - Borel and Lebesgue Measurability

### UNIT-II INTEGRATION OF FUNCTIONS OF A REAL VARIABLE

13 Hours

Integration of Non- negative functions - The General Integral –Integration of series- Riemann and Lebesgue Integrals

### UNIT-III FOURIER SERIES AND FOURIER INTEGRALS

13Hours

Introduction - Orthogonal system of functions - The theorem on best approximation - The Fourier series of a function relative to an orthonormal system - Properties of Fourier Coefficients - The Riesz-Fischer Thorem - The convergence and representation problems in for trigonometric series - The Riemann - Lebesgue Lemma - The Dirichlet Integrals - An integral representation for the partial sums of Fourier series - Riemann's localization theorem - Sufficient conditions for convergence of a Fourier series at a particular point –Cesarosummability of Fourier series-

Consequences of Fejes's theorem - The Weierstrass approximation theorem -The Fourier integral theorem.

#### UNIT-IV MULTIVARIABLE DIFFERENTIAL CALCULUS

13Hours

Introduction - The Directional derivative - Directional derivative and continuity - The total derivative - The total derivative expressed in terms of partial derivatives - The matrix of linear function - The Jacobian matrix - The chain rule - Matrix form of chain rule - The mean - value theorem for differentiable functions - A sufficient condition for differentiability - A sufficient condition for equality of mixed partial derivatives - Taylor's theorem for functions of  $R^n$  to  $R^1$

#### UNIT-V IMPLICIT FUNCTIONS AND EXTREMUM PROBLEMS

13Hours

Functions with non-zero Jacobian determinants – The inverse function theorem-The Implicit function theorem-Extrema of real valued functions of severable variables-Extremum problems with side conditions.

#### TextBook

- G. de Barra.( 1981).*Measure Theory and Integration*, Wiley Eastern Ltd., New Delhi. (for Units I and II)
- Tom M.Apostol(1974).*Mathematical Analysis*, 2nd Edition, Addison-Wesley Publishing Company Inc. New York. (for Units III, IV and V)

#### ReferenceBooks

- Burkill,J.C.(1951). *The Lebesgue Integral*, Cambridge University Press.
- Munroe,M.E.(1971). *Measure and Integration*. Addison-Wesley, Mass.
- Roydon,H.L(1988).*Real Analysis*, Macmillan Pub. Company, New York.
- Rudin, W. (1979). *Principles of Mathematical Analysis*, McGraw Hill Company, New York.
- Malik,S.C. and Savita Arora.(1991)*Mathematical Analysis*, Wiley Eastern Limited. New Delhi,.
- Sanjay Arora and Bansi Lal. (1991)*Introduction to Real Analysis*, Satya Prakashan, New Delhi,

#### Course Outcomes:

CO No.	On completion of the course , the student will be able to	Bloom's Level
CO-1	Relate and explain the basic concepts of Fourier series and Fourier integrals with respect to orthogonal system.	K1, K2
CO-2	Identify the representation and convergence problems of Fourier series.	K3
CO-3	Compare the difference between transforms of various functions.	K4
CO-4	Evaluate complex contour integrals directly and by the fundamental theorem.	K5
CO-5	Construct the Cauchy integral theorem in its various versions to compute contour integration	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	1
CO 2	3	3	3	2	3	1
CO 3	3	3	3	3	3	2
CO 4	2	3	3	3	3	2
CO 5	2	2	3	3	3	3

**High Correlation: 63.33% Moderate Correlation: 30% Low Correlation: 6.67%**

**PARTIAL DIFFERENTIAL EQUATIONS****PMAM214**

**Semester : II**

**Credits :4**

**Category :Core VI**

**Hours/Week :5**

**Class&Major :I M.ScMathematics**

**Total Hours :65**

**Course Objectives:**

CO No.	Toenable thestudents
CO-1	Define the Physical behavior of the Mathematical model.
CO-2	Relate the solution of Higher order partial differential equations.
CO-3	Identify the ideas of Differential equations in a coherent and meaningful manner for solving Real World Problems.
CO-4	Compare the solution to explain the underlying Physical Processes.
CO-5	Estimate Physical Problems as PDE using conservation laws.

**UNIT-I MATHEMATICAL MODELS AND CLASSIFICATION OF SECOND ORDER EQUATION 13 Hours**

Classical equations-Vibrating string – Vibrating membrane – waves in elastic medium – Conduction of heat in solids – Gravitational potential – Second order equations in two independent variables – canonical forms – equations with constant coefficients – general solution

**UNIT-II CAUCHY PROBLEM****13 Hours**

The Cauchy problem – Cauchy-Kowalewsky theorem – Homogeneous wave equation – Initial Boundary value problem- Non-homogeneous boundary conditions – Finite string with fixed ends – Non-homogeneous wave equation – Riemann method – Goursat problem – spherical wave equation – cylindrical wave equation.

**UNIT-III METHOD OF SEPARATION OF VARIABLES****13 Hours**

Separation of variable- Vibrating string problem – Existence and uniqueness of solution of vibrating string problem - Heat conduction problem – Existence and uniqueness of solution of heat conduction problem – Laplace and beam equations

**UNIT-IV BOUNDARY VALUE PROBLEMS****13 Hours**

Boundary value problems – Maximum and minimum principles – Uniqueness and continuity theorem –Dirichlet Problem for a circle, a circular annulus, a rectangle – Dirichlet problem involving Poisson equation – Neumann problem for a circle and a rectangle.

**UNIT-V GREEN’S FUNCTION****13 Hours**

The Delta function – Green’s function – Method of Green’s function – Dirichlet Problem for the Laplace and Helmholtz operators – Method of images and eigen functions – Higher dimensional problem – Neumann Problem.

**TextBook**

- TynMyint-U and LokenathDebnath, (1987).*Partial Differential Equations for Scientists and Engineers* (Third Edition), North Hollan, New York.

**ReferenceBooks**

- M.M.Smirnov. (1964).*Second Order partial Differential Equations*, Leningrad.
- I.N.Sneddon.(1983).*Elements of Partial Differential Equations*, McGraw Hill, New Delhi.
- R. Dennemeyer,(1968)*Introduction to Partial Differential Equations and Boundary Value Problems*, McGraw Hill, New York.
- M.D.Raisinghania. (2001)*Advanced Differential Equations*, S.Chand& Company Ltd., New Delhi.
- S, Sankar Rao.(2004). *Partial Differential Equations*, 2<sup>nd</sup> Edition, Prentice Hall of India, New Delhi.

**Course Outcomes:**

CO No.	On completion of the course , the student will be able to	Bloom’s Level
CO-1	Find and classify second order equations and general solutions	K1, K2
CO-2	Solve wave equations in different polar coordinates	K3
CO-3	Categorize Vibrating string problem, Heat conduction problem and Laplace and beam equations	K4
CO-4	Deduct the maximum and minimum principle’s and solve Dirichlet, Neumann problems for various boundary conditions	K5
CO-5	Develop Green’s function using Dirichlet, Laplace problems and Helmholtz operation.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	2	1
CO 2	3	3	3	2	3	1
CO 3	3	3	3	3	3	2
CO 4	2	3	3	3	3	2
CO 5	2	2	3	3	3	3

**High Correlation: 63.33% Moderate Correlation : 29.9% Low Correlation: 6.67%**

**MATHEMATICAL FINANCE AND FINANCIAL MANAGEMENT**  
**PMAM217**

<b>Semester</b>	<b>: II</b>	<b>Credits</b>	<b>:3</b>
<b>Category</b>	<b>:Core Industrial Module</b>	<b>Hours/Week</b>	<b>:4</b>
<b>Class&amp;Major</b>	<b>:I M.ScMathematics</b>	<b>Total Hours</b>	<b>:52</b>

**Course Objectives:**

CO No.	To enable the students
CO-1	Recall the foundational concepts of financial management.
CO-2	Discuss a deep understanding of partnership dynamics, goodwill, and the mechanics of money in a partnership.
CO-3	Utilize annuity concepts in solving practical problems related to amortization, perpetuity, and sinking funds.
CO-4	Assess the various types of investment projects.
CO-5	Justify the efficacy of different investment appraisal techniques.

**UNIT-I SIMPLE INTEREST AND COMPOUND INTEREST 10 Hours**

Introduction – Simple Interest – Compound Interest

**UNIT-II ANNUITY 11 Hours**

Introduction – Amount and Present Value of Immediate or Ordinary Annuity – Amortization – Annuity Due – Perpetual Annuity or Perpetuity – Deperred Annuity – Sinking Fund.

**UNIT-III INTRODUCTION TO FINANCIAL MANAGEMENT 10 Hours**

Basics of Financial Management – Finance Function – Meaning and significance – Goals of Financial Management - Factors affecting Financial Decision - Time value of money – Meaning of Time value of Money- Methods of Analysis – Compounding Technique- Discounting or Present Value Technique.

**UNIT-IV PARTNERSHIP, BILL OF EXCHANGE, STOCKS AND SHARES 10 Hours**

Partnership: Partnership – Goodwill Money. Bill of exchange: Introduction – Bill of Exchange. Stocks and Shares: Introduction – Important Terms – Debenture – Stock.

**UNIT-V INVESTMENT APPRAISAL TECHNIQUES 11 Hours**

Types of Investment Projects - Payback Period – Net Present Value (NPV) and Internal Rate of Return (IRR) – Discounted cash flow method- Relative Merits & Demerits of these methods- Project Risk Assessment through Sensitivity Analysis.

**TextBooks**

- Padmalochan Hazarika. (2009). “A Textbook of Business Mathematics” S.Chand& Company Ltd., New Delhi.



- Sharma R.K, (2020), Financial Management, Kalyani Publications. New Delhi.
- Pandey I.M., (2020), Financial Management, Vikas Publishing House Pvt. Ltd New Delhi.

#### ReferenceBooks

- Pandey I.M., (2020), Financial Management, Vikas Publishing House Pvt. Ltd New Delhi.
- Maheswari S.N., (2019), Financial Management, Sultan Chand and Sons, New Delhi.
- Khan and Jain, (2019), Financial Management, Sultan Chand and Sons, New Delhi.

#### Course Outcomes:

CO No.	On completion of the course , the student will be able to	Bloom's Level
CO-1	Recall and explain the key principles of simple interest and compound interest.	K1, K2
CO-2	Identify the goals of financial management and factors influencing financial decisions.	K3
CO-3	Survey the bill of exchange in financial transactions.	K4
CO-4	Criticize the payback period, net present value (NPV), and internal rate of return (IRR) as investment appraisal techniques.	K5
CO-5	Formulate a new investment strategy, considering risk factors and potential returns.	K6

#### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	3	2	3
CO 2	3	2	3	2	2	3
CO 3	2	3	2	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	1	2	3	3

High Correlation: 63% Moderate Correlation : 34% Low Correlation: 3%

### MATHEMATICAL STATISTICS

#### PMAM215

Semester : II

Credit :3

Category :Elective III

Hours/Week :4

Class&Major :IM.ScMathematics

Total Hours :52

#### Course Objectives:

CO No.	Toenable thestudents
CO-1	Recall the concepts of Probability.
CO-2	Explain the Conditional probability and expectation.
CO-3	Solve discrete probability distributions by applying probability laws and theoretical results.
CO-4	Discover moment generating Functions and weak law of large numbers.
CO-5	Interpret joint distribution function.

#### UNIT-I RANDOM VARIABLES

10 Hours

The Concepts of Random Variables – The distribution function – Random Variable of the

discrete type and the Continuous type – Functions of Random Variables – Marginal Distributions – Conditional Distributions – Independent Random Variables.

**UNIT-II SOME PROBABILITY AND DISTRIBUTIONS**

**11 Hours**

The Binomial Distributions – The Poisson Distributions – The Uniform Distribution – The Normal Distribution – The Gamma Distribution – The Beta Distribution.

**UNIT-III SAMPLE MOMENTS AND THEIR FUNCTIONS**

**10 Hours**

Notion of a Sample and a Statistic – Distribution of the Arithmetic Mean of Independent Normally Distributed random Variable – The  $\chi^2$  Distribution - The Distribution of the Statistic  $(\bar{X}, S)$  – Student’s t-Distribution – Fisher’s Z Distribution.

**UNIT-IV SIGNIFICANCE TESTS**

**11 Hours**

Concept of a Statistical test – Parametric test for small samples and large samples -  $\chi^2$ -test – Test of Kolmogorov and Smirnov type – Independence Test by Contingency tables.

**UNIT-V ANALYSIS OF VARIANCE**

**10 Hours**

One-way Classification and two-way Classification. Hypotheses Testing: The Power functions and OC function – Most Powerful test – Uniformly most power test – Unbiased test.

**TextBook**

- M. Fisz. (1963). *Probability Theory and Mathematical Statistics*, John Wiley and Sons, New York.

**ReferenceBooks**

- R.B. Ash, (1972) *Real Analysis and Probability*, Academic Press, New York.
- K.L.Chung, (1974). *A course in Probability*, Academic Press, New York.
- R.Durrett.(1996). *Probability: Theory and Examples*, (2<sup>nd</sup> Edition) Duxbury Press, New York.
- V.K.Rohatgi.(1988). *An Introduction to Probability Theory and Mathematical Statistics*, Wiley Eastern Ltd., New Delhi(3<sup>rd</sup> Print).
- S.I.Resnick,(1999) *A Probability Path*, Birhauser, Berlin.
- B.R.Bhat.(1999) *Modern Probability Theory* (3<sup>rd</sup> Edition), New Age International (P)Ltd, New Delhi.

**Course Outcomes:**

CO No.	On completion of the course , the student will be able to	Bloom’s Level
CO-1	Recall and explain the formulation of modern Probability Theory.	K1, K2
CO-2	Solve conditional probability models and function of random variables based on single & multiples random variables.	K3
CO-3	Examine the concept of discrete and continuous random variable.	K4
CO-4	Estimate Statistical data using ANOVA	K5
CO-5	Develop the specific applications to moments generating functions.	K6

## CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	3	2	3
CO 2	3	2	3	2	2	3
CO 3	2	3	2	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	1	2	3	3

High Correlation: 77% Moderate Correlation : 23% Low Correlation: 0%

## ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

### PMAM216

Semester : II

Credits :3

Category :Elective IV

Hours/Week:4

Class&Major :I M.ScMathematics

Total Hours :52

### Course Objectives:

CO No.	Toenable thestudents
CO-1	Find the basics of learning problems with hypothesis and version spaces.
CO-2	Classify the informed and uninformed problem types and apply search strategies to solve them.
CO-3	Build the difficult real life problems in a state space representation so as to solve those using AI techniques like searching and game playing.
CO-4	Assume the concept of neural networks for learning linear and non-linear activation functions
CO-5	Design and evaluate intelligent expert models for perception and prediction from intelligent environment.

### UNIT-I MACHINE LEARNING

13 Hours

Introduction – Machine Learning Process – Supervised Learning – Regression – Linear Regression – Predicting – Polynomial Regression – Classification – Feature Engineering – Logistic Regression –kNN classification.

### UNIT-II MACHINE LEARNING [CONTINUED]

13 Hours

Model representation, decision boundary, cost function, gradient descent, regularization, evaluating a hypothesis (Model selection), training/validation/testing procedures, bias/variance, learning curves, Accuracy and Error measures, evaluating the accuracy of a classifier or predictor.

### UNIT-III ARTIFICIAL INTELLIGENCE

13 Hours

Introduction to AI, Control strategies, Search strategies, Production system characteristics – Specialized production system- Problem solving methods – Problem graphs, Matching, Indexing

and Heuristic functions –Hill Climbing Depth first and Breadth first, Constraint’s satisfaction Problem.

**UNIT-IV GAME PLAYING AND KNOWLEDGE REPRESENTATION 13 Hours**

Game playing – Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge.

**UNIT-V FIRST ORDER LOGIC 13 Hours**

First order logic – Syntax and Semantics – Knowledge Engineering in First Order Logic – Inference in First Order Logic

**TextBook**

- Alexey Grigorev.(2020). *Machine Learning Bookcamp*, MEAP.
- Shai Shalev-Shwartz, Shai Ben-David.(2014). *Understanding Machine Learning From Theory to Algorithms*, Cambridge University Press

**ReferenceBooks**

- Kevin Night and Elaine Rich, Nair B.(2008), *Artificial Intelligence (SIE)*, McGraw Hill.

**Course Outcomes:**

CO No.	On completion of the course , the student will be able to	Bloom’s Level
CO-1	Define and explain the knowledge about Artificial Intelligence.	K1, K2
CO-2	Select the main abstractions and reasoning for intelligent systems.	K3
CO-3	Simplify basic AI based problems.	K4
CO-4	Evaluate models generated from data using principles and algorithms	K5
CO-5	Develop an understanding what is involved in learning models from data.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
<b>CO 1</b>	3	3	3	3	3	3
<b>CO 2</b>	2	2	3	2	2	3
<b>CO 3</b>	2	3	2	2	2	2
<b>CO 4</b>	3	3	3	3	3	3
<b>CO 5</b>	2	3	3	3	3	3

**High Correlation: 67% Moderate Correlation : 33% Low Correlation: 0%**

## RESEARCH TOOLS AND TECHNIQUES

PMAD201

Semester : II  
Category :SEC-2 (Discipline Specific)  
Class&Major :I PG  
Course Objectives:

Credits :2  
Hours/Week :3  
Total Hours :39

CO No.	To enable the students
CO-1	List the basics of MaTLab.
CO-2	Classify Basics of MATLAB coding.
CO-3	Build the program for a given problem in MATLAB coding.
CO-4	Discover variety of common numeric techniques to solve
CO-5	Justify the various electric circuits in MATLAB simulation tool.

### Lab Exercise

#### MATLAB

1. To calculate interest of your money.
2. To define the function using variable as symbol.
3. To find out left and right limit of a given function
4. To find limit of a function
5. To find derivative of a function
6. To find integration when limits are not given
7. To find integration when limits are given
8. To find values of Beta and Gamma functions
9. To find roots of equation
10. Simple 2-D plots

#### TextBook

- Stephen J. Chapman.(2012). *MATLAB Programming for Engineers*. Cengage Publishers.

#### ReferenceBooks

- RudraPratap.(2005).*MATLAB 7*. Oxford University Press.
- R.K. Bansal, A.K. Goel. (2016). *MATLAB and Its Applications In Engineering*.Pearson Education, India.
- Amos Gilat.(2012).*MATLAB An Introduction with Applications*. Wiley Publication.
- S.N. Sivanandam, S. Sumathi.(2017).*Introduction to Neural Networks Using MATLAB*. McGraw Hill Education Publishers.

**Course Outcomes:**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Define and Illustrate the numeric techniques and computer simulations to solve engineering-related problems.	K1 & K2
CO-2	Apply the concept of limits to determine the behavior of a function at specific points.	K3
CO-3	Categorize the top-down, modular, and systematic approach to design, write, test, and debug sequential MATLAB programs to achieve computational objectives.	K4
CO-4	Deduct clear and accurate 2-D plots to illustrate the behavior of mathematical functions.	K5
CO-5	Create and control simple plot and user-interface graphics objects in MATLAB	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	2	2	3	2	2	3
CO 3	2	3	2	2	2	2
CO 4	3	3	3	3	3	3
CO 5	2	3	3	3	3	3

**High Correlation: 67% Moderate Correlation : 33% Low Correlation: 0%**

**III & IV EVALUATION COMPONENTS OF CIA**

Semester	Category	Course code	CourseTitle	ComponentIII	ComponentI V
I	MajorCoreI	PMAM111	Algebraic Structures	Assignment	TermPaper
I	MajorCoreII	PMAM112	RealAnalysis I	Assignment	Seminar
I	MajorCoreIII	PMAM113	OrdinaryDifferentialEquations	Assignment	TermPaper
I	Elective (Discipline Centric) I	PMAM114	Graph Theory and Applications	Assignment	Seminar
I	Elective (Discipline Centric) II	PMAM115	Fuzzy Sets and their Applications	Assignment	TermPaper
II	Major Core IV	PMAM212	AdvancedAlgebra	Assignment	Seminar
II	Major Core V	PMAM213	Real Analysis II	Assignment	TermPaper
II	Major Core VI	PMAM214	Partial DifferentialEquations	Assignment	Seminar

II	Industrial Core Module	PMAM217	Mathematical Finance and Financial Management	Assignment	Problem Solving
II	Elective (Discipline Centric) I	PMAM215	Mathematical Statistics	Assignment	TermPaper
II	Elective (Discipline Centric) II	PMAM216	Artificial Intelligence and Machine Learning	Assignment	Seminar

### NON MAJOR ELECTIVE FOR PG

Semester	Category	Course Code	Course Title	Contact Hours/week	Credit
I	NonMajor Elective	PMAE101	Mathematical Documentation Using LaTeX	3	2

### MATHEMATICAL DOCUMENTATION USING LaTeX

#### PMAE101

<b>Semester</b>	<b>: I</b>	<b>Credits</b>	<b>:2</b>
<b>Category</b>	<b>:SEC-I (NME)</b>	<b>Hours/Week</b>	<b>: 3</b>
<b>Class&amp;Major</b>	<b>:IPG</b>	<b>Total Hours</b>	<b>: 39</b>

#### Course Objectives:

CO No.	To enable the students
CO-1	Compose and format documents using LaTeX, demonstrating proficiency in document structuring, text formatting, and layout design.
CO-2	Analyze and explain various text properties and their impact on document aesthetics, and they will apply color customization to enhance visual appeal.
CO-3	Categorize and experiment with different font sizes, grasping their significance in emphasizing content hierarchy and readability within documents.
CO-4	Construct, modify, and typeset mathematical equations using LaTeX, displaying proficiency in formatting complex mathematical notation.
CO-5	Integrate LaTeX skills to structure and format research articles, incorporating headings, sections, citations, and references, following academic writing conventions.

### Lab Exercise

1. Creating a documents using LaTeX.
2. Understanding Text property , Text Colour.
3. Understanding Font Size.
4. Expressing Mathematical equations using LaTeX.
5. Formulate the Article.
6. Draw & insert an image in LaTeX file.
7. How to insert a graph into LaTeX document.
8. Constructing tables using LaTeX.
9. Design a question paper.
10. Prepare Bibliography and data base.
11. Prepare a research paper and letter writing.
12. Beamer presentation using LaTeX.

### TextBook

- David F Griffiths and Desmond J. Higham.(1996), *Learning LaTeX*, SIAM (Society for Industrial and Applied Mathematics) Publishers, PhidelPhia.

### ReferenceBooks

- Martin J. Erickson and Donald Bindner.(2011).*A Student's Guide to the Study, Practice, and Tools of Modern Mathematics*, CRC Press, Boca Raton, FL.
- L. Lamport.(1994), *LATEX: A Document Preparation System*. Addison Wesley, New York, second edition.

### Course Outcomes:

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	List and understand the syntax and structure for expressing mathematical equations in LaTeX.	K1 & K2
CO-2	Build LaTeX commands and syntax to create a document with appropriate formatting.	K3
CO-3	Categorize the impact of table design on data representation in a LaTeX document.	K4
CO-4	Judge the appropriateness of LaTeX features in conveying the intended message.	K5
CO-5	Create well-crafted research papers and letters using LaTeX.	K6



## CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	3	3	2	3
CO 2	3	2	2	2	3	3
CO 3	3	2	3	3	3	3
CO 4	2	3	3	3	3	2
CO 5	2	3	2	3	2	2

**High Correlation: 60% Moderate Correlation : 40% Low Correlation: 0%**

## NON MAJOR ELECTIVE FOR UG

Semester	Category	CourseCode	Course Title	ContactHours/week	Credit
I	NonMajorElective	UMAE101	Mathematics for Banking	2	2
II	NonMajorElective	UMAE203	Behavioral Finance	2	2

## MATHEMATICS FOR BANKING

### UMAE101

**Semester :I**

**Category : Non Major Elective**

**Class &Major:IUG**

**Credit : 2**

**Hours/Week: 2**

**TotalHours:26**

### CourseObjectives:

CO No.	To enable the students
CO-1	Understanding of fundamental numerical concepts, including factors like HCF and LCM, enabling proficient arithmetic calculations.
CO-2	Apply root operations for square and cube roots, along with percentage calculations, to solve mathematical problems and real-world scenarios effectively.
CO-3	Analyze profit and loss scenarios, time and work problems, and challenges related to pipes and cisterns, demonstrating critical thinking in solving practical mathematical situations.
CO-4	Evaluate and solve problems involving trains, boats, and streams, demonstrating the ability to analyze complex speed and distance relationships and find practical solutions.
CO-5	Synthesize concepts related to simple and compound interest, along with area calculations, to apply mathematical skills in financial and geometric contexts.

### UNIT-I

Numbers - HCF & LCM.

**5Hours**

### UNIT-II

Percentage – Average – Ratio and Proportion

**5Hours**

### UNIT-III

Profit and Loss - Time and Work – Time and Distance

**5 Hours**

### UNIT-IV

Problems on Trains – Problems on Ages

**6Hours**

### UNIT-V

Simple Interest – Compound Interest – Partnership.

**5Hours**

**TextBooks:**

- R.S. Aggarwal.(2003).*Objective Arithmetic*, S. Chand and Company Ltd., New Delhi.

**ReferenceBooks**

- ParveenKumar. (2020). *Arithmetic for Competitive Exam*. S D Publications.
- Dinesh Khattar.(2019).*Quantitative Aptitude for Competitive Examinations*. Pearson.India.

**CourseOutcomes:**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Recall and Illustrate of fundamental numerical concepts, including factors like HCF and LCM, enabling proficient arithmetic calculations.	K1 & K2
CO-2	Solve mathematical problems and real-world scenarios using root operations for square and cube roots.	K3
CO-3	Simplify the profit and loss scenarios, time and work problems, and challenges related to pipes and cisterns, demonstrating critical thinking in solving practical mathematical situations.	K4
CO-4	Determine the problems involving trains, boats, and streams, demonstrating the ability.	K5
CO-5	Estimate the concepts related to simple and compound interest, along with area calculations.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	3	3
CO 3	3	2	3	3	3	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	2	3	3

High Correlation: 90%    Moderate Correlation : 10%    Low Correlation: 0%

**BEHAVIORAL FINANCE****UMAE203**

**Semester :II**  
**Category :Non Major Elective**  
**Class &Major:I UG**

**Credit : 2**  
**Hours/Week: 2**  
**TotalHours:26**

**CourseObjectives:**

CO No.	To enable the students
CO-1	Understand a solid comprehension of time value of money concepts, including simple interest, equations of value, and compound interest, to make informed financial decisions.
CO-2	Apply the principles of simple annuities and calculate accumulated and discounted values of ordinary simple annuities, showcasing the ability to solve financial problems involving annuity payments.

CO-3	Analyze debt amortization processes and outstanding fund calculations, demonstrating the ability to critically assess financial situations and determine optimal debt repayment strategies.
CO-4	Evaluate callable bonds, premium, and discount bonds, showcasing the capacity to assess different bond characteristics and determine bond pricing strategies.
CO-5	Synthesize concepts related to net present value (NPV) and internal rate of return (IRR), integrating these metrics to analyze and make informed decisions regarding investment opportunities.

**UNIT-I** **5 Hours**  
Simple interest, Equations of value, Partial payments, Simple discount, Compound Interest

**UNIT-II** **6 Hours**  
Simple Annuities, Accumulated value and discounted value of ordinary simple annuity.

**UNIT-III** **5 Hours**  
Amortization of a debt, Outstanding funds.

**UNIT-IV** **5 Hours**  
Callable bonds, Premium and discount

**UNIT-V** **5 Hours**  
Net present value, Internal rate of return

**TextBooks:**

- Petr Zima & Robert L. Brown. (2005), *Mathematics of Finance*, Tata McGraw, Hill Publishing Company Limited, New Delhi.

**ReferenceBooks**

- P.R. Vittal. (2005). *Business Mathematics*, Third Edition, Margham Publications, Chennai.
- V K Kapoor. (2005). *Business Mathematics*, Sultan Chand & Sons.
- Financial Management, Ninth edition, I.M. Pandey, VikassPublishing house Pvt. Ltd., 2005.
- S.N. Maheshwari. (2005). *Principles of Management Accounting*, Fifteenth Edition, Majestic Books.
- T.S. Reddy, Hari Prasad Reddy. (2004). *Management Accounting*, Second Editio, Margham Publications.

**CourseOutcomes:**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Recall and Relate the fundamental concepts of solid comprehension of time value of money, simple interest, equations of value, and compound interest, to make informed financial decisions.	K1 & K2
CO-2	Construct the principles of simple annuities and calculate accumulated and discounted values of ordinary simple annuities, showcasing the ability to solve financial problems involving annuity payments.	K3
CO-3	Compare the debt amortization processes and outstanding fund calculations, demonstrating the ability to critically assess financial situations and determine optimal debt repayment strategies.	K4

CO-4	Determine the callable bonds, premium, and discount bonds, showcasing the capacity to assess different bond characteristics and determine bond pricing strategies.	K5
CO-5	Build the concepts related to net present value (NPV) and internal rate of return (IRR), integrating these metrics to analyze and make informed decisions regarding investment opportunities.	K6

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	2	3	3	3	3	3
CO 2	2	2	2	1	1	3
CO 3	3	3	2	2	2	2
CO 4	3	3	3	3	2	2
CO 5	2	3	3	3	1	3

High Correlation: 53% Moderate Correlation : 37% Low Correlation : 10%

### III and IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course code	CourseTitle	ComponentIII	ComponentIV
I	NME	UMAE101	Mathematics for Banking	Assignment	Problem Solving
II	NME	UMAE203	Behavioral Finance	Assignment	Problem Solving

### ALLIED PROGRAMMES OFFERED TO OTHER DEPARTMENT

Class & Major	Semester	Category	CourseCode	CourseTitle	Conta ctHour s/week	Credit
						Min/M ax
IB.ScChem / IB.SC Phy	I	Allied	UMAA120	Allied Mathematics for Chemistry I / Allied Mathematics for Physics I	4	3
I B.Sc (CS)			UMAA122	Numerical Methods	4	3
IBCA			UMAA119	Statistical Methods and their Applications I	4	3
IB.ScChem / IB.SC Phy	II	Allied	UMAA224	Allied Mathematics for Chemistry II / Allied Mathematics for Physics II	4	3
I B.Sc (CS)			UMAA226	Graph Theory and its Applications	4	3
IBCA			UMAA225	Statistical Methods and their Applications II	4	3
IIB.Sc CND	IV	Allied	UMAA411	Bio Statistics	4	3

**ALLIED MATHEMATICS FOR CHEMISTRY I/  
ALLIED MATHEMATICS FOR PHYSICS I  
UMAA120**

**Semester : I**  
**Category : Allied**  
**Class & Major: I B.Sc Chemistry / I B.Sc Physics**

**Credit : 3**  
**Hours/Week : 4**  
**Total Hours : 52**

**Course Objectives:**

CO No.	To enable the students
CO-1	Recall the Binomial, Exponential and Logarithmic series.
CO-2	Summarize the Skew-Hermitian matrices, Orthogonal and Unitary Matrices.
CO-3	Make use of the techniques in Successive Differentiation.
CO-4	Classify the Trigonometric series and its applications.
CO-5	Determine the hyperbolic function and their properties.

**UNIT-I ALGEBRA**

**10 Hours**

Summation of series: Binomial –Exponential-Logarithmic series(Theorems without proof)-simple problems.

**UNIT-II MATRIX**

**11 Hours**

Symmetric, Skew-Symmetric, Orthogonal, Hermetian, Skew-Hermetian and Unitary matrices. Eigen values and Eigen-vectors, Cayley-Hamilton theorem (without proof) – verification- Computation of inverse of matrix using Cayley - Hamilton theorem.

**UNIT-III POLYNOMIAL EQUATIONS**

**10 Hours**

Polynomial equations with real coefficients, irrational roots, complex roots, symmetric functions of roots, transformation of equation by increasing or decreasing roots by a constant, reciprocal equation-simple problems.

**UNIT-IV TRIGONOMETRY**

**11 Hours**

Expansions of  $\sin(n\theta)$  and  $\cos(n\theta)$  in a series of powers of  $\sin\theta$  and  $\cos\theta$  - Expansions of  $\sin^n \theta$ ,  $\cos^n \theta$ ,  $\tan^n \theta$  in a series of sines, cosines and tangents of multiples of “ $\theta$ ” - Expansions of  $\sin\theta$ ,  $\cos\theta$  and  $\tan\theta$  in a series of powers of “ $\theta$ ”..

**UNIT-V DIFFERENTIATION**

**10 Hours**

Successive differentiation, nth derivatives, Leibnitz theorem (without proof) and applications, Jacobians.

**TextBooks**

- P. Duraipandian and S. Udayabaskaran. (2014). *Allied Mathematics*, Volume I and II, by, S. Chand Publications.

**ReferenceBooks**

- S. Narayanan and T.K. Manickavasagam Pillai, (2019). *Ancillary Mathematics*, S. Viswanathan Printers, 1986, Chennai. Dinesh Khattar.
- Dr. A. Singaravelu (2014). *Allied Mathematics*, Meenakshi Agency.

**Course Outcomes:**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Recall and Illustrate the definitions and properties of symmetric, skew-symmetric, orthogonal, Hermitian, skew-Hermitian, and unitary matrices.	K1 & K2
CO-2	Solve the polynomial equations using the symmetric functions of roots.	K3
CO-3	Analyze different types of series and identify their key characteristics.	K4
CO-4	Determine the utility of different trigonometric expansions in mathematical problem-solving.	K5
CO-5	Develop a problem requiring the application of multiple levels of differentiation concepts.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	2	2	3	2	1	3
CO 3	2	3	3	3	3	3
CO 4	3	3	1	3	3	3
CO 5	2	3	3	3	3	3

**High Correlation: 77% Moderate Correlation : 17% Low Correlation: 6%**

**NUMERICAL METHODS**

**UMAA122**

**Semester : I**

**Credit : 3**

**Category : Allied**

**Hours/Week : 4**

**Class & Major : I B.Sc Computer Science**

**Total Hours : 52**

**Course Objectives:**

CO No.	To enable the students
CO-1	Define the knowledge about the various topics in Numerical methods.
CO-2	Explain the fundamentals of algebraic equations.
CO-3	Solve interpolation and approximation on examples.
CO-4	Discover the Concepts of numerical differentiation and integration.
CO-5	Determine the linear systems, numerical solution of ordinary differential equations.

**UNIT- I FUNDAMENTALS OF ALGEBRAIC EQUATION**

**10 Hours**

Solution of algebraic and transcendental equations-Bisection method – Fixed point iteration method – Newton Raphson method –linear system of equations – Gauss elimination method – Gauss Jordan method. (Simple Problems only).

**UNIT-II ITERATIVE, INTERPOLATION AND APPROXIMATION 11 Hours**

Iterative methods - Gauss Jacobi and Gauss Seidel – Eigen values of a matrix by Power method and Jacobi’s method for symmetric matrices. Interpolation with unequal intervals – Lagrange’s interpolation – Newton’s divided difference interpolation. (Simple Problems only).

**UNIT-III INTERPOLATION WITH EQUAL INTERVAL 10 Hours**

Difference operators and relations. -Interpolation with equal intervals – Newton’s forward and backward difference formulae. (Simple Problems only).

**UNIT-IV NUMERICAL DIFFERENTIATION AND INTEGRATION 10 Hours**

Approximation of derivatives using interpolation polynomials – Numerical integration using Trapezoidal, Simpson’s 1/3 rule. (Simple Problems only).

**UNIT-V INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 11 Hours**

Single step methods – Taylor’s series method – Euler’s method – Modified Euler’s method - RungeKutta method for solving( first, second , Third and 4th) order equations – Multi step methods. (Simple Problems only).

**TextBooks**

- Sastry, S.S. (2012). *Introductory Methods of Numerical Analysis*. Prentice Hall of India.

**ReferenceBooks**

- Kandasamy, P. Thilagavathy, K. and Gunavathy, K. (2013). *Numerical Methods*. S.Chand& Company limited (5 th Ed). New Delhi. **CourseOutcomes:**

**Course Outcomes:**

CO No.	On completion of the course the student will be able to	Bloom’s Level
CO-1	Choose and Demonstrate various problems on numerical methods.	K1 & K2
CO-2	Make use of the approximation to solve Numerical methods problems	K3
CO-3	Simplify the various types of differentiation and integration problems.	K4
CO-4	Deduct the direct methods for solving linear systems.	K5
CO-5	Create Numerical solution for ordinary differential equations.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	3	2	3
CO 2	3	2	3	2	2	3
CO 3	2	3	2	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	1	2	3	3

**High Correlation: 63% Moderate Correlation : 34% Low Correlation: 3%**

**STATISTICAL METHODS AND THEIR APPLICATIONS-I  
UMAA119**

**Semester :I**

**Category :Allied**

**Class &Major:I BCA**

**Credit : 3**

**Hours/Week : 4**

**TotalHours :52**

**CourseObjectives:**

CO No.	To enable the students
CO-1	Recall the basic concepts of Mathematical Statistics.
CO-2	Explain the Statistical Characteristics, Discrete and Continuous Distributions and their properties.
CO-3	Solve the series of Complex numbers.
CO-4	Discover the Statistical applications.
CO-5	Compare to Mappings by Elementary Functions.

**UNIT-I****10 Hours**

Nature and Scope of Statistical Methods and Their Limitations — Classifications, Tabulation and Diagrammatic Representation of various types of statistical data — Frequency Curves and Ogives — Graphical determination of percentiles quartiles and their properties — Merits and Demerits.

**UNIT-II****11 Hours**

Measures of Location — Arithmetic Mean, Median, Mode, Geometric Mean, Harmonic Mean and their properties — Merits and Demerits.

**UNIT-III****10 Hours**

Measures of Dispersion — Range, Mean Deviation, Quartile Deviation, Standard Deviation, Coefficient of Variation, Skewness and Kurtosis and their properties.

**UNIT-IV****11 Hours**

Probability of an event — Finitely additive probability space addition and multiplication theorems — Independence of events — Conditional Probability — Bayes Theorem.

**UNIT-V****10 Hours**

Concepts of Random Variable — Mathematical expectation — Moments of random variable (raw and central moments) — Moment generating function — Chebychev's inequality —



Simple Problems.

### TextBooks

- Gupta, S.C. & Kapoor, V.K. (2008). *Fundamentals of Mathematical Statistics*. Sultan & Sons. New Delhi.

### ReferenceBooks

- Hogg, R.V. & Craig, A.T. (1998). *Introduction to Mathematical Statistics*. Macmillan. New York.
- Mood, A.M. Graybill, F.A. & Boes, D.G. (1974). *Introduction to Theory of Statistics*. McGrawHill. New York.

### CourseOutcomes:

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Define and explain the concepts of the nature, scope, and limitations of statistical methods, including classifications, tabulations, and diagrammatic representations of various data types.	K1 & K2
CO-2	Develop the probability concepts, including finite additive probability space, addition and multiplication theorems, and conditional probability, to analyze and solve probability problems, including using Bayes' theorem.	K3
CO-3	Examine the measures of location such as arithmetic mean, median, mode, geometric mean, and harmonic mean, along with understanding their properties and applicability.	K4
CO-4	Compare measures of dispersion, including range, mean deviation, quartile deviation, standard deviation, and coefficient of variation, and understand their significance in describing data variability.	K5
CO-5	Improve the concepts related to random variables, moments (raw and central), moment generating functions, and Chebyshev's inequality.	K6

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	2	3	3	3	3	3
CO 2	2	2	2	1	1	3
CO 3	3	3	2	2	2	2
CO 4	3	3	3	3	2	2
CO 5	2	3	3	3	1	3

High Correlation: 53% Moderate Correlation : 37% Low Correlation: 10%

### ALLIED MATHEMATICS FOR CHEMISTRY II / ALLIED MATHEMATICS FOR PHYSICS II UMAA224

Semester :II  
Category :Allied  
Class & Major: I B.Sc Chemistry / I B.Sc Physics

Credit : 3  
Hours/Week: 4  
Total Hours: 52

**Course Objectives:**

CO No.	To enable the students
CO 1	Recall the concept of Integrals.
CO 2	Explain the Integration by parts and its applications.
CO3	Solve the Full range Fourier series and half range Fourier series.
CO 4	Discover the Laplace transform and inverse Laplace transform for solving ordinary differential equation with constant coefficient
CO 5	Design the Homogeneous Linear Differential Equations of the Second Order with Variable co-efficient.

**UNIT-I INTEGRATION****10 Hours**

Bernoullis formula – Reduction formulae -  $\int_0^{\pi/2} \sin^n x dx$ ,  $\int_0^{\pi/2} \cos^n x dx$ ,  $\int_0^{\pi/2} \sin^m x \cos^n x dx$  (m,n being positive integers).

**UNIT-II DIFFERENTIAL EQUATIONS****11 Hours**

**Ordinary Differential Equations:** second order non-homogeneous differential equations with constant coefficients of the form  $ay'' + by' + cy = X$  where X is of the form  $e^{ax} \cos \beta x$  and  $e^{ax} \sin \beta x$  -Related problems only.

**Partial Differential Equations:** Formation, complete integrals and general integrals, four standard types and solving Lagrange's linear equation  $Pp + Qq = R$ . (Simple Problem only).

**UNIT-III LAPLACE TRANSFORMS****10 Hours**

Laplace transformations of standard functions and simple properties, inverse Laplace transforms, Application to solution of linear differential equations up to second order simple problems.

**UNIT-IV VECTOR CALCULUS****11 Hours**

Introduction, Scalar point functions, Vector point functions, Vector differential operator Gradient, Divergence, Curl, Solenoidal, irrotational, identities.

**UNIT-V VECTOR CALCULUS (CONTINUED)****10 Hours**

Line, surface and volume integrals. Simple problems on these.

**Text Books**

- P. Duraipandian and S. Udayabaskaran. (2014). *Allied Mathematics*, Volume I and II, by, S. Chand Publications.

**Reference Books**

- S. Narayanan and T.K. Manickavasagam Pillai, (2019). *Ancillary Mathematics*, S. Viswanathan Printers, 1986, Chennai. Dinesh Khattar.
- Dr. A. Singaravelu (2014). *Allied Mathematics*, Meenakshi Agency.

**Course Outcomes:**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO 1	Recall and relate techniques of integration, including Bernoulli's formula and reduction formulae, and apply them to solve a variety of integral problems.	K1 & K2
CO 2	Identify the application of second-order non-homogeneous differential equations with constant coefficients to solve problems involving exponential and trigonometric functions, illustrating the use of mathematical models in real-world scenarios.	K3
CO 3	Simplify Laplace transforms to address linear differential equations up to the second order, showcasing the ability to transform complex differential equations into solvable algebraic forms.	K4
CO 4	Evaluate fundamental concepts of vector calculus, including scalar and vector point functions, gradient, divergence, and curl operators, and understand their applications in modeling physical phenomena.	K5
CO 5	Construct the problems concerning fields, fluxes, and physical quantities, highlighting the practical application of integral concepts using line, surface, and volume integrals within the context of vector calculus	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	2	2	3	2	1	3
CO 3	2	3	3	3	3	3
CO 4	3	3	1	3	3	3
CO 5	2	3	3	3	3	3

**High Correlation: 77% Moderate Correlation : 17% Low Correlation: 6%**

**GRAPH THEORY AND ITS APPLICATIONS**

**UMAA226**

**Semester :II**  
**Category :Allied**  
**Class &Major:I B.Sc Computer Science**

**Credit : 3**  
**Hours/Week: 4**  
**TotalHours:52**

**Course Objectives:**

CO No.	To enable the students
CO 1	Define the Graph, sub graph their representations, degree and algebraic operations.
CO 2	Understand the concepts of Connected graphs, weighted graphs and shortest paths.
CO3	Utilize the concepts of Trees Characterizations, spanning tree, minimum spanning trees.
CO 4	Classify the concepts of graphs and solves the mathematical models using graphs.
CO 5	Construct mathematical models of real world problems

**UNIT-I INTRODUCTION****10 Hours**

Graph-mathematical definition- Introduction – sub graphs –Walks, paths, Circuits connectedness- Components- Euler Graphs- Hamiltonian paths and circuits-Trees- properties of Trees- Distance and centers in Tree- Rooted and Binary Trees.

**UNIT-II CONNECTIVITY AND PLANARITY****11 Hours**

Introduction to circuits - cut set- properties of cut set- All cut sets –connectivity and separability – Network Flows - 1-Isomorphism - 2-Isomorphism- Combinatorial and Geometric graphs- Planar Graphs – Different representation of planar graph.

**UNIT-III COLORING AND DIRECTED GRAPH****11 Hours**

Basics of Colouring&Chromatic number – Chromatic partitioning – Graph Colouring – four colour Problem Chromatic polynomial - Matching – Covering - Directed graphs - Types of Directed Graphs – Diagraphs and binary relations – Directed paths- Euler Graph.

**UNIT-IV MATRIX REPRESENTATION IN GRAPH****10 Hours**

Matrix representation of graphs, Sub graphs& Quotient Graphs, Transitive Closure digraph, Euler's Path & Circuit (only definitions and examples), spanning Trees of Connected Relations, Prim's Algorithm to construct Spanning Trees, Weighted Graphs, Minimal, Spanning Trees by Prim's Algorithm &Kruskal's Algorithm..

**UNIT-V APPLICATIONS OF GRAPH****10 Hours**

Traveling Sales Person Problem with Directed and Un directed Graph, - Graph with  $n$  vertices and  $k$  colours- Shortest path from one to many Cities with directed graph- Shortest Paths with Un directed Graphs-Connected Components..

**Text Book**

- NarsinghDeo, "Graph Theory with Application to Engineering and Computer Science" Prentice Hall of India 2010(Reprint ).
- Rosen H "Discrete Mathematics and Its Application " McGraw Hill , 2007.

**Reference Books**

- Discrete Maths for Computer Scientists & Mathematicians by Mott, Kandel, Baker.
- Clark J and Holton DA " First look at Graph Theory" Allied Publishers 1995.
- Discrete Maths for Computer Scientists & Mathematicians by Mott, Kandel, Baker

**Course Outcomes:**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO 1	Define and explain the fundamental concepts in graph theory Graphs, sub graphs, walks, Euler graphs, Hamiltonian Paths Tree Properties, Hamiltonian paths and circuits	K1 & K2
CO 2	Make use of the concepts of Circuits, Cut set and its Properties, Network Flows, Isomorphism and Combinatorial and Planar Graphs.	K3
CO 3	Categorize the concept of Colouring with Chromatic Number, Directed Graphs, Matching, Covering Pattern and Euler Graphs.	K4
CO 4	Criticize the Various Concepts of Representation of Graphs, Euler Paths Circuit, Kruskals and Prims Algorithms, Connected Components.	K5
CO 5	Develop the Applications with travelling sales person Problem, K colour Problem with n vertices in a Graph and Shortest Path finding Problem using Directed and Undirected Graphs.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	3	2	3
CO 2	3	2	3	2	2	3
CO 3	2	3	2	3	2	2
CO 4	3	3	3	3	3	3
CO 5	3	3	1	2	3	3

**High Correlation: 77% Moderate Correlation : 17% Low Correlation: 6%**

**STATISTICAL METHODS AND THEIR APPLICATIONS-II  
UMAA225**

**Semester : II**  
**Category : Allied**  
**Class & Major: II BCA**

**Credits : 3**  
**Hours/Week: 4**  
**Total Hours : 52**

**Course Objectives:**

CO No.	To enable the students
CO 1	Recall the basic concepts of Mathematical Statistics.
CO 2	Illustrate the Statistical Characteristics, Discrete and Continuous Distributions and their properties
CO3	Solve Sampling Theory Significance Tests and Testing of Hypothesis.
CO 4	Discover the Statistical applications.
CO 5	Deduct the knowledge of the usage of Correlation and Regression.

**UNIT - I CORRELATION ANALYSIS****10 Hours**

Correlation Analysis-Significance or the Study of Correlation- Types of Correlation- Methods Studying Correlation-Scatter Diagram Method, Graphical Methods, Karl Pearson's co-

Efficient of Correlation, Spearman’s Rank Correlation Coefficient, Concurrent Deviation Method- Properties of Coefficient of Correlation..

**UNIT - II REGRESSION ANALYSIS** **10 Hours**

Regression Analysis-Uses of Regression Analysis-Regression Lines-Regression Equations-Properties of Regression Coefficient.

**UNIT – III SAMPLING SURVEY AND DISTRIBUTION** **11 Hours**

Statistical Population Census and Sampling Survey - Parameter and Statistics - Sampling and Sampling Distribution and Standard Error. Sampling Distributions - Students ‘t’.

**UNIT - IV TEST OF SIGNIFICANCE** **10 Hours**

Test of significance - Large Sample Test for Proportion, Mean and Standard Deviation – Exact test based on ‘t’, Chi - square and F- distribution with respect to Population Mean, Variance and Correlation Coefficient.

**UNIT - V ANALYSIS OF VARIANCE** **11 Hours**

Analysis of Variance - One - way and Two-way Classification - Basic Principles of Design of Experiments - Randomization, Replication, Local Control design.

**Text Book**

- Gupta, S.C. & Kapoor, V.K. (2008). *Fundamentals of Mathematical Statistics*. Sultan & Sons. New Delhi.

**Reference Books**

- Hogg, R.V. & Craig, A.T.(1998). *Introduction to Mathematical Statistics*. Macmillan. New York.
- Mood, A.M. Graybill, F.A. & Boes, D.G. (1974). *Introduction to Theory of Statistics*. McGrawHill. New York.

**Course Outcomes:**

CO No.	On completion of the course the student will be able to	Bloom’s Level
CO 1	Recall and explain the different methods of correlation analysis, including scatter diagram method, graphical methods, and various correlation coefficients, to assess their appropriateness and limitations in analyzing relationships between variables.	K1 & K2
CO 2	Build the regression analysis techniques to make predictions, understanding regression lines, equations, and coefficient properties, and showcasing the ability to model and interpret relationships between variables.	K3
CO 3	Examine statistical population concepts, census, and sampling survey methods, understanding parameters vs. statistics, sampling distributions, and standard error, and interpreting the practical implications of different distributions.	K4
CO 4	Assess significance testing methodologies, including large sample	K5

	tests and chi-square tests, to determine the significance of population parameters, interpreting the results within the context of real-world data.	
CO 5	Design experiments using principles such as randomization, replication, and control, and plan the analysis of variance for one-way and two-way classifications, demonstrating the ability to set up effective experimental designs.	K6

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	3	3
CO 3	3	2	3	3	3	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	2	3	3

**High Correlation: 90% Moderate Correlation : 10% Low Correlation: 0%**

### III & IV EVALUATION COMPONENTS OF CIA

Class & Major	Semester	Category	CourseCode	CourseTitle	Component-III	Component-IV
IB.ScChem / IB.SC Phy	I	Allied	UMAA120	Allied Mathematics for Chemistry I / Allied Mathematics for Physics I	Problem solving	Assignment
I B.Sc (CS)			UMAA122	Numerical Methods	Assignment	Problem solving
IBCA			UMAA119	Statistical Methods and their Applications I	Problem solving	Assignment
IB.ScChem / IB.SCPhy	II	Allied	UMAA224	Allied Mathematics for Chemistry II / Allied Mathematics for Physics II	Assignment	Problem solving
I B.Sc (CS)			UMAA226	Graph Theory and its Applications	Problem solving	Assignment
I BCA			UMAA225	Statistical Methods and their Applications II	Assignment	Problem solving

## DEPARTMENT OF COMPUTER SCIENCE

### PREAMBLE

- UG** : Programme Profile and Syllabi of Courses from I to II semesters along with Evaluation Components III and IV (With effect from 2023-2026 Batch Onwards)
- PG** : Programme Profile and Syllabi of Courses from I to II semesters along with Evaluation Components III and IV (With effect from 2023-2025 Batch Onwards)

### PROGRAMME PROFILE B.Sc. (COMPUTER SCIENCE)

#### PROGRAMME SPECIFIC OUTCOMES (PSO)

<b>PSO No.</b>	<b>On completion of this programme, students will be able to</b>
PSO-1	Understand the fundamental principles and theories of computer science, including algorithms, data structures, programming languages, and computer architecture
PSO-2	Create proficiency in multiple programming languages and software development tools to design, implement, and test software solutions
PSO-3	Apply problem-solving skills and critical thinking to analyze and Knowledge for developing server based Languages such as Node.js, PHP, ASP.NET/C#, Python etc.,.
PSO-4	Analyze the principles of computer security and adhere to ethical and professional standards in computer science, including issues related to intellectual property, privacy, and social responsibility.
PSO-5	Develop software projects in teams to collaborate and demonstrate effective communication and project management skills based on emerging technologies such as cloud Computing, Big data, and Artificial intelligence, Internet of things, and apply them to solve real-world problems.
PSO-6	Demonstrate the ability to learn and adapt to new technologies and tools, and engage in lifelong learning to stay current in the field of computer science.



## PROGRAMME PROFILE – B.Sc COMPUTER SCIENCE

Semester	Part	Category	Course Code	Course Title	Contact Hour/Week	Credit Min/Max
I	I	Language: Tamil/ Hindi/ French	UTAL110/ UHIL102 UFRL102	General Tamil-I/ Hindi-I/ French-I	5	3
	II	Language: English	UENL111	General English	5	3
	III	Core Courses - I	UCSM111/ UCAM111/ UITM101	Object Oriented in Python Programming	5	4
	III	Core Courses - II	UCSR111 UCAR112 UITR101	Python Programming using OOPs Practicals	5	4
	III	Elective Course 1 ( <b>Generic</b> / Discipline Specific)	UMAA122	Numerical Methods	4	3
	IV	Foundation Course FC	UCSF101 UCAF101/	Problem Solving Computation	2	2
	IV	Skill Enhancement Course – SEC-1 (Non Major Elective)			2	2
	IV	Ability Enhancement Compulsory Course (AECC 1) -Soft Skill	USKS103	Soft Skill-1- Communicative English	2	2
<b>Total</b>					<b>30</b>	<b>23</b>
II	I	Language : Tamil/ Hindi/ French	UTAL210/ UHIL201 UFRL201	General Tamil II/ Hindi-II/ French-II	5	3
	II	LE: Language	UENL211	General English	5	3
	III	Core Courses - III	UCSM209/ UCAM208/ UITM201	Advanced Data Structures & Algorithms	5	4
	III	Core Courses - IV	UCSR208/ UCAR208/ UITR202	Advanced Data Structure and Algorithms – Practicals	5	4
	III	Elective Course –II ( <b>Generic</b> / Discipline Specific)	UMAA226	Graph Theory and its applications	4	3
	III	Internship / Industrial Training	UINS201	Internship / Industrial Training		-/ 2
	IV	Skill Enhancement Course – SEC-3 (Discipline / Subject Specific)	UCSD201/ UCAD201	PHP Programming	2	2
	IV	Skill Enhancement Course – SEC-1 (Non Major Elective)			2	2
	IV	Ability Enhancement Compulsory Course (AECC 2) Soft Skill-2	USKS203	Soft Skill-2	2	2
V	Extension Activity/ Physical Education/ NCC				1/2	
VI	Value added courses (Outside class hours)	CCSC201			-/2	
<b>Total</b>					<b>30</b>	<b>24/29</b>

III	I	Language: Tamil/ Hindi/ French	UTAL310/ UHIL301 UFRL301	General Tamil-III/ Hindi-III/ French-III	5	3
	II	Language: English	UENL311	General English	5	3
	III	Core Course - V	UCSM308 UCAM308/	Microprocessor and Microcontroller	4	4
	III	Core Course – VI	UCSR309/ UCAR309	Microprocessor and Microcontroller-Practical	4	4
	III	Elective Course 3 ( <b>Generic</b> / Discipline Specific) -EC3	UMAA306	Discrete Mathematical Structures	4	3
	IV	Skill Enhancement Course -SEC-5 ( <b>Discipline Specific</b> / Generic)	UCSD301	PHP Programming- Practical	2	2
	IV	Skill Enhancement Course -SEC-4 (Entrepreneurial Based)	UCSU311	Graphic Design	2	1
	IV	Ability Enhancement Compulsory Course (AECC 3) Soft Skill-3	USKS301	Soft Skill-3	2	2
	IV	Value Education	UGEV301	Value Education	2	2
<b>Total</b>					<b>30</b>	<b>24</b>
IV	I	Language: Tamil/ Hindi/French	UTAL409/ UTAL410	General Tamil IV/ Hindi-II/ French-II	5	3
	II	Language: English	UENL410	General English	5	3
	III	Core Course - VII	UCSM410 UCAM408 /	Industry Module : Java Application Programming	5	4
	III	Core Course - VIII	UCSR413 UCAR409/	Java Application Programming – Practicals	5	4
	III	Elective Course - EC4 (Generic )	UMAA404	Statistics Analysis using R	4	3
	III	Internship / Industrial Training	UINS401	Internship / Industrial Training	-	-/2
	IV	Skill Enhancement Course – SEC-6 ( <b>Discipline Specific</b> )	UCSD401	Cloud Computing	2	2
	IV	Skill Enhancement Course- <b>Online course</b>	UONL401	Online Course *	2	2
	IV	Ability Enhancement Compulsory Course (AECC 4) Soft Skill-4	USKS401	Soft Skill-4	2	2
	V	Extension Activity/ Physical Education/NCC			-	-/2
VI	Value added course (Outside class hours)	VCSC401		-	-/2	
<b>Total</b>					<b>30</b>	<b>23/29</b>
V	III	Core Course - IX	UCSM513	Software Engineering and Modeling	5	4
	III	Core Course - X	UCSM514	Advanced Database Management System	5	4
	III	Core Course - XI	UCSR513	Advanced Database Management System – Practical	5	4
	III	Elective Course – EC5	UCSD501	1.System Control Software	5	3

		(Generic / <b>Discipline Specific</b> )	UCSD502 UCSD503	2. System Programming 3.Linux Programming		
	III	Elective Course – EC6 (Generic / <b>Discipline Specific</b> )	UCSD504 UCSD505 UCSD506	1.Data Mining and Warehousing 2. System Administration and Maintenance 3. Artificial Neural Networks	4	3
	III	Core Course - XII	UCSP502	Project with Viva voce	4	4
	IV	Environmental Studies	UGEV501	Environmental studies	2	2
<b>Total</b>					<b>30</b>	<b>24</b>
VI	III	Core Course - XIII	UCSM616	Computer Networks	5	4
	III	Core Course - XIV	UCSM617	.NET Framework	5	4
	III	Core Course - XV	USCR610	.NET Framework -Practical	5	4
	III	Elective Course – EC7 (Generic / Discipline Specific)	UCSD601/ UCSD602/ UCSD603/	1.Introduction to Data Science 2. Machine Learning 3. Parallel Algorithm	6	4
	III	Elective Course – EC8 (Generic / Discipline Specific)	UCSD604/ UCSD605/ UCSD606/	1.Cyber Security 2.Information Security 3.Network Security	5	3
	III	Internship / Industrial Training (semester vacation 30 Hrs)	UINS601	Internship / Industrial Training	-	-/2
	III	Comprehensive Viva-voce			-	1
	IV	Professional Competency Skill Enhancement Course SEC8	UCSC601	Professional Competency	4	2
	V	Extension Activity/ Physical Education/NCC			-	-/2
	VI	VALUE ADD COURSE			-	-
<b>Total</b>					<b>30</b>	<b>22/26</b>
<b>OVERALL TOTAL</b>					<b>180</b>	<b>140/155</b>

### NON MAJOR ELECTIVE

Semester	Category	Course Code	Course Title	Contact Hrs/week	Credit
I	Skill Enhancement Course (Non Major Elective)	UCSE101/ UITE101 UCAE101	Office Automation	2	2
II	Skill Enhancement Course- SEC-2 (Non Major Elective)	UCSE211/ UITSE211/ UCAE211	Advanced Excel	2	2

### ALLIED COURSES OFFERED TO OTHER DEPARTMENTS

Semester	Part	Category	Course Code	Course Title	Contact Hrs/week	Credit
I	III	Generic(EC1)	UCSA106	Computer Fundamentals	4	3
II	III	Generic(EC2)	UCSA206	Programming with C++	4	3
III	III	Generic(EC3)	UCSA308	Visual Basic	4	3
IV	III	Generic(EC4)	UCSA409	Computer Networks	3	3
V	III	Generic(EC5)	UCSA511	Mobile Computing	4	3
VI	III	Generic(EC6)	UCSA601	Web Designing	5	3

**EXTRA CREDIT EARNING PROVISION  
SELF STUDY**

Semester	Category	Course Code	Course Title	Contact Hrs/week	Credit
I	Self-study Paper	UCSS101 UCSS102	C Programming Practical: C Programming	2	2
II	Self-study Paper	UCSS201 UCSS202	Desktop Publishing Hardware Trouble Shooting	2	2
III	Self-study Paper	UCSS301 UCSS302	Web Application Development Practical: Web Application Development.	2	2
IV	Self-study Paper	UCSS401 UCSS402	Mobile Adhoc Network Devops	2	2
V	Self-study Paper	UCSS501 UCSS502	Internet of Things Natural Language Processing	2	2
VI	Self-study Paper	UCSS601 UCSS602	Image Processing Computing Intelligence	2	2

**OBJECT ORIENTED IN PYTHON PROGRAMMING  
UCSM111/UCAM111/ UITM101**

<b>Semester</b>	<b>: I</b>	<b>Credit</b>	<b>: 4</b>
<b>Category</b>	<b>: Major Core (DSC) - I</b>	<b>Hour/ Week:</b>	<b>5</b>
<b>Class &amp; Major</b>	<b>: I B.Sc Computer Science</b>	<b>Total Hour:</b>	<b>65</b>

**COURSE OBJECTIVES**

CO No.	To enable the students
CO-1	Describe the core syntax and semantics of Python programming language
CO-2	Discover the need for working with the strings and functions.
CO-3	Illustrate the process of structuring the data using lists, dictionaries, tuples and sets.
CO-4	Understand the usage of packages and Dictionaries
CO-5	Study the definition of pointers and the initializing the pointers.

**UNIT - I INTRODUCTION**

**13 Hours**

Introduction: The essence of computational problem solving – Limits of computational problem solving-Computer algorithms-Computer Hardware-Computer Software-The process of computational problem solving-Python programming language - Literals - Variables and Identifiers - Operators - Expressions and Data types, Input / output.

**UNIT - II CONTROL STRUCTURES**

**13 Hours**

Control Structures: Boolean Expressions - Selection Control - If Statement- Indentation in Python- Multi-Way Selection -- Iterative Control- While Statement- Infinite loops- Definite vs. Indefinite Loops- Boolean Flag. String, List and Dictionary, Manipulations Building blocks of python programs, Understanding and using ranges.

**UNIT - III FUNCTIONS**

**13 Hours**

Functions: Program Routines- Defining Functions- More on Functions: Calling Value-Returning Functions- Calling Non-Value-Returning Functions- Parameter Passing - Keyword Arguments in Python - Default Arguments in Python-Variable Scope. Recursion: Recursive Functions

#### **UNIT - IV DICTIONARIES, SETS AND OOPS**

**13 Hours**

**Dictionaries and Sets:** Dictionary type in Python - Set Data type. **Object Oriented Programming using Python:** Encapsulation - Inheritance – Polymorphism. **Python packages:** Simple programs using the built-in functions of packages matplotlib, numpy, pandas etc. Data analysis with python

#### **UNIT - V OBJECTS AND THEIR USE**

**13 Hours**

**Objects and their use:** Software Objects - Turtle Graphics – Turtle attributes-Modular Design: Modules - Top-Down Design - Python Modules - Text Files: Opening, reading and writing text files – **Database Programming:** Connecting to a database, Creating Tables, INSERT, UPDATE, DELETE and READ operations, Transaction Control, Disconnecting from a database, String Processing - Exception Handling. Web frame works(e.g., Flask, Django)  
Case Study: Web Programming using Python Image Processing – Facebook Analysis – Twitter Analysis

#### **Text Books**

1. Charles Dierbach,(2015),“*Introduction to Computer Science using Python - A computational Problem solving Focus*”, Wiley India Edition.
2. Wesley J. Chun,(2016), “*Core Python Applications Programming*”, 3rd Edition , Pearson Education.

#### **Reference Books**

1. Mark Lutz,(2018),“*Learning Python Powerful Object Oriented Programming*”, O’reilly Media, 5<sup>th</sup> Edition.
2. Timothy A. Budd, (2011), “*Exploring Python*”, Tata MCGraw Hill Education Private Limited, 1<sup>st</sup> Edition.
3. John Zelle,(2013), “*Python Programming: An Introduction to Computer Science*”, Second edition, Course Technology Cengage Learning Publications, ISBN 978- 1590282410.
4. Michel Dawson,(2013), “*Python Programming for Absolute Beginners*” , Third Edition, Course Technology Cengage Learning Publications, ISBN 978-1435455009.

#### **e-Resource**

- [https://onlinecourses.swayam2.ac.in/cec22\\_cs20/preview](https://onlinecourses.swayam2.ac.in/cec22_cs20/preview)
- [Python - Object Oriented | Tutorialspoint](#)
- [Corey Schafer - YouTube](#)

## COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Understand the core concepts of python syntax and python control flow statements.	K1,K2
CO-2	Utilize the Object-oriented Programming concepts such as encapsulation, inheritance and polymorphism used in Python	K3
CO-3	Analyze the compound data using Python lists, tuples, dictionaries etc...	K4
CO-4	Determine the methods to manipulate Python programs by utilizing string and functions.	K4
CO-5	Develop python programs using read and write data using files.	K6

## CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	2	1	2	1
CO-2	3	3	3	2	2	2
CO-3	3	3	3	3	3	3
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

High Correlation – 73%      Moderate Correlation – 20%      Low Correlation – 7%

## PYTHON PROGRAMMING USING OOPS- PRACTICALS

### UCSR111/UCAR112/UTTR101

Semester : I

Category : Major Core (DSC) - III

Class & Major : I B.Sc Computer Science

Credit :4

Hour/Week : 5

Total Hour :65

## COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Acquire programming skills in core Python.
CO-2	Acquire Object-oriented programming skills in Python
CO-3	Develop the skill of designing graphical-user interfaces (GUI) in Python.
CO-4	Develop the ability to write database applications in Python.
CO-5	Acquire Python programming skills to move into specific branches

## List of Programs:

1. All kinds of Data types.
2. Operators
3. Decision Making
4. Looping
5. Functions
  - a. Calling Value-Returning Functions

- b. Calling Non-Value-Returning Functions
- c. Recursive Functions
- 6. Dictionaries, List, tuples and sets.
- 7. Object Oriented Programming
  - a. Class
  - b. Constructor
  - c. Polymorphism
  - d. Inheritance
- 8. Files.
- 9. Exception Handling
- 10. Database programming.

**Text books:**

- Charles Dierbach (2015), “*Introduction to Computer Science using Python - A computational Problem solving Focus*”, Wiley India Edition.
- Wesley J. Chun(2016), “*Core Python Applications Programming*”, 3rd Edition , Pearson Education.

**Reference books**

- Mark Lutz (2018), “*Learning Python Powerful Object Oriented Programming*”, O’reilly Media 2018, 5th Edition.
- Timothy A. Budd (2011), “*Exploring Python*”, Tata McGraw Hill Education Private Limited , 1st Edition.
- John Zelle(2013), “*Python Programming: An Introduction to Computer Science*”, Second edition, Course Technology Cengage Learning Publications.
- Michel Dawson(2013), “*Python Programming for Absolute Beginners*” , Third Edition, Course Technology Cengage Learning Publications.

**e-Resources:**

- <https://dabeaz-course.github.io/practical-python/Notes/Contents.html>
- <https://itvoyagers.in/best-python-programming-practicals-for-beginners/>

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom’s level
CO-1	Understand the problem solving approaches and Debug Python Programs	K1,K2
CO-2	Apply Conditionals and Loops statement for Python Programs	K3
CO-3	Examine the various computing strategies for Python-based solutions to real world problems	K4
CO-4	Determine the different operations on arrays and solve the problems.	K5
CO-5	Develop modular programs using strings and structures.	K6

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	2	1	2	1
CO-2	3	3	3	2	3	2
CO-3	3	3	3	3	2	2
CO-4	3	3	3	3	3	3
CO-5	3	3	2	3	2	3

High Correlation – 63%

Moderate Correlation – 30%

Low Correlation – 7%

**PROBLEM SOLVING COMPUTATION****UCSF101/UCAF101****Semester : I****Credit : 2****Category : Foundation course (FC) - IV****Hours/Week: 2****Class &Major: I B.Sc Computer Science****Total Hours : 26****COURSE OBJECTIVES**

CO No.	To enable the students
CO-1	To facilitate an exposure to a variety of ways to solve fundamental computing problems
CO-2	To learn efficient strategies and algorithms to solve standard problems, thus laying a firm foundation for designing algorithmic solutions to problems
CO-3	Develop the ability to solve the problems accurately.
CO-4	Identify credible sources and evaluate the reliability of information.
CO-5	Apply critical thinking skills to analyze problem scenarios.

**UNIT I INTRODUCTION TO COMPUTER PROBLEM SOLVING****6 Hours**

Algorithms - Building blocks of algorithms (statements, control flow, functions) -Notation (pseudo code, flow chart) - Algorithmic problem solving for socio economic conditions in global perspectives - Simple strategies for developing algorithms (iteration, recursion) - Efficiency of algorithms.

**UNIT II FUNDAMENTAL ALGORITHMS****5 Hours**

**Fundamental Algorithms:** Exchanging the values of two variables – Counting - Summation of a set of numbers - Factorial computation - Sine function computation - Fibonacci Series generation - Reversing the digits of an integer – Base Conversion – Character to Number Conversion.

**UNIT III FACTORING METHODS****5 Hours**

**Factoring Methods:** Finding the square root of a number – The smallest divisor of an integer – Greatest common divisor of two integers - Generating prime numbers – Computing the prime



factors of an integer – Generation of pseudo-random numbers - Raising a number to a large power – Computing the  $n$ th Fibonacci number.

#### UNIT IV ARRAY TECHNIQUES

5 Hours

**Array Techniques:** Array order reversal – Array counting or histogramming – Finding the maximum number in a set - Removal of duplicates from an ordered array - Partitioning an array – Finding the  $k^{\text{th}}$  smallest element – Longest monotone subsequence.

#### UNIT V TEXT PROCESSING AND PATTERN SEARCHING

5 Hours

**Text Processing and Pattern Searching:** Text line length adjustment – Left and right justification of text – Keyword searching in text – Text line editing – Linear pattern search.

**Recursive algorithms:** Towers of Hanoi – Permutation generation.

#### Text books:

- R. G. Dromey (2018), “*How to Solve it by Computer*”, Pearson India .

#### Reference Books:

- George Polya, Jeremy Kilpatrick , “*The Stanford Mathematics Problem Book: With Hints and Solutions*”, Dover Publications, (Kindle Edition 2013).
- Greg W. Scragg(1996), “*Problem Solving with Computers*”, Jones & Bartlett 1st edition.

#### e-Resources:

- [www.coursera.org/learn/computational-thinking-problem-solving](http://www.coursera.org/learn/computational-thinking-problem-solving)
- <http://www.campusrecruitment.co.in/download.html>
- [https://onlinecourses.nptel.ac.in/noc21\\_hs02/preview](https://onlinecourses.nptel.ac.in/noc21_hs02/preview)
- <https://www.itcareerlab.org/2017/04/20/10-episode-11-preparing-job-interview/>

#### COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom’s level
CO-1	Understand the basic systematic approach to solve problems.	K1,K2
CO-2	Apply algorithms to solve specific fundamental problems.	K2
CO-3	Analyze the efficient approach to solve specific factoring-related problems.	K3
CO-4	Estimate the array-related techniques to solve specific problems.	K4
CO-5	Demonstrate the efficient methods to solve real -world problems related to text processing and recursion function.	K5

#### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	1	1	1
CO-2	3	3	1	2	1	2
CO-3	3	3	1	2	3	3
CO-4	2	3	3	3	3	3
CO-5	2	3	1	3	1	2

High correlation-68 %

Moderate Correlation- 25%

Low Correlation- 7%

# OFFICE AUTOMATION

UCSE101/UITE101/UCAE101

Semester : I

Credit : 2

Category : Skill Enhancement Course (NME) - IV

Hours/Week : 2

Class & Major: I B.Sc Computer Science

Hours : 26

## Course Objectives

CO No.	To enable the students
CO-1	Impart training for students in Microsoft Office which has different components like MS Word, MS Excel and Power point.
CO-2	Designing the course is highly practice oriented rather than regular class room teaching.
CO-3	Acquire knowledge on editor, spread sheet and presentation software
CO-4	Apply formatting techniques for improved document presentation.
CO-5	Create, format, and manipulate spreadsheets effectively.

### UNIT I INTRODUCTORY CONCEPTS

6 Hours

**Introductory concepts** Memory unit – CPU-Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS – UNIX– Windows. Introduction to Programming Languages.

### UNIT II WORD PROCESSING

5 Hours

**Word Processing** :Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing – Preview, options, Mail merge concepts.

### UNIT III SPREADSHEETS

5 Hours

**Spreadsheets:** Excel – opening, entering text and data, formatting, navigating; Formulas – entering, handling and copying; Charts – creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.

### UNIT IV DATABASE CONCEPTS

5 Hours

**Database Concepts:** The concept of data base management system; Data field, records, and files, Sorting and indexing data; Searching records. Designing queries, and reports; Linking of data files; Understanding Programming environment in DBMS; Developing menu drive applications in query language (MS – Access).

### UNIT V TEXT PROCESSING AND PATTERN SEARCHING

5 Hours

**Power point:** Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition – Animation effects, audio inclusion, timers.

**Text book:**

- Peter Norton(2017), “*Introduction to Computers*” –Tata McGraw-Hill.

**Reference book:**

- Jennifer Ackerman Kettel, Guy Hat-Davis Curt Simmons,(2013) “*Microsoft 2013*”, Tata McGraw- Hill.

**e-Resources:**

- Web content from NDL / SWAYAM or open source web resources

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom’s level
CO-1	Understand the basics of computer systems and its components.	K1,K2
CO-2	Identify the basic tools of a word processing package.	K3
CO-3	Apply the tools of spreadsheet to complex problems.	K4
CO-4	Analyze the basic concepts of database management system.	K5
CO-5	Design a presentation using basic and advance PowerPoint tools.	K6

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	2	1	3
CO-2	3	3	3	2	1	3
CO-3	3	2	3	2	3	3
CO-4	3	3	3	3	1	3
CO-5	2	3	3	3	3	2

High correlation-62%

Moderate Correlation- 28%

Low Correlation- 10%

**COMPUTER FUNDAMENTALS  
UCSA106**

Semester : I

Credit : 3

Category : Generic (EC1) - III

Hours/Week : 4

Class &amp;Major: I B.com (CA)

Total Hours : 52

**COURSE OBJECTIVES**

CO No.	To enable the students
CO-1	Impart the Knowledge of Fundamentals of Computers.
CO-2	Discover the Knowledge of newly invented devices and Units
CO-3	Compute with the interconnected networks for the linkage of Worldwide Networks.
CO-4	Apply the software and understand the system software
CO-5	Acquire more information about internet and Web portals

**UNIT I EVOLUTION OF COMPUTERS****10 Hours**

Evolution of Computers - Generations, Types of computers, Computer system characteristics, Basic components of a Digital Computer - Control unit, ALU, Input/Output functions and memory, Memory addressing capability of a CPU, Word length of a computer, processing speed of a computer, Computer Classification.

## **UNIT II INPUT/OUTPUT UNITS**

**11 Hours**

Input/Output Units:- Keyboard, Mouse, Trackball, Joystick, Digitizing tablet, Scanners, Digital Camera, MICR, OCR, OMR, Bar-code Reader, Voice Recognition, Light pen, Touch Screen, Monitors and types of monitor -Digital, Analog, Size, Resolution, Refresh Rate, Dot Pitch, Video Standard - VGA, SVGA, XGA etc., Printers & types - Daisy wheel, Dot Matrix, Inkjet, Laser, Line Printer, Plotter, Sound Card and Speakers.

## **UNIT III MEMORY**

**11 Hours**

Memory - RAM, ROM, EPROM, PROM and other types of memory, Storage fundamentals - Primary Vs Secondary Data Storage, Various Storage Devices - Magnetic Tape, Magnetic Disks, Cartridge Tape, Hard Disk Drives, Floppy Disks (Winchester Disk), Optical Disks, CD, VCD, CDR, CD-RW, Zip Drive, flash drives Video Disk, Blue Ray Disc, SD/MMC Memory cards, Physical structure of floppy & hard disk, drive naming conventions in PC. DVD, DVD-RW, USB Pen drive.

## **UNIT IV TYPES OF SOFTWARE**

**10 Hours**

Software and its Need, Types of Software - System software, Application software, System Software - Operating System, Utility Program, Algorithms, Flow Charts - Symbols, Rules for making Flow chart, Programming languages, Assemblers, Compilers and Interpreter, Computer Applications in Business.

## **UNIT V INTRODUCTION TO INTERNET**

**10 Hours**

Introduction to Internet, connecting to the Internet Hardware, Software & ISPs, Search Engines, Web Portals, Online Shopping, Email – Types of email, Compose and send a message. Reply to a message, Working with emails.

### **Text book:**

- Ramesh Bangia(2015). *“Learning Computer Fundamentals”*, Khanna Publishers, New Delhi .
- Rajaraman(2018), *“Introduction to information Technology”*, PHI, New Delhi .
- Alexis Leon & Mathews Leon(2010). *“Fundamentals of Information Technology”*, Vikas Publishing House, New Delhi .

### **Reference book:**

- Barbara Wilson(1996). *“Information Technology: The Basics”*, Thomson Learning .
- George Beekman, Eugene Rathswohl(2005). *“Computer Confluence”*, Pearson Education, New Delhi .

### **e-Resources:**

- <https://www.google.co.in/books/edition/INFORMATICS/jKd2BAAAQBAJ?hl=en&gbpv=1&dq=informatics%20and%20cyber%20laws&pg=PP1&printsec=frontcover>
- [https://www.google.co.in/books/edition/Cybercrime\\_and\\_Information\\_Technology/mZhFEAAAQBAJ?hl=en&gbpv=1&dq=informatics%20and%20cyber%20laws&pg=PP1&printsec=Frontcover](https://www.google.co.in/books/edition/Cybercrime_and_Information_Technology/mZhFEAAAQBAJ?hl=en&gbpv=1&dq=informatics%20and%20cyber%20laws&pg=PP1&printsec=Frontcover)
- [https://www.youtube.com/watch?v=NG2KAtL\\_QtQ&list=PLb\\_GOtSrdPpDpqXiMApZw265y35dm4Qke](https://www.youtube.com/watch?v=NG2KAtL_QtQ&list=PLb_GOtSrdPpDpqXiMApZw265y35dm4Qke)

## COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's level
CO-1	Understand the different types of computers and its components	K1,K2
CO-2	Experiment with Input and Output Devices of storing and retrieving data.	K3
CO-3	Classify the Different types of Memory	K4
CO-4	Analyze system software and the Structure of Algorithms, Programs and Flowcharts for different database.	K5
CO-5	Develop Scholastic Representation of Web Portals and Search Engines	K6

## CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	2	1	3
CO-2	3	3	3	2	1	3
CO-3	3	2	3	2	2	3
CO-4	2	3	3	3	2	3
CO-5	2	3	2	3	2	2

High correlation: 66%

Moderate Correlation- 30%

Low Correlation- 6%

## C PROGRAMMING UCSS101

Semester : I  
Category : Self-Study Paper  
Class &Major: I -year

Credit : 2  
Hours/Week : 2  
Total Hours : 26

## COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Understand the basic concepts and syntax of C Language.
CO-2	Acquire knowledge in operators and decision making statements
CO-3	Create C programs using arrays and strings.
CO-4	Implement modular applications in C using functions
CO-5	Develop applications in C using pointers.

## UNIT – I BASICS OF C PROGRAMMING

9 Hours

Introduction to programming paradigms – Applications of C Language - Structure of C program - C programming: Data Types - Constants – Enumeration Constants - Keywords – Operators: Precedence and Associativity - Expressions - Input/Output statements, Assignment

statements – Decision making statements - Switch statement - Looping statements – Preprocessor directives - Compilation process.

## UNIT – II ARRAYS AND STRINGS

8 Hours

Introduction to Arrays: Declaration, Initialization – One dimensional array –Two dimensional arrays - String operations: length, compare, concatenate, copy – Selection sort, linear and binary search.

## UNIT – III FUNCTIONS AND POINTERS

9 Hours

Modular programming - Function prototype, function definition, function call, Built-in functions (string functions, math functions) – Recursion, Binary Search using recursive functions – Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – Array of pointers – Parameter passing: Pass by value, Pass by reference.

### Text Books

- ReemaThareja (2016), “*Programming in C*”, Oxford University Press, Second Edition.
- Kernighan(2015), B.W and Ritchie,D.M, “*The C Programming language*”, Second Edition, Pearson Education,

### Reference Books

- Paul Deitel and Harvey Deitel (2018), “*C How to Program with an Introduction to C++*”, Eighth edition, Pearson Education.
- Yashwant Kanetkar(2020), “*Let us C*”, 17th Edition, BPB Publications.
- Byron S. Gottfried(1996), “*Schaum’s Outline of Theory and Problems of Programming with C*”, McGraw-Hill Education.
- Pradip Dey, Manas Ghosh(2013), “*Computer Fundamentals and Programming in C*”, Second.Edition, Oxford University Press.
- Anita Goel and Ajay Mittal(2013), “*Computer Fundamentals and Programming in C*”, 1st Edition, Pearson Education.

### e- Resources:

- <https://youtu.be/87SH2Cn0s9A>
- [https://www.youtube.com/watch?v=\\_MF8L7ZxwRE](https://www.youtube.com/watch?v=_MF8L7ZxwRE)

### COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom’s level
CO-1	Understand algorithms and flowchart for solving problems in C Programming	K1,K2
CO-2	Apply arrays and strings to create simple applications	K3
CO-3	Analyze the modular applications in C using functions.	K4
CO-4	Choose the loops and decision-making statements to solve the problem	K5
CO-5	Develop applications in C using structures and pointers.	K6

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	2	3	1
CO-2	3	3	2	3	1	2
CO-3	3	2	3	3	1	3
CO-4	3	3	3	3	2	3
CO-5	2	3	2	3	2	2

High correlation-63%

Moderate Correlation- 30%

Low Correlation- 7%

## C PROGRAMMING-PRACTICALS

### UCSS102

Semester : I  
 Category : Self-Study Paper  
 Class & Major: I -year

Credit : 2  
 Hours/Week : 2  
 Total Hours : 26

**COURSE OBJECTIVES**

CO No.	To enable the students
CO-1	Understand about basic concepts of C programming language
CO-2	Implement programs in C using basic constructs
CO-3	Develop programs in C using arrays.
CO-4	Create applications in C using strings, pointers, functions
CO-5	Develop applications in C using structures

**List of Programs:**

1. I/O statements, operators, expressions
2. decision-making constructs: if-else, goto, switch-case, break-continue Loops: for, while, do-while
3. Arrays: 1D and 2D, Multi-dimensional arrays, traversal
4. Strings: operations
5. Functions: call, return, passing parameters by (value, reference), passing arrays to function.
6. Pointers: Pointers to functions, Arrays, Strings, Pointers to Pointers, Array of Pointers
7. Structures: Nested Structures, Pointers to Structures, Arrays of Structures and Unions.

**Text Books**

- ReemaThareja(2016), "*Programming in C*", Oxford University Press, Second Edition.
- Kernighan, B.W and Ritchie,D.M(2015), "*The C Programming language*", Second Edition, Pearson Education.

**Reference Books**

- Paul Deitel and Harvey Deitel, (2018), "*C How to Program with an Introduction to C++*", Eighth edition, Pearson Education.

- Yashwant Kanetkar(2020), *Let us C*, 17th Edition, BPB Publications.
- Byron S. Gottfried(1996), Schaum's "*Outline of Theory and Problems of Programming with C*", McGraw-Hill Education.
- Pradip Dey, Manas Ghosh(2013), "*Computer Fundamentals and Programming in C*", Second Edition, Oxford University Press.
- Anita Goel and Ajay Mittal, "*Computer Fundamentals and Programming in C*", 1st Edition, Pearson Education, 2013.

**e-Resources:**

- <https://www.youtube.com/watch?v=8hg3BJAyBqE>
- <https://www.youtube.com/watch?v=9piEmsS8CF4>

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom's level
CO-1	Acquire knowledge of C Programming syntax and Loop statements.	K1,K2
CO-2	Experiment with the simple applications in C using structures	K3
CO-3	Analyze the applications using arrays and strings	K4
CO-4	Assess the modular applications in C using functions.	K5
CO-5	Create C Programs using advance concepts and techniques.	K5,K6

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	2	2	1
CO-2	3	3	3	3	1	2
CO-3	3	2	3	2	1	3
CO-4	2	3	3	3	2	3
CO-5	2	3	2	3	2	2

High correlation-68%

Moderate Correlation- 24%

Low Correlation- 8%

**ADVANCED DATA STRUCTURES & ALGORITHMS  
UCSM209/UCAM208/UITM201**

**Semester : II**  
**Category : Major Core (DSC) - III**  
**Class &Major: I B.Sc Computer Science**

**Credit : 4**  
**Hours/Week : 5**  
**Total Hours : 65**

**COURSE OBJECTIVES**

CO No.	To enable the students
CO-1	Impart the basic concepts of data structures and algorithms
CO-2	Acquaint the student with the basics of the various data structures and make the students knowledgeable in the area of data structures.
CO-3	Apply various algorithm design techniques
CO-4	Implement and evaluate algorithms using appropriate data structures.



**UNIT – I INTRODUCTION TO DATA STRUCTURES:****13 Hours**

Data Structures: Definition- Time & Space Complexity-Arrays: Representation of arrays, Applications of arrays, sparse matrix and its Representation-Linear list: Singly linked list implementation, insertion, deletion and searching operations on linear list - Circular linked list: implementation, Double linked list implementation, insertion, deletion and searching operations. Applications of linked lists- Dynamic Storage management.

**UNIT - II STACKS:****13 Hours**

**Inheritance:** Operations, array and linked representations of stack- stack applications, infix to postfix conversion, postfix expression evaluation, recursion implementation

**UNIT - III QUEUES, TREES & GRAPHS:****13 Hours**

**Queues:** operations on queues, array and linked representations- **Circular Queue:** operations,, applications of queues. **Trees:** Definitions and Concepts- Representation of binary tree, Binary tree traversals (Inorder, Postorder , preorder)- Binary search trees - AVL Trees and balanced Search tree. **Graphs :** Representation of Graphs- Types of graphs -Breadth first traversal – Depth first traversal- -Applications of graphs .

**UNIT - IV INTRODUCTION TO ALGORITHMS:****13 Hours**

**INTRODUCTION:** Definition of Algorithms- Overview and importance of algorithms- pseudocode conventions, Asymptotic notations, practical complexities. **Divide-and-Conquer:** : General Method – Binary Search- Quick Sort- Merge Sort. **Greedy Method:** General method- Knapsack problem- Tree vertex splitting- Job sequencing with deadlines.

**UNIT – V DYNAMIC PROGRAMMING, BACKTRACKING & BRANCH & BOUND 13 Hours**

**Dynamic programming:** General method, Multistage Graphs, All pairs shortest path, Single source shortest path.-**Backtracking:** General method, 8 Queens, Graph coloring, Hamiltonian cycle. -**Branch & Bound:** General method, Travelling salesperson problem.

**Text Books**

- Seymour Lipschutz(2022) ,”*Data Structures with C*”, First Edition, Schaum’s outline series in computers, Tata McGraw Hill .
- E. Horowitz, S. Sahni and S. Rajasekaran(2022), Second Edition ,”*Fundamentals of Computer Algorithms* “ Universities Press.

**Reference Books**

- Seymour Lipschutz(2022) ,”*Data Structures with C*”, First Edition, Schaum’s outline series in computers, Tata McGraw Hill .
- R.Krishnamoorthy and G.Indirani Kumaravel (2008),”*Data Structures using C*”, Tata McGrawHill .

- A.K.Sharma (2011), “Data Structures using C”, Pearson Education India.
- G. Brassard and P. Bratley (1997.), “Fundamentals of Algorithms”, PHI, New Delhi.
- Ellis Horowitz(1993), Sartaj Sahni, Susan Anderson Freed, Second Edition, “Fundamentals of Data in C”, Universities Press.
- Thomas H. Cormen, C.E. Leiserson, R L.Rivest and C. Stein (2009), “Introduction to Algorithms”, Third edition, MIT Press.
- Sanjoy Dasgupta, C.Papadimitriou and U.Vazirani (2008), “Algorithms “, Tata McGraw-Hill.

#### e-Resource

- [https://gurukpo.com/Content/BCA/Data\\_structure\\_and\\_Algorithm.pdf](https://gurukpo.com/Content/BCA/Data_structure_and_Algorithm.pdf)
- <https://www.youtube.com/watch?v=EmH29ylz-Z8>

#### COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom’s level
CO-1	Understand the concepts of simple linear data structures.	K1,K2
CO-2	Experiment with basics structure of stack, queue and Linked list.	K3
CO-3	Analyze the problems using algorithms such as tree, heap and graph	K4
CO-4	Choose the appropriate algorithms techniques for solving problems	K5
CO-5	Create an algorithm like Dynamic Programming, Backtracking, Branch and Bound.	K6

#### CO-PSO MAPPING :

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	1	3	2	3
CO-2	3	3	2	1	3	3
CO-3	3	3	2	3	3	3
CO-4	3	3	2	3	2	1
CO-5	3	3	2	3	3	3

High correlation-67%

Moderate Correlation- 25%

Low Correlation- 8%

#### ADVANCED DATA STRUCTURES & ALGORITHMS-PRACTICALS UCSR208/UCAR208/UITR202

Semester : II

Category : Major Core (DSC) - IV

Class &Major: I B.Sc Computer Science

Credit : 4

Hours/Week: 5

Total Hours : 65

#### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Understand the concepts of ADTs.
CO-2	Recall linear data structures-lists, stacks, queues
CO-3	Apply Tree structures and application of trees.
CO-4	Examine graph structures and application of graphs.
CO-5	Develop various sorting and searching techniques

## List of Exercises:

Implement the following exercises using Python Programming language:

1. Implement the List ADT using arrays and linked lists.
2. Implement the following using a singly linked list.
  - Stack ADT
  - Queue ADT
3. Display the Evaluation expression using stack
  - Infix expression
  - Postfix expression .
4. Implement priority queue ADT.
5. To perform the binary search tree operations:
  - Insert ,Delete, Search..
6. To perform the following operations
  - Insertion into an AVL-tree
  - Deletion from an AVL-tree.
7. Implement the BFS and DFS for a given graph.
8. Implement the following searching methods:
  - Linear search
  - Binary search.
9. To implementing the following sorting methods:
  - Bubble sort
  - Selection sort
  - Insertion sort
  - Radix sort.

## Text Books

- Seymour Lipschutz(2017) ,”*Data Structures with C*”, First Edition, Schaum’s outline series in computers, Tata McGraw Hill .
- A.K.Sharma (2011), *Data Structures using C* , Pearson Education India.

## Reference Books

- Seymour Lipschutz(2017) ,”*Data Structures with C*”, First Edition, Schaum’s outline series in computers, Tata McGraw Hill .
- R.Krishnamoorthy and G.Indirani Kumaravel (2008), “*Data Structures using C*”, Tata McGrawHill .
- A.K.Sharma (2011), “*Data Structures using C*” , Pearson Education India.

- G. Brassard and P. Bratley (1997), “*Fundamentals of Algorithms*”, PHI, New Delhi.
- Thomas H. Cormen, C.E. Leiserson, R L.Rivest and C. Stein (2009), *Introduction to Algorithms*, Third edition, MIT Press.
- Sanjoy Dasgupta, C.Papadimitriou and U.Vazirani (2008), *Algorithms* , Tata McGraw-Hill, .

**e- Resources:**

- <https://logicmojo.com/data-structures-and-algorithms>

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom’s Level
CO-1	Understand advanced data structures such as balanced search trees, heaps, graphs, and hash tables.	K1,K2
CO-2	Apply different sorting techniques for designing algorithms that are efficient in terms of time and space complexity.	K3
CO-3	Analyze the algorithm of complexity time, space complexity by using mathematical methods like Big O notation.	K4
CO-4	Assess different techniques for solving problems in sorting and searching	K5
CO-5	Develop Programs using BFS, DFS, Sorting, Searching and Graphs	K6

**CO-PSO MAPPING :**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	1	3	3
CO-2	3	3	3	2	3	2
CO-3	3	3	1	2	2	2
CO-4	3	3	3	1	2	1
CO-5	3	3	2	2	3	1

High correlation-72%

Moderate Correlation- 21%

Low Correlation- 7%

**ADVANCED EXCEL  
UCSE211/UITSE211/UCAE211**

**Semester : II**

**Category : Major Core (DSC) - V**

**Class &Major: I B.Sc Computer Science**

**Credit : 2**

**Hours/Week: 2**

**Total Hours : 26**

**COURSE OBJECTIVES**

CO No.	To enable the students
CO -1	Customize common options in Excel, such as default font, number formatting, and display settings.
CO -2	Understand the concept of absolute and relative cell referencing.
CO -3	Protect worksheets and cells to prevent unauthorized changes.
CO -4	Create templates for specific purposes, such as budgeting, project management, or sales reports.
CO -5	Generate subtotals with multiple levels of grouping and summarization.

**List of Lab Exercise**

1. Protecting and Unprotecting sheets

2. Data Validations
3. Create Pivot table and Chart
4. Data sorting and Filtering
5. 3D Graph
6. Working with Reports
7. Working With Conditional and Logical Functions
8. Consolidated data from Various sheets using VLookup
9. Date and Time Function
10. Inline and Data Charts

### Text Books

- Michael Alexander and Richard Kusleika(2016), “*Excel 2016 Power Programming with VBA*”, Wiley Publication .
- Jordan Goldmeier and John Michaloudis(2015), “*Advanced Excel Essentials*”Apress Publication .

### Reference Books

- Bill Jelen and Michael Alexander (2019),” *Microsoft Excel 2019 Pivot Table*” Data Crunching.
- Chris Webb(2014),” *Power Query for Power BI and Excel*”, Apress Publication .

### e-Resource

- Web resources from NDL Library, E-content from open source libraries

### COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom’s Level
CO-1	Understand the use of advance functions and tools to create worksheets.	K1,K2
CO-2	Apply the use of consolidation to summarize and report the results from multiple worksheets	K3
CO-3	Analyze the manipulated data using Outline, auto filter and PivotTables.	K4
CO-4	Determine the enhanced lists using pivot tables and pivot table charts	K5
CO-5	Develop the tools by using worksheets and workbook for case studies.	K6

### CO-PSO MAPPING :

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	2	2	1
CO-2	3	3	2	3	2	3
CO-3	3	2	2	3	3	2
CO-4	2	3	3	3	2	3
CO-5	2	3	2	3	2	1

High correlation-74%

Moderate Correlation- 22%

Low Correlation- 4%

## PROGRAMMING IN C++

UCSA206

Semester : II  
Category : Generic(EC1)- III  
Class &Major: I B.com(CA)

Credit : 3  
Hours/Week : 4  
Hours : 52

### COURSE OBJECTIVES

CO No.	To enable the students
CO1	Understand about object-oriented languages and their applications
CO2	Introduce basic concepts of C++language
CO3	Knowledge about various conversions
CO4	Enlighten the various inheritance system
CO5	Impart knowledge on files and exception handling

### UNIT-I INTRODUCTION TO C++

10 Hours

Introduction to C++; Tokens, Keywords, Identifiers, Variables, Operators, Manipulators, Data types -Expressions and Control Structures in C++; Simple C++ Programs.

### UNIT- II FUNCTIONS IN C++

10 Hours

Functions in C++ - Main Function - Function Prototyping -Parameters Passing in Functions - Values Return by Functions – Inline Functions - Friend and Virtual Functions .

### UNIT- III CLASSES AND OBJECTS

11 Hours

Classes and Objects; Constructors and Destructors; Operator Overloading and Type Conversions - Type of Constructors – Function Definition - Function overloading – Function Overriding.

### UNIT-IV INHERITANCE

11 Hours

Inheritance: Single Inheritance - Multilevel Inheritance - Multiple Inheritance - Hierarchical Inheritance - Hybrid Inheritance - Pointers, Virtual Functions and Polymorphism; Managing Console I/O operations.

### UNIT-V WORKING WITH FILES

10 Hours

Working with Files: Classes for File Stream Operations -Opening and Closing a File - Endof-File Deduction - File Pointers - Updating a File - Error Handling during File Operations - Command-line Arguments.

### Text Books:

- Ulla Kirh-Prinz, Peter Prinz, (2022), *A Complete guide to Programming in C++*, Jones and Bartlett Publications.
- Yashavant Kanetkar,(2017), “*Object Oriented Programming with C++*”, BPB Publications.

- E. Balagurusamy, (1995), *Object Oriented Programming with C++*, Tata McGraw-Hill Publishing Company Ltd.
- Herbert Schildt,(1999), *C++-The Complete Reference*.,3rd Edition, Tata McGraw Hill, Pub– Ltd.
- John R.Hubbard,(1996), *Programming with C++* -- Schaum’s outline series.

### Reference Books

- Robert Lafore,(2012) *Object Oriented Programming in Microsoft C++*, Galgotia publication.
- H.Schildt, (1998) *C++ The Complete Reference*--TMH Edition.
- YeswantKanetkar (1999), *Let us C++* — BPB Publications.

### e-Resources

- [https://www.google.co.in/books/edition/A\\_Complete\\_Guide\\_to\\_Programming\\_in\\_C++/-yhuY0Wg\\_QcC?hl=en&gbpv=1&dq=Programming%20in%20C%2B%2B&pg=PP1&printsec=frontcover](https://www.google.co.in/books/edition/A_Complete_Guide_to_Programming_in_C++/-yhuY0Wg_QcC?hl=en&gbpv=1&dq=Programming%20in%20C%2B%2B&pg=PP1&printsec=frontcover)
- [https://www.google.co.in/books/edition/The\\_C++\\_Programming\\_Language/q7fomH9IOU8C?hl=en&gbpv=1&dq=Programming%20in%20C%2B%2B&pg=PP1&printsec=frontcover](https://www.google.co.in/books/edition/The_C++_Programming_Language/q7fomH9IOU8C?hl=en&gbpv=1&dq=Programming%20in%20C%2B%2B&pg=PP1&printsec=frontcover)
- <https://beginnersbook.com/2017/08/c-plus-plus-tutorial-for-beginners/>

### COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom’s Level
CO-1	Understand the proficiency in C++ syntax and language features.	K1,K2
CO-2	Apply the database integration techniques in C++ language	K3
CO-3	Analyze the object-oriented programming concepts in C++.	K4
CO-4	Determine the dynamic web applications using C++.	K5
CO-5	Develop the problem-solving and debugging skills in C++ programming.	K6

### CO-PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	3	2	1
CO-2	3	3	1	2	1	2
CO-3	3	3	3	2	3	2
CO-4	3	3	3	3	2	2
CO-5	3	3	2	3	2	3

**High Correlation-76%    Moderate Correlation- 18%    Low Correlation- 6%**

## PHP PROGRAMMING UCSD201

**Semester : II**

**Credit : 2**

**Category : Major Core (DSC) - V**

**Hours/Week : 2**

**Class &Major: I B.Sc Computer Science**

**Total Hours : 26**

## COURSE OBJECTIVES

CO No.	To enable the students
CO1	Analyze the behaviour of basic quantum algorithms
CO2	Implement simple quantum algorithms and information channels in the quantum circuit model
CO3	Simulate a simple quantum error-correcting code
CO4	Prove basic facts about quantum information channels
CO5	Develop dynamic web applications using PHP.

### UNIT-I COMPUTER AS A DESIGN TOOL

**5 Hours**

Introduction to PHP -Basic Knowledge of websites -Introduction of Dynamic Website - Introduction to PHP -Scope of PHP -XAMPP and WAMP Installation- PHP Programming Basics - Syntax of PHP -Embedding PHP in HTML -Embedding HTML in PHP .

### UNIT- II PHOTOSHOP

**5 Hours**

Introduction to PHP Variable -Understanding Data Types -Using Operators -Using Conditional Statements -If(), else if() and else if condition Statement -Switch() Statements -Using the while() Loop -Using the for() Loop

### UNIT- III CORELDRAW

**5 Hours**

PHP Functions -PHP Functions -Creating an Array -Modifying Array Elements -Processing Arrays with Loops -Grouping Form Selections with Arrays -Using Array Functions -Using Predefined PHP Functions -Creating User-Defined Functions.

### UNIT-IV WEB DESIGNING

**5 Hours**

PHP Advanced Concepts -Reading and Writing Files -Reading Data from a File -Managing Sessions and Using Session Variables -Destroying a Session -Storing Data in Cookies -Setting Cookies

### UNIT-V DREAM WEAVER

**6 Hours**

OOPS Using PHP -OOPS Concept-Class, Object, Abstractions, Encapsulation, Inheritance, Polymorphism -Creating Classes and Object in PHP-Cookies and Session Management-Working with forms and system file - Error Handling- Model View Controller – AJAX.

#### Text Book:

- Jon Duckett (2022).” PHP & MySQL Server-side Web Development”- Wiley publication 2022



## Reference Book

- The Joy of PHP: A Beginner's Guide to Programming Interactive Web Applications with PHP and MySQL- Alan Forbes

## e-Resources:

- <https://www.php.net/manual/en/>
- <https://www.tutorialspoint.com/php/>

## COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Understand the object-oriented principles for PHP.	K1,K2
CO-2	Apply the PHP Scripts using Decisions and Loops.	K3
CO-3	Analyze HTML elements that work with any server-side language.	K4
CO-4	Evaluate Scripting to produce dynamic web Pages.	K5
CO-5	Develop PHP applications using string, Arrays and Functions.	K6

## CO-PSO MAPPING :

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	1	3	3	2
CO-2	3	3	2	3	2	3
CO-3	3	2	2	2	2	3
CO-4	2	3	3	3	2	3
CO-5	3	3	2	3	2	3

High correlation-75%

Moderate Correlation- 19%

Low Correlation- 6%

## DESKTOP PUBLISHING UCSS201

Semester : II  
Category : Self-Study Paper  
Class &Major: I -year

Credit : 2  
Hours/Week : 2  
Total Hours : 26

## COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Understand the basic concepts of Graphics Tools
CO-2	Utilize advanced formatting tools to enhance documents
CO-3	Insert, Edit and manipulate graphics in various publications
CO-4	Develop effective visual presentations using tools
CO-5	Creates effective designs based on design principles

## UNIT – I MS-WINDOW&PAGEMAKER

9 Hours

Introduction to Computer-Computer Basics-Creating Folder-Directories- Type Settings for Publication, Page Layout, Word Wrapping, Grouping, Merging two or more files, Creating columns, Tab settings, Paragraph settings, Hyphenation, Paper Style, Index & Table of Contents, Fonts, Mixing Text & Graphics, inking objects, Printing facility.

## UNIT – II CORELDRAW

9 Hours

Logo Designing, Frame Settings Graphical Tools, Bitmap & Shadow Effects -Special Effects such as Perspective -Blending, Text Settings into objects -Alignment Setting -Tabs, Power Line -Power Clip -Contour -Import & Export Facility

**UNIT – II PHOTOSHOP**

**8 Hours**

All Tools (Marquee Tool, Magnetic Tool, Slice Tool, Patch Tool, Clone Stamp Tool, Gradient Tool, Smudge Tool, Blur Tool, Text Tool etc.) Fill, Stroke Option -Histogram, Group, Ungroup -Lock Object, Color Range -Feather, Modify, Grow, Filter -Liquify, Artistic- Blur, Video Option etc.

**Textbook:**

- Sandee Cohen,(2015), *“InDesign CC: Visual QuickStart Guide”*, Peachpit Press.

**Reference book:**

- David Blatner and Christopher Smith(2009), *“Design Type: Professional Typography with Adobe InDesign”*.

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom’s Level
CO-1	Find the publishing software such as Adobe InDesign, Adobe Illustrator, Adobe Photoshop.	K1,K2
CO-2	Apply the facts of typography, such as font selection, spacing, and formatting.	K3
CO-3	Examine the ideas of edit documents, layouts, and designs.	K4
CO-4	Analyze the work with images and graphics in desktop publishing, including cropping, resizing, and enhancing images for use in documents.	K5
CO-5	Build different types of publications such as brochures, flyers, newsletters, magazines, and more.	K6

**CO-PSO MAPPING :**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	2	2	3
CO-2	3	3	3	2	1	3
CO-3	3	3	3	3	1	3
CO-4	3	3	3	3	2	3
CO-5	3	3	3	2	1	3

**High correlation-69%**

**Moderate Correlation- 25%**

**Low Correlation- 6%**

**HARDWARE TROUBLESHOOTING  
UCSS202**

**Semester : II**  
**Category : Self-Study Paper**  
**Class &Major: I -year**

**Credit : 2**  
**Hours/Week : 2**  
**Total Hours : 26**

## COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Identify and explain the functions of key hardware components in a computer system
CO-2	Apply safety precautions and best practices when working with computer hardware.
CO-3	Perform preventive maintenance on computer systems to extend their lifespan and reliability.
CO-4	Develop strategies for systematic hardware troubleshooting, including isolating and testing components
CO-5	Interpret error messages and diagnostic codes to pinpoint hardware problems.

### UNIT – I INTRODUCTION TO HARDWARE TROUBLESHOOTING

8 Hours

Course overview and objectives- Importance of hardware troubleshooting- Safety precautions and best practices- Tools and equipment for hardware troubleshooting- Identification and functions of essential hardware components (CPU, motherboard, RAM, storage devices, etc.)

### UNIT – II DIAGNOSTICS AND TESTING

9 Hours

Using diagnostic software and built-in diagnostics tools-Troubleshooting techniques for hardware problems-Analyzing error codes and system messages- Importance of regular system maintenance-Cleaning and cooling system maintenance-Data backup and disaster recovery planning.

### UNIT – III TROUBLESHOOTING SPECIFIC HARDWARE ISSUES

9 Hours

Troubleshooting common issues with CPUs, RAM, and motherboards-Identifying and resolving storage device problems-Network card and peripheral troubleshooting, Safe handling of components-Replacing hardware components (e.g., RAM, hard drives, power supplies)-Soldering and desoldering techniques (if applicable)

#### Text Book:

- Mark Minasi, 2016, "The Complete PC Upgrade and Maintenance Guide", Sybex

#### Reference Book:

- Morris Rosenthal, 2012, "Troubleshooting and Repairing Major Appliances", McGraw-Hill Education

#### e-Resources:

- <https://www.youtube.com/watch?v=L2E7vpj3Iq8>
- <https://www.youtube.com/watch?v=Jh4Fu2AbJ7M>

## COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Understand the functions of major hardware components within a computer system, including the CPU, motherboard, RAM, storage devices, and peripherals.	K1,K2
CO-2	Apply the regular preventive maintenance practices to extend the lifespan and reliability of computer systems.	K3
CO-3	Analyze the accurate interpret error messages, diagnostic codes, and system logs to isolate and diagnose hardware issues.	K4

CO-4	Estimate various methods to secure the data from data loss.	K5
CO-5	Demonstrate the effective strategies for systematic hardware troubleshoot.	K6

### CO-PSO MAPPING :

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	1	1	1	3
CO-2	3	3	2	2	1	3
CO-3	3	2	2	2	2	3
CO-4	2	3	3	3	2	3
CO-5	2	3	2	3	2	3

High correlatio-50%

Moderate Correlation- 35%

Low Correlation- 15%

### III AND IV EVALUATION OF COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
I	Core Course- I	UCAM111/ UCSM111	Object Oriented in Python Programming	Assignment	Poster Design
	Core Course- II	UCAR112 UCSR111	Python Programming using OOPs Practicals	DPA	Viva-voce
II	Core Course- III	UCAM208/ UCSM208	Advanced Data Structures & Algorithms	Problem Solving	Poster Design
	Core Course- IV	UCAR208/ UCSR208	Advanced Data Structure and Algorithms – Practicals	DPA	Viva-voce

## DEPARTMENT OF COMPUTER SCIENCE (M.Sc.)

### PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO No.	On completion of this programme, students will be able to
PSO-1	Understand the advanced computing technology and to develop creative applications and innovative solutions to the complex problems.
PSO-2	Develop strong analytical skills, critical thinking and experimental skills in various programming languages and to conduct independent research and apply advanced research methodologies to investigate and solve complex problems in computer science
PSO-3	Create professional development in the fields of IT to develop effective software solutions needed for the government organizations and industrial areas.
PSO-4	Design and develop advanced software systems, technology skills, and application tools using cutting-edge technologies and programming languages
PSO-5	Apply analytical thinking, programming approaches, and contextual knowledge to address changing societal and technological challenges, while assessing and fulfilling responsibilities relevant to computer science problems.
PSO-6	Investigate Research Gaps, Analyze and Carry out Research in the Specialized/Emerging trends of Computing Technologies and engage in lifelong learning in the field of Computer Science.

## PROGRAMME PROFILE M.Sc. (Computer Science)

Semester	Category	Course Code	Course Title	Contact Hrs/Week	Credit Min/Max
I	Core Courses - I	PCSM120	Design and Analysis of Algorithms	5	4
	Core Courses - II	PCSM121	Advanced Python Programming	5	4
	Core Courses - III	PCSR109	Algorithms and Python Programming – Practical	5	4
	Elective (Generic / <b>Discipline Centric</b> )-I	PCSO101	Network Protocols	5	3
	Elective (Generic / <b>Discipline Centric</b> )-II	PCSR110	Network Protocols Lab	5	3
	Skill Enhancement Course SEC 1 –(NME)			3	2
	Skill Enhancement Online Course		Online Course	2	2
<b>Total</b>				<b>30</b>	<b>22</b>
II	Core Courses – IV	PCSM218	Theory of Computation	5	4
	Core Courses – V	PCSM219	Big Data Analytics tools and technologies	5	4
	Core Courses – VI	PCSR210	Big Data Analytics tools and technologies - Practical	5	4
	Core Industry Module-I	PCSM220	Software Testing	4	3
	Elective (Generic / <b>Discipline Centric</b> )-III	PCSO201	Embedded system in Internet of Things	4	3
	Elective (Generic / <b>Discipline Centric</b> )-IV	PCSR211	Embedded system in Internet of Things - Practical	4	3
	Skill Enhancement Course SEC 1 –( <b>Discipline</b> )	PCSD201	Mobile Computing	3	2
	Service Learning ( IV)	PALE201		-	1
	Internship/Field visit( IV)	PINS201		-	2
<b>Total</b>				<b>30</b>	<b>26</b>
III	Core Courses – VII	PCSM318	Artificial Intelligence & Machine learning	5	4
	Core Courses – VIII	PCSM319	Network Security and Cryptography	5	4
	Core Courses – IX	PCSM320	Natural Language Processing	5	4
	Core Industry Module - II	PCSR309	Advanced Artificial Intelligence & Machine Learning Lab	4	3
	Elective (Generic / <b>Discipline Centric</b> )-V	PCSO301	Blockchain Technologies	4	3
	Elective (Generic / <b>Discipline Centric</b> )-VI	PCSR321	Blockchain Technologies - Practical	3	3
	Skill Enhancement Course SEC 3( <b>Interdisciplinary</b> )	PCSI302	Research Methodology	4	2
<b>Total</b>				<b>30</b>	<b>23</b>
IV	Core Courses – X	PCSM409	Digital Image Processing	5	4
	Core Courses – XI	PCSM410	Data Science & Analytics	5	4
	Core Courses – XII	PCSR401	Digital Image Processing using Co-Lab	5	4

	Project with Viva-Voce	PCSP403	Project and Viva-Voce	6	4
	Elective-Discipline Specific	PCSO401	Augmented Virtual Reality	5	3
	Skill Enhancement Course - <b>Professional Competency Skill</b>	PCSC401	Professional Competency	4	2
	Internship/Field visit( IV)	PINS401	Internship		-/2
<b>Total</b>				<b>30</b>	<b>21/23</b>
<b>Grand Total</b>				<b>120</b>	<b>92/94</b>

### NON-MAJOR ELECTIVE

Semester	Category	Course Code	Course Title	Contact Hrs/week	Credit
I	Skill Enhancement Course (Non Major Elective)	PCSE101	Web Application Development using Python	3	2
II	Skill Enhancement Course- SEC-2 (Non Major Elective)	PCSE102	Mobile Application Development using android	3	2

### DESIGN AND ANALYSIS OF ALGORITHMS

#### PCSM120

**Semester : I**

**Category : Core Course-I**

**Class & Major : I M.Sc Computer Science**

**Credit :4**

**Hour/Week: 5**

**Total Hour: 65**

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Introduce various design techniques and methods for algorithms
CO-2	Performance analysis of Algorithms using asymptotic and empirical approaches
CO-3	Provide clear idea on algorithmic design paradigms like Divide-and-Conquer, Dynamic Programming, Greedy, Branch and Bound etc.
CO-4	Demonstrate a familiarity with major algorithms and data structures.
CO-5	Apply important algorithmic design paradigms and methods of analysis.

### UNIT- I INTRODUCTION

**13 Hours**

Introduction – Notion of Algorithm - Fundamentals of algorithmic problem solving – Important problem types – Fundamentals of the analysis of algorithm efficiency – analysis framework – Asymptotic Notations and Basic Efficiency Classes-Mathematical analysis of non-recursive Algorithms – Non-recursive solution to the Matrix Multiplication - Mathematical analysis of recursive algorithms – Recursive solution to the Tower of Hanoi Puzzle.

**UNIT- II DIVIDE AND CONQUER TECHNIQUES****13 Hours**

Divide and conquer Technique: Merge sort – Quick Sort – Binary Tree Traversal - Multiplication of large integers – Strassen’s matrix multiplication – Closest pair and Convex Hull Problems - Greedy method: Prim’s algorithm – Kruskal’s algorithm – Dijkstra’s algorithm- Huffman Trees and Codes.

**UNIT- III DYNAMIC PROGRAMMING****13 Hours**

Dynamic Programming: Computing a binomial coefficient – Warshall’s and Floyd’ Algorithm – Application of Warshall’s Algorithm to the digraph – Flyd’s Algorithm for the all pairs shortest paths Problem - The Knapsack problem and Memory function.

**UNIT- IV BACKTRACKING****13 Hours**

Backtracking: N-Queens problem – Hamiltonian circuit problem – Subset sum problem. Branch and bound: Assignment problem – Knapsack problem – Traveling salesman problem.

**UNIT- V NP-COMPLETE PROBLEMS****13 Hours**

P, NP, NP –Hard and NP-complete problems – Basic concepts, non-deterministic algorithms. Approximation algorithms for NP-hard problems: Traveling salesman problem – Knapsack problem

**Text Book:**

- Anany Levitin(2011) “*Introduction to the Design and Analysis of Algorithms*” Pearson Education. (Chapters 1.1-1.3, 2.1, 2.2, 2.3, 2.4, 4.5, 4.6, 8.2, 8.4, 9.1-9.3, 11.3, 12.1,12.2, 12.3)

**Reference Books:**

- Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest (1990), “*Introduction to algorithms*”, Prentice Hall .
- S.K. Basu (2005), “*Design methods and Analysis of Algorithms*”, Prentice Hall.

**e-Resources**

- <https://www.youtube.com/watch?v=GQNT0v5zKhE>
- [https://www.youtube.com/watch?v=3udyFh\\_Dbbc](https://www.youtube.com/watch?v=3udyFh_Dbbc)

**Course Outcomes**

COs	On the successful completion of the course, students will be able	Blooms Level
CO-1	Acquire knowledge about algorithms and various design techniques.	K1,K2
CO-2	Apply greedy method and its algorithm in various models and applications.	K3
CO-3	Examine the dynamic programming techniques in various algorithms.	K4

CO-4	Evaluate the methods of backtracking & branch and bound technique, divide and conquer to real time database.	K5
CO-5	Choose the appropriate algorithm design techniques for solving problems in business applications.	K6

### CO-PSO MAPPING :

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	2	1	2	1
CO-2	3	2	3	3	2	1
CO-3	3	3	2	3	2	2
CO-4	3	3	3	3	2	2
CO-5	3	3	3	2	3	2

**High Correlation – 50%**

**Moderate Correlation – 40%**

**Low Correlation – 10%**

## ADVANCED PYTHON PROGRAMMING PCSM121

**Semester : I**

**Credit : 4**

**Category : Core Course-II**

**Hour/Week: 5**

**Class & Major : I M.Sc Computer Science**

**Total Hour: 65**

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Acquire programming skills in core Python
CO-2	Learn Strings and function
CO-3	Develop object oriented skills in Python
CO-4	Comprehend various Python Packages
CO-5	Develop web applications using Django

### UNIT- I INTRODUCTION

**13 Hours**

Introduction to Python: Software Development Process - Strings, Assignment, and Comments - Numeric Data types and Character sets – Expressions. Loops and Selection Statements: Definite iteration: the for Loop - selection: if and if-else statements - Conditional iteration: the while Loop

### UNIT- II STRINGS AND TEXT FILES

**13 Hours**

Strings and Text Files: Accessing Characters and substrings in strings - Data encryption- Strings and Number systems- String methods – Text. Lists and Dictionaries: Lists – Dictionaries. Design with Functions: A Quick review - Problem Solving with top-Down Design - Design with recursive Functions - Managing a Program’s namespace - Higher-Order Functions

### UNIT- III DESIGN WITH CLASSES

**13 Hours**



Design with Classes: Getting inside Objects and Classes – Data-Modeling Examples – Building a New Data Structure – The Two – Dimensional Grid - Structuring Classes with Inheritance and Polymorphism - Graphical User Interfaces - The Behavior of terminal-Based programs and GUI-Based programs - Coding Simple GUI-Based programs - Windows and Window Components - Command Buttons and responding to events.

#### **UNIT- IV WORKING WITH PYTHON PACKAGES**

**13 Hours**

Working with Python Packages: NumPy Library-Ndarray – Basic Operations – Indexing, Slicing and Iteration – Array manipulation - Pandas –The Series – The DataFrame - The Index Objects – Data Visualization with Matplotlib – The Matplotlib Architecture – pyplot – The Plotting Window – Adding Elements to the Chart – Line Charts – Bar Charts – Pie charts

#### **UNIT- V DJANGO**

**13 Hours**

Django: Installing Django – Building an Application – Project Creation – Designing the Data Schema – Creating a Hello world page - Creating an administration site for models - Working with Query Sets and Managers – Retrieving Objects – Building List and Detail Views-Image Uploading – Apps Life Cycle-API and Security.

Case Study: Income Tax Calculator,Text Analysis, Generating Sentences, Gathering Information from a File System, An ATM, Data Encryption with a Block Cipher

#### **Text Books**

- K.A. Lambert (2018), “*Fundamentals of Python: first programs*”, Second Edition, Cengage Learning, **(Unit - I, II and III)**
- Fabio Nelli (2018), “*Python Data Analytics: With Pandas, NumPy, and Matplotlib*”, Second Edition, Kindle Edition, **(Unit - IV)**
- Antonio Mele (2020), “*Django 3 By Example*”, Third Edition, **(Unit - V)**

#### **Reference Books**

- Mark Lutz (2018), “*Learning Python Powerful Object Oriented Programming*”, O’reilly Media , 5<sup>th</sup> Edition.
- Timothy A. Budd, (2011), “*Exploring Python*”, Tata MC Graw Hill Education Private Limited, 1<sup>st</sup> Edition.
- John Zelle (2013), “*Python Programming: An Introduction to Computer Science*”, Second edition, Course Technology Cengage Learning Publications.
- Michel Dawson (2013), “*Python Programming for Absolute Beginners*”, Third Edition, Course Technology Cengage Learning Publications, 2013, ISBN 978-1435455009

#### **e-Resource**

- [https://onlinecourses.swayam2.ac.in/cec22\\_cs20/preview](https://onlinecourses.swayam2.ac.in/cec22_cs20/preview)

## COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Understand the basic skills in Python Programming concepts like File operations, classes and objects	K1,K2
CO-2	Apply Object Oriented concepts in Python with strings and functions	K3
CO-3	Discover the skills in advanced software systems, technology skills, and applications of Python	K4
CO-4	Evaluate the use of Python packages to perform numerical computations and data visualization	K5
CO-5	Build interactive web applications and client server networking applications	K6

## CO-PSO MAPPING :

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	2	1	2	1
CO-2	3	3	3	3	2	2
CO-3	3	3	3	3	3	3
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

High Correlation – 77%      Moderate Correlation – 17%      Low Correlation – 6%

## ALGORITHMS AND PYTHON PROGRAMMING – PRACTICAL PCSR109

Semester : I  
Category : Core Course - III  
Class & Major : I M.Sc Computer Science

Credit : 4  
Hour/Week: 5  
Total Hour: 65

## COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Understand fundamentals of writing python scripts
CO-2	Explore python's object-oriented features
CO-3	Write python functions to facilitate code reuse
CO-4	Use functions for structuring Python programs
CO-5	Develop web programming with Django

## LIST OF PROGRAMS

1. Knapsack problem using backtracking
2. 0/1 knapsack problem using Dynamic programming
3. 8 Queen's problem using backtracking
4. Dijkstra's Algorithm using greedy technique

5. Apply the divide and conquer technique implement Strassen's matrix Multiplication Algorithm
6. Program using elementary data items, lists, dictionaries and tuples
7. Program using conditional branches, loops, functions
8. Program using classes and objects, inheritance, polymorphism
9. Program using Numpy
10. Program using Pandas
11. Program using Matplotlib
12. Program for creating dynamic and interactive web pages using Django forms

### COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Recall and Illustrate the programming skills in python and its scripts	K1, K2
CO-2	Make use of lists, dictionaries, sets and tuples as programs to create python applications	K3
CO-3	Analyze the skills, critical thinking and experimental skills in various Object Oriented Programming concepts such as objects and classes, inheritance and polymorphism	K4
CO-4	Determine the use of Python computations and perform data visualization	K5
CO-5	Design interactive web applications for emerging trends of Computing Technologies	K6

### CO-PSO MAPPING :

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	1	2	1
CO-2	3	3	3	3	2	1
CO-3	3	3	3	3	3	3
CO-4	3	3	3	3	3	2
CO-5	3	3	3	3	3	3

**High Correlation – 77%    Moderate Correlation – 13%    Low Correlation – 10%**

### NETWORK PROTOCOLS

#### PCSO102

**Semester : I**

**Category : Elective (Generic / Discipline Centric)- I**

**Class & Major : I M.Sc Computer Science**

**Credit : 3**

**Hour/Week: 5**

**Total Hour : 65**

## COURSE OBJECTIVES

CO No.	To enable the students
CO1	Understand the basic concepts of Transmission Control Protocol/Internet Protocol and associated functions
CO2	Explore to describe the internet architecture and its processes associated with the data transfer and to provide the quality of service
CO3	Implement technologies and services associated with network protocols along with the challenges of data transfer.
CO4	Examine the importance and functioning of Routing Protocols over communication service.
CO5	Empower the learners to comprehend and manage the issues associated with IP protocols like data traffic problems, security and mobility.

### **UNIT I: TRANSMISSION CONTROL PROTOCOL/INTERNET PROTOCOL 13 Hours**

Fundamental Architecture - Internet Protocol Basics – Routing. Transport-Layer Protocols: Transmission Control Protocol - User Datagram Protocol - Stream Control Transmission Protocol - Real-Time Transport Protocol.

### **UNIT II: INTERNET ARCHITECTURE 13 Hours**

Internet Exchange Point - History of Internet Exchange Points - Internet Service Provider Interconnection Relationships - Peering and Transit. IP Routing Protocols: Overview of Routing Protocols - Routing Information Protocol - Open Shortest Path First - Border Gateway Protocol - Multiprotocol Label Switching.

### **UNIT III: IP QUALITY OF SERVICE 13 Hours**

Introduction - Quality of Service in IP Version 4 - Integrated Services - Differentiated Services - Quality of Service with Nested Differentiated Services Levels. IP Multicast and Any cast: Addressing - Multicast Routing - Routing Protocols –Any casting- IPv6 Any cast Routing Protocol: Protocol Independent Any cast—Sparse Mode. Transport over Packet: Draft-Martini Signaling and Encapsulation - Layer-2 Tunneling Protocol.

### **UNIT IV: VIRTUAL PRIVATE WIRED SERVICE 13 Hours**

Virtual private wired service - Types of Private Wire Services - Generic Routing Encapsulation - Layer-2 Tunneling Protocol - Layer-3 Virtual Private Network 2547bis, Virtual Router. IP and Optical Networking: IP/Optical Network Evolution - Challenges in Legacy Traditional IP/Optical Networks - Automated Provisioning in IP/Optical Networks - Control Plane Models for IP/Optical Networking - Next-Generation MultiLayer Network Design Requirements - Benefits and Challenges in IP/Optical Networking. IP Version 6: Addresses in IP Version 6 - IP Packet Headers - IP Address Resolution - IP Version 6 Deployment: Drivers and Impediments.

## UNIT V: IP TRAFFIC ENGINEERING

13 Hours

Models of Traffic Demands - Optimal Routing with Multiprotocol Label Switching - Link-Weight Optimization with Open Shortest Path First - Extended Shortest-Path-Based Routing Schemes - IP Network Security: Introduction - Detection of Denial-of-Service Attack - IP Trace back- Edge Sampling Scheme - Advanced Marking Scheme - Mobility Support for IP: Mobility Management Approaches - Security Threats Related to IP Mobility - Mobility Support in IPv6 - Reactive Versus Proactive Mobility Support - Relation to Multihoming - Protocols Supplementing Mobility.

### Text Book :

- Eiji Oki, Roberto Rojas-Cessa, Mallikarjun Tatipamula, Christian Vogt 2012 “*Advanced Internet Protocols, Services and Applications*”, Copyright © 2012 by John Wiley & Sons, Inc.

### Reference Books :

- Behrouz A. Forouzan 2010, “*TCP/IP Protocol Suite*”, Fourth Edition, Tata Mcgraw-Hill Edition .
- Michael A. Gallo & William M. Hancock(2012)“*Computer Communications and Networking Technologies*” - BROOKS&COLE .
- Douglas E. Comer(2015)“*Computer Networks and Internets*” - PEARSON.
- William Stallings “*Data and Computer Communications*”, Eighth Edition -Pearson Education.
- Eric Cole, Bible (2012)“*Network Security*”, 2nd edition, , Wiley Publishers.
- James Irvine and David Harley “*Data communication and networks*” - Publishers: Wiley India.

### e-Resources

- <https://www.youtube.com/watch?v=ly8ikWtAY7s>
- <https://www.youtube.com/watch?v=E5bSumTAHZE>

### COURSE OUTCOMES:

COs	On the successful completion of the course, students will be able to	Blooms Level
CO-1	Understand and find the concepts of Communication Protocols with its architecture and functions	K1, K2
CO-2	Apply the appropriate internet architecture along with efficient protocol models for the user defined	K3
CO-3	Categorize the appropriate IP routing protocol to establish a efficient data transfer	K4
CO-4	Evaluate the concepts of virtual wired service and IP/optical networking with its functions and deployment	K5
CO-5	Create and formulate the IP traffic engineering and its models along with the security mechanisms	K6

## CO-PSO MAPPING :

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	2	1	2	1
CO-2	3	3	3	2	3	2
CO-3	3	3	3	3	2	2
CO-4	3	3	3	3	3	3
CO-5	3	3	2	3	2	3

High Correlation – 63%

Moderate Correlation – 30%

Low Correlation – 7%

## NETWORK PROTOCOLS LAB

### PCSR110

Semester : I

Category : Elective (Generic / Discipline Centric)-II

Class & Major : I M.Sc Computer Science

Credit :3

Hour/Week: 5

Total Hour: 65

## COURSE OBJECTIVES

CO No.	To enable the students
CO1	Understand and implement the basic concepts of Transmission Control Protocol/Internet Protocol and associated functions.
CO2	Develop programming skills in Implement various technologies and services associated with network protocols along with the challenges of data transfer.
CO3	Implement the importance and functioning of Routing Protocols over communication service.
CO4	Enhance skills to connect two routers and any two switches.
CO5	Comprehend related to SSH protocols and accessing the remote device.

### Implement the following using Linux / Windows environments

1. Implement the following commands
  - a. ipconfig
  - b. ping
  - c. traceroute
  - d. netsat
  - e. nslookup
2. Implement the following server commands
  - a. ifconfig
  - b. ip
  - c. tracepath
  - d. ss
  - e. tcpdump
3. Connect and place the given file in the FTP server
4. Install packet tracer and connect a computer to router, switch and get a ICMP request
5. Implement the SSH protocols and accessing the remote device

6. Connect any two switches and get the status of each switches
7. Connect two routers and get packets from the routers.
8. Get the access of the router by connecting with working computer
9. Identify the route password of server and get the connection using telnet
10. Install wire shark for capture and analyse the packets (TCP /UDP).

### COURSE OUTCOMES

COs	On the successful completion of the course, students will be able to	Blooms Level
CO-1	Identify and Outline the programming skills in SSH protocols and access the remote device	K1,K2
CO-2	Utilize the various functioning of Routing Protocols over communication service.	K3
CO-3	Analyze the use of FTP server to implement the Social needs	K4
CO-4	Choose any two switches to connect and get the status of each switches	K5
CO-5	Create two routers and get packets from the routers for the development	K6

### CO-PSO MAPPING :

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	2	3	2
CO-2	3	3	2	3	2	1
CO-3	3	2	3	3	2	2
CO-4	3	3	3	3	2	2
CO-5	3	3	3	3	3	2

**High Correlation – 63%      Moderate Correlation – 33%      Low Correlation – 4%**

### THEORY OF COMPUTATION PCSM218

**Semester : II**

**Category : Core Course-IV**

**Class & Major : I M.Sc Computer Science**

**Credit :4**

**Hour/Week: 5**

**Total Hour: 65**

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Understand core concepts in Automata and Theory of Computation
CO-2	Identify different Formal language Classes and their Relationships
CO-3	Design Grammars and Recognizers for different formal languages
CO-4	Prove or disprove theorems in automata theory using their properties
CO-5	Determine the decidability and intractability of Computational problems

## **UNIT I INTRODUCTION HISTORY OF AUTOMATA**

**13 Hours**

History of automata- grammar-Chomsky hierarchy-use of automata characteristics of automata-finite automata-graphical and tabular representation transactional system-DFA and NFA – conversion of NFA to DFA-Equivalence of DFA and NFA-Dead state-Finite automata with output-conversion of one machine to minimization of finite automata-Two way finite automata

## **UNIT II FINITE STATE MACHINE**

**13 Hours**

Finite state machine-state equivalence and minimization of machine - incompletely specified machine-merger graph- merger table-finite memory and definite memory information lossless machine-inverse machine-minimal inverse machine-ardens theorem-construction of finite automata from regular expression

## **UNIT III EQUIVALENCE OF TWO FINITE AUTOMATA**

**13 Hours**

Equivalence of two finite automata- Equivalence of two regular expression- construction of regular grammar from an RE-constructing FA from regular grammar-Pumping lemma for regular expression--derivation and parse tree-Ambiguity in context free grammar-left recursion and left factoring-linear grammar-normal form – pumping lemma for CFL-Ogdens lemma for CFL

## **UNIT IV PUSH DOWN AUTOMATA**

**13 Hours**

Push down automata-acceptance PDA-DPDA and NPDA-Construction of PDA from CFG-construction of CFG equivalent to PDA-Graphical notation for PDA-Turing Machine-transactional representation of turing machine –non deterministic turing – conversion of regular expression to turing machine.

## **UNIT V TURING MACHINE & RECURSIVELY ENUMERABLE LANGUAGES (REL) 13 Hours**

Variations of turing machine-turing machine as an integer function. Properties of recursive and recursively enumerable languages, Universal Turing machine-linear bounded automata-undecidability- Post's correspondence problem (PCP), reducibility.

### **Text Books:**

- ShyamenduKandar 2011, “Introduction to automata theory, formal languages and Computation” First Edition, Pearson Education, 2013.

### **Reference Books**

- John E. Hopcroft, Rajeev Motwani, Jeffrey D.Ullman 2011, “Introduction to Automata Theory, Languages and Computation”, 3<sup>rd</sup> Edition, Pearson Education, 2011

### **e-Resources**

- [https://onlinecourses.nptel.ac.in/noc21\\_cs83/preview](https://onlinecourses.nptel.ac.in/noc21_cs83/preview)
- [https://onlinecourses.nptel.ac.in/noc23\\_cs31/preview](https://onlinecourses.nptel.ac.in/noc23_cs31/preview)



## COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Define and Understand the concepts and methodology of automata.	K1,K2
CO-2	Apply automata, regular expressions and grammars in the Computation.	K3
CO-3	Analyze and examine the push down automata and various Turing machines.	K4
CO-4	Evaluate advanced knowledge of formal computation and its relationship to languages.	K5
CO-5	Elaborate formal reasoning languages for real world Computation.	K6

## CO-PSO MAPPING :

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	1	1
CO-2	3	3	2	3	2	1
CO-3	3	3	2	3	3	2
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

High Correlation – 70%

Moderate Correlation – 20%

Low Correlation – 10%

## BIG DATA ANALYTICS TOOLS AND TECHNOLOGIES

### PCSM219

Semester : II

Category : Core Course - V

Class & Major : I M.Sc Computer Science

Credit :4

Hour/Week: 5

Total Hour: 65

## COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Understand the concepts of big data tools such as Hive, MongoDB and Pig.
CO-2	Explore the capabilities of Hadoop as a distributed computing framework for big data processing
CO-3	Learn Hadoop, HDFS and MapReduce concepts for proficient big data processing and analysis..
CO-4	Apply the mapreduce algorithm in real-time problems
CO-5	Analyze and assess diverse big data analytics tools and technologies to design and implement effective solutions for organizational decision-making.

## UNIT I BIG DATA AND ANALYTICS

13 Hours

Big Data and Analytics: Classification of Digital Data: Structured Data- Semi Structured Data and Unstructured Data.

**Introduction to Big Data:** Characteristics – Evolution – Definition - Challenges with Big Data - Other Characteristics of Data - Big Data - Traditional Business Intelligence versus Big Data - Data Warehouse and Hadoop.

**Environment Big Data Analytics:** Classification of Analytics – Challenges - Big Data Analytics important - Data Science - Data Scientist - Terminologies used in Big Data Environments – Basically Available Soft State Eventual Consistency - Top Analytics Tools.

## **UNIT II TECHNOLOGY LANDSCAPE**

**13 Hours**

Technology Landscape: NoSQL, Comparison of SQL and NoSQL, Hadoop -RDBMS Versus Hadoop - Distributed Computing Challenges – Hadoop Overview - Hadoop Distributed File System (HDFS) Architecture and Components - Processing Data with Hadoop - Managing Resources and Applications with Hadoop YARN - Interacting with Hadoop Ecosystem.

## **UNIT III MONGODB AND MAPREDUCE PROGRAMMING:MONGODB**

**13 Hours**

**Mongodb and Mapreduce Programming: MongoDB:** Mongo DB - Terms used in RDBMS and Mongo DB - Data Types – MongoDB Operators - MongoDB Query Language.

MapReduce: Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression

## **UNIT IV HIVE**

**13 Hours**

**Hive:** Introduction – Architecture - Data Types - File Formats - Hive Query Language Statements – Partitions – Bucketing – Views - Sub- Query – Joins – Aggregations - Group by and Having – RCFile - Implementation - Hive User Defined Function - Serialization and Deserialization.

## **UNIT V PIG**

**13 Hours**

**Pig:** Introduction - Anatomy – Features – Philosophy - Use Case for Pig - Pig Latin Overview - Pig Primitive Data Types - Running Pig - Execution Modes of Pig - HDFS Commands - Relational Operators - Eval Function - Complex Data Types - Piggy Bank - User-Defined Functions - Parameter Substitution – Diagnostic Operator - Word Count Example using Pig - Pig at Yahoo! - Pig Versus Hive.

### **Text Books:**

- Seema Acharya, Subhashini Chellappan 2015, “*Big Data and Analytics*”, WileyPublications, First Edition.

### **Reference Books**

- Judith Huruwitz, Alan Nugent, Fern Halper, Marcia Kaufman (2013), “*Big data for dummies*”, John Wiley & Sons, Inc.
- Tom White (2015), “*Hadoop The Definitive Guide*”, O’Reilly Publications, Fourth Edition.
- Dirk Deroos, Paul C.Zikopoulos, Roman B.Melnky, Bruce Brown, Rafael Coss (2014), “*Hadoop For Dummies*”, Wiley Publications.

- Robert D.Schneider (2012), “Hadoop For Dummies”, John Wiley & Sons, Inc.
- Paul Zikopoulos,( 2012) “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, McGraw Hill, Chuck Lam, “Hadoop In Action”, Dreamtech Publications,

**e-Resource**

- [https://onlinecourses.nptel.ac.in/noc20\\_cs92/preview](https://onlinecourses.nptel.ac.in/noc20_cs92/preview)

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom’s Level
CO-1	Understand and illustrate the concepts and techniques of Data Science, Big Data Analytics and its tools	K1, K2
CO-2	Apply the various computing methods for big data in Hadoop, and NoSQL environment.	K3
CO-3	Discover the concepts of data science and big data analytics projects to implement the Map Reduce, and MongoDB concepts.	K4
CO-4	Determine the concepts of big data analytics projects in HIVE database for the development of Software Industry.	K5
CO-5	Develop and review the concepts of PIG database in Hadoop environment to satisfy the research and emerging technology.	K6

**CO-PSO MAPPING :**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	1	2	1
CO-2	3	2	3	3	2	1
CO-3	3	3	2	3	3	3
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation – 73%      Moderate Correlation – 17%      Low Correlation – 10%**

**BIG DATA ANALYTICS TOOLS AND TECHNOLOGIES– PRACTICALS  
PCSR210**

**Semester : II**  
**Category : Core Course -VI**  
**Class & Major : I M.Sc Computer Science**

**Credit :4**  
**Hour/Week:5**  
**Total Hour: 65**

**COURSE OBJECTIVES**

<b>CO No.</b>	To enable the students
CO-1	Understand the concepts of big data tools such as Hive, MongoDB and Pig.
CO-2	Explore the capabilities of Hadoop as a distributed computing framework for big data processing
CO-3	Analyse the bigdata using Hadoop, HDFS, MapReduce, MongoDB, Hive, and Pig

CO-4	Apply the mapreduce algorithm in real-time problems
CO-5	Create skills to solve complex data.

### LIST OF PROGRAMS

1. Implement File System Shell Commands for HDFS in Hadoop Environment
2. Write a Mapreduce program using single reduce function for finding Maximum and Minimum Number
3. Write a Mapreduce program using multiple reduce function for Word Count in an given Text document
4. Implement the following using Pig Latin
  - a. Input and Output Operations Relational Operations
  - b. User Defined Functions Advanced Relational Operations
5. Write a Word Count program using Pig Latin Script
6. Write a program to find a maximum temperature using Pig Latin Script
7. Implement the following using Hive commands
  - a. Handling the Database Creating and Manipulating table
8. Implement Simple Queries for database using Mongodb
9. Implement Simple Queries for collections using Mongodb

### COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Recall and demonstrate conceptually how Big Data is stored and implement it using different tools	K1, K2
CO-2	Experiment with programs for data storage in HDFS and table manipulation using Big Data tools in Hadoop environment	K3
CO-3	Examine BigData data sets to implement the solutions for it using MongoDB to satisfied the basic requirements	K4
CO-4	Evaluate BigData data sets to determine the required solutions using HIVE database for computation.	K5
CO-5	Develop the data sets to find the solutions to handle it using PIG in real world problems	K6

### CO-PSO MAPPING :

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	2	3	1	1
CO-2	3	3	2	3	2	2
CO-3	3	3	2	3	3	2
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation – 70%      Moderate Correlation – 23%      Low Correlation – 7%**

**SOFTWARE TESTING**  
**PCSM220**

**Semester : II**  
**Category : Major Core XI**  
**Class &Major: I M.Sc Computer Science**

**Credit: 3**  
**Hour/Week: 4**  
**Total Hour: 52**

**COURSE OBJECTIVES:**

<b>COs</b>	<b>To enable the students</b>
CO1	Acquire Knowledge for Software Testing.
CO2	Analyse Quality Assurance and Control.
CO3	Evaluate the Quality of Project.
CO4	Develop a strong understanding of test planning and strategy creation.
CO5	Learn how to effectively identify and report defects in software applications.

**UNIT- I INTRODUCTION**

**11 Hour**

Introduction to Quality - Historical Perspective of Quality - Definitions of Quality - Core Components of Quality - Quality View - Customer, Suppliers and Processes - The Purpose of Testing. Basic Concepts of Software Testing: Introduction - Definition of Testing - Basic Principles of Testing - Work Bench - Test Policy - Test Strategy - Developing Test Strategy -Test Methodologies.

**UNIT II TEST CASE DESIGN STRATEGIES**

**11 Hour**

Test case Design Strategies – Using Black Box Approach to Test Case Design – Boundary Value Analysis – Equivalence Class Partitioning – State Based Testing – Cause-Effect Graphing – Compatibility Testing – User Documentation Testing – Domain Testing – Random Testing – Requirements Based Testing – Using White Box Approach to Test Design – Test Adequacy Criteria – Static Testing vs. Structural Testing – Code Functional Testing.

**UNIT- III VERIFICATION AND VALIDATION**

**10 Hour**

Software Verification and Validation: Introduction - Verification - Verification Work Bench - Methods of Verification - Types of Review on The Basis of Stage/Phase - Coverage in Verification - Concerns of Verification – Validation - Work Bench – Levels - Acceptance Testing - Software Development Verification and Validation Activities. V-Test Model - Analyzing and Reporting Test Results.

**UNIT- IV TESTING TECHNIQUES AND TOOLS**

**10 Hour**

Testing Techniques and Tools: Levels of Testing - Acceptance Testing: Introduction - Acceptance Criteria - Importance of Acceptance Criteria - Alpha Testing - Beta Testing - Gamma Testing - Acceptance Testing During Each Phase of Software Development - Software Development Methodologies - Developing Acceptance Plan.

**UNIT-V TEST AUTOMATION**

**10 Hour**

Software test automation – skills needed for automation – scope of automation – design and Architecture for Automation – Requirements for a Test Tool – Challenges in Automation – Test

Metrics and Measurements – Project, Progress and Productivity Metrics.

**Text Books**

- Shen,J.J.(2019). *Software Testing: Techniques. Principles, and Practices.*
- Krishna Rungta. (2019). *Software Testing Learn Testing in 1 Day.* Kindle Edition.

**Reference Book**

- Dr. Anand Nayyar. (2019). *Instant Approach to Software Testing: Principles, Applications, Techniques, and Practices.*

**e-Resources**

- <https://www.youtube.com/watch?v=T3q6QcCOZQg>
- <https://developer.android.com/studio>

**COURSE OUTCOMES**

COs	On the successful completion of the course, students will be able to	Blooms Level
CO-1	Find and Illustrate software defects accurately for the development of Software Product.	K1, K2
CO-2	Identify test plans to implement the Software testing strategies for the software development.	K3
CO-3	Analyze the ability to assess and address testing risks for development of Software Products to the social requirements.	K4
CO-4	Assess the better test results to stakeholders for better communication of software development for the successful implementation.	K5
CO-5	Create Software products in the recent research and emerging field.	K6

**CO-PSO MAPPING :**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	3	3	3
CO-2	3	3	3	3	2	1
CO-3	3	3	2	3	3	3
CO-4	3	3	3	3	3	2
CO-5	3	3	3	3	3	3

**High Correlation – 87%      Moderate Correlation – 10%      Low Correlation – 3%**

**EMBEDDED SYSTEM IN INTERNET OF THINGS**

**PCSO201**

**Semester : II**

**Category : Elective (Generic / Discipline Centric) – III**

**Class & Major : I M.Sc Computer Science**

**Credit :3**

**Hour/Week: 5**

**Total Hour: 65**

## **COURSE OBJECTIVES:**

<b>CO No.</b>	<b>To enable the students</b>
CO1	Familiar with the evolution of IOT with its design principles
CO2	Outline the functionalities and protocols of internet communication
CO3	Analyze the hardware and software components needed to construct IOT applications
CO4	Identify the appropriate protocol for API construction and writing embedded code
CO5	Realize various business models and ethics in Internet of Things

### **UNIT I FUNDAMENTALS OF IOT**

**13 Hours**

Evolution of Internet of Things – Enabling Technologies - Connected Roadways - Connected Factory - Smart Connected Buildings - Smart Creatures- IoT Challenges. IOT Architectures: oneM2M, IOT World Forum (IOTWF) and Alternative IOT models – Simplified IOT Architecture and Core IOT Functional Stack – Fog, Edge and Cloud in IOT – Functional blocks of an IOT ecosystem – Sensors, Actuators, Smart Objects and Connecting Smart Objects.

### **UNIT II IOT PROTOCOLS**

**13 Hours**

IOT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.15.4g, 802.15.4e, 1901.2a, 802.11ah and LoRaWAN – Network Layer: IP versions, Constrained Nodes and Constrained Networks – Optimizing IP for IOT: From 6LoWPAN to 6Lo, Routing over Low Power and Lossy Networks – Application Transport Methods: Supervisory Control and Data Acquisition – Application Layer Protocols: CoAP and MQTT.

### **UNIT – III DESIGN AND DEVELOPMENT**

**13 Hours**

Prototyping Embedded Devices: Electronics - Embedded Computing Basics – Arduino - Raspberry Pi - Beagle Bone Black - Electric Imp. Prototyping the Physical Design: Non digital Methods - Laser Cutting - 3D printing - CNC Milling - Repurposing/Recycling.

### **UNIT – IV PROTOTYPING ONLINE COMPONENTS**

**13 Hours**

Prototyping Online Components: Getting started with an API - Writing a New API - Real-Time Reactions - Other Protocols. Techniques for Writing Embedded Code: Memory Management - Performance and Battery Life – Libraries - Debugging.

### **UNIT – V BUSINESS MODELS**

**13 Hours**

Business Models: History of Business Models – Model – Internet of Starting up – Lean Startups. Moving to Manufacture: Designing Kits - Designing Printed circuit boards – Certification – Costs - Scaling Up Software. Ethics: Privacy – Control – Environment – Solutions.

### **Text Books:**

- David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry(2017), —”IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things”, Cisco Press, (UNIT I and II)
- Adrian McEwen and Hakim Cassimally,(2014) “Designing the Internet of Things”, Wiley,. (UNIT III, IV and V)

**Reference Books:**

- Ovidiu Vermesan and Peter Friess(2014), “*Internet of Things – From Research and Innovation to Market Deployment*” , River Publishers.
- Peter Waher(2015), “*Learning Internet of Things*” ,Packt Publishing.
- Donald Norris(2015), “*The Internet of Things: Do-It-Yourself at Home Projects for Arduino, Raspberry Pi and BeagleBone Black*”,McGraw Hill.

**COURSE OUTCOMES**

CO.NO	On the successful completion of the course, students will be able to	Blooms Level
CO-1	Recall and Outline the IoT evolution with its architecture and sensors.	K1, K2
CO-2	Apply the networking concepts for network communication and underlying IoT protocols for its appropriate solution.	K3
CO-3	Classify the embedded technologies and develop prototypes for the IoT products to meet social needs	K4
CO-4	Evaluate the use of Application Programming Interface and design an API for IoT in real time	K5
CO-5	Design and Develop the Computing models and perform security analysis	K6

**CO-PSO MAPPING :**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	3	2	2	1
CO-2	3	3	3	3	2	2
CO-3	3	3	3	3	3	3
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation – 80%**

**Moderate Correlation – 17%**

**Low Correlation – 3%**

**EMBEDDED SYSTEM IN INTERNET OF THINGS -PRACTICAL  
PCSR211**

**Semester : II**

**Category : Elective (Generic / Discipline Centric)-IV**

**Class & Major : I M.Sc Computer Science**

**Credit :3**

**Hour/Week: 4**

**Total Hour: 52**



## COURSE OBJECTIVES:

CO No.	To enable the students
CO1	Create IoT program to turn ON/OFF LED
CO2	Implement IoT program for object detection
CO3	Develop IoT programs for agricultural purpose
CO4	Examine web server program for local hosting
CO5	Design IoT application for health monitoring

### List of Programs

1. To develop an IoT program to turn ON/OFF LED light (3.3V)
2. To develop an IoT program using IR sensor (Smart Garbage Monitoring, Detecting Parking Availability, etc.)
3. To develop an IoT program using Humidity and Temperature Monitoring (Forest fire Detection, Weather Monitoring)
4. To develop an IoT web server program for local hosting
5. To develop an IoT program using Soil Moisture Sensor
6. To develop an IoT program using Ultrasonic Sensor (Distance Measurement, etc.)
7. To develop an real-time IoT program using Relay Module (Smart Home Automation with 230V)
8. To develop an IoT program for Fire Detection (Home, Industry, etc.)
9. To develop an IoT program for Gas Leakage detection (Home, Industry, etc.)
10. To develop an IoMT program using Heartbeat Sensor

## COURSE OUTCOMES

CO No.	On the successful completion of the course, students will be able to,	Blooms Level
CO-1	Understand IoT programs implementation at basic Project	K1, K2
CO-2	Experiment with IoT programs to detect objects in the critical Situation for the Social Experiments	K3
CO-3	Analyze IoT programs play a role for agricultural purpose to satisfy their requirements	K4
CO-4	Evaluate web server program for local hosting to solve the real world problems	K5
CO-5	Design the IoT based application in the field of medical emerging problems	K6

## CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	3	2	1
CO-2	3	3	3	2	2	1

CO-3	3	3	2	1	2	2
CO-4	3	3	3	3	3	3
CO-5	3	3	3	3	3	3

**High Correlation – 67%      Moderate Correlation – 23%      Low Correlation – 10%**

## **MOBILE COMPUTING**

### **PCSD201**

<b>Semester</b>	<b>: II</b>	<b>Credit</b>	<b>: 2</b>
<b>Category</b>	<b>: Skill Enhancement Course(Discipline)</b>	<b>Hours/Week</b>	<b>: 3</b>
<b>Class &amp; Major</b>	<b>: I M.Sc Computer Science</b>	<b>Total Hours</b>	<b>: 39</b>

#### **Course Objectives:**

<b>COs</b>	<b>To enable the students</b>
CO1	Understand the Concepts of GSM, SMS, and GPRS Architecture.
CO2	Understand basic concepts of Mobile IP used in Network Layer.
CO3	Acquire Knowledge of Wireless Protocols
CO4	Implement the Concepts of Mobile Application Development Platform.
CO5	Apply various services in Mobile Application Development

#### **UNIT- I WIRELESS COMMUNICATION FUNDAMENTALS ARCHITECTURE      8 Hours**

Frequency Spectrum-Multiplexing-Spread Spectrum- GSM vs CDMA --Comparison of 2G, 3G, 4G -GSM Architecture-Entities-Call Routing-Address and Identifiers

#### **UNIT- II MOBILE WIRELESS SHORT RANGE NETWORKS      7 Hours**

Introduction-WLAN Equipment-WLAN Topologies-WLAN Technologies-IEEE 802.11 Architecture-WLAN MAC-Security of WLAN, Power Management-Standards-WAP Architecture

#### **UNIT- III MOBILE IP NETWORK LAYER, TRANSPORT LAYER      8 Hours**

IP and Mobile IP Network Layer-Packet delivery and Handover Management-Location Management-Registration-Tunneling and Encapsulation-Route Optimization-Mobile Transport Layer.

#### **UNIT- IV MOBILE APPLICATION DEVELOPMENT USING ANDROID      8 Hours**

Mobile Applications Development -Understanding the Android Software Stack –Android Application Architecture –The Android Application Life Cycle –The Activity Life Cycle.

#### **UNIT -V MOBILE APPLICATION DEVELOPMENT USING ANDROID      8 Hours**

Services-Broadcast Receivers –Adapters –Data Storage, Retrieval and Sharing-Location Based Services-Development of Simple Mobile Applications.

#### **Text Books**

- Asoke,K.Talukder. HasanAhmed. Roopa,R.Yavagal.(2010).*Mobile Computing*. Tata McGraw Hill Pub .(2<sup>nd</sup>Ed.)
- Barry,A. Burd.(2015).*Android Application Development for Dummies All in One*, Wiley.
- Ed, Burnette. Hello. (2012).*Android: Introducing Google’s Mobile Development Platform*.(3<sup>rd</sup>

Ed.). Pragmatic Programmers.

### Reference Books

- Maritn, Sauter. (2011).*From GSM to LTE:An Introduction to Mobile Networks and MobileBroadband*. John Wiley and Sons.
- Raj Kamal.(2012).*Mobile Computing*. Oxford Higher Education.(2<sup>nd</sup> Ed.).

### e-Resources

- [https://youtu.be/jGwO\\_UgTS7I?list=PLoROMvodv4rMiGQp3WXShMGgzqpfVfbU](https://youtu.be/jGwO_UgTS7I?list=PLoROMvodv4rMiGQp3WXShMGgzqpfVfbU)
- <https://youtu.be/WSbgixdC9g8>

### COURSE OUTCOMES

COs	On the successful completion of the course, students will be able to	Blooms
CO-1	Define and Classify Wide Variety of Wireless Communication to transfer the data to the destination.	K1, K2
CO-2	Apply Mobile IP in Network Layer for the development of Mobile Application for the development of software Industry.	K3
CO-3	Examine Mobile Application Technologies for the development of application to justify the Social Requirements	K4
CO-4	Evaluate Mobile Computing Network in Android using Different Mobile Computing Technologies.	K5
CO-5	Design Mobile Computing services for societal and technological challenges.	K6

### CO-PSO MAPPING :

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	1	1
CO-2	3	2	3	3	3	2
CO-3	3	3	2	3	3	2
CO-4	3	3	3	3	3	3
CO-5	3	3	3	2	3	3

**High Correlation – 70%**

**Moderate Correlation – 23%**

**Low Correlation – 7%**

### III AND IV EVALUATION OF COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
I	Core Course - I	PCSM120	Design and Analysis of Algorithms	Problem Solving	Prototyping
	Core Course - II	PCSM121	Advanced Python Programming	Prototyping	Problem Solving
	Core Course - III	PCSR109	Algorithm & Python Programming – Practical	DPA	Viva-voce
	Elective (Generic / Discipline Centric) - I	PCSO101	Network Protocol	Prototyping	Poster Presentation
	Elective (Generic / Discipline Centric) – II	PCSR102	Network Protocol Lab	DPA	Viva-voce
II	Core Course – IV	PCSM218	Theory of Computation	Assignment	Problem Solving
	Core Course – V	PCSM219	Big Data Analytics tools and technologies	Prototyping	Poster Presentation
	Core Course – VI	PCSR210	Big Data Analytics tools and technologies - Practical	DPA	Viva-voce
	Elective (Generic / Discipline Centric) – III	PCSO201	Embedded system in Internet of Things	Prototyping	Seminar
	Elective (Generic / Discipline Centric) - IV	PCSR211	Embedded system in Internet of Things - Practical	DPA	Viva-voce
	Skill Enhancement Course SEC 1 –(Discipline)	PCSD201	Mobile Computing	Assignment	Seminar

## DEPARTMENT OF INFORMATION TECHNOLOGY

### PREAMBLE

**UG** : Programme Profile and Syllabi of Courses from I to II semesters along with Evaluation Components III and IV (With effect from 2023-2026 Batch Onwards)

### PROGRAMME PROFILE B.Sc. (INFORMATION TECHNOLOGY)

#### PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO No.	On completion of this programme, students will be able to
PSO-1	Understand and apply fundamental principles of Information Technology, including computer systems, networks, and software development
PSO-2	Acquire analytical and problem solving skills and to develop proficiency in programming languages, database management, and web development to design and implement IT solutions to solve the real world problems
PSO-3	Demonstrate knowledge and skills in areas such as cyber security, data analytics, and cloud computing to ensure the security and efficiency of IT systems and Information sharing and retrieval for the usage of Applications
PSO-4	Apply project management principles and practices to effectively plan, execute, and manage IT projects.
PSO-5	Evaluate the efficiency and effectiveness of different Computational solutions and adhere to ethical and professional standards in information technology,
PSO-6	Design, develop and test software systems for world-wide network of computers to provide solutions to real world problems and engage in lifelong learning in the field of Information Technology

### PROGRAMME PROFILE – B.Sc INFORMATION TECHNOLOGY

Semester	Part	Category	Course Code	Course Title	Contact Hour/Week	Credit Min/Max
I	I	Language: Tamil/ Hindi/ French	UTAL110	General Tamil-I/ Hindi-I/ French-I	5	3
	II	Language: English	UENL111	General English	5	3
	III	Core Courses - I	UITM101 UCSM111/ UCAM111/	Object Oriented in Python Programming	5	4
	III	Core Courses - II	UITR101 UCSR111 UCAR112	Python Programming using OOPs Practicals	5	4
	III	Elective Course 1 (Generic / <b>Discipline Specific</b> )	UMAA122	Numerical Methods	4	3
	IV	Skill Enhancement Course – SEC-1 (Non Major Elective)			2	2
	IV	Foundation Course FC	UCSF101/ UITF101	Principles of Information Technology	2	2
	IV	Ability Enhancement Compulsory Course (AECC 1) -Soft Skill	USKS103	Soft Skill-1	2	2

				<b>Total</b>	<b>30</b>	<b>23</b>
II	I	Language : Tamil/ Hindi/ French	UTAL210	General Tamil II/ Hindi-II/ French-II	5	3
	II	LE: Language	UENL211	General English	5	3
	III	Core Courses - III	UITM201 UCAM208/ UCSM208/	Advanced Data Structures & Algorithms	5	4
	III	Core Courses - IV	UITR202 UCAR208/ UCSR208/	Advanced Data Structure and Algorithms – Practicals	5	4
	III	Elective Course –II ( <b>Generic</b> / Discipline Specific)	UMAA226	Graph Theory and its applications	4	3
	III	Internship / Industrial Training	UITI201	Internship / Industrial Training		-/ 2
	IV	Skill Enhancement Course – SEC-2 (Non Major Elective)			2	2
	IV	Skill Enhancement Course – SEC-3 ( <b>Discipline / Subject Specific</b> )	UITD201	Multimedia - 3D Animation	2	2
	IV	Ability Enhancement Compulsory Course (AECC 2) Soft Skill-2	USKS203	Soft Skill-2	2	2
	V	Extension Activity/ Physical Education/NCC				1/2
	VI	Value added courses (Outside class hours)	UVCC201			-/2
				<b>Total</b>	<b>30</b>	<b>24/29</b>
III	I	Language: Tamil/ Hindi/ French	UTAL310	General Tamil-III/ Hindi-III/ French-III	5	3
	II	Language: English	UENL311	General English	5	3
	III	Core Course - V	UITM301	Web Application Development	4	4
	III	Core Course – VI	UITR302	Web Practical – Practicals	4	4
	III	Elective Course 3 (Generic / <b>Discipline Specific</b> ) -EC3	UITD303	Operating system	4	3
	IV	Skill Enhancement Course -SEC-4 (Entrepreneurial Based)	UITU301	Graphic Design	2	1
	IV	Skill Enhancement Course -SEC-5 ( <b>Discipline Specific/</b> Generic)	UITR304	R Programming– Practical	2	2
	IV	Ability Enhancement Compulsory Course (AECC 3) Soft Skill-3	USKS303	Soft Skill-3	2	2
	IV	Value education	UGEV301	Value education	2	2
				<b>Total</b>	<b>30</b>	<b>24</b>
IV	I	Language: Tamil/ Hindi/French	UTAL410	General Tamil IV/ Hindi-II/ French-II	5	3
	II	Language: English	UENL411	General English	5	3
	III	Core Course - VII	UITM401	Industry Module- Java Application Programming	5	4
	III	Core Course - VIII	UITM402	Software Engineering	5	4
	III	Elective Course - EC4	UITR403	Java Application Programming–	4	3

		(Generic / <b>Discipline Specific</b> )		Practicals		
	III	Internship / Industrial Training	UCAI401	Internship / Industrial Training		-/2
	IV	Skill Enhancement Course – SEC-6	UITD404	Internet of Things	2	2
	IV	Skill Enhancement Course- <b>Online course</b>	UITD405	Online Course *	2	2
	IV	Ability Enhancement Compulsory Course (AECC 4) Soft Skill-4	USKS403	Soft Skill-4	2	2
	V	Extension Activity/ Physical Education/NCC				-/2
	VI	Value added course (Outside class hours)	UVCC401			-/2
<b>Total</b>					<b>30</b>	<b>23/29</b>
V	III	Core Course - IX	UITM501	Computer Networks	5	4
	III	Core Course - X	UITM502	Advanced Database Management System	5	4
	III	Core Course - XI	UITR501	RDBMS Lab	5	4
	III	Elective Course – EC5 (Generic / <b>Discipline Specific</b> )	UITD501	Information Security	5	3
	III	Elective Course – EC6 (Generic / <b>Discipline Specific</b> )	UITD502	Introduction to Data science	4	3
	III	Core Course - XII	UITP501	Project with Viva voce	4	4
	IV	Value Education	UGEV501	Value Education	2	2
<b>Total</b>					<b>30</b>	<b>24</b>
VI	III	Core Course - XIII	UITM601	Machine Learning	5	4
	III	Core Course - XIV	UITM602	Data Analytics	5	4
	III	Core Course - XV	UITR603	Android Programming Theory and Practical	5	4
	III	Elective Course – EC7 (Generic / <b>Discipline Specific</b> )	UITR604	PHP Practical	6	5
	III	Elective Course – EC8 (Generic / <b>Discipline Specific</b> )	UITD601	Fuzzy Logic	5	4
	III	Comprehensive viva-voce			-	1
	III	Internship / Industrial Training	UINS601	Internship / Industrial Training	-	1
	IV	Professional Competency Skill Enhancement Course SE8		Professional Competency Skill Enhancement Course SE8	4	2
	V	Extension Activity/ Physical Education/NCC			-	-/2
VI	VALUE ADD COURSE			-	-	
<b>Total</b>					<b>30</b>	<b>25/27</b>
<b>OVERALL TOTAL</b>					<b>180</b>	<b>140/156</b>

## NON MAJOR ELECTIVE

Semester	Category	Course Code	Course Title	Contact Hrs/week	Credit
I	Skill Enhancement Course (Non Major Elective)	UCSE101/ UITE101 UCAE101	Office Automation	2	2
II	Skill Enhancement Course- SEC-2 (Non Major Elective)	UCSE211/ UITSE211/ UCAE211	Advanced Excel	2	2

## EXTRA CREDIT EARNING PROVISION SELF-STUDY PAPER

Semester	Category	Course Code	Course Title	Contact Hrs/week	Credit
I	Self-study Paper	UITS101 UITS102	Principles of Information Technology Flash	2	1
II	Self-study Paper	UITS201 UITS202	Desktop Publishing Hardware Trouble Shooting	2	1
III	Self-study Paper	UITS301 UITS302	Design Thinking Information Science	2	1
IV	Self-study Paper	UITS401 UITS402	Computer Graphics Devops	2	1
V	Self-study Paper	UITS501 UITS502	Internet of Things Natural Language Processing	2	1
VI	Self-study Paper	UITS601 UITS602	Machine Learning Computing Intelligence	2	1

## OBJECT ORIENTED IN PYTHON PROGRAMMING UITM101

**Semester : I**  
**Category : Major Core (DSC) - I**  
**Class & Major: I B.Sc (Information Technology)**

**Credit : 4**  
**Hour/ Week: 5**  
**Total Hour: 65**

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Describe the core syntax and semantics of Python programming language
CO-2	Discover the need for working with the strings and functions.
CO-3	Illustrate the process of structuring the data using lists, dictionaries, tuples and sets.
CO-4	Understand the usage of packages and Dictionaries
CO-5	Study the definition of pointers and the initializing the pointers.

### UNIT - I INTRODUCTION

**13 Hours**

Introduction: The essence of computational problem solving – Limits of computational problem solving-Computer algorithms-Computer Hardware-Computer Software-The process of computational problem solving-Python programming language - Literals - Variables and Identifiers - Operators - Expressions and Data types, Input / output.

### UNIT - II CONTROL STRUCTURES

**13 Hours**



Control Structures: Boolean Expressions - Selection Control - If Statement- Indentation in Python- Multi-Way Selection -- Iterative Control- While Statement- Infinite loops- Definite vs. Indefinite Loops- Boolean Flag. String, List and Dictionary, Manipulations Building blocks of python programs, Understanding and using ranges.

### **UNIT - III FUNCTIONS**

**13 Hours**

Functions: Program Routines- Defining Functions- More on Functions: Calling Value-Returning Functions- Calling Non-Value-Returning Functions- Parameter Passing - Keyword Arguments in Python - Default Arguments in Python-Variable Scope. Recursion: Recursive Functions

### **UNIT - IV DICTIONARIES, SETS AND OOPS**

**13 Hours**

**Dictionaries and Sets:** Dictionary type in Python - Set Data type. **Object Oriented Programming using Python:** Encapsulation - Inheritance – Polymorphism. **Python packages:** Simple programs using the built-in functions of packages matplotlib, numpy, pandas etc. Data analysis with python

### **UNIT - V OBJECTS AND THEIR USE**

**13 Hours**

**Objects and their use:** Software Objects - Turtle Graphics – Turtle attributes-Modular Design: Modules - Top-Down Design - Python Modules - Text Files: Opening, reading and writing text files – **Database Programming:** Connecting to a database, Creating Tables, INSERT, UPDATE, DELETE and READ operations, Transaction Control, Disconnecting from a database, String Processing - Exception Handling. Web frame works(e.g., Flask, Django)  
Case Study: Web Programming using Python Image Processing – Facebook Analysis – Twitter Analysis

#### **Text Books**

- Charles Dierbach 2015, “*Introduction to Computer Science using Python - A computational Problem solving Focus*”, Wiley India Edition.
- Wesley J. Chun 2016, “*Core Python Applications Programming*”, 3rd Edition , Pearson Education.

#### **Reference Books**

- Mark Lutz 2018, “*Learning Python Powerful Object Oriented Programming*”, O’reilly Media , 5th Edition.
- Timothy A. Budd 2011, “*Exploring Python*”, Tata MCGraw Hill Education Private Limited 2011, 1 st Edition.
- John Zelle 2013, “*Python Programming: An Introduction to Computer Science*”, Second edition, Course Technology Cengage Learning Publications.
- Michel Dawson 2013, “*Python Programming for Absolute Beginners*” , Third Edition, Course Technology Cengage Learning Publications.

## e-Resource

- [https://onlinecourses.swayam2.ac.in/cec22\\_cs20/preview](https://onlinecourses.swayam2.ac.in/cec22_cs20/preview)
- [Python - Object Oriented | Tutorialspoint](#)
- [Corey Schafer - YouTube](#)

## COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Understand the core concepts of python syntax and python control flow statements	K1,K2
CO-2	Utilize the Object-oriented Programming concepts such as encapsulation, inheritance and polymorphism used in Python	K3
CO-3	Analyze the compound data using Python lists, tuples, dictionaries etc...	K4
CO-4	Determine the methods to manipulate Python programs by utilizing string and functions.	K5
CO-5	Develop python programs using read and write data using files .	K6

## CO-PSO MAPPING :

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	2	1	2	1
CO-2	3	3	1	1	2	2
CO-3	3	2	2	3	2	3
CO-4	3	3	2	3	2	3
CO-5	3	3	2	3	3	3

High correlation- 53%

Moderate Correlation-37%

Low Correlation-13%

## PYTHON PROGRAMMING USING OOPS- PRACTICALS

### UITR101

Semester : I

Category : Major Core (DSC) - III

Class &Major : I B.Sc (Information Technology)

Credit :4

Hour/Week : 5

Total Hour :65

## COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Acquire programming skills in core Python.
CO-2	Acquire Object-oriented programming skills in Python
CO-3	Develop the skill of designing graphical-user interfaces (GUI) in Python.
CO-4	Develop the ability to write database applications in Python.
CO-5	Acquire Python programming skills to move into specific branches

## List of Programs:

1. All kinds of Data types.
2. Operators

3. Decision Making
4. Looping
5. Functions
  - a. Calling Value-Returning Functions
  - b. Calling Non-Value-Returning Functions
  - c. Recursive Functions
6. Dictionaries, List, tuples and sets.
7. Object Oriented Programming
  - a. Class
  - b. Constructor
  - c. Polymorphism
  - d. Inheritance
8. Files.
9. Exception Handling
10. Database programming.

**TEXT BOOKS:**

- Charles Dierbach (2015), “*Introduction to Computer Science using Python - A computational Problem solving Focus*”, Wiley India Edition .
- Wesley J. Chun (2016), “*Core Python Applications Programming*”, 3rd Edition , Pearson Education.

**REFERENCE BOOKS**

- Mark Lutz (2018), “*Learning Python Powerful Object Oriented Programming*”, O’reilly Media, 5<sup>th</sup> Edition.
- Timothy A. Budd (2011), “*Exploring Python*”, Tata MCGraw Hill Education Private Limited, 1<sup>st</sup> Edition.
- John Zelle, (2013), “*Python Programming: An Introduction to Computer Science*”, Second edition, Course Technology Cengage Learning Publications, ISBN 978- 1590282410
- Michel Dawson,(2013), “*Python Programming for Absolute Beginners*”, Third Edition, Course Technology Cengage Learning Publications, ISBN 978-1435455009

**e-Resources:**

- <https://dabeaz-course.github.io/practical-python/Notes/Contents.html>
- <https://itvoyagers.in/best-python-programming-practicals-for-beginners/>

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom’s level
CO-1	Understand the problem solving approaches and Debug Python Programs	K1,K2
CO-2	Apply Conditionals and Loops statement for Python Programs	K3
CO-3	Examine the various computing strategies for Python-based solutions to real world problems	K4

CO-4	Determine the different operations on arrays and solve the problems.	K5
CO-5	Develop modular programs using strings and structures.	K6

### CO-PSO MAPPING :

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	2	1	2	1
CO-2	3	3	3	2	3	2
CO-3	3	2	3	2	2	2
CO-4	3	3	3	1	2	3
CO-5	3	3	2	3	2	3

High correlation- 47%

Moderate Correlation-43%

Low Correlation-10%

## PRINCIPLES OF INFORMATION TECHNOLOGY

### UITF101

Semester : I

Credit : 2

Category : Foundation course (FC) - IV

Hours/Week: 2

Class & Major: I B.Sc (Information Technology)

Hours : 26

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Obtain Knowledge on Object Oriented Programming Concepts.
CO-2	Understand the Basics of Microprocessor and Compiler.
CO-3	Explain the organization and functioning of computer systems, including hardware, software, operating systems, and computer networks..
CO-4	Develop an understanding of software development principles, methodologies, and lifecycle processes.
CO-5	Evaluate the design and management of information systems to support organizational goals.

### UNIT –I PROGRAMMING LANGUAGES

5 Hours

Introduction - Evolution of Programming Languages- Classification of Programming Languages - Generations of Programming Languages - Features of a Good Programming Language- Selection of a Programming Language

### UNIT-II FUNDAMENTALS OF COMPUTER ARCHITECTURE

6 Hours

Introduction- Central Processing Unit (CPU) Memory- Communication between Various Units of a Computer System- The Instruction Format- Instruction Set- Processor Speed- Multiprocessor Systems. Primary Memory Introduction- Memory Hierarchy- Random Access Memory (RAM)- Types of RAM- Read Only Memory (ROM)- Types of ROM. Secondary Storage Introduction- Classification of Secondary Storage Devices- Magnetic Tape- Magnetic

Disk- Optical Disk- Magneto Optical disk. Input Devices - Output Devices.

### **UNIT-III MICROPROCESSOR**

**5 Hours**

Introduction to Microprocessor – Microcontroller - 8085 Microprocessor and Architecture - Opcode fetch - Machine cycle - Memory Read Machine Cycle - Memory Write Machine Cycle - IO Read Machine Cycle - IO Write Machine Cycle - Execution time of the Instruction Cycle.

### **UNIT-IV INFORMATION SECURITY**

**5 Hours**

Introduction to Information Security - Components of Information System - Balancing Information Security and Access - The Systems Development Life Cycle - The Security Systems Development Life Cycle - Security Professionals and Organization.

### **UNIT-V OPEN SOURCE SOFTWARES**

**5 Hours**

Introduction to Open sources – Need of Open Sources – Advantages of Open Sources – Application of Open Sources. Open Source Operating Systems: LINUX. Introduction: MySQL - PHP – Python.

#### **Text Books**

- Arvind Kumar Bansal(2014). *Introduction to Programming Languages*”. CRC PRESS. Taylor and Francis Group.
- Michael, E. Whitman. Herbert, J. Mattord.(2011), “*Principles of Information Security. Course Technology*”. (4th Ed.). Cengage Learning.
- Alexis Leon. Mathews Leon (2009), *Fundamentals of Information Technology*”. Vikas Publishing House Pvt. Ltd.
- Rasmus Lerdorf. Levin Tatroe.(2018) “*Programming in PHP*”. Reilly.
- Ramesh, S. Goankar (2002). *Microprocessor Architecture Programming and Applications with 8085*. Penram International. (5th Ed.).

#### **Reference Books**

- Dennis, P. Curtin. Kim Foley. Kunal Sen and Cathleen Morin. (2005).” *Information Technology*” - the Breaking Wave. Tata-McGraw Hill Publications. (7th Reprint).
- Alexis Leon. Mathews Leon. (2004). “*Fundamentals of Information System.*” Co-Published by Vijay Nicole Imprints Pvt Ltd.

#### **e-Resource**

- <http://indexof.es/Computer/Fundamentals%20of%20Computer%20Organization%20and%20Architecture.pdf>

#### **COURSE OUTCOMES**

<b>CO No.</b>	<b>On completion of the course the student will be able to</b>	<b>Bloom’s level</b>
CO-1	Understand the components and architecture of IT	K1,K2

	infrastructure, including hardware, software, networks, and databases.	
CO-2	Apply the organization and functioning of computer systems, such as hardware, software, operating systems, and computer networks.	K3
CO-3	Analyse the principles of information systems to design, develop, and manage systems that support business processes and decision-making.	K4
CO-4	Evaluate basic software programs using programming languages and follow software development methodologies and best practices	K5
CO-5	Demonstrate the data management techniques to efficiently store, retrieve, manipulate, and secure data..	K6

### CO-PSO MAPPING :

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	3	3	2
CO-2	3	3	1	2	3	2
CO-3	3	3	1	2	2	3
CO-4	2	3	2	3	1	3
CO-5	3	3	3	2	2	1

**High correlation-56%**

**Moderate Correlation-23%**

**Low Correlation-13%**

## ADVANCED DATA STRUCTURES AND ALGORITHMS UITM201

**Semester : II**  
**Category : Major Core (DSC) - I**  
**Class & Major : I B.Sc (Information Technology)**

**Credit :4**  
**Hour/ Week: 5**  
**Total Hour: 65**

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Impart the basic concepts of data structures and algorithms
CO-2	Acquaint the student with the basics of the various data structures and make the students knowledgeable in the area of data structures.
CO-3	Apply various algorithm design techniques
CO-4	Implement and evaluate algorithms using appropriate data structures.
CO-5	Develop applications using stacks and queues.

### UNIT - I INTRODUCTION

**13 Hours**

Introduction: The essence of computational problem solving – Limits of computational problem solving-Computer algorithms-Computer Hardware-Computer Software-The process of

computational problem solving-Python programming language - Literals - Variables and Identifiers - Operators - Expressions and Data types, Input / output.

## **UNIT - II CONTROL STRUCTURES**

**13 Hours**

Control Structures: Boolean Expressions - Selection Control - If Statement- Indentation in Python- Multi-Way Selection -- Iterative Control- While Statement- Infinite loops- Definite vs. Indefinite Loops- Boolean Flag. String, List and Dictionary, Manipulations Building blocks of python programs, Understanding and using ranges.

## **UNIT - III FUNCTIONS**

**13 Hours**

Functions: Program Routines- Defining Functions- More on Functions: Calling Value-Returning Functions- Calling Non-Value-Returning Functions- Parameter Passing - Keyword Arguments in Python - Default Arguments in Python-Variable Scope. Recursion: Recursive Functions

## **UNIT - IV DICTIONARIES, SETS AND OOPS**

**13 Hours**

**Dictionaries and Sets:** Dictionary type in Python - Set Data type. **Object Oriented Programming using Python:** Encapsulation - Inheritance – Polymorphism. **Python packages:** Simple programs using the built-in functions of packages matplotlib, numpy, pandas etc. Data analysis with python

## **UNIT - V OBJECTS AND THEIR USE**

**13 Hours**

**Objects and their use:** Software Objects - Turtle Graphics – Turtle attributes-Modular Design: Modules - Top-Down Design - Python Modules - Text Files: Opening, reading and writing text files – **Database Programming:** Connecting to a database, Creating Tables, INSERT, UPDATE, DELETE and READ operations, Transaction Control, Disconnecting from a database, String Processing - Exception Handling. Web frame works(e.g., Flask, Django)  
Case Study: Web Programming using Python Image Processing – Facebook Analysis – Twitter Analysis

### **Text Books**

1. Charles Dierbach, (2015) “*Introduction to Computer Science using Python - A computational Problem solving Focus*”, Wiley India Edition,.
2. Wesley J. Chun,( 2016) “*Core Python Applications Programming*”, 3rd Edition , Pearson Education,

### **Reference Books**

1. Mark Lutz,(2018), “*Learning Python Powerful Object Oriented Programming*”, O’reilly Media, 5<sup>th</sup> Edition.

2. Timothy A. Budd, (2011) “*Exploring Python*”, Tata McGraw Hill Education Private Limited, 1<sup>st</sup> Edition.
3. John Zelle,( 2013) “*Python Programming: An Introduction to Computer Science*”, Second edition, Course Technology Cengage Learning Publications, , ISBN 978- 1590282410
4. Michel Dawson,( 2013) “Python Programming for Absolute Beginners” , Third Edition, Course Technology Cengage Learning Publications, 2013, ISBN 978-1435455009

#### e-Resource

1. [https://onlinecourses.swayam2.ac.in/cec22\\_cs20/preview](https://onlinecourses.swayam2.ac.in/cec22_cs20/preview)
2. [Python - Object Oriented | Tutorialspoint](#)
3. [Corey Schafer - YouTube](#)

#### COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom’s Level
CO-1	Understand the concepts of simple linear data structures.	K1.K2
CO-2	Experiment with basics structure of stack, queue and Linked list.	K3
CO-3	Analyze the problems using algorithms such as tree, heap and graph	K4
CO-4	Choose the appropriate algorithms techniques for solving problems	K5
CO-5	Create an algorithm like Dynamic Programming, Backtracking, Branch and Bound.	K6

#### CO-PSO MAPPING :

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	1	2	2	3
CO-2	3	3	2	1	3	3
CO-3	3	3	2	3	2	3
CO-4	3	3	2	3	2	1
CO-5	3	3	2	3	3	3

High correlation-63%

Moderate Correlation-27%

Low Correlation-10%

#### ADVANCED DATA STRUCTURES AND ALGORITHMS- PRACTICALS UITR202

Semester : I  
Category : Major Core (DSC) - III  
Class &Major : I B.Sc (Information Technology)

Credit :4  
Hour/Week : 5  
Total Hour :65

#### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Understand the concepts of ADTs.
CO-2	Recall linear data structures-lists, stacks, queues
CO-3	Apply Tree structures and application of trees.
CO-4	Examine graph structures and and application of graphs.
CO-5	Develop various sorting and searching techniques



**Implement the following exercises using Python Programming language:**

1. Implement the List ADT using arrays and linked lists.
2. Implement the following using a singly linked list.
  - Stack ADT
  - Queue ADT
3. Display the Evaluation expression using stack
  - Infix expression
  - Postfix expression .
4. Implement priority queue ADT.
5. To perform the binary search tree operations:
  - Insert ,Delete, Search..
6. To perform the following operations
  - Insertion into an AVL-tree
  - Deletion from an AVL-tree.
7. Implement the BFS and DFS for a given graph.
8. Implement the following searching methods:
  - Linear search
  - Binary search.
9. To implementing the following sorting methods:
  - Bubble sort
  - Selection sort
  - Insertion sort
  - Radix sort.

**Text Books:**

- Mark Allen Weiss, (2013)“*Data Structures and Algorithm Analysis in C++*”, Pearson Education , 4th Edition.
- Reema Thareja,(2014) “*Data Structures Using C*”, Oxford Universities Press , 2nd Edition

**Reference Books**

- Thomas H.Cormen,Chales E.Leiserson,Ronald L.Rivest, Clifford Stein(2011), “*Introduction to Algorithms*”, McGraw Hill, 3rd Edition
- Timothy
- A. Budd(2011), “*Exploring Python*”, Tata MCGraw Hill Education Private Limited , 1st Edition.
- Aho, Hopcroft and Ullman(2011), “*Data Structures and Algorithms*”, Pearson Education

**e-Resources:**

- NPTEL & MOOC courses titled Data Structures
- <https://nptel.ac.in/courses/106106127/>

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom's level
CO-1	Understand advanced data structures and gain a comprehensive understanding of advanced data structures, including balanced search trees, heaps, graphs, and hash tables, sorting and searching algorithms, such as quicksort, mergesort, and binary search.	K1,K2
CO-2	Apply and build a Design efficient algorithms and Learn techniques for designing algorithms that are efficient in terms of time and space complexity.	K3
CO-3	Analyze algorithm complexity and Learn how to analyze the time and space complexity of algorithms using mathematical methods like Big O notation.	K4
CO-4	Construct advanced data structures programs to Develop hands-on experience in implementing advanced data structures using popular programming language like Python.	K5
CO-5	Design a data structures program using the concepts of trees, graphs, sorting and searching	K6

**CO-PSO MAPPING :**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	1	3	3
CO-2	3	3	3	2	3	2
CO-3	3	3	3	2	3	2
CO-4	3	3	3	1	2	2
CO-5	3	3	2	2	3	3

**High correlation-72%****Moderate Correlation-21%****Low Correlation-7%****MULTIMEDIA - 3D ANIMATION****UITD201****Semester : II****Credit : 2****Category : Major Core (DSC) - V****Hours/Week: 2****Class &Major: I B.Sc (Information Technology)****Total Hours : 26****COURSE OBJECTIVES**

CO No.	To enable the students
CO -1	Improve the Multimedia skills of the students
CO -2	Prepare the students for Designer Field
CO -3	Design the 3D Animated Modeling
CO -4	Determine an individual's abilities, assessing how they are likely to perform in an area in which they have no prior training or knowledge
CO -5	Tests the Designing skills along with animation skills of a person.

**UNIT – I: 3D Modeling****5 Hours**

Introduction to 3D space in Blender - Introduction to Modeling Techniques - In- organic Modeling - Organic Modeling.

**UNIT – II: 3D Shading****5 Hours**

Use of Materials & Shader - Shader and Texture editing - Shading organic Models - Shading In – Organic Models

**UNIT - III: 3D Animation and Rigging (Practical)****6 Hours**

Introduction to 3D Animation - Create, Edit and working with Animation Graph, Rigging using Blender - Setting up controllers for joints - Simple Skeleton structure with proper joint orientation,

**UNIT - IV: 3D Lighting and Rendering (Practical)****5 Hours**

Understanding Lighting in Cycles - Direct and Indirect Lighting - Light Linking, Final Composition - Creating composition and Light with the Shaded Models

**UNIT-V: 3D Dynamics (Practical)****5 Hours**

Introduction to Dynamics, Active and Passive Bodies - Creating basic Simulation and collision using Rigid body - Cloth Simulation, Simulation of Brick wall collision - Introduction to Fluid Effects, Creating fluid simulation

**Text Books :**

- Prashant Jawalkar , Shreeram Gholap , Ms Renuka\_Zope(2017), “ *Multimedia and Animation – Computer Technology*”,\_First Edition .
- Ami Chopine(2018) ,”*3D Art Essentials: The Fundamentals of 3D Modeling, Texturing, and Animation*”, 4th Edition

**Reference Books**

- Umakant S Shirshetti, Rajesh S Yemul(2014) ,”*Multimedia And Animation Techniques*”, Nirali Prakashan Publisher.
- Pakhira, Malay K(2012).,”*Computer Graphics, Multimedia And Animation*”, Nirali Prakashan Publisher.

**e-Resources:**

- <https://www.youtube.com/watch?v=JacdkRqdCuU>
- <https://programmap.lamission.edu/academics/interest-clusters/e2068320-d2f3-421d-bbf8-a0014e859702/programs/90cd4a92-0d9f-7931-b51c-edd76fc61fd1>

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom’s Level
CO-1	Understand the concepts of 3D Animation in Multimedia Modelling.	K1,K2

CO-2	Apply the 3D Animations Designing.	K3
CO-3	Analyse the Designing Components	K4
CO-4	Determine the 3D Animation Techniques	K5
CO-5	Develop the Multimedia and 3D Animation Designing	K6

**CO-PSO MAPPING :**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	2	1	1
CO-2	3	3	3	3	1	2
CO-3	3	3	3	2	1	3
CO-4	3	2	3	3	2	1
CO-5	3	3	3	2	1	2

**High correlation- 56%    Moderate Correlation-26%    Low Correlation-20%**

**III AND IV EVALUATION OF COMPONENTS OF CIA**

Sem ester	Category	Course Code	Course Title	Component III	Component IV
I	Core Course - I	UITM101	Object Oriented in Python Programming	Assignment	Poster Presentation
	Core Course - II	UITR101	Python Programming using OOPs Practicals	DPA	Viva-voce
II	Core Course - III	UITM201	Advanced Data Structures & Algorithms	Problem Solving	Prototyping
	Core Course - IV	UITR201	Advanced Data Structure and Algorithms – Practicals	DPA	Viva-voce
	Skill Enhancement Course-III	UITD204	Multimedia – 3D Animation	DPA	Viva-voce

## DEPARTMENT OF COMPUTER APPLICATIONS

### PREAMBLE

UG : Programme Profile and Syllabi of Courses from I to II semesters along with Evaluation Components III and IV (With effect from 2023-2024 Batch Onwards)

### PROGRAMME PROFILE COMPUTER APPLICATION

#### PROGRAMME SPECIFIC OUTCOME

PSO.No.	Upon completion of the Programme , the students will be able to
PSO1:	Understand and develop a strong foundation in computer applications concepts, including programming languages, algorithms, computer networks, database management, and software engineering.
PSO2:	Identify the system solutions using suitable computing techniques leading to propulsion towards employability.
PSO3:	Communicate effectively in both technical and non-technical stakeholders and collaborate a team environment and leadership skills, and they will present their ideas, solutions and project outcomes in a clear and concise manner.
PSO4:	Apply computational methods, proficiency in programming languages and tools for solving real-time Problems.
PSO5:	Develop professional practices in the field of Computer Applications in adherence to ethical standards.
PSO6:	Demonstrate the ability to learn and adapt to emerging technologies and tools, and engage in lifelong learning in the field of computer applications.

### PROGRAMME PROFILE – BCA COMPUTER APPLICATION

Semester	Part	Category	Course Code	Course Title	Contact Hour/Week	Credit Min/Max
I	I	Language: Tamil/ Hindi/ French	UTAL110/ UHIL102/ UFRL102	General Tamil-I/Hindi-I/ French-I	5	3
	II	Language: English	UENL111	General English	5	3
	III	Core Courses - I	UCAM111/ UCSM111	Object Oriented in Python Programming	5	4
	III	Core Courses - II	UCAR112 UCSR111	Python Programming using OOPs Practical's	5	4
	III	Elective Course 1 (Discipline Specific)	UCAO101 UCAO102 UCAO103	a)Multimedia Systems b)Biometrics c)E-Commerce	4	3

	III	Allied – Discipline Non-Specific Elective- I	UMAA119	<b>Statistical Methods and its Applications-I</b>		
	IV	Foundation Course FC	UCAF101/ UCSF101	Problem Solving Computation	2	2
	IV	Skill Enhancement Course- SEC-1 (Non Major Elective)			2	2
	IV	Ability Enhancement Compulsory Course(AECC 1) - Soft Skill	USKS103	Soft Skill-1- Communicative English	2	2
<b>Total</b>					<b>30</b>	<b>23</b>
II	I	Language : Tamil/ Hindi/ French	UTAL210/ UHIL201/ UFRL201	General Tamil II/ Hindi-II/ French-II	5	3
	II	LE: Language	UENL211	General English	5	3
	III	Core Courses - III	UCAM208/ UCSM208/ UITM201	Advanced Data Structures & Algorithms	5	4
	III	Core Courses - IV	UCAR208/ UCSR208/ UITR202	Advanced Data Structure and Algorithms – Practical's	5	4
	III	Elective – Discipline Specific Elective – II	UCAO201 UCAO202 UCAO203	a) Cyber Forensics b) Information Security c) Human Computer Interaction		
	III	Allied – Discipline Non-Specific Elective- II	UMAA225	Allied – Discipline Non-Specific Elective- I [Any One] a) Allied Mathematics-II <b>b) Statistical Methods and its Applications-II</b> a) c)Cost and Management Accounting	4	3
	III	Internship / Industrial Training	UINS202	Semester vacation 30 Hrs / Summer vacation 60 Hrs	-	-/2
	IV	Skill Enhancement Course- SEC-2 (Non Major Elective)			2	2
	IV	Skill Enhancement Course – SEC-3 (Discipline / Subject Specific)	UCAD201/ UCSD201	Web Application Development Tools	2	2
	IV	Ability Enhancement Compulsory Course (AECC 2) Soft Skill-2	USKS203	Soft Skill-2	2	2
	V	Extension Activity/ Physical Education/NCC				1/2
VI	Value Added course				-/2	
<b>Total</b>					<b>30</b>	<b>24/29</b>

III	I	Language: Tamil/ Hindi/ French	UTAL310/ UHIL301/ UFRL301	General Tamil-III// Hindi-III/French-III	5	3
	II	Language: English	UENL311	General English	5	3
	III	Core Course - V	UCAM308/ UCSM306	Microprocessor Architecture	4	4
	III	Core Course – VI	UCAR309/ UCSR309	Microprocessor Architecture – Practical's	4	4
	III	Elective – Discipline Specific Elective – III	UCAO301/ UCAO302/ UCAO303	a) Fuzzy Logic b) ERP c) Artificial Intelligence	4	3
	III	Allied – Discipline Non-Specific Elective- I	UCOA304	Financial Accounting		
	IV	Skill Enhancement Course -SEC- 3(Discipline)	UCAD301	PHP	2	2
	IV	Skill Enhancement Course -SEC- 3(Entrepreneurial)	UCAU301	Multimedia and its application	2	1
	IV	Ability Enhancement Compulsory Course (AECC 3) Soft Skill-3	USKS303	Soft Skill-3	2	2
	IV	Value Education		Value Education	2	2
<b>Total</b>					<b>30</b>	<b>24</b>
IV	I	Language: Tamil/ Hindi/ French	UTAL410/ UHIL401/ UFRL401	General Tamil-IV/ Hindi-IV/French-IV	5	3
	II	Language: English	UENL411	English	5	3
	III	Core Course - VII	UCAM408 /UCSM410	Industry Module : Java Application Programming	5	4
	III	Core Course - VIII	UCAR409/ UCSR413	Java Application Programming – Practical's	5	4
	III	Elective- Discipline Specific Elective – IV	UCAO401	a)Software Testing b) Image Processing c) Big data Analytics	4	3
	III	Allied – Discipline Non-Specific Elective- I	UMAA404	a)Allied Mathematics-II b)Statistical Methods and its Application- II c) Cost and Management Accounting		
	III	Internship / Industrial Training	UINS401		-	-/2
	IV	Online course *	UONL401		2	2
	IV	Skill Enhancement Course – SEC-3 (Discipline / Subject Specific)	UCAD401	Mobile Computing	2	2
	IV	Ability Enhancement Compulsory Course ( AECC)	USKS403	Soft Skill-4	2	2

		Soft Skill – 4				
	V	Extension Activity/ Physical Education/NCC				-/2
	VI	Value Added course				-/2
<b>Total</b>					<b>30</b>	<b>23/29</b>
V	III	Core Course - IX	UCAM511	NET Programming	5	4
	III	Core Course - X	UCAM512	Database Management System	5	4
	III	Core Course - XI	UCAM513	NET Programming – Practical	5	4
	III	Core Course - XII	UCAP502	Project with Viva voce	4	4
	III	Elective- Discipline Specific Elective – V	UCAO501	a) Artificial Neural Network b) Pattern Recognition c) Introduction to Data Science D) Operation Research	5	3
	III	Elective- Discipline Specific Elective – VI	UCAO502	a)Cloud computing b)Agile Project Management c)Simulation and Modeling	4	3
	IV	Environmental Studies			2	2
<b>Total</b>					<b>30</b>	<b>24</b>
VI	III	Core Course - XIII	UCAM611	R Programming	5	4
	III	Core Course - XIV	UCAM612	Operating System	5	4
	III	Core Course - XV	UCAM613	Practical : R Programming	5	4
	III	Elective- Discipline Specific Elective – VII	UCAO601	a)Data Mining and Warehousing b)Network Security c) Robotics	6	4
	III	Elective- Discipline Specific Elective – VIII	UCAO602	a)Mobile Adhoc Network b)Computational Intelligence c)Grid Computing	5	3
	III	Comprehensive Viva-Voce				1
	III	Internship / Industrial Training (semester vacation 30 Hrs/)	UINS602		-	-/2
	IV	Professional Competency Skill	UCAC601	Professional Competency Skill [Competitive Examinations]	4	2
	V	Extension Activity/ Physical Education/NCC	-	-	-	-/2
	VI	Value Added Course	-	-	-	-
<b>Total</b>					<b>30</b>	<b>22/26</b>
<b>OVERALL TOTAL</b>					<b>180</b>	<b>140/155</b>



## NON MAJOR ELECTIVE

Semester	Category	Course Code	Course Title	Contact Hrs/week	Credit
I	Skill Enhancement Course (Non Major Elective)	UCSE101/ UITE101 UCAE101	Office Automation	2	2
II	Skill Enhancement Course- SEC-2 (Non Major Elective)	UCSE211/ UITSE211/ UCAE211	Advanced Excel	2	2
III	Skill Enhancement Course- SEC-2 (Non Major Elective)	UCAE311	Web Development Application Tools	2	2
IV	Skill Enhancement Course- SEC-2 (Non Major Elective)	UCAE401	Python Programming	2	2

## EXTRA CREDIT EARNING PROVISION

Semester	Category	Course Code	Course Title	Contact Hrs /week	Credit
I	Self-study Paper	UCAS101 UCAS102	C Programming Practical: C Programming	2	1
II	Self-study Paper	UCAS201 UCAS202	Desktop Publishing Hardware Trouble Shooting	2	1
III	Self-study Paper	UCAS301 UCAS302	Web Application Development Practical: Web Application Development.	2	1
IV	Self-study Paper	UCAS401 UCAS402	Computer Graphics Develops	2	1
V	Self-study Paper	UCAS501 UCAS502	Internet of Things Natural Language Processing	2	1
VI	Self-study Paper	UCAS601 UCAS602	Machine Learning Computing Intelligence	2	1

## OBJECT ORIENTED IN PYTHON PROGRAMMING UCAM111/ UCISM111

<b>Semester</b>	: I	<b>Credit</b>	: 4
<b>Category</b>	: Major Core (DSC) - I	<b>Hour/ Week:</b>	<b>5</b>
<b>Class &amp; Major</b>	: I BCA	<b>Total Hour</b>	<b>: 65</b>

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Describe the core syntax and semantics of Python programming language
CO-2	Discover the need for working with the strings and functions.
CO-3	Illustrate the process of structuring the data using lists, dictionaries, tuples and sets.
CO-4	Understand the usage of packages and Dictionaries
CO-5	Study the definition of pointers and the initializing the pointers.

## **UNIT - I INTRODUCTION**

**13 Hours**

Introduction: The essence of computational problem solving – Limits of computational problem solving-Computer algorithms-Computer Hardware-Computer Software-The process of computational problem solving-Python programming language - Literals - Variables and Identifiers - Operators - Expressions and Data types, Input / output.

## **UNIT - II CONTROL STRUCTURES**

**13 Hours**

Control Structures: Boolean Expressions - Selection Control - If Statement- Indentation in Python- Multi-Way Selection -- Iterative Control- While Statement- Infinite loops- Definite vs. Indefinite Loops- Boolean Flag. String, List and Dictionary, Manipulations Building blocks of python programs, Understanding and using ranges.

## **UNIT - III FUNCTIONS**

**13 Hours**

Functions: Program Routines- Defining Functions- More on Functions: Calling Value-Returning Functions- Calling Non-Value-Returning Functions- Parameter Passing - Keyword Arguments in Python - Default Arguments in Python-Variable Scope. Recursion: Recursive Functions

## **UNIT - IV DICTIONARIES, SETS AND OOPS**

**13 Hours**

**Dictionaries and Sets:** Dictionary type in Python - Set Data type. **Object Oriented Programming using Python:** Encapsulation - Inheritance – Polymorphism. **Python packages:** Simple programs using the built-in functions of packages matplotlib, numpy, pandas etc. Data analysis with python

## **UNIT - V OBJECTS AND THEIR USE**

**13 Hours**

**Objects and their use:** Software Objects - Turtle Graphics – Turtle attributes-Modular Design: Modules - Top-Down Design - Python Modules - Text Files: Opening, reading and writing text files – **Database Programming:** Connecting to a database, Creating Tables, INSERT, UPDATE, DELETE and READ operations, Transaction Control, Disconnecting from a database, String Processing - Exception Handling. Web frame works(e.g., Flask, Django) Case Study: Web Programming using Python Image Processing – Facebook Analysis – Twitter Analysis

### **Text Books**

1. Charles Dierbach, *“Introduction to Computer Science using Python - A computational Problem solving Focus”*, Wiley India Edition, 2015.
2. Wesley J. Chun, *“Core Python Applications Programming”*, 3rd Edition , Pearson Education, 2016

**Reference Books**

1. Mark Lutz, “*Learning Python Powerful Object Oriented Programming*”, O’reilly Media 2018, 5th Edition.
2. Timothy A. Budd, “*Exploring Python*”, Tata MCGraw Hill Education Private Limited 2011, 1st Edition.
3. John Zelle, “*Python Programming: An Introduction to Computer Science*”, Second edition, Course Technology Cengage Learning Publications, 2013, ISBN 978-1590282410
4. Michel Dawson, “*Python Programming for Absolute Beginners*”, Third Edition, Course Technology Cengage Learning Publications, 2013, ISBN 978-1435455009

**e-Resource**

1. [https://onlinecourses.swayam2.ac.in/cec22\\_cs20/preview](https://onlinecourses.swayam2.ac.in/cec22_cs20/preview)
2. [Python - Object Oriented | Tutorialspoint](#)
3. [Corey Schafer - YouTube](#)

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom’s Level
CO-1	Find the simple Python programs using conditionals and looping for solving problems	K1,K2
CO-2	Construct compound data using Python lists, tuples, dictionaries etc.	K3
CO-3	Examine a Python program into functions.	K4
CO-4	Estimate the data from/to files in Python programs.	K5
CO-5	Develop and execute simple Python programs.	K6

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	2	3	3	3
CO-2	3	2	3	3	2	3
CO-3	2	3	2	3	2	3
CO-4	3	3	3	3	3	3
CO-5	2	3	3	2	3	3

**High Correlation – 70%    Moderate Correlation – 30%    Low Correlation – NIL**

**PYTHON PROGRAMMING USING OOPS- PRACTICALS  
UCAR112/ UCSR111**

<b>Semester : I</b>	<b>Credit : 4</b>
<b>Category : Major Core (DSC) - III</b>	<b>Hour/Week : 5</b>
<b>Class &amp;Major : I BCA</b>	<b>Total Hour : 65</b>

**COURSE OBJECTIVES**

CO No.	To enable the students
CO-1	Acquire programming skills in core Python.
CO-2	Acquire Object-oriented programming skills in Python

CO-3	Develop the skill of designing graphical-user interfaces (GUI) in Python.
CO-4	Develop the ability to write database applications in Python.
CO-5	Acquire Python programming skills to move into specific branches

### List of Programs:

1. All kinds of Data types.
2. Operators
3. Decision Making
4. Looping
5. Functions
  - a. Calling Value-Returning Functions
  - b. Calling Non-Value-Returning Functions
  - c. Recursive Functions
6. Dictionaries', List, tuples and sets.
7. Object Oriented Programming
  - a. Class
  - b. Constructor
  - c. Polymorphism
  - d. Inheritance
8. Files.
9. Exception Handling
10. Database programming.

### Text Books:

- Charles Dierbach, (2015), “*Introduction to Computer Science using Python - A computational Problem solving Focus*”, Wiley India Edition,.
- Wesley J. Chun,(2016),“*Core Python Applications Programming*”, 3rd Edition , Pearson Education.

### Reference books

- Mark Lutz, (2018) “*Learning Python Powerful Object Oriented Programming*”, O’reilly Media, 5th Edition.
- Timothy A. Budd,( 2011) “*Exploring Python*”, Tata MCGraw Hill Education Private Limited, 1<sup>st</sup> Edition.
- John Zelle,(2013) “*Python Programming: An Introduction to Computer Science*”, Second edition, Course Technology Cengage Learning Publications, , ISBN 978-1590282410.
- Michel Dawson,( 2013) “*Python Programming for Absolute Beginners*” , Third Edition, Course Technology Cengage Learning Publications, ISBN 978-1435455009

### e-Resources:

- <https://dabeaz-course.github.io/practical-python/Notes/Contents.html>
- <https://itvoyagers.in/best-python-programming-practicals-for-beginners/>

## COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's level
CO-1	Understand the problem solving approaches	K1,K2
CO-2	Learn the basic programming constructs in Python	K3
CO-3	Practice various computing strategies for Python-based solutions to real world problems	K4
CO-4	Use Python data structures - lists, tuples, dictionaries	K5
CO-5	Design and Implement files handling.	K6

## MULTIMEDIA SYSTEMS

### UCAD101

Semester : I

Category : Elective(DSE) - III

Class &Major: I BCA

Credit : 3

Hours/Week : 4

Hours : 52

## COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Explain the characteristics of multimedia systems.
CO-2	Apply Transformations on Components.
CO-3	Classify the write, document, debug and evaluate a non-trivial multimedia system.
CO-4	Examine the different types of media format and their properties.
CO-5	Discuss the technical concepts and practices in specialized areas

### UNIT I MULTIMEDIA DEFINITION

10 Hours

Multimedia Definition-Use Of Multimedia-Delivering Multimedia- Text: About Fonts and Faces - Using Text in Multimedia -Computers and Text Font Editing and Design Tools-Hyper media and Hypertext.

### UNIT II IMAGES

11 Hours

Images: Plan Approach - Organize Tools - Configure Computer Workspace -Making Still Images - Color - Image File Formats. Sound: The Power of Sound -DigitalAudio-MidiAudio-Midivs.DigitalAudio-MultimediaSystemSounds Audio File Formats -Vaughan's Law of Multimedia Minimums - Adding Sound to Multimedia Project.

### UNIT III ANIMATION

11 Hours

Animation: The Power of Motion-Principles of Animation-Animation by Computer - Making Animations that Work. Video: Using Video - Working with Video and Displays-Digital Video Containers-Obtaining Video Clips -Shooting and Editing Video.

### UNIT IV MAKING MULTIMEDIA

10 Hours

Making Multimedia: The Stage of Multimedia Project - The Intangible Needs -The Hardware Needs - The Software Needs - An Authoring Systems Needs-Multimedia Production Team.

## UNIT V PLANNING AND COSTING

**10 Hours**

Planning and Costing: The Process of Making Multimedia-Scheduling-Estimating - RFPs and Bid Proposals. Designing and Producing - Content and Talent: Acquiring Content-Ownership of Content Created for Project-Acquiring Talent.

### Text Book:

- Tay Vaughan, Multimedia: Making it Work (with CD), 9th Edition, McGraw Hill Education

### Reference Book

- Ranjan Parekh, Principles of Multimedia, 2nd Edition, McGraw Hill Education, 2013. Mode of

### e-resources

- <https://nptel.ac.in/courses/117105083>

## Course Outcome

CO No.	On completion of the course the student will be able to	Bloom's level
CO-1	Explain the characteristics of multimedia systems.	K1,K2
CO-2	Apply Transformations on Components.	K3
CO-3	Classify the write, document, debug and evaluate a non-trivial multimedia system.	K4
CO-4	Examine the different types of media format and their properties.	K5
CO-5	Discuss the technical concepts and practices in specialized areas	K6

### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	2	3	3	3
CO-2	2	2	3	2	2	2
CO-3	3	3	3	3	2	3
CO-4	3	3	2	2	3	3
CO-5	2	3	3	2	3	3

**High Correlation – 60%      Moderate Correlation – 40%      Low Correlation – NIL%**

# BIOMETRICS

## UCAD102

**Semester : I**  
**Category : Elective (DSE) - III**  
**Class &Major : I BCA**

**Credit : 3**  
**Hours/Week : 4**  
**Hours : 52**

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Identify the various biometric technologies.
CO-2	Design of biometric recognition.
CO-3	Develop simple applications for privacy
CO-4	Understand the need of biometric in the society
CO-5	Understand the scope of biometric techniques

### UNIT I INTRODUCTION

**10 Hours**

**Introduction:** What is Biometrics, History, Types of biometric Traits, General architecture of biometric systems, Basic working of biometric matching, Biometric system error and performance measures, Design of biometric system, Applications of biometrics, Biometrics versus traditional authentication methods.

**Face Biometrics:** Introduction, Background of Face Recognition, Design of Face Recognition System,

Neural Network for Face Recognition, Face Detection in Video Sequences, Challenges in Face Biometrics, .7 Face Recognition Methods, Advantages and Disadvantages.

### UNIT II RETINA AND IRIS BIOMETRICS

**11 Hours**

**Retina and Iris Biometrics:** Introduction, Performance of Biometrics, Design of Retina Biometrics, Design of Iris Recognition System, Iris Segmentation Method , Determination of Iris Region, Determination of Iris Region, Applications of Iris Biometrics, Advantages and Disadvantages

**Vein and Fingerprint Biometrics:** Introduction, Biometrics Using Vein Pattern of Palm, Fingerprint Biometrics, Fingerprint Recognition System, Minutiae Extraction, Fingerprint Indexing, Experimental Results, Advantages and Disadvantages.

### **UNIT III PRIVACY ENHANCEMENT USING BIOMETRICS**

**11 Hours**

**Privacy Enhancement Using Biometrics:** Introduction, Privacy Concerns Associated with Biometric Deployments, Identity and Privacy, Privacy Concerns, Biometrics with Privacy Enhancement, Comparison of Various Biometrics in Terms of Privacy, Soft Biometrics.

**Multimodal Biometrics:** Introduction to Multimodal Biometrics, Basic Architecture of Multimodal Biometrics, Multimodal Biometrics Using Face and Ear, Characteristics and Advantages of Multimodal Biometrics, Characteristics and Advantages of Multimodal Biometrics.

### **UNIT IV WATERMARKING TECHNIQUES**

**10 Hours**

**Watermarking Techniques:** Introduction, Data Hiding Methods, Basic Framework of Watermarking, Classification of Watermarking, Applications of Watermarking, Attacks on Watermarks, Performance Evaluation, Characteristics of Watermarks, General Watermarking Process, Image Watermarking Techniques, Watermarking Algorithm, Experimental Results, Effect of Attacks on Watermarking Techniques, Attacks on Spatial Domain Watermarking.

### **UNIT V SCOPE AND FUTURE**

**10 Hours**

**Scope and Future:** Scope and Future Market of Biometrics, Biometric Technologies, Applications of Biometrics, Biometrics and Information Technology Infrastructure, Role of Biometrics in Enterprise Security, Role of Biometrics in Border Security, Smart Card Technology and Biometrics, Radio Frequency Identification (RFID) Biometrics, DNA Biometrics, Comparative Study of Various Biometric Techniques.

**Biometric Standards:** Introduction, Standard Development Organizations, Application Programming Interface (API), Information Security and Biometric Standards, Biometric Template Interoperability.

#### **Text Books:**

- G.R Sinha and SandeepB.Patil,(2013) Biometrics: Concepts and Applications, Wiley,
- Nalini K. Ratha, Ruud Bolle, and Venu Govindaraju (2007), "Biometrics: Theory, Methods, and Applications".

#### **Reference Books:**

- Ruud M. Bolle , SharathPankanti, Nalinik.Ratha, Andrew W.Senior, Jonathan H. Connel, (2009), Guide to Biometrics, Springer.
- Anil k. Jain, Arun A. Ross, KarthikNandakumar (2011) Introduction to Biometrics
- Anil K. Jain, Patrick Flynn, Arun A.Ross (2008), Hand book of Biometrics



## e-Resources

- <https://www.tutorialspoint.com/biometrics/index.htm>
- <https://www.javatpoint.com/biometrics-tutorial>
- <https://www.thalesgroup.com/en/markets/digital-identity-and-security/government/inspired/biometrics>

## COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's level
CO-1	Understand the basic concepts and the functionality of the Biometrics, Face Biometrics, Types, Architecture and Applications.	K1,K2
CO-2	Know the concepts Retina and Iris Biometrics and Vein and Fingerprint Biometrics.	K3
CO-3	Analyze the Privacy Enhancement and Multimodal Biometrics.	K4
CO-4	Describe the analytical idea on Water marking Techniques.	K5
CO-5	Evaluating the scope of Biometrics, and Study of various Biometric Techniques.	K6

## CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	2	2	3	3	3	2
CO-2	3	3	3	2	2	2
CO-3	3	3	3	2	3	2
CO-4	3	3	2	2	3	3
CO-5	3	3	3	2	3	3

High Correlation – 63% Moderate Correlation – 37% Low Correlation – NIL

## E-COMMERCE

### UCAD103

Semester : I

Category : Elective (DSE) - III

Class &Major: I BCA

Credit : 3

Hours/Week : 4

Hours : 52

## COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Understand the basic electronic business management
CO-2	Analyze the technologies and marketing trends in Ecommerce
CO-3	Illustrate the process of E-security, Legal and Ethical issues
CO-4	Evaluate the e -payment systems.

CO-5	Organize the expertise in mobile commerce and apply knowledge in development of E- Business portals
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### **UNIT I HISTORY OF E-COMMERCE AND INDIAN BUSINESS CONTEXT 10 Hours**

**History of E-commerce and Indian Business Context:** E-Commerce –Emergence of the Internet –Emergence of the WWW – Advantages of E-Commerce – Transition to E-Commerce in India –The Internet and India – E-transition Challenges for Indian Corporate.

**Business Models for E-commerce:** Business Model – E-business Models Based on the Relationship of Transaction Parties -E-business Models Based on the Relationship of Transaction Types.

### **UNIT II ENABLING TECHNOLOGIES OF THE WORLD WIDE WEB 10 Hours**

**Enabling Technologies of the World Wide Web:** World Wide Web – Internet Client-Server Applications–Networks and Internets–Software Agents–Internet Standards and Specifications–ISP. **e-Marketing:** Traditional Marketing–Identifying Web Presence Goals–Online Marketing–E-advertising–E-branding.

### **UNIT III E-SECURITY 11 Hours**

**E-Security:** Information system Security–Security on the Internet–E-business Risk Management Issues – Information Security Environment in India.

**Legal and Ethical Issues :** Cybers talking – Privacy is at Risk in the Internet Age– Phishing – Application Fraud –Skimming–Copyright–Internet Gambling–Threats to Children.

### **UNIT IV E-PAYMENT SYSTEMS 11 Hours**

**e-Payment Systems:** Main Concerns in Internet Banking – Digital Payment Requirements –Digital Token-based e-payment Systems – Classification of New Payment Systems – Properties of Electronic Cash – Cheque Payment Systems on the Internet – Risk and e-Payment Systems –Designing e-payment Systems – Digital Signature – Online Financial Services in India – Online Stock Trading..

### **UNIT V INFORMATION SYSTEMS FOR MOBILE COMMERCE 10 Hours**

**Information systems for Mobile Commerce:** What is Mobile Commerce?–Wireless Applications –Cellular Network – Wireless Spectrum – Technologies for Mobile Commerce – Wireless Technologies –Different Generations in Wireless Communication – Security Issues Pertaining to Cellular Technology.

**Portals for E-Business:** Portals–Human Resource Management–Various HRIS Modules.

**Text Books:**

- P.T.Joseph, S.J.,( 2012 )"E-Commerce-An Indian Perspective", PHI, 4<sup>th</sup>Edition.
- "E-Commerce (2019): Business, Technology, Society" by Kenneth C. Laudon, Carol Guercio Traver, and Peter DeBussy

**Reference Books:**

- DavidWhiteley,(2001) "E-CommerceStrategy,Technologies and Applications",Tata McGrawHill.
- RaviKalakota, Andrew B Whinston,( 2006), "Frontiers of Electronic Commerce", Pearson 12th Impression.
- Janice Reynolds,(2017), The complete E-commerce book design, build and maintain a successful web-based business, 2nd edition, CRC Press, Taylor & Francis Group,

**e-Resources**

- [https://www.tutorialspoint.com/e\\_commerce/index.htm](https://www.tutorialspoint.com/e_commerce/index.htm)
- <https://www.javatpoint.com/online-marketing>
- <https://www.geeksforgeeks.org/e-commerce/>

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom's level
CO-1	Understanding the basic electronic business management	K1,K2
CO-2	Analyze the technologies and marketing trends in Ecommerce	K3
CO-3	Illustrate the process of E-security, Legal and Ethical issues	K4
CO-4	Evaluate the e -payment systems.	K5
CO-5	Organize the expertise in mobile commerce and apply knowledge in development of E- Business portals	K6

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	2	3	2	3
CO-2	3	3	3	3	3	2
CO-3	2	3	3	3	3	2
CO-4	3	2	3	3	2	3
CO-5	2	3	2	2	2	3

High Correlation – 57% Moderate Correlation – 43% Low Correlation – NIL%

**PROBLEM SOLVING COMPUTATION**

UCAF101/UCSF101

Semester : I

Credit : 2

Category : Foundation course (FC) - IV

Hours/Week : 2

Class &Major : I BCA

Hours : 26

## COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Understand the basic systematic approach to problem solving.
CO-2	Learn the approach and algorithms to solve specific fundamental problems.
CO-3	Develop the ability to solve the problems accurately.
CO-4	Identify credible sources and evaluate the reliability of information.
CO-5	Apply critical thinking skills to analyze problem scenarios.

### UNIT I INTRODUCTION TO COMPUTER PROBLEM SOLVING

6 Hours

Algorithms - Building blocks of algorithms (statements, control flow, functions) - Notation (pseudo code, flow chart) - Algorithmic problem solving for socio economic conditions in global perspectives - Simple strategies for developing algorithms (iteration, recursion) - Efficiency of algorithms.

### UNIT II FUNDAMENTAL ALGORITHMS

5 Hours

**Fundamental Algorithms:** Exchanging the values of two variables – Counting - Summation of a set of numbers - Factorial computation - Sine function computation - Fibonacci Series generation - Reversing the digits of an integer – Base Conversion – Character to Number Conversion.

### UNIT III FACTORING METHODS

5 Hours

**Factoring Methods:** Finding the square root of a number – The smallest divisor of an integer – Greatest common divisor of two integers - Generating prime numbers – Computing the prime factors of an integer – Generation of pseudo-random numbers - Raising a number to a large power – Computing the  $n$ th Fibonacci number.

### UNIT IV ARRAY TECHNIQUES

5 Hours

**Array Techniques:** Array order reversal – Array counting or histogramming – Finding the maximum number in a set - Removal of duplicates from an ordered array - Partitioning an array – Finding the  $k^{\text{th}}$  smallest element – Longest monotone subsequence.

### UNIT V TEXT PROCESSING AND PATTERN SEARCHING

5 Hours

**Text Processing and Pattern Searching:** Text line length adjustment – Left and right justification of text – Keyword searching in text – Text line editing – Linear pattern search.  
**Recursive algorithms:** Towers of Hanoi – Permutation generation.

**Text Book:**

1. R. G. Dromey,( 2008), “*How to Solve it by Computer*”, Pearson India,.

### Reference Books:

1. Wiley (2019), Wiley's TCS National Qualifier Test Study Guide, Editorial Paperback
2. George Polya, Jeremy Kilpatrick, (2009), *The Stanford Mathematics Problem Book: With Hints and Solutions*, Dover Publications, (Kindle Edition 2013).
3. Greg W. Scragg,(1996) *Problem Solving with Computers*, Jones & Bartlett 1<sup>st</sup> edition.

### e-Resources:

1. [www.coursera.org/learn/computational-thinking-problem-solving](http://www.coursera.org/learn/computational-thinking-problem-solving)
2. <http://www.campusrecruitment.co.in/download.html>
3. [https://onlinecourses.nptel.ac.in/noc21\\_hs02/preview](https://onlinecourses.nptel.ac.in/noc21_hs02/preview)
4. <https://www.itcareerlab.org/2017/04/20/10-episode-11-preparing-job-interview/>

### COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's level
CO-1	Define the basic systematic approach to problem solving.	K1,K2
CO-2	Learn the approach and algorithms to solve specific fundamental problems.	K3
CO-3	Compare the efficient approach to solve specific factoring-related problems.	K4
CO-4	Evaluate the efficient array-related techniques to solve specific problems.	K5
CO-5	Create the efficient methods to solve specific problems related to text processing and how recursion works.	K6

### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	3	3	3	3
CO-2	2	3	2	3	2	3
CO-3	3	3	2	2	3	3
CO-4	3	3	2	3	2	2
CO-5	3	2	3	2	3	2

**High Correlation – 60% Moderate Correlation – 40% Low Correlation – NIL**

## OFFICE AUTOMATION

UCSE101/UCAE101

**Semester : I**

**Credit : 2**

**Category : Skill Enhancement Course (NME) - IV**

**Hours/Week : 2**

**Class &Major: I B.Sc Computer Science**

**Hours : 26**

### COURSE OBJECTIVES

<b>CO No.</b>	<b>To enable the students</b>
CO-1	Impart training for students in Microsoft Office which has different components like MS Word, MS Excel and Power point.
CO-2	Designing the course is highly practice oriented rather than regular class room teaching.
CO-3	Acquire knowledge on editor, spread sheet and presentation software
CO-4	Apply formatting techniques for improved document presentation.
CO-5	Create, format, and manipulate spreadsheets effectively.

### **UNIT I INTRODUCTORY CONCEPTS**

**6 Hours**

**Introductory concepts** Memory unit – CPU-Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS – UNIX– Windows. Introduction to Programming Languages.

### **UNIT II WORD PROCESSING**

**5 Hours**

**Word Processing** :Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing – Preview, options, Mail merge concepts.

### **UNIT III SPREADSHEETS**

**5 Hours**

**Spreadsheets:** Excel – opening, entering text and data, formatting, navigating; Formulas – entering, handling and copying; Charts – creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.

### **UNIT IV DATABASE CONCEPTS**

**5 Hours**

**Database Concepts:** The concept of data base management system; Data field, records, and files, Sorting and indexing data; Searching records. Designing queries, and reports; Linking of data files; Understanding Programming environment in DBMS; Developing menu drive applications in query language (MS – Access).

### **UNIT V TEXT PROCESSING AND PATTERN SEARCHING**

**5 Hours**

**Power point:** Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition – Animation effects, audio inclusion, timers.

#### **Text book:**

- Peter Norton(2017), “*Introduction to Computers*” –Tata McGraw-Hill.

#### **Reference book:**

- Jennifer Ackerman Kettel, Guy Hat-Davis 2013, Curt Simmons, “Microsoft 2013”, Tata McGraw- Hill.

**e-Resources:**

- Web content from NDL / SWAYAM or open source web resources

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom’s level
CO-1	Match the basics of computer systems and its components.	K1,K2
CO-2	Apply the basic concepts of a word processing package.	K3
CO-3	Classify the basic concepts of electronic spreadsheet software.	K4
CO-4	Design the access of database management system.	K5
CO-5	Create a presentation using PowerPoint tool.	K6

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	3	3	3	3
CO-2	3	2	3	2	2	2
CO-3	2	3	3	2	1	3
CO-4	3	2	2	2	3	2
CO-5	3	3	2	3	2	3

**High Correlation – 57%      Moderate Correlation – 40%      Low Correlation – 3%**

**C PROGRAMMING-PRACTICALS**

**UCAS102**

**Semester : I**  
**Category : Self-Study Paper**  
**Class &Major: I -year**

**Credit : 2**  
**Hours/Week : 2**  
**Total Hours : 26**

**COURSE OBJECTIVES**

CO No.	To enable the students
CO-1	Recognize and understand the syntax and construction of C programming code
CO-2	Know the alternative ways of providing solution to a given problem.
CO-3	Apply all the concepts that have been covered in the theory course
CO-4	Develop programs to print output on the screen as well as in the files
CO-5	Gain experience of procedural language programming.

**List of Programs**

1. I/O statements, operators, expressions
2. decision-making constructs: if-else, goto, switch-case, break-continue      Loops: for, while, do-while
3. Arrays: 1D and 2D, Multi-dimensional arrays, traversal
4. Strings: operations

5. Functions: call, return, passing parameters by (value, reference), passing arrays to function.
6. Pointers: Pointers to functions, Arrays, Strings, Pointers to Pointers, Array of Pointers
7. Structures: Nested Structures, Pointers to Structures, Arrays of Structures and Unions.

#### Text Books

- Reema Thareja (2016), “*Programming in C*”, Oxford University Press, Second Edition.
- Kernighan, B.W and Ritchie, D.M (2015), “*The C Programming language*”, Second Edition, Pearson Education.

#### Reference Books

- Paul Deitel and Harvey Deitel, (2018), “*C How to Program with an Introduction to C++*”, Eighth edition, Pearson Education.
- Yashwant Kanetkar (2020), *Let us C*, 17<sup>th</sup> Edition, BPB Publications.
- Byron S. Gottfried (1996), Schaum’s “*Outline of Theory and Problems of Programming with C*”, McGraw-Hill Education.
- Pradip Dey, Manas Ghosh (2013), “*Computer Fundamentals and Programming in C*”, Second Edition, Oxford University Press.
- Anita Goel and Ajay Mittal, (2013) “*Computer Fundamentals and Programming in C*”, 1st Edition, Pearson Education.

### ADVANCED DATA STRUCTURES AND ALGORITHMS UCAM208/UCSM208/UITM201

<b>Semester</b>	<b>: II</b>	<b>Credit</b>	<b>: 4</b>
<b>Category</b>	<b>: Major Core (DSC) - I</b>	<b>Hour/ Week</b>	<b>: 4</b>
<b>Class &amp; Major</b>	<b>: I BCA</b>	<b>Total Hour</b>	<b>: 52</b>

#### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Know about the linear and Nonlinear data structures.
CO-2	Analyze the efficiency of algorithm.
CO-3	Apply data structures and algorithms in real time applications
CO-4	Develop applications using Greedy, Divide and Conquer, dynamic programming
CO-5	Implement applications for backtracking algorithms using relevant data structures.

#### UNIT - I INTRODUCTION

**10 Hours**



Abstract Data Types (ADTs)- List ADT-array-based implementation-linked list implementation singly linked lists-circular linked lists-doubly-linked lists-applications of lists-Polynomial Manipulation- All operations-Insertion-Deletion-Merge-Traversal

**UNIT - II CONTROL STRUCTURES 11 Hours**

Stack ADT-Operations- Applications- Evaluating arithmetic expressions – Conversion of infix to postfix expression-Queue ADT-Operations-Circular Queue- Priority Queue- deQueueapplications of queues.

**UNIT - III FUNCTIONS 10 Hours**

Tree ADT-tree traversals-Binary Tree ADT-expression trees-applications of trees-binary search tree ADT- Threaded Binary Trees-AVL Trees- B-Tree- B+ Tree – Heap-Applications of heap.

**UNIT - IV DICTIONARIES , SETS AND OOPS 11 Hours**

Definition- Representation of Graph- Types of graph-Breadth first traversal – Depth first traversal-Topological sort- Bi-connectivity – Cut vertex- Euler circuits-Applications of graphs.

**UNIT - V OBJECTS AND THEIR USE 11 Hours**

Searching- Linear search-Binary search-Sorting-Bubble sort-Selection sort-Insertion sort-Shell sort-Radix sort-Hashing-Hash functions-Separate chaining- Open Addressing- Rehashing Extendible Hashing.

**Text Books**

- Mark Allen Weiss, (2014) “*Data Structures and Algorithm Analysis in C++*”, Pearson Education, 4<sup>th</sup> Edition.
- Reema Thareja,( 2014), “*Data Structures Using C*”, Oxford Universities Press 2014, 2<sup>nd</sup> Edition

**Reference Books**

- Thomas H.Cormen, Chales E.Leiserson,Ronald L.Rivest, Clifford Stein, (2009) “*Introduction to Algorithms*”, McGraw Hill, 3rd Edition.
- Aho, Hopcroft and Ullman,(2003), “*Data Structures and Algorithms*”, Pearson Education.

**e-Resource**

- NPTEL & MOOC courses titled Data Structures
- <https://nptel.ac.in/courses/106106127/>

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom’s Level
CO-1	Knowing the concept of Dynamic memory management, data types, and algorithms.	K1,K2

CO-2	Understand basic data structures such as arrays, linked lists, stacks and queues, trees, graphs.	K3
CO-3	Applying the concepts of collision and its resolution methods.	K4
CO-4	Evaluating problem involving concepts data structure and heaps.	K5
CO-5	Creating own program for solving problems like sorting, searching, insertion and deletion of data in ADT	K6

### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	3	3	2	3
CO-2	3	2	3	2	3	3
CO-3	3	3	2	3	2	3
CO-4	2	3	3	3	3	3
CO-5	2	3	2	3	3	2

**High Correlation – 67% Moderate Correlation – 33% Low Correlation – NIL**

## ADVANCED DATA STRUCTURES AND ALGORITHMS- PRACTICALS

UCAR208/ UCSR208/UITR202

**Semester : I**

**Category : Major Core (DSC) - III**

**Class & Major : I BCA**

**Credit : 4**

**Hour/Week : 5**

**Total Hour :65**

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Know about the linear and Nonlinear data structures.
CO-2	Analyze the efficiency of algorithm.
CO-3	Apply data structures and algorithms in real time applications
CO-4	Develop applications using Greedy, Divide and Conquer, dynamic programming
CO-5	Implement applications for backtracking algorithms using relevant data structures.

### List of Programs (Implement in Python Programming language)

1. Implement the List ADT using arrays and linked lists.
2. Implement the following using a singly linked list.
  - Stack ADT
  - Queue ADT
3. Display the Evaluation expression using stack
  - Infix expression
  - Postfix expression .
4. Implement priority queue ADT.
5. To perform the binary search tree operations:

- Insert ,Delete, Search..
6. To perform the following operations
    - Insertion into an AVL-tree
    - Deletion from an AVL-tree.
  7. Implement the BFS and DFS for a given graph.
  8. Implement the following searching methods:
    - Linear search
    - Binary search.
  9. To implementing the following sorting methods:
    - Bubble sort
    - Selection sort
    - Insertion sort
    - Radix sort.

**Text Books:**

- Mark Allen Weiss,( 2014), “*Data Structures and Algorithm Analysis in C++*”, Pearson Education, 4th Edition.
- Reema Thareja,(2014) “*Data Structures Using C*”, Oxford Universities Press, 2nd Edition

**Reference Books**

- Thomas H.Cormen,Chales E.Leiserson,Ronald L.Rivest, Clifford Stein,(2009) “*Introduction to Algorithms*”, McGraw Hill, 3rd Edition
- Timothy A. Budd,( 2011) “*Exploring Python*”, Tata MCGraw Hill Education Private Limited, 1 st Edition.
- Aho, Hopcroft and Ullman,(2001) “*Data Structures and Algorithms*”, Pearson Education

**e-Resources:**

- <https://nptel.ac.in/courses/106106127/>

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom’s level
CO-1	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.	K1,K2
CO-2	Understand basic data structures such as arrays, linked lists, stacks and queues.	K3
CO-3	Describe the hash function and concepts of collision and its resolution methods.	K4
CO-4	Solve problem involving graphs, trees and heaps.	K5
CO-5	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data	K6

**CYBER FORENSICS  
UCAD201**

**Semester : II**  
**Category : Elective Course 2- III**  
**Class & Major : I BCA**

**Credit : 3**  
**Hours/Week : 4**  
**Total Hours : 52**

**COURSE OBJECTIVES**

<b>CO No.</b>	<b>To enable the students</b>
CO -1	Understand the principles of network , mobile and cyber forensic science
CO -2	Analyze the digital evidences and arriving at conclusions
CO -3	Apply the cyber-crime techniques to data acquisition and evidence collection
CO -4	Illustrate the cyber-crime investigation procedures
CO -5	Examine the Volatile and Non-volatile Digital Evidence

**UNIT - I OVERVIEW OF COMPUTER FORENSICS TECHNOLOGY**

**10 Hours**

**Overview of Computer Forensics Technology:** Computer Forensics Fundamentals: What is Computer Forensics? Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of professional Forensics Methodology, Steps taken by Computer Forensics Specialists. Types of Computer. Forensics Technology: Types of Business Computer Forensic, Technology–Types of Military Computer Forensic Technology–Types of Law Enforcement–Computer Forensic. Technology–Types of Business Computer Forensic Technology.

**UNIT – II COMPUTER FORENSICS EVIDENCE AND CAPTURE**

**11 Hours**

**Computer Forensics Evidence and capture:** Data Recovery: Data Recovery Defined, Data Back–up and Recovery, The Role of Back –up in Data Recovery, The Data –Recovery Solution. Evidence Collection and Data Seizure: Collection Options, Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collection and Archiving, Methods of Collections, Artefacts, Collection Steps, Controlling Contamination: The chain of custody.

**UNIT - III DUPLICATION AND PRESERVATION OF DIGITAL EVIDENCE**

**11 Hours**

**Duplication and Preservation of Digital Evidence:** Processing steps, Legal Aspects of collecting and Preserving Computer forensic Evidence. Computer image Verification and

Authentication: Special needs of Evidential Authentication, Practical Consideration, Practical Implementation.

#### UNIT- IV COMPUTER FORENSICS ANALYSIS

10 Hours

**Computer Forensics Analysis:** Discovery of Electronic Evidence: Electronic Document Discovery: A Powerful New Litigation Tool. Identification of Data: Time Travel, Forensic Identification and Analysis of Technical Surveillance Devices.

#### UNIT- V RECONSTRUCTING PAST EVENTS

10 Hours

**Reconstructing Past Events:** How to Become a Digital Detective, Useable File Formats, Unusable File Formats, Converting Files. Networks: Network Forensics Scenario, a technical approach, Destruction Of E-Mail, Damaging Computer Evidence, Documenting The Intrusion on Destruction of Data, System Testing.

#### Text Book

- John R. Vacca,(2002) “Computer Forensics: Computer Crime Investigation”, 3/E, Firewall Media, New Delhi,

#### Reference Books

- Nelson, Phillips Enfinger, Steuart,(2004)“Computer Forensics and Investigations” Enfinger, Steuart, CENGAGE Learning.
- Anthony Sammes and Brian Jenkinson,(2007)”Forensic Computing: A Practitioner’s Guide”, Second Edition, Springer–Verlag London Limited.
- Robert M.Slade,(2005)” Software Forensics Collecting Evidence from the Scene of a Digital Crime”, TMH.

#### e-Resources

- <https://www.vskills.in>
- <https://www.hackingarticles.in/best-of-computer-forensics-tutorials/>
- <https://www.softwaretestinghelp.com/digital-forensics/>
- [https://www.tutorialspoint.com/python\\_digital\\_forensics/index.htm](https://www.tutorialspoint.com/python_digital_forensics/index.htm)

#### COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom’s Level
CO-1	Understand the definition of computer forensics fundamentals	K1,K2
CO-2	Apply the different types of computer forensics technology	K3
CO-3	Analyze various computer forensics systems	K4
CO-4	Evaluating the methods for data recovery, evidence collection and data seizure.	K5
CO-5	Implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools.	K6

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	3	2	3	2	3
CO-2	2	3	3	2	3	2
CO-3	3	2	3	3	2	3
CO-4	3	3	2	2	3	3
CO-5	2	3	3	3	2	3

**High Correlation – 63% Moderate Correlation – 37% Low Correlation – NIL**

**INFORMATION SECURITY  
UCAD202**

**Semester : II**  
**Category : Elective Course 2- III**  
**Class & Major: I BCA**

**Credit : 3**  
**Hours/Week: 4**  
**Total Hours : 52**

**COURSE OBJECTIVES**

CO No.	To enable the students
CO -1	Know the network security threats, security services, and counter measures
CO -2	Understand vulnerability analysis of network security
CO -3	Analyzing background on hash functions; authentication; firewalls; intrusion detection techniques
CO -4	Gain hands-on experience with programming and simulation techniques for security protocols.
CO -5	Create a methods for authentication, access control, intrusion detection and prevention

**UNIT - I INTRODUCTION TO INFORMATION SECURITY****10 Hours**

Introduction to Information Security : Security mindset, Computer Security Concepts (CIA), Attacks, Vulnerabilities and protections, Security Goals, Security Services, Threats, Attacks, Assets, malware, program analysis and mechanisms.

**UNIT – II THE SECURITY PROBLEM IN COMPUTING****11Hours**

The Security Problem in Computing: The meaning of computer Security, Computer Criminals, Methods of Defense. Cryptography: Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption.

**UNIT - III SYMMETRIC AND ASYMMETRIC CRYPTOGRAPHIC TECHNIQUES** **11 Hours**

Symmetric and Asymmetric Cryptographic Techniques: DES, AES, RSA algorithms .Authentication and Digital Signatures : Use of Cryptography for authentication, Secure Hash function, Key management – Kerberos.

## UNIT- IV PROGRAM SECURITY

10 Hours

Program Security : Non-malicious Program errors – Buffer overflow, Incomplete mediation, Time-of-check to Time-of-use Errors, Viruses, Trapdoors, Salami attack, Man-in-the-middle attacks, Covert channels. File protection Mechanisms, User Authentication Designing Trusted O.S: Security polices, models of security, trusted O.S design, Assurance in trusted O.S. Implementation examples.

## UNIT- V SECURITY IN NETWORKS

10 Hours

Security in Networks: Threats in networks, Network Security Controls – Architecture, Encryption, Content Integrity, Strong Authentication, Access Controls, Wireless Security, Honeypots, Traffic flow security. Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction

### Text Books

1. Charles P. Pfleeger,(2015), Security in Computing, Fourth Edition, Pearson Education
2. William Stallings,(2011), Cryptography And Network Security Principles And Practice, Fourth or Fifth Edition, Pearson

### Reference Books

1. C K Shyamala, N Harini, Dr T R Padmanabhan,(2011) Cryptography and Network Security:, Wiley India, 1<sup>st</sup> Edition
2. Forouzan Mukhopadhyay(2007), “Cryptography and Network Security, Mc Graw Hill, 2<sup>nd</sup> Edition
3. Wiley(2021) , Information Security, Principles and Practice: Mark Stamp, India
4. WM.Arthur Conklin, Greg White, (2016) “Principles of Computer Sceurity”, TMH

### e-Resource

1. <https://www.geeksforgeeks.org/what-is-information-security/>
2. <https://www.tutorialspoint.com/what-is-information-security#:~:text=Information%20security%20is%20designed%20and,destruction%20C%20alteration%2C%20and%20disruption.>
3. <https://www.w3schools.com/cybersecurity/>

## COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Know the network security threats, security services, and counter measures	K1,K2
CO-2	Understand vulnerability analysis of network security	K3
CO-3	Analyzing background on hash functions; authentication; firewalls; intrusion detection techniques	K4
CO-4	Gain hands-on experience with programming and simulation techniques for security protocols.	K5

CO-5	Create a methods for authentication, access control, intrusion detection and prevention	K6
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**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	2	3	2	3	3	3
CO-2	3	3	3	2	3	2
CO-3	2	2	3	3	2	3
CO-4	3	3	2	2	3	3
CO-5	2	3	3	3	3	3

**High Correlation – 53% Moderate Correlation – 47% Low Correlation – NIL**

**HUMAN COMPUTER INTERACTION  
UCAD203**

**Semester : II**  
**Category : Elective Course 2- III**  
**Class &Major: I BCA**

**Credit : 3**  
**Hours/Week: 4**  
**Total Hours : 52**

**COURSE OBJECTIVES**

CO No.	To enable the students
CO -1	Understand the fundamentals of HCI.
CO -2	Sketch the design and software process technologies.
CO -3	Implement the HCI models and theories.
CO -4	Evaluate the Mobile Ecosystem, types of Mobile Applications, mobile Architecture and design.
CO -5	Develop the various types of Web Interface Design.

**UNIT - I FOUNDATIONS OF HCI :**

**10 Hours**

The Human: I/O channels – Memory - Reasoning and problem solving; The Computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms. - Case Studies

**UNIT – II DESIGN & SOFTWARE PROCESS:**

**11Hours**

Interactive Design:-Basics – process – scenarios -Navigation: screen design Iteration and prototyping.-HCI in software process.

Software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules: principles, standards, guidelines, rules. Evaluation Techniques – Universal Design

**UNIT - III MODELS AND THEORIES:**

**11 Hours**

HCI Models : Cognitive models:- Socio-Organizational issues and stakeholder requirements Communication and collaboration models-Hypertext, Multimedia and WWW.

**UNIT- IV Mobile HCI:**

**10 Hours**



Mobile Ecosystem: Platforms, Application frameworks-Types of Mobile Applications: Widgets, Applications, Games-Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools. - Case Studies

**UNIT- V WEB INTERFACE DESIGN**

**10 Hours**

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow - Case Studies .

**Text Books**

- Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale,(2004) "Human -Computer Interaction", III Edition, Pearson Education. (UNIT I, II & III)
- Brian Fling,( 2009) "Mobile Design and Development", I Edition, O'Reilly Media Inc., (UNIT-IV)
- Bill Scott and Theresa Neil,( 2009), "Designing Web Interfaces", First Edition, O'Reilly. (UNIT-V)

**Reference Books**

- Shneiderman,(2016), "Designing the User Interface: Strategies for Effective Human-Computer Interaction", V Edition, Pearson Education.
- Andrew Sears, Julie A. Jacko (2007), The Human-Computer Interaction Handbook Fundamentals, Evolving Technologies and Emerging Applications, Second Edition,.

**e-Resources**

- <https://www.interaction-design.org/literature/topics/human-computer-interaction>
- [https://link.springer.com/10.1007/978-0-387-39940-9\\_192](https://link.springer.com/10.1007/978-0-387-39940-9_192)
- [https://en.wikipedia.org/wiki/Human%E2%80%93computer\\_interaction](https://en.wikipedia.org/wiki/Human%E2%80%93computer_interaction)
- [https://www.tutorialspoint.com/human\\_computer\\_interface/index.htm](https://www.tutorialspoint.com/human_computer_interface/index.htm)

**COURSE OUTCOMES**

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Understand the fundamentals of HCI.	K1,K2
CO-2	Sketch the design and software process technologies.	K3
CO-3	Implement the HCI models and theories.	K4
CO-4	Evaluate the Mobile Ecosystem, types of Mobile Applications, mobile Architecture and design.	K5
CO-5	Develop the various types of Web Interface Design.	K6

**CO-PSO MAPPING:**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	3	2	3	3
CO-2	3	3	2	2	3	3
CO-3	3	2	3	3	3	2

CO-4	3	3	3	2	3	3
CO-5	2	2	3	3	3	3

**High Correlation** – 70% **Moderate Correlation** – 30% **Low Correlation** – NIL

**WEB APPLICATION DEVELOPMENT TOOLS  
UCAD201/UCSD201**

**Semester : II** **Credit : 2**  
**Category : Skill Enhancement Course – SEC-3** **Hours/Week: 2**  
**Class &Major: I BCA** **Total Hours : 26**  
**COURSE OBJECTIVES:**

CO.NO	To enable the students
CO1	Understand the basic structure and components of the World Wide Web.
CO2	Explore the suite of Google Apps, including Gmail, Google Drive, Google Docs, Google Sheets, and Google Slides
CO3	Gain an understanding of WordPress as a content management system (CMS) and its role in website development.
CO4	Explore the process of creating and managing content, including pages, posts, media files, and categories.
CO5	Create and modify interactive projects in Alice by utilizing pre-built objects, scripting, and customization options.

**UNIT-I WEB TERMINOLOGIES**

**5 Hours**

Web, web page, http, domain name, register and host a domain name, ISP. XML Technology: XML Tree, XML DTD. Client side scripting: Definition, importance, examples: JavaScript, AJAX, APPLET etc., Server side scripting: Definition, importance, examples CGI, Servlet, JSP,J2EE etc.,

Web Services scripting: Definition, importance, examples.

**UNIT-II INTRODUCTION TO GOOGLE APPS**

**6 Hours**

Creating Mail account. Gmail compose and reply:streamlined compose pane, check your mail while typing, formatting options appear only when you need them, new keyboard shortcuts,drag and drop addresses, drag and rop files, compose two messages at once,draft,create signatures,labels,filters,contacts(create groups and mailing lists, import contacts, contacts picker)- **Chat** - Calendar (scheduling and other calendar basics, set up reminders, sharing and more)-Working with Documents: Word, Excel, Creating Form – Drive (set up google drive, organize, find, share files), open and preview files – Working with groups-Google printer-Working with drop box.

### **UNIT-III WORD PRESS**

**5 Hours**

Introduction to word press: make a website or a log using a wordpress, downloading and installing wordpress on XAMPP Server. Dashboard: website management functions of wordpress.-Themes: Installing and handling themes, editing the appearance of themes, theme configuration, adjusting different elements of installed themes like slideshow, post, pages. Posts: Adding new post, modifying existing posts, placing images, videos to the posts, adding categories to publishing the posts on the websites. pages: Adding new webpages, modifying pages, editing pages, placing images, videos, mp3 to the pages, publishing the pages on the websites, creating static home page.

### **UNIT-IV MEDIA**

**5 Hours**

Media: Uploading pictures, videos, editing images, publishing them on the websites, embedding videos from youtube to your website. links: Adding new links, editing the links, adding categories to the links, managing categories. Widgets: adding, editing widgets to the theme. plugins: introduction to plugins, installing plugins, editing plugins. social media plugins: Floating social networking , social media widget, social media tabs, social media mashup, social networking icons. Users: managing the accessibility to the website/blog. Slider: adding custom slider to the themes.

### **UNIT-V USING ALICETO CREATE ANIMATIONS**

**5 Hours**

Code editor, methods panel, control panel/tiles, scene editor, galleries. camera navigation control: turn camera left/right,forward/backward,move camera. creating first animation: open, save and run the project, add and position objects. – example using do in order on together, move up, down forward, backward, right,left. Examples using control structures – using memory variables – user define procedures – add rotation and randomization – use keyboard controls, develop small animation

#### **Text Books:**

- Uttam kumar roy, debarshi kumar sanyal,(2010), Web Technologies, Oxford university press.
- Chuck Tomasi, Kreg Steppe, (2010), sams teach yourself wordpress 3 in 10 minutes, Sams
- Dann, Cooper and Pausch,(2012), “Learning to Program with Alice”,3<sup>rd</sup> edition, Prentice HallPearson Education) ISBN- 0-13-212247-2.

#### **Reference Books**

- Terry Felke-Morris,(2019), "Web Development and Design Foundations with HTML5," Pearson.
- Jennifer Niederst Robbins,(2018) "Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics," O'Reilly Media.
- Terry Felke-Morris,(2019), "Web Development and Design Foundations with HTML5" Pearson.

#### e-resources

- <http://learn.wordpress.com>
- <http://learn.googleapps.com/training-videos>
- [http://www.alice.org/3/1/materials\\_videos](http://www.alice.org/3/1/materials_videos)

#### COURSE OUTCOME

CO's	To enable the students	Bloom's Level
CO1	Identify and utilize common web development frameworks and tools to create interactive and responsive web pages.	K1,K2
CO2	Demonstrate proficiency in using various Google Apps, including Gmail, Google Drive, Google Docs, Google Sheets, and Google Slides.	K3
CO3	Design the content, including pages, posts, media files, and categories, within a Word Press site.	K4
CO4	Apply strategies for creating engaging and relevant content on social media platforms.	K5
CO5	Create interactive 3D animations and games using Alice, incorporating objects, methods, events, loops, and conditionals.	K6

#### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	3	3	3	3
CO-2	3	3	2	3	3	2
CO-3	3	2	3	3	2	3
CO-4	3	3	3	3	3	3
CO-5	2	2	3	2	3	3

High Correlation – 73% Moderate Correlation – 27% Low Correlation – NIL

#### ADVANCED EXCEL UCSE211

Semester : II  
Category : Major Core (DSC) - V  
Class &Major: I B.Sc Computer Science

Credit : 2  
Hours/Week: 2  
Total Hours : 26

## COURSE OBJECTIVES

CO No.	To enable the students
CO -1	Customize common options in Excel, such as default font, number formatting, and display settings.
CO -2	Understand the concept of absolute and relative cell referencing.
CO -3	Protect worksheets and cells to prevent unauthorized changes.
CO -4	Create templates for specific purposes, such as budgeting, project management, or sales reports.
CO -5	Generate subtotals with multiple levels of grouping and summarization.

### UNIT - I BASICS OF EXCEL

**6 Hours**

Basics of Excel- Customizing common options- Absolute and relative cells- Protecting and un-protecting worksheets and cells- Working with Functions - Writing conditional expressions - logical functions - lookup and reference functions- VlookUP with Exact Match, approximate Match- Nested VlookUP with Exact Match- VlookUP with Tables, Dynamic Ranges- Nested VlookUP with Exact Match- Using VLookUP to consolidate Data from Multiple Sheets.

### UNIT - II DATA VALIDATIONS

**5 Hours**

Data Validations - Specifying a valid range of values - Specifying a list of valid values- Specifying custom validations based on formula - Working with Templates Designing the structure of a template- templates for standardization of worksheets - Sorting and Filtering Data -Sorting tables- multiple-level sorting- custom sorting- Filtering data for selected view - advanced filter options- Working with Reports Creating subtotals- Multiple-level subtotal.

### UNIT - III CREATING PIVOT TABLES

**5 Hours**

Creating Pivot tables Formatting and customizing Pivot tables- advanced options of Pivot tables- Pivot charts- Consolidating data from multiple sheets and files using Pivot tables- external data sources- data consolidation feature to consolidate data- Show Value As % of Row, % of Column, Running Total, Compare with Specific Field- Viewing Subtotal under Pivot- Creating Slicers.

### UNIT - IV DATE AND TIME FUNCTIONS

**5 Hours**

More Functions Date and time functions- Text functions- Database functions- Power Functions - Formatting Using auto formatting option for worksheets- Using conditional formatting option for rows, columns and cells- WhatIf Analysis - Goal Seek- Data Tables- Scenario Manager.

### UNIT - V FORMATTING CHARTS & MACROS

**5 Hours**

Charts - Formatting Charts- 3D Graphs- Bar and Line Chart together- Secondary Axis in Graphs- Sharing Charts with PowerPoint / MS Word, Dynamically. The Visual Basic Editor - Parts of the VBA Editor - Modules and Macros - About VBA Forms, Sub Procedures & Modules - Creating Forms - Using Controls and their Properties - Running VBA Forms in Excel.

### Text Books

- Michael Alexander and Richard Kusleika(2016), “Excel 2016 Power Programming with VBA”, Wiley Publication.
- Jordan Goldmeier and John Michaloudis(2015), “Advanced Excel Essentials”Apress Publication.

### Reference Books

- Bill Jelen and Michael Alexander (2019),” Microsoft Excel 2019 Pivot Table” Data Crunching,
- Chris Webb(2014),” Power Query for Power BI and Excel”, Apress Publication.

### e-Resource

- Web resources from NDL Library, E-content from open source libraries

### COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom’s Level
CO-1	Use advanced functions and productivity tools to assist in developing worksheets.	K1,K2
CO-2	Manipulate data lists using Outline, Auto filter and PivotTables.	K3
CO-3	Apply the consolidation to summarise and report results from multiple worksheets.	K4
CO-4	Enhance lists using pivot tables and pivot table charts	K5
CO-5	Create the use case studies to create worksheets and workbook	K6

### CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	3	2	3	3
CO-2	2	2	2	2	3	2
CO-3	3	2	3	2	2	3
CO-4	3	3	2	3	3	3
CO-5	3	3	3	2	3	3

**High Correlation – 60% Moderate Correlation – 40% Low Correlation – NIL**

## DESKTOP PUBLISHING UCAS201

**Semester : II**  
**Category : Self-Study Paper**  
**Class & Major: I -year**

**Credit : 2**  
**Hours/Week : 2**  
**Total Hours : 26**

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Understanding of desktop publishing software such as Adobe In Design, Adobe Illustrator, Adobe Photoshop,
CO-2	Develop the edit documents, layouts, and designs.
CO-3	Learn about typography, including font selection, spacing, and formatting.
CO-4	Evaluate how to work with images and graphics in desktop publishing, including cropping, resizing, and enhancing images for use in documents.
CO-5	Create different types of publications, such as brochures, flyers, newsletters, magazines, and more.

### UNIT – I MS-WINDOW&PAGEMAKSER

**8 Hours**

**Introduction to Computer-Computer Basics-Creating Folder-Directories-** Type Settings for Publication, Page Layout, Word Wrapping, Grouping, Merging two or more files, Creating columns, Tab settings, Paragraph settings, Hyphenation, Paper Style, Index & Table of Contents, Fonts, Mixing Text & Graphics, inking objects, Printing facility.

### UNIT – II CORELDRAW

**9 Hours**

Logo Designing, Frame Settings Graphical Tools, Bitmap & Shadow Effects -Special Effects such as Perspective -Blending, Text Settings into objects -Alignment Setting -Tabs, Power Line -Power Clip -Contour -Import & Export Facility

### UNIT – III PHOTOSHOP

**9 Hours**

All Tools (Marquee Tool, Magnetic Tool, Slice Tool, Patch Tool, Clone Stamp Tool, Gradient Tool, Smudge Tool, Blur Tool, Text Tool etc.) Fill, Stroke Option -Histogram, Group, Ungroup -Lock Object, Color Range -Feather, Modify, Grow, Filter -Liquify, Artistic- Blur, Video Option etc.

#### Text Book:

- Sandee Cohen,(2015), *"InDesign CC: Visual QuickStart Guide"*, Peachpit Press.

#### Reference Book:

- David Blatner and Christopher Smith(2009), *"Design Type: Professional Typography with Adobe InDesign"*.

## COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Understanding of desktop publishing software such as Adobe In Design, Adobe Illustrator, Adobe Photoshop,	K1,K2
CO-2	Develop the edit documents, layouts, and designs.	K3
CO-3	Learn about typography, including font selection, spacing, and formatting.	K4
CO-4	Evaluate how to work with images and graphics in desktop publishing, including cropping, resizing, and enhancing images for use in documents.	K5
CO-5	Create different types of publications, such as brochures, flyers, newsletters, magazines, and more.	K6

## CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	3	3	3	2
CO-2	3	3	2	2	2	2
CO-3	2	2	2	3	3	3
CO-4	3	3	2	2	3	3
CO-5	2	3	3	3	3	3

**High Correlation – 60% Moderate Correlation – 40% Low Correlation – NIL**

## HARDWARE TROUBLESHOOTING

### UCAS202

**Semester : II**  
**Category : Self-Study Paper**  
**Class &Major: I -year**

**Credit : 2**  
**Hours/Week : 2**  
**Total Hours : 26**

## COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Identify and explain the functions of key hardware components in a computer system
CO-2	Apply safety precautions and best practices when working with computer hardware.
CO-3	Perform preventive maintenance on computer systems to extend their lifespan and reliability.
CO-4	Develop strategies for systematic hardware troubleshooting, including isolating and testing components
CO-5	Interpret error messages and diagnostic codes to pinpoint hardware problems.

## UNIT – I INTRODUCTION TO HARDWARE TROUBLESHOOTING

**8 Hours**

Course overview and objectives- Importance of hardware troubleshooting- Safety precautions and best practices- ools and equipment for hardware troubleshooting- Identification and functions of essential hardware components (CPU, motherboard, RAM, storage devices, etc.)



## UNIT – II DIAGNOSTICS AND TESTING

9 Hours

Using diagnostic software and built-in diagnostics tools-Troubleshooting techniques for hardware problems-Analyzing error codes and system messages- Importance of regular system maintenance-Cleaning and cooling system maintenance-Data backup and disaster recovery planning.

## UNIT – II TROUBLESHOOTING SPECIFIC HARDWARE ISSUES

9 Hours

Troubleshooting common issues with CPUs, RAM, and motherboards-Identifying and resolving storage device problems-Network card and peripheral troubleshooting, Safe handling of components-Replacing hardware components (e.g., RAM, hard drives, power supplies)-Soldering and desoldering techniques (if applicable)

### Text book:

- Mark Minasi, (2016), "The Complete PC Upgrade and Maintenance Guide", Sybex.

### Reference Book:

- Morris Rosenthal,(2012), "Troubleshooting and Repairing Major Appliances", McGraw-Hill Education.

## COURSE OUTCOMES

CO No.	On completion of the course the student will be able to	Bloom's Level
CO-1	Recognize and describe the functions of major hardware components within a computer system, including the CPU, motherboard, RAM, storage devices, and peripherals.	K1,K2
CO-2	Adhere to essential safety precautions when handling and troubleshooting computer hardware to protect themselves and equipment.	K3
CO-3	Implement regular preventive maintenance practices to extend the lifespan and reliability of computer systems.	K4
CO-4	Accurately interpret error messages, diagnostic codes, and system logs to isolate and diagnose hardware issues.	K5
CO-5	Develop and apply effective strategies for systematic hardware troubleshooting, including testing and isolating components.	K6

## CO-PSO MAPPING:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO-1	3	2	3	3	3	3
CO-2	3	2	2	2	2	3
CO-3	3	3	2	3	2	3
CO-4	2	2	3	2	3	3
CO-5	2	3	3	3	3	3

High Correlation – 60% Moderate Correlation – 40% Low Correlation – NIL

### III AND IV EVALUATION OF COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
I	Core Course -I	UCAM111/ UCSM111	Object Oriented in Python Programming	Assignment	Poster Presentation
	Core Course -II	UCAR112 UCSR111	Python Programming using OOPs Practical's	DPA	Viva-voce
	Elective Course 1 (Discipline Specific)	UCAD101	a)Multimedia Systems b)Biometrics c)E-Commerce	Assignment	Poster Presentation
II	Core Course -III	UCAM208/ UCSM208	Advanced Data Structures & Algorithms	Problem Solving	Prototyping
	Core Course - IV	UCAR208/ UCSR208	Advanced Data Structure and Algorithms – Practical's	DPA	Viva-voce
	Elective – Discipline Specific Elective – II	UCAD201	a) Cyber Forensics b) Information Security c) Human Computer Interaction	Assignment	Prototyping

## DEPARTMENT OF PSYCHOLOGY

### PREAMBLE

**UG:** Programme Profile and the Syllabi of Courses Offered in the I & II Semester along with Evaluation Components III & IV (With effect from 2023 - 2026 Batch Onwards).

### PROGRAMME SPECIFIC OUTCOMES

PSO No.	Upon completion of the Programme , the students will be able to
<b>PSO-1</b>	Identify the major historical frameworks that shaped the development of psychology, including Structuralism, Functionalism, Behaviorism, and Psychoanalysis.
<b>PSO-2</b>	Understand the psychological processes influencing human behavior and develop critical thinking skills enhances one's comprehension of the cognitive mechanisms that shape individuals' actions and reactions.
<b>PSO-3</b>	Apply key psychological concepts, theoretical perspectives, and by carrying out hands-on activities and showcasing how these ideas are applied in real-world situations.
<b>PSO-4</b>	Analyze the essence of human values by critically examining acts of social commitment, and assess the development of professional ethics and responsibilities.
<b>PSO-5</b>	Evaluate the behavioral concepts in both laboratory settings and real-life situations.
<b>PSO-6</b>	Develop and acquire skills in psychological assessment and Progress on the career path of higher studies, psychological services in the community, and research.

### PROGRAMME PROFILE B.Sc. Psychology

Sem ester	Part	Category	Course Code	Course Title	Contact Hrs/ week	Credit Min/ Max
I	I	Tamil / Hindi / French	UTAL110/ UHIL110/ UFRL110	General Tamil- I/ Hindi -I / French- I	5	3
	II	English	UENL111	General English – I	5	3
	III	Core Course I	UPSM101	Introduction to Psychology- I	5	4
		Core Course II	UPSM102	Biological Psychology	5	4
		Elective Course I	UPSO101	Building Psychological Capital	4	3
	IV	SEC I (NME)			2	2
		Foundation Course	UPSF101	Careers and Ethics in Psychology	2	2
		AECC I (Soft Skill-I)	USKS103		2	2
<b>TOTAL</b>					<b>30</b>	<b>23</b>
II	I	Tamil / Hindi / French	UTAL210/ UHIL210/ UFRL210	General Tamil – II / Hindi -II / French- II	5	3
	II	English	UENL211	General English – II	5	3
	III	Core Course III	UPSM201	Introduction to Psychology-II	5	4
		Core Course IV	UPSM202	Psychology of Childhood	5	4
		Elective Course II	UPSO201	Cross-Cultural Psychology	4	3

	III	Internship	UINS201		-	-/2
	IV	SEC II (NME)			2	2
		SEC III (Discipline Specific)	UPSD201	Psychological First Aid	2	2
		AECC II (Soft Skill-II)	USKS203		2	2
	V	Extension Activity / Physical Education			-	1/2
	VI	Value Added Course			-	-/2
<b>TOTAL</b>					<b>30</b>	<b>24/29</b>
III	I	Tamil / Hindi / French	UTAL310/ UHIL310/ UFRL310	General Tamil – III / Hindi -III / French- III	5	3
	II	English	UENL311	General English – III	5	3
	III	Core Course V	UPSM301	Psychology of Adolescence and Early Adulthood	4	4
		Core Course VI	UPSM302	Social Psychology-I	4	4
		Elective Course III	UPSO301	Statistics for Behavioural Science	4	3
	IV	SEC IV (Entrepreneurship)	UPSU301	Managing Behaviour in Organization	2	1
		SEC V (Discipline Specific)	UPSD302	Relaxation Techniques	2	2
		AECC III (Soft Skill-III)			2	2
		Value education			2	2
<b>TOTAL</b>					<b>30</b>	<b>24</b>
IV	I	Tamil / Hindi / French	UTAL410/ UHIL410/ UFRL410	General Tamil – IV / Hindi -IV / French- IV	5	3
	II	English	UENL411	General English – IV	5	3
	III	Core Course VII	UPSM401	Psychology of Middle Age and Old Age	5	4
		Core Course VIII	UPSM402	Social Psychology II	5	4
		Elective Course IV	UPSO401	Introduction to Research Methodology	4	3
		Internship	UINS401		-	-/2
	IV	NME – Online Course*			2	2
		SEC VII (Discipline Specific)	UPSD402	Personality Development	2	2
		AECC IV (Soft Skill-IV)			2	2
	V	Extension Activity / Physical Education			-	-/2
	VI	Value Added Course			-	-/2
<b>TOTAL</b>					<b>30</b>	<b>23/29</b>
V	III	Core Course IX	UPSM501	Psychopathology I	5	4
		Core Course X	UPSM502	Cognitive Psychology	5	4
		Core Course XI	UPSM503	Assessments in Psychology	5	4

		Major Elective I	UPSO501	Organisational Psychology	5	3
		Major Elective II	UPSO502	Counselling Psychology	4	3
		Core Course XII	UPSP501	Project	4	4
	IV	Environmental Studies			2	2
<b>TOTAL</b>					<b>30</b>	<b>24</b>
VI	III	Core Course XIII	UPSM601	Psychopathology II	5	4
		Core Course XIV	UPSM602	Educational Psychology	5	4
		Core Course XV	UPSM603	Health Psychology	5	4
		Major Elective VII	UPSO601	Sports and Exercise Psychology	6	4
		Major Elective VIII	UPSO602	Environmental Psychology	5	3
	III	Internship	UINS601		-	-/2
	III	Comprehensive Viva-voce	UPSM604		-	1
	IV	Professional Competency Skill	UPSC601		4	2
	V	Extension Activity			-	-/2
	VI	Value Added Course			-	-
<b>TOTAL</b>					<b>30</b>	<b>22/26</b>
<b>GRAND TOTAL</b>					<b>180</b>	<b>140/155</b>

### COURSES OFFERED TO OTHER DEPARTMENTS

#### NON-MAJOR ELECTIVE

Sem ester	Part	Category	Course Code	Course Title	Contact Hour/Week	Credit
						Min/Max
I	IV	SEC I (NME)	UPSE101	Child and Adolescent Mental Health	2	2
II	IV	SEC I (NME)	UPSE201	Social Interactions and Human Behaviour	2	2

**INTRODUCTION TO PSYCHOLOGY I**  
**UPSM101**

**Semester : I**  
**Category : Major Core I**  
**Class & Major : I B.Sc. Psychology**

**Credit : 4**  
**Hours / Week : 5**  
**Total Hours : 65**

**COURSE OBJECTIVES**

<b>CO No.</b>	<b>To enable the students</b>
CO-1	Propound a comprehensive overview and understanding of the Origins, Goals, Research Methods and Fields of Specialization in Psychology.
CO-2	Understand the principles of sensation for vision, hearing, smell, taste and bodily senses.
CO-3	Implement the principles of Perception and Illusion.
CO-4	Highlight the principles of Classical and Operant Conditioning and Observational Learning.
CO-5	Explain emotions and theoretical perspectives of emotions.

**UNIT I - INTRODUCTION TO PSYCHOLOGY**

**14 Hours**

Definition of Psychology. Nature of Psychology. Origin of Psychology. Philosophical origins: Early Indian and Greek thoughts, Major ideas of Descartes, Locke. Brief history of modern scientific Psychology: Structuralism, Functionalism, Behaviourism, Gestalt psychology, Piaget, Psychoanalysis, Cognitive approach. A scientific approach to Psychology – Assessments in Psychology: Introspective Method - Observation Method - Experimental Method - Correlation Method - Case Study Method - Clinical Method - Genetic Method - Interview Method - Survey Method - Rating Scales – Checklists – Questionnaires - Psychological Tests - Cross-Cultural Method.

**UNIT II – SCOPE OF PSYCHOLOGY**

**13 Hours**

Goals of Psychology. Role of a psychologist in society. Branches of Psychology: Clinical Psychology, Industrial Psychology, Counselling Psychology, Developmental Psychology, Social Psychology, Positive Psychology, Sports Psychology, Health Psychology, Criminal Psychology, Gender Psychology, Biopsychology.

**UNIT III - ATTENTION, SENSATION & PERCEPTION**

**12 Hours**

Attention: Definition, Factors affecting attention, Set in attention. Characteristics – Types - Determinants of Attention. Sensation: Definition, Types of Sensation, Elements of Sensation. Perception: Definition, Gestalt Laws, Subliminal Perception, ESP - Principles of Perceptual Organization - Constancies in Perception - Size, Shape, Form, Space, Movement - Depth Perception – Illusions - Plasticity of Perception.

## UNIT IV - LEARNING

13 Hours

Characteristics of Learning. Classical conditioning (Pavlov) - Principles involved, Significance, Operant Conditioning (B.F Skinner) – Principles involved, Significance, Trial and Error (Thorndike) Conditioning – Principles Involved, Significance, Insight learning (Kohler)- Principles Involved, Significance, Social Learning Theory (Bandura)- – Principles Involved, Significance.

## UNIT V – EMOTION

13 Hours

Definition. Nature. Types. Physiological Responses-Arousal and Emotional Intensity. Theories: James Lange Theory, Cannon Bard Theory, Schachter-Singer Theory, Richard Lazarus' Theory. Communication of Emotion: Emotional Expression, Characteristics, Innate Expression of Emotions, Social Aspects of Emotional Expressions.

### Text Books

- Passer, M.W. & Smith R.E. (2007) *Psychology- The Science of mind and Behavior* (3<sup>rd</sup> ed.) New Delhi: Tata McGraw-Hill Publishing Company Ltd
- Baron, R.A. & Misra, G. (2017) *Psychology Indian Subcontinent Edition* (5<sup>th</sup>ed.) India, U.P.: Pearson India Inc.
- Ciccarelli, S.K., & White, J.N. *Psychology* 5<sup>th</sup>ed. (2018). Adapted Misra, G. Noida: Pearson India Education Services Pvt Ltd
- Hockenbury, D. H. & Hockenbury, S. E. (2003). *Psychology* (3<sup>rd</sup> ed.) New York: Worth Publishers.
- Khatoon, N. (2012) *General Psychology*. Dorling Kindersley (India) Pvt Ltd

### Reference Books

- Morgan, C.T., King, R.A., Weisz, J.R., & Schopler, J. (2007). *Introduction to Psychology*, 7<sup>th</sup> Edition. Singapore: McGraw- Hill.
- Myers, D.G. (2004). *Psychology*. 5th Edition, Worth Publishers: New York.

### e-Resource

- Frontiers in Psychology (<https://www.frontiersin.org/journals/psychology>)
- Archives of Scientific Psychology (<https://psycnet.apa.org/PsycARTICLES/journal/arc/6/1>)
- BMC PSYCHOLOGY (<https://bmcpublishing.biomedcentral.com/>)
- <https://www.psywww.com/careers/specialt.html> [www.worthpublishers.com/hockenbury](http://www.worthpublishers.com/hockenbury)
- <https://courses.lumenlearning.com/wsu-sandbox/chapter/gestalt-principles-of-perception/>

## COURSE OUTCOMES

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Recall the foundational aspects of psychology, encompassing various branches and research methods to explore human cognition, emotion, and behavior.	K1
CO-2	Summarize the characteristics and methodologies of various psychological approaches.	K2
CO-3	Utilize knowledge of physiological responses to arousal and emotional intensity to address practical issues related to stress management.	K3
CO-4	Analyse cultural and societal influences on emotional expression.	K4
CO-5	Examine the ethical implications inherent in diverse psychological research methodologies.	K4

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	1	1	0	0
CO 2	3	2	2	1	1	0
CO 3	3	3	2	1	1	1
CO 4	3	3	3	3	2	1
CO 5	3	3	3	3	3	2

**High Correlation** : 43 %  
**Medium Correlation** : 20%  
**Low Correlation** : 27 %  
**No correlation** : 10 %

## BIOLOGICAL PSYCHOLOGY UPSM102

**Semester** : I  
**Category** : Major Core II  
**Class & Major** : I B.Sc. Psychology

**Credit** : 4  
**Hours / Week** : 5  
**Total Hours** : 65

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Highlight the perspectives and research methods of Biological Psychology.
CO-2	Examine the structure and Communication of the cells of the nervous system and synaptic transmission.
CO-3	Understand the role of the brain in regulating temperature, thirst and hunger
CO-4	Detect the nature and functions of the endocrine glands.
CO-5	Assess the causes of brain damage and its effect on behaviour.

### UNIT I - BIOLOGICAL FOUNDATIONS OF BEHAVIOUR

**12 Hours**

Introduction – Meaning of Biological Psychology, Biological explanation of behaviour, Mind Brain relationship, Recording brain activity, Research methods.

### UNIT II – BASICS OF NERVOUS SYSTEM AND NEUROTRANSMISSION

**14 Hours**



Development of nervous system, Central Nervous System, Peripheral Nervous System; Neurons – Structure, types; Brain – Structure, Divisions, Glial cells, Cerebrospinal fluid, Blood-Brain barrier; Neurotransmitters – Meaning, Types, Events at synapse; Membrane Potential – Action potential and Resting potential.

**UNIT III - REGULATION OF INTERNAL BODY STATES 13 Hours**

Temperature – Homeostasis, Allostasis, Temperature Regulations and Behaviour; Thirst – Maintaining water balance, Causes of thirst, Osmotic thirst and hypovolemic thirst; Hunger – Physiological mechanisms of hunger and satiety, Role of Hypothalamus.

**UNIT IV - HORMONES AND BEHAVIOUR 14 Hours**

Hormones: Introduction and Definition. Principles of Hormones. Neural versus Hormonal Communication. Hormones: Classification by Chemical Structure. Endocrine Glands and its Specific Hormones: The Pituitary Gland; The Adrenal Gland; The Thyroid Gland; The Gonads; The Pineal Gland; The Pancreas and The Parathyroid Glands

**UNIT V – BRAIN DAMAGE 12 Hours**

Causes of Brain damage, Neurodegenerative diseases, Stress and illness.

**Text Books**

- Kalat, J.W. (2011). *Biopsychology*. Delhi, India: Cengage Learning India Private Limited.
- Pinel, J. (2007). *Biopsychology*. New Delhi, India: Pearson India Education Services Pvt Ltd.

**Reference Books**

- Rosenweig, Breedlov, Leiman (2002) : *Biological psychology*, 3rd edition, Sinaven Associate, Inc
- Carlson, N.R. (2007). *Foundations of physiological psychology*. New Delhi, India: Pearson India Education Services Pvt Ltd.

**e-Resource**

- Behavioural and Brain Functions (<https://behavioralandbrainfunctions.biomedcentral.com/>)
- Biological Psychology (<https://www.journals.elsevier.com/biological-psychology>)
- <http://www.ecpdu.net/htmlfiles/uploads/2015/01/research-methods-in-biopsychology.pdf>
- <https://www.khanacademy.org/science/biology/human-biology/neuron-nervous-system/a/overview-of-neuron-structure-and-function>
- <https://www.khanacademy.org/science/biology/human-biology/neuron-nervous-system/a/the-synapse>

**COURSE OUTCOMES**

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Comprehend different methods used in recording brain activity.	K1
CO-2	Differentiate between neural and hormonal communication.	K2

CO-3	Apply research methods to investigate biological explanations of behaviour.	K3
CO-4	Examine the classification of hormones based on chemical structure.	K4
CO-5	Analyse strategies for mitigating the impact of stress on brain health.	K4

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	1	1	0
CO 2	3	2	2	2	2	0
CO 3	3	3	3	2	1	1
CO 4	3	3	3	2	2	2
CO 5	3	3	3	3	3	2

**High Correlation : 43 %**

**Medium Correlation : 37%**

**Low Correlation : 13%**

**No correlation : 7%**

### BUILDING PSYCHOLOGICAL CAPITAL UPSO101

**Semester : I**  
**Category : Elective**  
**Class & Major : I B.Sc. Psychology**

**Credit : 3**  
**Hours / Week : 4**  
**Total Hours : 52**

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Identify a comprehensive overview of Positive Psychology and Psychological capital.
CO-2	Associate the basics of Self-efficacy and ways to strengthen an individual's Self-efficacy to enhance performance.
CO-3	Attributing the differentiation of hope and hopelessness and its impact on mental state and strategies to imbibe hope.
CO-4	Reviewing the various spectrums of optimism and locus of control.
CO-5	Examine the resilience and 7 C's Model of resilience.

### UNIT I – INTRODUCTION

**10 Hours**

The need for a different approach, positive vs negative approach, contributions of positive psychology, psy cap in relation to job satisfaction motivation and performance

### UNIT II – PSYCAP EFFICACY

**10 Hours**

Definition, key ingredients of efficacy, ways to strengthen efficacy.

### UNIT III – PSYCAP HOPE

**10 Hours**

Definition of hopelessness, effects of hopelessness, hopelessness and depression, ways to improve hope.

**UNIT IV – PSYCAP OPTIMISM****12 Hours**

Definition of optimism in locus of control, ways to develop optimism dispositional optimism, explanatory style.

**UNIT V – PSYCAP RESILIENCE****10 Hours**

Definition, ways to develop resilience 7 C's model of resilience, qualities of a resilient Person.

**Text Books**

- Fred Luthans., Carolyn, M. Youssef— Morgan. & Bruce, J. Avolio. (20 15), Psychological Capital and beyond, New York: Oxford University Press.
- Snyder, C.R. & Lopez, S.J. (2002). Handbook of positive psychology. (eds.). Oxford University Press. New York.
- Carr, A. (2004). Positive psychology, The science of happiness and human strengths. New York: Routledge.

**Reference Books**

- Avolio. (2006), Psychological Capital: Developing the Human Competitive Edge, New York: Oxford University Press.
- Singh, A. (2013). Behavioral science: Achieving behavioral excellence for success. New Delhi: Wiley India Pvt ltd.

**e-Resource**

- <https://positivepsychology.com/what-is-positive-psychology-definition/>
- <https://academic.oup.com/book/26255/chapter-abstract/194462811?redirectedFrom=fulltext&login=false>
- <https://academic.oup.com/book/26255/chapter-abstract/194463790?redirectedFrom=fulltext&login=false>
- <https://journals.sagepub.com/doi/full/10.1177/18344909211010514>
- <https://academic.oup.com/book/26255/chapter-abstract/194465570?redirectedFrom=fulltext&login=false>

**COURSE OUTCOMES**

<b>CO No.</b>	<b>On completion of the course, the student will be able to</b>	<b>Bloom's Level</b>
CO-1	Recall various strategies for implementing positive psychology practices in diverse organizational settings.	K1
CO-2	Understand the components of the 7 C's model of resilience.	K2
CO-3	Construct practical strategies to enhance PsyCap efficacy in personal and professional contexts.	K3
CO-4	Examine the impact of optimism on individuals' perceptions and actions.	K4

CO-5	Dissect the research studies that support the contributions of positive psychology and provide a critical assessment.	K4
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### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	1	0	0
CO 2	3	2	2	1	1	0
CO 3	3	2	2	2	1	1
CO 4	3	3	3	2	2	1
CO 5	3	3	3	3	3	2

**High Correlation** : 37%

**Medium Correlation** : 33%

**Low Correlation** : 20%

**No correlation** : 10%

## CHILD AND ADOLESCENT MENTAL HEALTH UPSE101

**Semester** : I  
**Category** : Non Major Elective  
**Class & Major** : I UG

**Credit** : 2  
**Hours / Week** : 2  
**Total Hours** : 26

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Develop a sensitivity to various cultural perspectives of mental health and illness.
CO-2	Understand the influences on mental health in young children age.
CO-3	Identify when a child needs help and explore the various ways you can support their mental health.
CO-4	Examine social determinants of children's mental health, global trends, resources, and barriers to change.
CO-5	Evaluate the abilities for adaptive and positive behaviour, that enables the individuals to deal effectively with the demands and challenges of everyday life.

### UNIT I - MENTAL HEALTH

**5 Hours**

Definition of Mental Health (WHO) - Prevalence of Mental Health issues in young people- Assessment of Mental Health issues in Children and Adolescent: Interview- Case study –Observation - Psychological Testing.

### UNIT II - FACTORS AFFECTING MENTAL HEALTH IN YOUNG CHILDREN

**5 Hours**

Biological Factors - Psychological Factors - Temperament - Environmental factors: Role of Parenting - Peer influence - Impact of School - Impact of Culture and Community.

### UNIT III - GENERAL MENTAL HEALTH ISSUES

**5 Hours**

Emotional Problems: Separation Anxiety- Social Anxiety and Behavioural Problems: Temper Tantrums- Conduct Disorders-Risk-taking behaviours- Bullying-Alcohol and Drug Abuse.

### UNIT IV - OTHER COMMON MENTAL HEALTH ISSUES

**6 Hours**

Attention Deficit Hyperactivity Disorder- Learning Disability- Depression - Schizophrenia.

**UNIT V - BASIC MANAGEMENT OF MENTAL HEALTH ISSUES****5 Hours**

Counselling- Psycho education- Behaviour Therapy- Play Therapy - Family Intervention.

**Text Books**

- Dogra N; Parkin A; Frake C and Gale F (2002). A Multidisciplinary Handbook of Child and Adolescent Mental Health for Front-line Professionals, Jessica Kingsley Publishers: London.
- Thompson M, Hooper C, Laven-Bradbury C and Gale C (2012). Child and Adolescent Mental Health Theory and Practice. (2<sup>nd</sup> Ed.), Hodder Education. United Kingdom.
- Berk, E.L. (2001). Child development, Prentice Hall of Indics, New Delhi.

**Reference Books**

- Mussen, P.H., Conpa Kapan, J. and Hussain. (1987). Child development, Halt Rinehart and Winston Inc.
- Santrock, J.W. (1981). Life span development, Brown Bench mall.

**e-Resource**

- [https://www.who.int/health-topics/mental-health#tab=tab\\_1](https://www.who.int/health-topics/mental-health#tab=tab_1)
- <https://www.bmj.com/content/374/bmj.n1730>
- <https://www.who.int/news-room/fact-sheets/detail/mental-disorders>
- <https://www.insurinary.ca/most-common-mental-disorders/>
- <https://hbr.org/2022/10/a-guide-to-managing-your-mental-health>

**COURSE OUTCOMES**

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Define mental health according to the WHO classification.	K1
CO-2	Interpret the examination plan to understand how parenting, peer influence, and environmental factors shape the mental health of children.	K2
CO-3	Identify the symptoms and characteristics of Attention Deficit Hyperactivity Disorder (ADHD) and Learning Disabilities.	K3
CO-4	Differentiate between emotional and behavioural problems in children.	K4
CO-5	Analyse the signs and manifestations of depression and schizophrenia in young individuals	K4

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6		
CO 1	3	2	2	2	1	0	<b>High Correlation</b>	<b>: 47%</b>
CO 2	3	2	1	1	1	0	<b>Medium Correlation</b>	<b>: 30%</b>
CO 3	2	3	3	2	2	1	<b>Low Correlation</b>	<b>: 17%</b>
CO 4	3	3	3	3	3	2	<b>No correlation</b>	<b>: 6%</b>
CO 5	3	3	3	3	3	2		

## CAREERS AND ETHICS IN PSYCHOLOGY

UPSF101

Semester : I  
Category : Foundation Course  
Class & Major : I B.Sc. Psychology

Credit : 2  
Hours / Week : 2  
Total Hours : 26

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Demonstrate how an understanding of all of the above components of the subject form part of the discipline's calling to reflective, critical, and ethical practice.
CO-2	Recognize the necessity of ethical behaviour in all aspects of the science and practice of psychology.
CO-3	Analyse the information and technology ethically and responsibly.
CO-4	Correlate high standards of personal integrity with others.
CO-5	Simulate the ability for ethical reflection and an increased ability to apply this kind of thinking to everyday ethical challenges.

### UNIT I – ETHICS IN PSYCHOLOGY

6 Hours

Domains of ethics – academics - research and practice - ethical standards in India and other countries - ethics and the law.

### UNIT II – PROFESSIONAL CODES OF CONDUCT

7 Hours

APA code of conduct - ethics for researchers and professionals in different areas such as counselling, clinical, human resource management, teaching.

### UNIT III – ETHICAL ISSUES

4 Hours

Ethical issues and their management in India - Current UGC guidelines.

### UNIT IV – RCI

5 Hours

Rehabilitation Council of India - Need for appropriate norms in psychological testing - Testing the vulnerable groups.

### UNIT V – PRACTICING SKILLS FOR RESEARCH

4 Hours

Systematic method - communication skills - writing a project - Presentation of findings.

### Text Books

- Coolican, H. (2006). Introduction to research methods in Psychology. Hodder Arnold.
- Gladding, S.T. (2011). Counseling: A comprehensive profession. Pearson.
- Kaplan, M.R., Saccuzzo, D.P (2005). Psychological Testing: Principles, Applications, & Issues. Thomson-Wadsworth.
- Laws, S., Harper, C., Marcus, R. (2003). Research for Development. Vistaar.

## Reference Book

- Miller, S.A. (2013). Developmental Research Methods. Sage
- Bennett, B., et al. (2006). Assessing and managing risk in psychological practice. Rockville, Md:

## e-Resource

- <https://www.apa.org/ethics/code>
- <https://www.indeed.com/career-advice/career-development/professional-code-of-ethics>
- <https://academic.oup.com/edited-volume/28158/chapter/212956051?login=false>
- <http://rehabcouncil.nic.in/>
- <https://www.zippia.com/advice/research-skills/>

## COURSE OUTCOMES

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Memorize ethical considerations specific to counselling, clinical practice, human resource management, and teaching in psychology.	K1
CO-2	Explain the APA Code of Conduct, illustrating its relevance to different areas of psychology.	K2
CO-3	Apply UGC guidelines to make ethical decisions and solve problems encountered in psychological research and practice.	K3
CO-4	Analyse the importance of effective communication skills in presenting research findings.	K4
CO-5	Examine various communication strategies used in presenting research findings.	K4

## CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	1	0	0
CO 2	3	2	2	1	1	0
CO 3	3	2	2	2	2	1
CO 4	3	3	3	3	2	1
CO 5	3	3	3	3	3	2

High Correlation : 40%  
Medium Correlation : 33%  
Low Correlation : 17%  
No correlation : 10%

## INTRODUCTION TO PSYCHOLOGY II UPSM201

Semester : II  
Category : Major Core III  
Class & Major : I B.Sc. Psychology

Credit : 4  
Hours / Week : 5  
Total Hours : 65

## COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Examine the various spectrum of Cognition like problem-solving and Decision making.
CO-2	Understand the way memory works and the stages of memory.
CO-3	Analyse the theories of motivation and its implication on behaviour.
CO-4	Explain what is intelligence and various theoretical approaches to it.
CO-5	Evaluate the underlying concept of personality and how it applies in different settings such as the workplace, in a marriage, in forming friendships, also emphasizes the measurement of and practical applications of personality.

### UNIT I – COGNITION

**14 Hours**

Meaning – Cognitive Psychology- Types of cognition: – Mental Imagery – Concept, Problem-solving- Steps- Barriers to Effective problem solving- Strategies of problem-solving: Algorithms, Heuristic, Decision making – Step, Reasoning – Inductive and Deductive reasoning, Language: Nature - Main Components of Language – Phonemes Morphemes – Syntax - Semantics – Pragmatics.

### UNIT II – MEMORY

**12 Hours**

Definition. Nature of memory (Encoding, storage and retrieval) Memory encoding Attention, levels of Processing, Elaboration, Imagery. Memory storage – Sensory Memory, short –Term memory, Chunking and Rehearsal, working Memory, Long-Term Memory, Explicit Memory, Implicit Memory. Memory Retrieval – Retrieval Cues and retrieval tasks. Forgetting – Encoding Failure; Retrieval Failure; Memory and Study Strategies in encoding, storage and retrieval

### UNIT III – MOTIVATION

**13 Hours**

Meaning, Definition –Motivation Cycle; Types of Motivation-Physiological Motivation – Hunger, Thirst, Psychological Motivation – Achievement, Affiliation, Power; Theories of Motivation – Need Theories – Maslow and ERG, Drive Reduction Theories - Hunger – Sexual Motivation – Aggressive Motivation- Achievement Motivation – Intrinsic Motivation.

### UNIT IV - INTELLIGENCE

**12 Hours**

Definition. Intelligence as a process: Piaget. Structure of intelligence: Approaches of Spearman, Thurstone, Cattell. Triarchic approach. Multiple intelligences. Concept of IQ. Evolution of intelligence testing: Stanford-Binet, Wechsler scales. Extremes of intelligence: Mental retardation and giftedness. Determiners of intelligence: heredity and environment. Emotional intelligence.

### UNIT V – PERSONALITY

**14 Hours**

Definition, Determinants, Approaches – Psychoanalytic – Freud- Structuring Personality, Psychosexual stages of development, defence mechanism. Type approach – Jung's typology, Trait



theory – Allport; Eysenck and BIG Five; Assessment of personality – Objective, Subjective and Projective

### Text Books

- Passer, M.W. & Smith R.E. (2007) *Psychology- The Science of mind and Behavior* (3<sup>rd</sup> ed.) New Delhi: Tata McGraw-Hill Publishing Company Ltd
- Baron, R.A. & Misra, G. (2017) *Psychology Indian Subcontinent Edition* (5<sup>th</sup>ed.) India, U.P.: Pearson India Inc.
- Ciccarelli, S.K., & White, J.N. *Psychology* 5<sup>th</sup>ed. (2018). Adapted Misra, G. Noida: Pearson India Education Services Pvt Ltd
- Hockenbury, D. H. & Hockenbury, S. E. (2003). *Psychology* (3<sup>rd</sup> ed.) New York: Worth Publishers.
- Khatoon, N. (2012) *General Psychology*. Dorling Kindersley (India) Pvt Ltd

### Reference Books

- Morgan, C.T., King, R.A., Weisz, J.R., & Schopler, J. (2007). *Introduction to Psychology*, 7<sup>th</sup> Edition. Singapore: McGraw- Hill.
- Myers, D.G. (2004). *Psychology*. 5<sup>th</sup> Edition, Worth Publishers: New York.

### e-Resource

- Judgment and Decision making (<http://journal.sjdm.org/>)
- <https://courses.lumenlearning.com/boundless-psychology/chapter/introduction-to-memory/>
- <http://ncert.nic.in/ncerts/l/kepy108.pdf>
- <https://pdfs.semanticscholar.org/3da0/efc3e89115d759d7a2ec2a7e399a07cb17f5.pdf>
- [http://wps.ablongman.com/wps/media/objects/1530/1567154/278-316\\_CH08\\_61939.pdf](http://wps.ablongman.com/wps/media/objects/1530/1567154/278-316_CH08_61939.pdf)

### COURSE OUTCOME

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Define the measures involved in different aspects of human behaviour.	K1
CO-2	Explain the importance of experiments in the field of Psychology.	K2
CO-3	Identify the psychological principles to personal and social issues.	K3
CO-4	Examine the role of mental processing in day-to-day life for solving problems.	K4
CO-5	Analyse the psychological concepts in everyday life events	K4

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	1	1	0
CO 2	3	2	2	2	1	1
CO 3	3	3	2	2	2	1
CO 4	3	3	3	3	2	1
CO 5	3	3	3	3	3	2

High Correlation : 43 %  
 Medium Correlation : 34%  
 Low Correlation : 20%  
 No correlation : 3%

**PSYCHOLOGY OF CHILDHOOD**  
**UPSM202**

**Semester : II**  
**Category : Major Core IV**  
**Class & Major : I B.Sc. Psychology**

**Credit : 4**  
**Hours / Week : 5**  
**Total Hours : 65**

**COURSE OBJECTIVES**

<b>CO No.</b>	<b>To enable the students</b>
CO-1	Outline an overview of the human development stages from conception to babyhood.
CO-2	Understand the characteristics of early childhood at physiological domain.
CO-3	Analyse the emotional development of childhood and socialization process.
CO-4	Examine the characteristics of late childhood at physiological domain, challenges of development.
CO-5	Illustrate the various perspectives to explain cognitive and personality development in early childhood.

**UNIT I – HUMAN DEVELOPMENT**

**14 Hours**

Human development, Period of life span, Conception through Birth, Heredity and environment; Birth – Stages, Methods and settings of Child birth; Characteristics of Infancy and Babyhood.

**UNIT II – EARLY CHILDHOOD**

**12 Hours**

Characteristics of early childhood, Developmental tasks, Physical development, Physiological habits, Speech during early childhood.

**UNIT III – EMOTIONS AND SOCIALISATIONS IN EARLY CHILDHOOD**

**13 Hours**

Emotions – Common emotions of early childhood, Variations in emotional pattern; Socialization– Patterns of early socialization, Early forms of behaviour in social situations, Companionship in early childhood, Social and Unsocial behaviour patterns.

**UNIT IV – LATE CHILDHOOD**

**14 Hours**

Characteristics of late childhood, Developmental tasks, Physical development, Interests in later childhood, Sex-role typing in late childhood, Hazards of late childhood, Happiness in late childhood.

**UNIT V – COGNITION AND PERSONALITY IN CHILDHOOD**

**12 Hours**

Cognitive Development – Piaget’s Sensory motor stage, Piaget’s Pre-operational stage, Piaget’s stage of Concrete operations, Information Processing Approach of memory development, Psychometric and Vygotskian Approaches of Intelligence; Personality – Development of Self- concept, Freud’s Phallic stage and Latency stage, Erikson’s Initiative Vs guilt and Industry Vs inferiority.

**Text Books**

- Papalia D. E, Olds S. W.& Feldman R.D. (2004) *Human Development* (9<sup>th</sup>Ed.) Chennai: McGraw-Hill Education (India) Private Limited.

- Santrock J.W. (2011) *Life-Span Development* (13<sup>th</sup> Ed.) New Delhi: Tata McGraw Education Private Limited.
- Santrock J.W. (2013) *Child Development* (13<sup>th</sup> Ed.) New Delhi: Tata McGraw Education Private Limited.
- Hurlock E.B. (2010) *Developmental Psychology: A Life Span Approach*, Tata McGraw, Hill Education Pvt Ltd

### Reference Books

- Berndt, T.J. (1997). *Child development*, Madison, WI: Brown & Benchmark Publishers.
- Smith, Barry D. (1998). *Psychology Science and Understanding* The McGraw-Hill Company.

### e-Resources

- Genes and Environment (<https://genesenvironment.biomedcentral.com/>)
- Developmental psychology commons (<http://network.bepress.com/social-and-behavioral-sciences/psychology/developmental-psychology/>)
- <https://courses.lumenlearning.com/wmopen-psychology/chapter/stages-of-development/>
- <https://www.gracepointwellness.org/461-child-development-parenting-infants-0-2/article/10107-infancy-physical-development>
- <https://www.gracepointwellness.org/461-child-development-parenting-infants-0-2/article/10116-infancy-emotional-social-development-emotional-expression-and-understanding>

### COURSE OUTCOME

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Recall the theoretical viewpoints in relation to Developmental Psychology during counselling.	K1
CO-2	Outline the developmental stage of conception through birth.	K2
CO-3	Identify the symptoms and prognosis of developmental disorders.	K3
CO-4	Distinguish various emotions and socialization patterns of early childhood.	K4
CO-5	Analyse the cognitive and personality development in childhood.	K4

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	1	0	0
CO 2	3	2	2	2	1	0
CO 3	3	3	2	2	2	1
CO 4	3	3	3	3	3	2
CO 5	3	3	3	3	3	2

**High Correlation** : 47%  
**Medium Correlation** : 33%  
**Low Correlation** : 10%  
**No correlation** : 10%

### CROSS CULTURAL PSYCHOLOGY UPSO201

**Semester** : II  
**Category** : Elective  
**Class & Major** : I B.Sc. Psychology

**Credit** : 3  
**Hours / Week** : 4  
**Total Hours** : 52

## COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Highlight the principles, concepts and issues associated with the study of cross-cultural psychology.
CO-2	Identify and explore the diversity associated with different cultures and how culture influences all aspects of human interaction in all situations.
CO-3	Facilitate students understanding of their own cultural heritage and how these cultural perspectives impact on their lives.
CO-4	Examine the role of Culture in various development aspects of human development process and emotionality.
CO-5	Explore gender sensitisation in view of cultural spectrum.

### UNIT I – INTRODUCTION TO CULTURE AND PSYCHOLOGY

11 Hours

Definition of Culture, Origins of Culture, Contents of Culture, Pan cultural Principles Ethics & Emics.

### UNIT II – SOCIALIZATION & ENCULTURATION

11 Hours

Definition, Bronfenbrenner model, Culture & Parenting - Parenting Goals & Beliefs, Baumrind parenting theory, Culture & Peer – Margaret Mead socialization theory, Social and cultural factors that influence math's achievement.

### UNIT III – CULTURE AND DEVELOPMENTAL PROCESS-TEMPERAMENT

10 Hours

Three major categories of temperaments Thomas & Chess, 1977, Goodness of fit - Cross-Cultural research on Temperament; Attachment- Bowlby's (1969) evolutionary theory of attachment, Ainsworth's *Classification* System of Attachment; Moral reasoning- Kohlberg's Theory of Morality, Criticism: Kohlberg's Theory of Morality.

### UNIT IV – CULTURE, LANGUAGE AND COMMUNICATION

10 Hours

Structure of language, Language differences across cultures, Culture, language, and cognition – Sapir- Whorf hypothesis support and Criticisms, Bilingualism and culture, Components of communication – Non-Verbal Communication, Role of culture in the communication process, Intracultural vs. intercultural communication-- Barna's obstacles in communication, Improving intercultural communication.

### UNIT V – CULTURE AND GENDER

10 Hours

Definition of terms, Gender differences- Hofstede's Masculinity vs. Femininity, Cognitive differences, Gender stereotypes, Gender role ideology, Future research.

#### Text Books

- Matsumoto, D., & Juang, L. (2013). *Culture and Psychology* (5<sup>th</sup> Ed.). Belmont, CA: Wadsworth Cengage Learning.

## Reference Books

- Kenneth D. Keith (2019) Cross-Cultural Psychology: Contemporary Themes and Perspectives (2<sup>nd</sup>Ed.) John Wiley & Sons Ltd.
- Segall, M. H., Dasen, P. R., Berry, J. W., &Poortinga, Y. H. (1990). Human behavior in global perspective: An introduction to cross-cultural psychology. Pergamon Press.

## e-Resources

- <https://journals.sagepub.com/home/cap>
- <https://pediaa.com/what-is-the-difference-between-socialization-and-enculturation/>
- <https://www.sciencedirect.com/science/article/abs/pii/S0273229717301077>
- <https://www.britannica.com/topic/language/Language-and-culture>
- <https://academic.oup.com/book/34980/chapter-abstract/298640932?redirectedFrom=fulltext>

## COURSE OUTCOME

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Define key terms related to culture and gender.	K1
CO-2	Explain the impact of culture on human development concepts.	K2
CO-3	Apply cultural psychology to personal and societal issues.	K3
CO-4	Analyse how cultures influence our socialisation process.	K4
CO-5	Demonstrate the role of culture in understanding gender roles.	K4

## CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	1	0	0
CO 2	3	2	2	1	1	0
CO 3	3	2	2	2	2	1
CO 4	3	3	3	2	2	2
CO 5	3	3	3	3	3	2

High Correlation	: 37%
Medium Correlation	: 40%
Low Correlation	: 13%
No correlation	: 10%

## SOCIAL INTERACTIONS AND HUMAN BEHAVIOUR UPSE201

Semester : II  
Category : Non-Major elective  
Class & Major : I UG

Credit : 2  
Hours / Week : 2  
Total Hours : 26

## COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Understand the psychological processes behind human behaviour in a social setting.
CO-2	Explain the psychological aspects of various social phenomena.
CO-3	Implement the social psychology in everyday living.
CO-4	Assist in measuring human behaviours to gain insight.
CO-5	Describe the dynamics of group behaviour in areas of social influence, such as altruism, conformity, obedience, deindividuation, leadership, intergroup relations, and conflict and cooperation.

**UNIT I: SOCIAL INFLUENCE****4 Hours**

Social Norms - Conformity: Asch's research – Compliance - Obedience.

**UNIT II: PROSOCIAL BEHAVIOUR****6 Hours**

Motives for Prosocial Behaviour: Theories – Empathy – Altruism - Negative-state relief - Empathic joy - Competitive altruism - Kin selection theory.

**UNIT III: AGGRESSION****4 Hours**

Determinants and causes of aggression: Social – Cultural - Personal and Situational.

**UNIT IV: GROUPS AND INDIVIDUALS****6 Hours**

Key components/Features of groups - Effects of the presence of others: Social facilitation - Social Loafing - Effects of being in a crowd: Deindividuation.

**UNIT V: SOCIAL PSYCHOLOGY AND LEGAL SYSTEM****6 Hours**

Social Influence and the Legal System - Social cognition and the Legal system: Eyewitness testimony - Influence of Prejudice and Stereotypes on the Legal System.

**Text Books**

- Baron, R. A., Branscombe, N. R., Byrne, D., & Bhardwaj, G. (2010). Social Psychology. Delhi: Pearson
- Baron, R.A. & Branscombe, N.R. (2015). Social Psychology. Delhi: Pearson.
- Baron, R. A. & Byrne, D. (2001). Social Psychology (8th ed). New Delhi: Prentice Hall of India Pvt Ltd.
- Baron, R. A., Branscombe, N. R. (2016). Social Psychology (14th ed.). Boston, MA.

**Reference Book**

- Singh, A. K. (2010). Tests, measurements and Research Methods in Behavioural Sciences. New Delhi: Bharathi Bhawan.
- Singh, A. K. (2015). Social Psychology. Delhi: PHI Learning Private Ltd.

**e-Resources**

- <https://www.simplypsychology.org/a-level-social.html>
- <https://positivepsychology.com/prosocial-behavior/>
- <https://www.verywellhealth.com/aggression-5525859>
- <https://courses.lumenlearning.com/wm-organizationalbehavior/chapter/group-vs-individuals/>
- <https://sociallawstoday.com/social-psychology-and-its-application-in-legal-system/>

**COURSE OUTCOMES**

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Define and interpret the social conditions and their relation with conflicts.	K1
CO-2	Interpret the roots and process of conflict in the global world.	K2

CO-3	Apply cross-cultural psychology principles in education and healthcare, to promote intercultural understanding.	K3
CO-4	Point out the importance of conflict transformation skills in peacebuilding.	K4
CO-5	Compare and contrast real-world issues and their relationship with psychological theories.	K4

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	1	1	1
CO 2	3	2	2	2	1	1
CO 3	3	3	2	2	2	2
CO 4	3	3	3	3	2	2
CO 5	3	3	3	3	3	2

High Correlation : 43%

Medium Correlation : 40%

Low Correlation : 17%

No correlation : 0%

## PSYCHOLOGICAL FIRST AID

UPSD201

Semester : II

Category : Skill Enhancement Course

Class & Major : I B.Sc. Psychology

Credit : 2

Hours / Week : 2

Total Hours : 26

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Establish a human connection in a non-intrusive, compassionate manner.
CO-2	Demonstrate good verbal and non-verbal communication skills, to convey interest and enthusiasm with words and body language.
CO-3	Recognise what accepting PFA entails.
CO-4	Describe what kinds of assistance different types of people may need
CO-5	Describe helpful and unhelpful things to say and do when offering PFA.

### UNIT I – UNDERSTANDING PSYCHOLOGICAL FIRST AID

7 Hours

What is psychological first aid? - What psychological first aid isn't - Who benefits from psychological first aid? - The aim of psychological first aid - Five elements of psychological first aid - Who delivers psychological first aid?

### UNIT II - USING PSYCHOLOGICAL FIRST AID IN THE FIELD

6 Hours

Preparing to provide psychological first aid in the field - Psychological first aid action principles - Important questions and messages to consider when using psychological first aid.

### UNIT III - ADAPTING PSYCHOLOGICAL FIRST AID

5 Hours

For culture - For children and young people - For people with health conditions or physical or mental disabilities.

### UNIT IV - SELF-CARE FOR PEOPLE WORKING IN THE FIELD

3 Hours

**UNIT V - PRACTICING THE ART OF PFA**

**5 Hours**

Rapport and Reflective Listening - Assessment of Needs – Prioritization – Intervention – Disposition.

**Text Books**

- American Psychiatric Association. (1954). Psychological first aid in community disasters. Washington, DC: Author.
- Baker, E. K. (2003). Caring for ourselves as psychologists. *The Register Report*, 28, 7–10
- Dieltjens, T., Moonens, I., Van Praet, K., De Buck, E., & Vandekerckhove, P. (2014). A systematic literature search on psychological first aid: lack of evidence to develop guidelines. *PLoS one*, 9(12), e114714
- Everly, G. S., Jr. (1999). Toward a model of psychological triage. *International Journal of Emergency Mental Health*, 1, 151–154.
- Everly, G. S., Jr., & Lating, J. M. (2013). *A clinical guide to the treatment of the human stress response* (3rd ed.). New York, NY: Springer

**Reference Books**

- Harrison, R. L., & Westwood, M. J. (2009). Preventing vicarious traumatization of mental health therapists: Identifying protective practices. *Psychotherapy Theory, Research, Practice, Training*, 46, 203–219.
- Hill, C. E. (2009). *Helping skills: Facilitating exploration, insight, and action* (3rd ed.). Washington, DC: American Psychological Association.

**e-Resources**

- [apa.org/practice/programs/dmhi/psychological-first-aid](http://apa.org/practice/programs/dmhi/psychological-first-aid)
- <https://www.who.int/publications/i/item/9789241548205>
- <https://www.frontiersin.org/articles/10.3389/fpsy.2021.809679/full>
- <https://www.indeed.com/career-advice/career-development/selfcare-at-work>
- <https://www.press.jhu.edu/books/title/12655/johns-hopkins-guide-psychological-first-aid>

**COURSE OUTCOMES**

<b>CO No.</b>	<b>On completion of the course, the student will be able to</b>	<b>Bloom’s Level</b>
CO-1	Identify the beneficiaries of psychological first aid.	K1
CO-2	Understand the overall aims, agenda and methods of the orientation.	K2
CO-3	Discover the frequent needs of trauma survivors.	K3
CO-4	Examine where PFA can be provided safely.	K4
CO-5	Demonstrate positive regard, respect, and non-judgment.	K4



**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
<b>CO 1</b>	3	2	2	1	1	0
<b>CO 2</b>	3	2	2	1	1	0
<b>CO 3</b>	3	3	2	2	2	2
<b>CO 4</b>	3	3	3	3	2	2
<b>CO 5</b>	3	3	3	3	3	2

**High Correlation : 43 %****Medium Correlation : 37%****Low Correlation : 13%****No correlation : 7%****III AND IV EVALUATION COMPONENTS OF CIA**

Semester	Course Code	Course Title	Component III	Component IV
I	UPSM101	Introduction to Psychology - I	Assignment	Chart Work
I	UPSM102	Biological Psychology	Assignment	Case Study
I	UPSO101	Building Psychological Capital	Group Study	Chart Work
I	UPSE101	Child and Adolescent Mental Health	Assignment	Chart Work
I	UPSF101	Careers and Ethics in Psychology	Assignment	Seminar
II	UPSM201	Introduction to Psychology – II	Group Study	Seminar
II	UPSM202	Psychology of Childhood	Problem Solving	Seminar
II	UPSO201	Cross-cultural Psychology	Assignment	Chart Work
II	UPSE201	Social Interactions and Human Behaviour	Assignment	Seminar
II	UPSD201	Psychology of First Aid	Assignment	Chart Work

## M.Sc. APPLIED PSYCHOLOGY

### PREAMBLE

**PG:** Programme Profile and the Syllabi of Courses Offered in the I & II Semesters along with Evaluation Components III & IV (**With effect from 2023 - 2025 Batch Onwards**).

### PROGRAMME SPECIFIC OUTCOMES

PSO No.	Upon completion of the Programme , the students will be able to
PSO-1	Recall the fundamental core concepts, theories, key terminology, historical milestones and practices within journalism and mass communication.
PSO-2	Understand and interpret media content and diverse perspectives critically.
PSO-3	Apply their skills to connect people, ideas, books, media, and technology, thereby contributing to meaningful and impactful communication.
PSO- 4	Examine professional ethics and responsibilities within the field.
PSO- 5	Determine the skills in assessing and enhancing teamwork and collaboration within diverse media environments.
PSO- 6	Generate original and engaging video materials and life-long learning within the ever-evolving socio-technological landscape.

### PROGRAMME PROFILE M.Sc. Psychology

Semester	Part	Category	Course code	Course Title	Contact Hrs/ week	Credit Min/M ax
I	I	Major Core I / DSC I	PPSM 101	Advanced General Psychology	5	4
		Major Core II / DSC II	PPSM 102	Applied Social Psychology	5	4
		Major Core III / DSC III	PPSM 103	Lifespan Psychology	5	4
		Elective I (DSE)	PPSO 101	Bio-Psychology	5	3
		Elective II (DSE)	PPSO 102	Community Psychology	5	3
	II	Skill Enhancement Course (NME)			3	2
		Online Course	PONL201	NPTEL	2	2
<b>TOTAL</b>					<b>30</b>	<b>22</b>
II	I	Major Core VI / DSC VI	PPSM201	Theories of Personality	5	4
		Major Core VII / DSC VII	PPSM202	Psychological Statistics.	5	4
		Major Core VIII / DSC VIII	PPSR201	Experimental Psychology Practical -I	5	4

		Core Industry Module	PPSM204	Career Guidance and Counselling	4	3
		Elective III (DSE)	PPSO201	Counselling Skills	4	3
		Elective IV (DSE)	PPSO202	Positive Psychology	4	3
	II	Skill Enhancement Course –Discipline specific	PPSD201	Psychology of Social Problems	3	2
		Internship/Industrial training/ field visit	PINS201			2
		Service Learning			-	1
	<b>TOTAL</b>				<b>30</b>	<b>26</b>
III	I	Major Core XI / DSC XI	PPSM301	Psychopathology	5	4
		Major Core XII / DSC XII	PPSM302	Criminal Psychology	5	4
		Major Core XIII / DSC XIII	PPSM303	Research Methodology	5	4
		Core Industry Module	PPSM304	Industrial Psychology	4	3
		Elective V (DSE)	PPSO301	Psychotherapy	4	3
		Elective VI (DSE)	PPSO302	Psychology in Classroom	3	3
	PPSO303		Health Psychology			
II	SEC (Interdisciplinary)	PPSI301	Nutritional Psychology	4	2	
	<b>TOTAL</b>				<b>30</b>	<b>23</b>
IV	I	Major Core XVII / DSC XVII	PPSM 401	Internship Programme	15	11
		Major Core XVIII / DSC XVIII	PPSR401	Experimental Psychology Practical -II	5	4
		Project with Viva Voce	PPSP401	Project	6	4
	II	SEC (Professional Competency)	PPSC401	Professional Competency	4	2
		Internship	PINS401			-/2
	<b>TOTAL</b>				<b>30</b>	<b>21/23</b>
	<b>GRAND TOTAL</b>				<b>120</b>	<b>92/94</b>

### COURSES OFFERED TO OTHER DEPARTMENTS

#### NON-MAJOR ELECTIVE

Semester	Part	Category	Course Code	Course Title	Contact Hour/Week	Credit
						Min/Max
I	IV	SEC I (NME)	PPSE101	Personality Development	3	2

**ADVANCED GENERAL PSYCHOLOGY  
PPSM101**

**Semester : I**  
**Category : Major Core I**  
**Class & Major : I M.Sc. Psychology**

**Credit : 4**  
**Hours / Week : 5**  
**Total Hours : 65**

**COURSE OBJECTIVES**

CO No.	To enable the students
CO-1	Develop an appreciation for human behaviour and mental processes.
CO-2	Understand the recent advancements in General Psychology.
CO-3	Illustrate different research methods in psychology.
CO-4	Analyse various states of consciousness and evaluate the effects of consciousness-altering drugs.
CO-5	Apply psychological principles to solve his/her own adjustment problems.

**UNIT- I BIOLOGICAL BASES OF BEHAVIOUR**

**13 Hours**

Modern Psychology: Definition and its scope - Goals - Schools of Psychology - Methods: Introspection - Observation - Experiment - Case study - Developmental methods - Brief history of psychology - Fields in psychology.

Neurons: Structure - Functions – Neurotransmitters - Nervous system: Major divisions. Brain: Structure and functions - The endocrine system - Heredity and environment in the development of behaviour – Approaches to study Human Behaviour.

**UNIT- II SENSATION AND STATES OF CONSCIOUSNESS**

**13 Hours**

Sensation - Meaning - Stimulus thresholds - Adaptation - Signal detection theory - Sense organs - Vision - Hearing - Touch and other skin senses - Smell and taste - Kinesthesia and Vestibular sense. Perception: Meaning - Factors - Organizing principles - Errors in perception - Extrasensory perception – Attention – Types of Attention – Factors influencing Attention.

State of Consciousness: Biological Rhythms: Tides of life and consciousness experience – Waking State of Consciousness – Stages of Sleep – Sleep Disorders – Hypnosis: Altered State of Consciousness – Consciousness – Altering Drugs: What they are and what they do – Psychoactive Substances.

**UNIT- III LEARNING**

**13 Hours**

Concept of learning - Nature of learning – Classical and Operant Conditioning - Learning curve – Stages of Learning - Types of Learning; Associative learning and Cognitive learning – Transfer of Learning – Motivation – Impact of motivation on learning.

Classical conditioning: Basic experiment and basic terms; Principles of Classical conditioning Acquisition; Forward conditioning - simultaneous conditioning and Backward conditioning - Higher order conditioning – Extinction – Reconditioning - Spontaneous recovery - Generalization and Discrimination - Applications of classical conditioning.

Operant conditioning; Law of effect - Basic experiment of Skinner – Reinforcement – Punishment - Shaping and Chaining - Schedules of reinforcement - Applications of operant conditioning.

Cognitive learning: Sign learning - Latent learning and Cognitive map - Insight learning - Observational learning/ Modelling: Bobo doll experiment and basic processes.

#### **UNIT- IV MEMORY, FORGETTING AND COGNITION**

**13 Hours**

Memory and Forgetting – Human memory – Two influential views – Kinds of information stored in Memory – Types of Memory - STM – LTM – Memory in everyday life – Memory distortion – Improving memory forgetting – Contrasting Views – Nature – Causes. Cognition: Thinking – Forming Concepts and Reasoning to Conclusions – Making Decisions: Choosing among Alternatives – Problem-Solving: Finding Paths to Desired Goals – Language – Nature – Development – Language: The Communication of Information.

#### **UNIT- V INTELLIGENCE AND CREATIVITY**

**13 Hours**

Intelligence: Meaning - The concept of I.Q. theories: Two-factor theory – Multifactor theory - Group factor theory - Guilford's model - Triarchic theory - Intelligence tests: verbal, nonverbal and performance tests – Extremes of intelligence - Meaning - Steps in creative thinking - Characteristics of creative people - Personality: Meaning - Determinants - Types and traits.

#### **Text Books**

- Baron, R.A. (1998) Psychology. Boston: Allyn & Bacon.
- Feldman, R.S. (1996) Understanding Psychology. (4th Ed.,) New York: McGraw Hill.
- Hilgard, E.R. (1999). Introduction to Psychology (6th Ed.), New Delhi: Oxford and IBH Publishing Co, Pvt Ltd.
- Mangal, S.K (1999). General Psychology. New Delhi: Surjeeth Publications.

#### **Reference Books**

- Morgan, C.T., King, R.A., Weisy, J.R. and Scooper, J. (1993). Introduction to Psychology, New Delhi: Tata Mc-Graw Hill Publishing Company.
- Rajamanickam, M. (2000). Modern General Psychology. Agra: Bhargava Book House.

#### **e-Resource**

- Frontiers in Psychology (<https://www.frontiersin.org/journals/psychology>)
- Archives of Scientific Psychology (<https://psycnet.apa.org/PsycARTICLES/journal/arc/6/1>)
- BMC PSYCHOLOGY (<https://bmcpublishing.biomedcentral.com/>)
- <https://www.psywww.com/careers/specialt.html> [www.worthpublishers.com/hockenbury](http://www.worthpublishers.com/hockenbury)
- <https://courses.lumenlearning.com/wsu-sandbox/chapter/gestalt-principles-of-perception/>

#### **COURSE OUTCOMES**

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Relate psychology to other disciplines and fields of study	K1, K2
CO-2	Apply psychological theories to understand various social issues.	K3
CO-3	Distinguish types of academic experience and performance that will facilitate entry into the workforce.	K4
CO-4	Explain how psychological theories and principles relate to everyday life.	K5
CO-5	Develop skills and experiences relevant to their future career.	K6

#### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	1	2	1	2	1
CO 2	3	2	3	2	3	2
CO 3	3	2	2	3	3	1
CO 4	3	2	3	2	3	2
CO 5	3	3	3	3	3	3

**High Correlation**                      **53%**

**Medium Correlation**                      **33%**

**Low Correlation**                              **14%**

**No Correlation**                                **0**

### APPLIED SOCIAL PSYCHOLOGY PPSM102

**Semester**                      : **I**  
**Category**                      : **Major Core II**  
**Class & Major** : **I M.Sc. Psychology**

**Credit**                              : **4**  
**Hours / Week**                      : **5**  
**Total Hours**                      : **65**

#### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Develop the conceptual knowledge of social psychology, its history, scope, and methods.
CO-2	Understand the cognitions, emotions, and actions of oneself and others in the social and cultural context.
CO-3	Explain the causes of self and others' behaviours and sources of bias in evaluating such behaviours.
CO-4	Analyse the comprehension of the social phenomena involving self and others by underscoring the role of cultural differences.
CO-5	Conduct basic experiments by applying the various research methods in social psychology.

#### UNIT- I THE FIELD OF PSYCHOLOGY

**13 Hours**

Social Psychology: A working definition. Focuses on the behaviour of the individuals - Social Psychology: A capsule Memory: Early years, its youth, 1970's, and 1980's 1990's and beyond - Research Methods in Social Psychology: The Experimental Method, Correlational Method, Social Psychological and perennial skeptics: The importance of replication and multiple methods in social research, Role of Theory in Social Psychology -The Quest for knowledge and the rights of individuals.

## **UNIT- II SOCIAL PERCEPTION**

**13 Hours**

Social Perception - Non-verbal communication: The basic channels, Non-verbal behaviours and social interaction: Self-Presentation and the detection of Deception Attribution Theories of Attribution: Jones and Davis theory - Kelley's theory of casual attribution - Attribution: Some basic facts and impression formation: Some basic facts and impression Management.

## **UNIT- III ATTITUDES**

**13 Hours**

Attitudes – Formation of attitudes: Social learning direct experience and genetic factors - Attitudes and Behaviour: The essential link attitude specify - Attitude components - Attitude strength - Vested interest and the role of self-awareness - Attitude accessibility - Persuasion: The Traditional and cognitive approach - Reciprocity of persuasion - When attitude change fails reactance -Forewarning and selective avoidance - Cognitive Dissonance: Dissonance and attitudinal change - Dissonance and the less - lead - to more effect -Dissonance - Origin of Dissonance.

## **UNIT-IV PREJUDICE AND DISCRIMINATION**

**13 Hours**

Prejudice and Discrimination - The origins of Prejudice: Direct intergroup for Prejudice - Ultimate attribution error - Early experience - Cognitive sources of Prejudice - Challenging prejudice: On learning not to hate - Direct Intergroup contact - Recategorization and its nature and effect: Gender stereotypes – Discrimination against females and sexual harassment – Aggression – Outcome of Aggression.

Pro-social behaviour - Responding to an Emergency: Behaviour of bystanders - Bystander apathy versus diffusion of responsibility - Five necessary cognitive steps -Internal and External factors that influence altruistic behaviour - Explanations of Pro-social behaviour: Empathy - Altruism theory - Egoistic theory – Empathic joy and Genetic selfishness.

## **UNIT- V GROUPS AND INDIVIDUAL**

**13 Hours**

Groups: Mob: Crowd: their nature and function - Group formation and how groups function - Groups and task performance social facilitation - Group versus individuals - Social loafing - Social facilitation and social loafing - Decision making by groups: The decision-making process - Nature of group decisions - Some potential pitfalls - Leadership: Its nature and impact in groups – Leadership characteristics and types.

### **Text Books**

- Robert, A. Baron., and Donn Byrne. (1995) Social Psychology: Understanding Human Interaction (7th Ed.); New Delhi: Prentice Hall of India Private Limited.
- Robert, S. Feldman. (1995) Social Psychology; Englewood Cliffs, New Jersey: Prentice Hall.

### **Reference Books**

- David, O. Sears Anne Peplan, Jones than L. Freeman and Shelly, E. Taylor. (1998) Social Psychology (6<sup>th</sup> Ed.). New Jersey: Englewood Cliffs.
- Kuppusamy, B. (1982.) An introduction to social psychology, (2<sup>nd</sup> Ed.), Bombay: Lily Jayasing publishers pvt.ltd.

### e-Resources

- <http://www.personalityresearch.org/attachment.html>
- <http://www.thelifeyoucansave.com/>
- <http://sparq.stanford.edu/>
- <https://www.apa.org/education-career/guide/subfields/social>

### COURSE OUTCOMES

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Describe the scientific methods used in obtain knowledge about social behavior.	K1, k2
CO-2	Explain how various social factors influence human behavior.	K3
CO-3	Analyze contemporary events using social psychological theories.	K4
CO-4	Deduct the outcomes of various social situations.	K5
CO-5	Adapt and communicate effectively with people from diverse backgrounds.	K6

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	1	2	1
CO 2	3	3	3	1	2	1
CO 3	3	2	3	2	3	2
CO 4	3	2	3	2	3	3
CO 5	3	3	3	2	2	3

**High Correlation**      50%  
**Medium Correlation**    37%  
**Low Correlation**        13%  
**No Correlation**         0

### LIFESPAN PSYCHOLOGY PPSM103

**Semester**        : I  
**Category**        : Major Core III  
**Class & Major** : I M.Sc. Psychology

**Credit**            : 4  
**Hours / Week**   : 5  
**Total Hours**    : 65

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Define human development and identify the stages of human development.
CO-2	Estimating principles and pattern of maturation and Individuals differences.
CO-3	Examining steps involved in physical, intellectual, and social development.



CO-4	Analysing various aspects of speech, emotions and play.
CO-5	Evaluate each person's development stages and the pros and cons related to development.

### **UNIT- I HUMAN DEVELOPMENT**

**13 Hours**

Human Development: An Introduction – Early Approaches – Human development today – Influences on Development – Timing of Influences – Theoretical Perspectives – Conceiving new life – Heredity and Environment – Prenatal Development - The Birth Process.

### **UNIT- II INFANCY, TODDLERHOOD & EARLY CHILDHOOD**

**13 Hours**

New-born baby – Survival health and hazards – Early Physical development – Cognitive development – Motor Development – Emotional Development - Classic approaches – Newer approaches – Language development – Foundations of Psychosocial development – Developmental issues in infancy and Toddlerhood – Contact with other children – Children of working parents.

#### **Early Childhood**

Aspects of Physical development – Motor skills – Health, safety and challenges – Cognitive development – Language and other cognitive abilities – Early childhood education – Psychosocial development in early childhood – Developing self – Play parenting – Relationship with other children.

### **UNIT- III MIDDLE CHILDHOOD AND ADOLESCENCE**

**13 Hours**

#### **Middle Childhood**

Aspects of physical development – Health and safety – Cognitive development – Piagetian approach – Language and literacy – Child in school – Psychosocial development Child in the family – Child in peer-group – Mental health.

#### **Adolescence**

Physical Development – Physical and Mental Health – Nutrition and Eating Disorders – Use and Abuse of Drugs – Depression – Cognitive Development – Aspects of Cognitive Maturation – Moral Reasoning: Kohlberg's theory – Educational and Vocational Issues – Psychosocial Development in Adolescence.

### **UNIT – IV YOUNG ADULTHOOD AND MIDDLE ADULTHOOD**

**13 Hours**

#### **Young Adulthood**

Physical Development – Health, safety and Challenges – Cognitive Development – Moral Development – Education and Work – Psychosocial Development – Marital and Nonmarital Lifestyles.

#### **Middle Adulthood**

Physical Development and challenges – Health – Cognitive Development – Creativity – Psychosocial Development – Self at Midlife – Divorce – Friendship.

## UNIT – V LATE ADULTHOOD AND GERONTOLOGY

13 Hours

Longevity and Ageing – Physical changes – Physical and Mental Health – Cognitive Development – Psychosocial Development – Lifestyle and Social issues – Consensual relationship.

Dealing with Death and Bereavement – Special Losses – Medical, Legal and Ethical Issues: The rights to Die - Finding Meaning and Purpose in Life and Death.

### Text Books

- Papalia, D.E & Olds, S.D(2004). Human Development (9th Edition). New Delhi: Tata McGraw Hill Publishing Co. Ltd.
- Hurlock, E.B. (1976) Child Development (4th Edn.). New Delhi: Tata McGraw Hill Co. Ltd.,

### Reference Books

- Ambron & Brodzinsky, Life Span Human Development New York: Holt Rinhart Winston.
- Schiamberg, L.B. (1984). Human Development (2nd Edn. New York: Macmillan publishing Co.,

### e-Resource

- <https://www.apa.org/ed/precollege/topss/lessons/life-development.pdf>
- <https://study.com/learn/lesson/exploring-life-span-development-multidirectional-psychology.html>
- <https://www.mpib-berlin.mpg.de/research/research-centers/lifespan-psychology>
- <https://pressbooks-dev.oer.hawaii.edu/psychology/chapter/lifespan-theories/>

## COURSE OUTCOMES

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Realize the components of human development (Psychical, intellectual and social).	K1
CO-2	Understand human development from conception to childhood	K2
CO-3	Explain the biological foundations behind the developments.	K3
CO-4	Identify defects in the development of others and of his own.	K4
CO-5	Assessing major categories of mental illness found in children.	K5

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	1	2	3	2
CO 2	3	3	2	1	3	2
CO 3	3	3	0	2	3	2
CO 4	3	2	0	2	3	2
CO 5	3	3	2	3	2	3

<b>High Correlation</b>	<b>50%</b>
<b>Medium Correlation</b>	<b>36%</b>
<b>Low Correlation</b>	<b>7%</b>
<b>No Correlation</b>	<b>7%</b>

**BIO PSYCHOLOGY  
PPSO101**

**Semester : I**  
**Category : Elective I**  
**Class & Major : I M.Sc. Psychology**

**Credit : 3**  
**Hours / Week : 5**  
**Total Hours : 65**

**COURSE OBJECTIVES**

CO No.	To enable the students
CO-1	Describe the developmental perspective and its relationship to development.
CO-2	Identify how hereditary and environmental factors influence development.
CO-3	Analyse critical current issues within the field and their impact on the developing child.
CO-4	Explain the key concepts of the scientific method to research in child development.
CO-5	Choose the appropriate interaction technique with children by using developmental principles.

**UNIT- I BRAIN BEHAVIOUR DYNAMICS****13 Hours**

Bio Psychology - Nature and Scope – Biological Roots – Principles of the evolution of human behaviour – Reflexes, Instinct; Environmental influences on behaviour.

**UNIT- II BEHAVIOUR GENETICS****13 Hours**

Behaviour Genetics: Nature and scope – Methods of study and research techniques – Chromosomal functions Hereditary determinants of behaviour – Chromosomal and Genetic Abnormalities – Eugenics – Genetic Engineering.

**UNIT- III NERVOUS SYSTEM AND ENDOCRINE SYSTEM****13 Hours**

Neurons – Structure, types and functions of neurons – synaptic conduction – Neuronal conduction – Communication between neurons – Synaptic conduction – Neurotransmitters – Categories and functions – Nervous system – Structure and functions, Divisions - Methods of studying the brain - Endocrine system – Neurological and Endocrine Disorders – Neuropsychological Assessment.

**UNIT-IV BIOLOGICAL ORIGINS OF SLEEP, EMOTIONS AND REPRODUCTIVE BEHAVIOUR****13 Hours**

Sleep – Nature and functions of sleep – Physiological Mechanism of sleep and walking – Disorders of Sleep – Biological Rhythm – Emotions: Hormonal and Neural Basis of emotion – Anormal

Behaviour – Types – OCD - Aggressive Behaviour – Reproductive Behaviours – Hormonal and Neuronal Control of Sexual Behaviours – Parental Behaviour.

## UNIT- V PSYCHOPHARMACOLOGY

13 Hours

Basic Principles of Psychopharmacology – Classification of Psychotropic Medications: Antipsychotic – Antidepressants – Anxiolytics and sedatives – Mood Stabilizers – Stimulants, Sedatives / Hypnotics – Miscellaneous Drugs – Adverse Effects of Psychotropic Medication – Side effects – Orthostatic Hypotension – Liver/Kidney dysfunction – Ethical issues in Psychopharmacology.

### Text Books

- Neil. R. Carlson (2005) *Foundations of Physiological Psychology*, (6<sup>th</sup> Ed.,). Pearson
- David. M. Buss (2005). *The Handbook of Evolutionary Psychology*. John Wiley and Sons.
- Carlson, N.R. (2012). *Physiology of Behaviour*. Allen and Bacon. (11<sup>th</sup> Ed.). London.

### Reference Books

- Carlson, N.R. (2009). *Foundations of Physiological Psychology*. Pearson Education. (6<sup>th</sup> Ed.) New Delhi.
- Pinel. J. Barnes. S. (2016) *Introduction to Biopsychology*, (9<sup>th</sup> Ed.,). Pearson.

### e-Resource

- <https://www.verywellmind.com/what-is-biopsychology-2794883>
- <https://assignment.ignouservice.in/2022/02/nature-of-biopsychology.html>
- <https://opentextbc.ca/introductiontopsychology/chapter/2-1-biological-psychology-structuralism-and-functionalism/>
- <https://www.britannica.com/science/biological-psychology>

## COURSE OUTCOMES

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	State the most essential fundamental Physiological Events.	K1,k2
CO-2	Identify and describe the parts and functions of the brain	K3
CO-3	Examine the role of the nervous system and endocrine systems	K4
CO-4	Explain the process of involved in sensory systems.	K5
CO-5	Elaborate how nature, nurture, and epigenetics influence personality and behavior	K6

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	0	2	3	1
CO 2	3	3	0	2	3	2
CO 3	3	3	1	1	3	1
CO 4	3	3	0	1	3	2
CO 5	3	3	2	2	3	1

High Correlation            50%  
 Medium Correlation        20%  
 Low Correlation            20%  
 No Correlation              10%

**COMMUNITY PSYCHOLOGY**  
**PPSO102**

**Semester : I**  
**Category : Elective II**  
**Class & Major : I M.Sc. Psychology**

**Credit : 3**  
**Hours / Week : 5**  
**Total Hours : 65**

**COURSE OBJECTIVES**

<b>CO No.</b>	<b>To enable the students</b>
CO-1	Defining theoretical concepts of community psychology and the importance of the subject in the present context, parameters for measuring the quality of life and strength of empowerment.
CO-2	Understand the social issue and the types of responses psychologists often engage in and consider alternatives to address this issue
CO-3	Examining the social determinants of health and the types of responses psychologists often engage in and consider alternatives to address this issue.
CO-4	Analysing the role of community psychologist at the grass-root level in addressing issues of students, disadvantaged children, and aged people
CO-5	Assessing the community's perception of mental health and issues and challenges faced by people with HIV/AIDS.

**UNIT- I PERSPECTIVES OF COMMUNITY PSYCHOLOGY**

**13 Hours**

Definition and perspectives of Community Psychology with reference to Mental Health - Organizational health and social action; individual wellness - Quality of life and parameters to measure the quality of life - Sense of community - Psychological sense of community - Social Justice - Participatory approach – Empowerment - Citizen participation - Collaborative community strength - Human diversity and empirical grounding; primary, secondary and tertiary prevention.

**UNIT- II INTRODUCTION ON SCHOOL INTERVENTIONS**

**13 Hours**

Challenges faced by the students - Academic stress, Anxiety related to examination, Depression - Adjustment of the students - Dependence of students on substances - Institutional disciplinary measures and their impact - Safety measures in the schools - Motivating students; life skill education for students - Parents and community involvement in school development and functioning - Intervention program for parents and teachers for creating student friendly environment - National Education Policy; Integrated school-based intervention program for addressing students' mental health – Self Efficacy – Altruism.

**UNIT- III DEFINITION AND BACKGROUND OF VULNERABLE CHILDREN**

**13 Hours**

The Living condition of street/orphan children, slum children - Children in conflict with the law and children of commercial sex workers - Child abuse, trafficking, and prostitution - Problems encountered by the vulnerable children - Child rights; prevention, the role of Psychologists and Social workers and other professionals in intervention and rehabilitation of vulnerable children - Steps for

effective implementation of intervention program - Social Defence Measures - Government policies for Vulnerable Children.

#### **UNIT-IV PROBLEMS FACED BY THE ELDERLY PEOPLE IN THE FAMILY 13 Hours**

Role of age in the family - Domestic violence & abuse, causes and consequences amongst elderly Dementia – Alzheimer’s Disease - Illness and palliative care - Family-based intervention programs - Social support, maladjustment and role conflict - Support services for the family and elderly people - Perception about support services - Positive aging; institutional, community and palliative care - National Policy for Protection of Rights of Aged People.

#### **UNIT- V COMMUNITY PSYCHOLOGY IN THE SERVICE OF HIV/AIDS & PANDEMIC SITUATION 13 Hours**

Definition of HIV/AIDS, and basic information - Need and importance of HIV/AIDS counselling - Qualities of a Counsellor - Micro-skills in counselling - Objectives of pre and post-test counselling - Psycho-social impact of the disease – Stigma attached to the disease - Prevention, intervention and rehabilitation - Skill development training; National AIDS Control – Role of NGO – Community Based Rehabilitation – Government Policies and Amendments.

#### **Text Books**

- Barrera, M. (2000). *Social Support Research in Community Psychology. In Handbook of Community Psychology* (pp. 215-245). Springer, Boston, MA.
- Deb, Sibnath, et al. (2019). *Childhood to Adolescence: Issues and Concerns*, New Delhi, PEARSON.
- Deb, Sibnath (2018). *Positive Schooling and Child Development: International Perspectives*. Singapore, Springer Nature.

#### **Reference Books**

- Orford, J. (2008). *Community Psychology: Challenges, Controversies and Emerging Consensus*. John Wiley & Sons.
- Reich, S., Riemer, M., Prilleltensky, I., & Montero, M. (2007). *International community Psychology*. New York: Springer Science Business Media, LLC.

#### **e-Resource**

- <https://www.communitypsychology.com/what-is-community-psychology/>
- <https://compact.org/resources/community-psychology>
- <https://www.britannica.com/science/community-psychology>
- [https://www.apa.org/pubs/books/supplemental/Community-Psychology-Fourth-Edition/Chapter\\_Summaries.pdf](https://www.apa.org/pubs/books/supplemental/Community-Psychology-Fourth-Edition/Chapter_Summaries.pdf)

#### **COURSE OUTCOMES**

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Define and explain the core values of community psychology.	K1,K2
CO-2	Appraise the role of human development and family structure on Mental Health	K3
CO-3	Critically examine the socio-economic factors and their impact on development.	K4
CO-4	Analyse and evaluate various socio-cultural psychological models and behaviors.	K5
CO-5	Develop preventive measures and design promotion programs for better community development	K6

#### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	2	1	3	2
CO 2	3	3	3	1	3	1
CO 3	3	3	3	2	3	2
CO 4	3	3	3	3	2	2
CO 5	3	3	3	3	3	3

<b>High Correlation</b>	<b>67%</b>
<b>Medium Correlation</b>	<b>23%</b>
<b>Low Correlation</b>	<b>10%</b>
<b>No Correlation</b>	<b>0%</b>

#### PERSONALITY DEVELOPMENT PPSE101

**Semester : I**  
**Category : Non-Major Elective**  
**Class & Major: I M.Sc. Psychology**

**Credit : 2**  
**Hours / Week : 3**  
**Total Hours : 39**

#### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Interpreting ways to manage the self
CO-2	Understand the various concepts under self-knowledge
CO-3	Discover the art of learning and writing guidelines
CO-4	Develop the various skills in leadership
CO-5	Create insight into learning the development process

#### UNIT I INTRODUCTION TO PERSONALITY

**8 Hours**

The concept of personality - Dimensions of personality – Theories of Freud & Erickson- Significance of personality development. The concept of success and failure: What is success? - Hurdles in achieving success - Overcoming hurdles - Factors responsible for the success – What is failure - Causes of failure -Fear of Failure – Fear of Success - SWOT analysis.

**UNIT – II ATTITUDE & MOTIVATION****8 Hours**

Attitude - Concept - Significance - Factors affecting attitudes - Positive attitude – Advantages – Negative attitude- Disadvantages - Ways to develop positive attitude - Differences between personalities having a positive and negative attitude. Concept of motivation - Significance – Internal and external motives - Importance of self-motivation - Factors leading to de-motivation.

**UNIT – III SELF ESTEEM****8 Hours**

Term self-esteem - Symptoms - Advantages - Do's and Don'ts to develop positive self-esteem – Low self-esteem - Symptoms - Personality having low self-esteem - Positive and negative self-esteem. Interpersonal Relationships – Defining the difference between aggressive, submissive and assertive behaviours - Lateral thinking.

**UNIT - IV OTHER ASPECTS OF PERSONALITY DEVELOPMENT****8 Hours**

Body language - Problem-solving - Conflict and Stress Management - Decision-making skills - Leadership and qualities of a successful leader – Character building -Team-work – Time management - Work ethics –Good manners and etiquette

**UNIT – V EMPLOYABILITY QUOTIENT****7 Hours**

Resume building- The art of participating in Group Discussion – Facing the Personal (HR & Technical) Interview – Interview Techniques - Frequently Asked Questions - Psychometric Analysis - Mock Interview Sessions – Iceberg Games – Team Building.

**Text Books**

- Hurlock, E.B (2006). Personality Development, 28th Reprint. New Delhi: Tata McGraw Hill.
- Stephen P. Robbins and Timothy A. Judge (2014), Organizational Behavior 16th Edition: Prentice Hall.

**Reference Books**

- Andrews, Sudhir. How to Succeed at Interviews. 21st (rep.) New Delhi. Tata McGraw-Hill 1988.
- Heller, Robert. Effective leadership. Essential Manager series. Dk Publishing, 2002

**e-Resource**

- <https://www.artofliving.org/in-en/lifestyle/tips/personality-development>
- <https://www.managementstudyguide.com/personality-development.htm>
- <https://www.griet.ac.in/cls/Personality%20Development.pdf>
- <https://www.britannica.com/topic/personality>

**COURSE OUTCOMES**

<b>CO No.</b>	<b>On completion of the course, the student will be able to</b>	<b>Bloom's Level</b>
CO-1	Relate Personality theories in their professional development.	K1, k2
CO-2	Develop team-building and time-management skills.	K3
CO-3	Analyze the importance of etiquette in the profession.	K4



CO-4	Consciously overcome their limitations and move towards self-esteem	K5
CO-5	Develop and exhibit an accurate sense of self.	K6

#### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	1	3	1	3	1
CO 2	3	0	3	2	3	3
CO 3	2	0	3	1	3	1
CO 4	2	1	3	2	3	3
CO 5	3	1	3	2	2	1

<b>High Correlation</b>	<b>47%</b>
<b>Medium Correlation</b>	<b>20%</b>
<b>Low Correlation</b>	<b>27%</b>
<b>No Correlation</b>	<b>6%</b>

### THEORIES OF PERSONALITY PPSM201

Semester : II  
Category : Major Core VI  
Class & Major : I M.Sc. Psychology

Credit : 4  
Hours / Week : 5  
Total Hours : 65

#### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Learn about personality and its various theories
CO-2	Understand the personality theories of Horney, Fromm and Erikson
CO-3	Gain exposure on trait perspectives of personality by Allport, Cattell and Eysenck
CO-4	Explain the cognitive, humanistic and existential perspectives of personality
CO-5	Know the behaviouristic and social perspectives of personality proposed by Skinner, Rotter and Bandura.

#### UNIT- I PERSONALITY AND SCIENTIFIC OUTLOOK 15 Hours

Definition of personality - The scientific orientation - Theory and research methodology. Psychoanalytic and Neo analytic Perspectives Concepts and principles - Personality development - Assessment techniques in Freud's Psychoanalytic Theory in Jung's Analytical Psychology in Adler's Individual Psychology – Type and Trait Approach – Personality Determinants.

#### UNIT- II CONCEPTS AND PRINCIPLES 11 Hours

Personality development -Assessment techniques. in Horney's Social and Cultural Psychoanalysis in Fromm's Humanistic Psychoanalysis in Erikson's Psychoanalytic Ego Psychology

#### UNIT- III TRAIT PERSPECTIVES 11 Hours

Concept and principles - Personality development - Assessment techniques. In Allport's Trait Theory - Cattell's Structure-Based Systems Theory in Eysenck's Biological Typology

#### UNIT-IV COGNITIVE - HUMANISTIC - EXISTENTIAL PERSPECTIVES 14 Hours

Concepts and principles - Personality development -Assessment techniques- in Kelly's Theory of Personal Constructs- in Maslow's Self- Actualization Position- in Roger's Person-centered Theory- in May's Existential Analytic Position.

## UNIT- V SOCIAL BEHAVIOURISTIC PERSPECTIVES

14 Hours

Concepts and principles - Personality development -Assessment techniques in Skinner's Operant Analysis in Rotter's Expectancy Reinforcement Value Model. in Bandura's Social Cognitive Theory The future of Personality psychology.

### Text Books

- Ryckman, Richard, M. (1989) Theories of Personality (4th Edn).California : Brooks / Cole Publishing Company.
- Hall, C.S., and Linzey, G. (1978) Theories of Personality (3rd Edn). New Delhi: Wiley Eastern Limited,

### Reference books

- Kurt Lewin, Adams, D.K., and Zener, K.E. A (1935) Dynamic Theory of Personality. New York : McGraw - Hill Book Company, Inc. 30
- Blum, G.S. (1956) Psychoanalytic Theories of Personality. New York : McGraw - Hill Book Company, Inc.

### e-Resource

- <https://psychcentral.com/health/personality-theories-in-psychology>
- <https://www.prospectivedoctor.com/personality/>
- <https://www.iedunote.com/theories-of-personality>
- <https://www.britannica.com/topic/personality>

## COURSE OUTCOMES

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Compare the strengths and weaknesses of basic research methods in personality.	K1, K2
CO-2	Apply course concepts to their understanding of real-life situations.	K3
CO-3	Analyze the fundamental concepts of major personality theories.	K4
CO-4	Explain various methods of assessment of personality	K5
CO-5	Develop skills to observe the personality characteristics of others	K6

## CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	1	0	2	1
CO 2	2	3	1	2	2	1
CO 3	3	2	2	3	3	1
CO 4	3	3	1	3	3	3
CO 5	3	3	2	3	3	3

High Correlation 50%

Medium Correlation 27%

Low Correlation 20%

No Correlation 3%

**PSYCHOLOGICAL STATISTICS**  
**PPSM202**

**Semester : II**  
**Category : Major Core VII**  
**Class & Major : I M.Sc. Psychology**

**Credit : 4**  
**Hours / Week : 5**  
**Total Hours : 65**

**COURSE OBJECTIVES**

<b>CO No.</b>	<b>To enable the students</b>
CO-1	Highlight the application of Statistics within Psychology.
CO-2	Interpreting statistical analyses commonly used in Psychology and other social sciences.
CO-3	Demonstrate proficiency in statistical techniques.
CO-4	Explain categorization and presentation of data; graphical representation used to communicate data
CO-5	Explore and get introduced to the various statistical tools (parametric and non-parametric) used for analysis.

**UNIT- I PSYCHOLOGICAL ASSESSMENT: AN OVERVIEW**

**15 Hours**

Introduction – Psychological Assessment – History of Assessment – Theory and Assessment - Measurement and Evaluation – Theory of measurement – Scales of Measurement – Functions of Measurement – Measurement, Assessment and Evaluation – Tests and Assessment – the use of tests

**UNIT- II STATISTICAL METHODS IN TESTING**

**11 Hours**

Frequency distributions and Graphs: Steps – Exact limits and mid-points of the class intervals – Graphical representation of Data: Different types of graphs – Issues to consider when preparing a graph. Measures of Central Tendency: The Mean, Median and Mode – Measures of Variability: The Range, Quartile Deviation, Average Deviation and Standard Deviation.

**UNIT- III FINDING POINTS WITHIN DISTRIBUTIONS**

**11 Hours**

Normal probability curve: Characteristics – Applications – Skewness and kurtosis. Percentile Ranks – Calculation of Percentiles. Standard Scores and Distributions: z score – Standard Normal Distribution – Percentile and Z scores – Mc Calls T – Quartiles and Deciles – Sten – Stanine scores.

**UNIT-IV BIVARIATE ANALYSIS**

**14 Hours**

Correlation: Meaning – Concept of Correlation – Pearson’s Product moment correlation – Rank order correlation – Test of Significance: ‘t’ Test – Calculation and interpretations – The ‘t’ ratio and its assumptions – Chi Square test.

**UNIT- V OTHER STATISTICAL METHODS**

**14 Hours**

Analysis of Variance (ANOVA): Meaning – logic – example for one-way ANOVA – interpretation – Assumptions of the ANOVA. Regression and Prediction- An overview of non-Parametric statistics.

### Text Books

- Garret, H.E. and Woodworth, R.S. (2000). Statistics in Psychology and Education. Bombay: Vakils, Feffer and Simons Pvt ltd.
- Singh, A.K. (2006). Tests, Measurements and Research Methods in Behavioural Sciences. Patna: Bharati Bhavan Publishers.
- Chadha, N.K. (2006). Theory and Practice of Psychometry. New Delhi: New Age International Ltd.

### Reference Books

- Ruyon, R.P, Haber, A, Pittenger, D.J and Coleman, K.A. (2010). Fundamentals of Behavioural Statistics. New York: McGraw Hill.
- Kerlinger, N. (1996). Foundations of behavioral research. India: Prentice Hall.

### e-Resource

- <https://irl.umsl.edu/cgi/viewcontent.cgi?article=1000&context=oer>
- [https://stats.libretexts.org/Bookshelves/Applied\\_Statistics/An\\_Introduction\\_to\\_Psychological\\_Statistics\\_\(Foster\\_et\\_al.\)](https://stats.libretexts.org/Bookshelves/Applied_Statistics/An_Introduction_to_Psychological_Statistics_(Foster_et_al.))
- <https://www.verywellmind.com/why-are-statistics-necessary-in-psychology-2795146>
- <https://dictionary.apa.org/psychological-statistics>

### COURSE OUTCOMES

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Outline the application of appropriate statistical analysis in psychological research	K1,K2
CO-2	Select appropriate scales and how to measure them precisely.	K3
CO-3	Analyze the processes of describing and reporting statistical data.	K4
CO-4	Evaluate the methods of hypothesis testing by using appropriate statistical analysis	K5
CO-5	Create qualitative and quantitative research designs.	K6

**CO – PSO MAPPING**

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	0	1	3	3	3
CO 2	3	1	0	3	3	3
CO 3	3	1	1	2	3	3
CO 4	3	0	2	3	3	3
CO 5	3	0	3	3	3	3

<b>High Correlation</b>	<b>67%</b>
<b>Medium Correlation</b>	<b>7%</b>
<b>Low Correlation</b>	<b>13%</b>
<b>No Correlation</b>	<b>13%</b>

**EXPERIMENTAL PSYCHOLOGY PRACTICAL – I  
PPSM203**

**Semester : II**  
**Category : Major Core VIII**  
**Class & Major : I M.Sc. Psychology**

**Credit : 4**  
**Hours / Week : 5**  
**Total Hours : 65**

**COURSE OBJECTIVES**

CO No.	To enable the students
CO-1	Gain exposure to methods of testing the psychological principles
CO-2	Learn the methods of giving instruction to the subjects
CO-3	Understand the method of conducting the experiment and collecting data
CO-4	Interpret the uses of suitable statistical tools and interpret them
CO-5	Assess and interpret various intelligence tests and various ability test

**UNIT- I LEARNING / CREATIVITY****13 Hours**

Transfer of Training - Habit Interference - Concept Formation – Passi Test of Creativity –  
Mirror Drawing Test

**UNIT- II EMOTION / ADJUSTMENT AND ATTENTION****13 Hours**

Adjustment Inventory for College Students - Emotional Intelligence – Tachistoscope – Muller  
Lyre Illusion.

**UNIT –II MEMORY / INTELLIGENCE****13 Hours**

Immediate Memory Span- PGI Memory Scale – Bhatia’ s Battery

**UNIT-IV APTITUDE AND PERSONALITY****13 Hours**

Test of Verbal & Nonverbal reasoning– 16 Personality Factor – Big Five Personality.

**UNIT- V POSITIVE ATTITUDE / STRESS****13 Hours**

Test of personal values - Mental Health – State & Trait Anxiety - Beck’s Depression Inventory  
– Hamilton Anxiety Scale.

### Reference books

- Anne Anastasi, Susana Urbina “Psychological Testing” 7th Edition pearson Publication, 2016.
- Rajamani.M. Experimental Psychology with Advanced Experiments, Concept Publishing Company New Delhi, 2005.
- Woodworth.R.S& Schlosberg. H Experimental Biology. NewYorkMethenand Co. Ltd, 1965.

### e-Resource

- <https://www.britannica.com/science/experimental-psychology>
- <https://www.verywellmind.com/what-is-experimental-psychology-2795784>
- <https://online.csp.edu/resources/article/what-is-experimental-psychology/>

### COURSE OUTCOME

CO No.	On completion of the course, the student will be able to	Bloom’s Level
CO-1	Define psychological principles through tests and experiments.	K1, k2
CO-2	Build appropriate instruction manual for the subjects for conducting the test	K3
CO-3	Infer the data obtained and write a report.	K4
CO-4	Evaluate the differences among various intelligence and ability tests.	K5
CO-5	Improve knowledge and skills to prepare and present the report	K6

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6		
CO 1	3	1	1	3	3	1	<b>High Correlation</b> <b>60%</b> <b>Medium Correlation</b> <b>13%</b> <b>Low Correlation</b> <b>17%</b> <b>No Correlation</b> <b>10%</b>	
CO 2	3	2	0	3	3	2		
CO 3	3	1	0	3	3	3		
CO 4	3	0	1	3	3	2		
CO 5	3	3	2	3	3	3		

### CAREER GUIDANCE AND COUNSELLING PPSM204

<b>Semester</b>	: II	<b>Credit</b>	: 3
<b>Category</b>	: Core Industry Module	<b>Hours / Week</b>	: 4
<b>Class &amp; Major:</b>	I M.Sc. Psychology	<b>Total Hours</b>	: 52

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Understand the basic principles of Career Guidance and Counselling.
CO-2	Develop insight into different models in Career Counselling.

CO-3	Assess and diagnose the nature and intensity of day-to-day problems of the masses.
CO-4	Integrate psychological principles and therapeutic techniques.
CO-5	Recognize the effectiveness of different practicing techniques in sorting out the ongoing problems.

### **UNIT I COUNSELLING AS A HELPING PROFESSION**

**10 Hours**

The Professional Counsellor - Counselling as a discipline - Traditional activities - Basic Principles for Schools and Community Agencies; Future Directions for the profession.

### **UNIT II COUNSELLING AND MISCONCEPTIONS**

**11 Hours**

Skills necessary to be an effective Career Counsellor - Principles and stages in Career Counselling, Goals of Counselling; The Counselling Process; Relationship establishment; Problem Identification and exploration.

### **UNIT III STUDENT COUNSELLING IN EDUCATIONAL INSTITUTIONS**

**11 Hours**

Types of students, bullying, Special counselling situations – Drug abuse, Tobacco use, Alcohol abuse - Victims of abuse - Students with Disabilities - Students with Poverty - HIV AIDS. Role and function of Counsellor as Career Guidance and Counsellor - Training programmes for Counsellor and relationships with other helping professions; patterns of Counselling Programme Organization in educational settings; future directions for programmes of Counselling; Guidance – personal, academic and vocational.

### **UNIT IV THEORIES OF CAREER DEVELOPMENT AND DECISION MAKING**

**10 Hours**

Overview of Career Development Models: Donald's Super - Bandura's Social Cognitive Theory - Nancy Schlosberg Career Shift Theory - Holland's Self-Directed Search - Career Counselling and the Development of Human Potential; Career Planning and decision making in schools; Career Counselling in non-school settings; Computerized Career Assistance Systems.

### **UNIT V ASSESSMENT IN CAREER COUNSELLING**

**10 Hours**

Guiding the students to prepare for career entry by designing good bio-data/resume, facing interviews and group discussion and excelling in the career path. (ii) Types of standardized tests: Intelligence testing, Aptitude tests, Special aptitude tests, Vocation; Aptitude - batteries, Scholastic Aptitude Tests, Academic Achievement tests, Interest inventories, Observation instruments; self-reporting; group assessment techniques, Personality and understanding personality tests. (iii) Ethical issues; The Counsellor and the Law; Legal concerns of Counsellors.

#### **Text Books**

- Gibson R. & Mitchell H.M.(2015) Introduction to Counselling and Guidance. 7 th edition. Delhi: Pearson Education.
- Narayana Rao (2003) Counseling and guidance. 2nd edition. New Delhi. Tata Mc Graw Hill.
- Nystul, M (2018). Introduction to Counseling. As art and science perspective.(6th Edition) Cognella Inc Richard

- Nelson – Jones (2012). Basic Counselling Skills. 3rd Edn. New Delhi: Sage Publication

### Reference Books

- Bond, T. (2015). Standards and Ethics for Counselling in Action, 4 th Edn. London: Sage Publication
- Griffiths, & Weatherilt, T. (2001). Safe School, Friendly School: A Framework for Developing a Safe and Friendly School. Swan Education District, Perth, WA: Department of Education.
- Woolfe, R., Strawbridge, S., Douglas, B and Kasket, E. & Galbraith, V. (2016). Handbook of Counselling Psychology, 4 th Edn. London: Sage Publication.

### e-Resource

- <https://www.boisestate.edu/career/what-is-career-counseling/>
- <https://www.coursera.org/articles/career-counseling>
- <https://www2.ed.gov/about/offices/list/ovae/pi/cte/cgcp.html>

### COURSE OUTCOMES

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Understand the nature and procedural aspects of Educational and Vocational guidance	K1,K2
CO-2	Explain the significance of relationship establishment in the counselling context.	K3
CO-3	Propose future directions for counselling programs in educational institutions.	K4
CO-4	Judge the relevance of different career development theories.	K5
CO-5	Generate innovative strategies for addressing special counseling situations.	K6

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	1	3	1	1	1
CO 2	3	0	2	1	2	1
CO 3	3	1	2	0	3	2
CO 4	3	2	2	0	2	1
CO 5	3	3	3	3	3	3

**High Correlation**            **40%**  
**Medium Correlation**       **23%**  
**Low Correlation**            **27%**  
**No Correlation**              **10%**

### COUNSELING SKILLS PPSO201

**Semester**            : **II**  
**Category**            : **Elective III**  
**Class & Major:** **I M.Sc. Psychology**

**Credit**                : **3**  
**Hours / Week**      : **4**  
**Total Hours**       : **52**

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Identify the Micro skills in counselling.
CO-2	Understand skills required at various stages of counselling.



CO-3	Know the skills needed in relating stage.
CO-4	Interpret the skills at changing stage.
CO-5	Outline the Professional and Ethical issues in counselling.

### **UNIT I SKILLS IN COUNSELLING**

**10 Hours**

Counsellors as helpers - Basic skills in Counselling – Counselling and Guidance - Counselling and helping process - micro skills in counselling – Rapport – Types of Counselling.

### **UNIT II SKILLS IN RELATING STAGE**

**10 Hours**

Understanding internal frame of reference - showing attention and interest - reflecting feelings - managing resistance.

### **UNIT III SKILLS IN UNDERSTANDING STAGE**

**11 Hours**

Assessing feelings -thinking and physical reactions - Assessing communication - challenges feedback and self-disclosure – monitoring - summarising and identifying.

### **UNIT IV SKILLS IN CHANGING STAGE**

**11 Hours**

Coaching skills: Speaking- Demonstration and Rehearsing- Improving Communication- Thinking and Actions- Negotiation homework- Terminating Counselling – Crisis management – Impact of Counselling.

### **UNIT V PROFESSIONAL AND ETHICAL ISSUES IN COUNSELLING**

**10 Hours**

Professional code of ethics in counselling - Client Diversity Issues in Counselling - Distance counselling mediated by technology and social media – Role of a Psychologist as a Counsellor – Counselling for Depressive.

#### **Text Books**

- Corey, G. (2015). Theory and practice of counseling and psychotherapy. Nelson Education.
- Nelson-Jones, R. (2012). Introduction to counseling skills: Text and activities. (4th Edition) Sage.
- Nelson-Jones, R. (2015). The theory and practice of counseling psychology (Sixth Edition). SAGE Publications.
- Nystul, M. S. (2015). Introduction to counseling: An art and science perspective. SAGE Publications

#### **Reference Books**

- American Counselling Association (2014).Code of Ethics Alexandria.
- Woolfe, R., Strawbridge, S., Douglas, B and Kasket, E. & Galbraith, V. (2016). Handbook of Counselling Psychology, 4 th Ed. London: Sage Publication

#### **e-Resource**

- <https://asuonline.asu.edu/newsroom/online-learning-tips/effective-counseling-techniques-skills/>
- <https://counsellingtutor.com/basic-counselling-skills/>
- <https://positivepsychology.com/counseling-skills/>

- <https://onlinecounselingprograms.com/become-a-counselor/resources/counseling-skills-techniques>

### COURSE OUTCOMES

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	List out the micro-skills involved in counseling	K1,K2
CO-2	Utilize crisis management skills during counselling sessions.	K3
CO-3	Analyse the challenges associated with providing feedback.	K4
CO-4	Assess the ethical implications of counseling.	K5
CO-5	Develop an effective client counselee relationship.	K6

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	1	2	1
CO 2	3	1	1	0	1	1
CO 3	3	3	1	0	2	2
CO 4	3	2	2	1	3	2
CO 5	3	3	3	2	3	3

<b>High Correlation</b>	<b>40%</b>
<b>Medium Correlation</b>	<b>27%</b>
<b>Low Correlation</b>	<b>27%</b>
<b>No Correlation</b>	<b>6%</b>

### POSITIVE PSYCHOLOGY PPSO202

**Semester** : II  
**Category** : Elective IV  
**Class & Major** : I M.Sc. Psychology

**Credit** : 3  
**Hours / Week** : 4  
**Total Hours** : 52

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Differentiate between Western and Eastern perspectives of positive psychology
CO-2	Understand the Theories of Wisdom.
CO-3	Identify the significance of positive outcomes and the importance of mindfulness.
CO-4	Explain the significance of developmental focus on Positive Psychology
CO-5	Ensure understanding of the important aspects of Prosocial Behaviour.

### UNIT –I WESTERN PERSPECTIVES ON POSITIVE

**11 Hours**

Western Perspectives on Positive Psychology Geek Mythology – Western Civilization – History of Hope in Western Civilization - Industrial Revolution.

### Classifications and Measures of Human Strengths and Positive Outcomes:

Gallup's Clifton Strength Finder-The VIA Classification of Strengths-The Search Institute's 40 Developmental Assets-Distinguishing Among the Measures of Human Strength-Identifying Your Personal Strengths-Discovering and Capitalizing on your strength- Positive outcomes for all-Dimensions of well-being – toward a better understanding of Positive outcomes – Identifying strength and moving toward a vital Balance.

**UNIT-II: LIVING WELL AT EVERY STAGE OF LIFE****11 Hours**

Resilience in childhood – the case of Jackson – roots of resilience research – resilience resources. Positive youth development – youth development programs – the life tasks and adulthood – the trajectories of precocious children – Primary task of adulthood – successful aging-adult development study – a more developmental focus in positive psychology.

**UNIT –III: POSITIVE COGNITIVE STATES AND PROCESS****10 Hours**

Seeing our futures through self-efficacy, optimism and hope –fascination with the future – being busy not and end in itself – self-efficacy – changing behavior through The 36 Heroes – Optimism – Hope – Life Enhancements strategies – Personal Mini Experiments: Balancing your perspective on time-cultural caveats about temporal.

**UNIT –IV: WISDOM AND COURAGE****10 Hours**

Theories of wisdom-- Implicit theories of wisdom – explicit theories of wisdom – being wise – developing wisdom – wise people and their characteristics –the measurement of wisdom – relationships between wisdom and intelligence – implicit theories of courage.

**Becoming and Being Courageous**

Take on courage - courage research – the measurement of courage – wisdom and courage in daily life – courage be learned – life enhancement strategies – the value of wisdom and courage.

**UNIT -V MINDFULNESS, FLOW & SPIRITUALITY****10 Hours**

Optimal experiences – Moment-to-moment searches – mindfulness – living with mindfulness – the benefits of mindfulness – personal mini-experiments - Flow state – enhancement strategies- Spirituality: In search of the sacred – true benefits of Spirituality – the search continues.

**Pro-social Behaviour**

Empathy and egotism: Portals to Altruism, Gratitude, and Forgiveness –Altruism – Defining Altruism- Egotism Motive – Motivated Altruism – Hypothesis the genetic and Neural foundations of Empathy – cultivating altruism – Cultivating Forgiveness measuring forgiveness – Evolutionary and neurobiological bases of forgiveness Societal implications of Altruism, Gratitude, and forgiveness.

**Text Books**

- C.R Snyder & Shane J. Lopez ,2007, Postive Psychology, New Delhi SAGE Publication
- Argyle M (2001) The Psychology of Happiness ,2nd Edition London: Rutledge.

**Reference Books**

- Groopman. J, (2004), The anatomy of hope: How people prevail in the face of illness. New York Random house
- Sue,D.W., & Sue,D(2003). Counseling the culturally diverse: Theory and practice (4thed). New York:Wiley.

**e-Resource**

- <https://positivepsychology.com/what-is-positive-psychology-definition/>
- <https://positivepsychology.com/>
- <https://www.psychologytoday.com/us/basics/positive-psychology>

### COURSE OUTCOMES

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Summarize the various developmental assets in promoting positive outcomes.	K1, K2
CO-2	Make use of positive cognitive states on clients' behavior change.	K3
CO-3	Simplify the concepts of mindfulness and their benefits in daily life.	K4
CO-4	Evaluate the benefits of spirituality on overall well-being.	K5
CO-5	Develop a positive perspective and outlook on life.	K6

### CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	2	1	0	2	1
CO 2	3	3	3	0	1	2
CO 3	3	3	3	1	2	2
CO 4	3	3	3	1	2	2
CO 5	3	3	3	2	3	2

**High Correlation**            **40%**  
**Medium Correlation**       **30%**  
**Low Correlation**            **17%**  
**No Correlation**              **6%**

### PSYCHOLOGY OF SOCIAL PROBLEMS PPSD201

**Semester**            : **II**  
**Category**            : **Non-Major Elective**  
**Class & Major** : **I PG**

**Credits**             : **2**  
**Hours/week**        : **3**  
**Total hours**        : **39**

### COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Understand the intersectionality of social issues, recognizing how multiple factors and identities can create complex challenges.
CO-2	Analyze the psychological factors contributing to the development and perpetuation of social problems, such as poverty, discrimination, addiction, and violence.
CO-3	Evaluate the impact of societal structures, norms, and values on the emergence and persistence of social problems.
CO-4	Examine the psychological processes involved in social change and activism, including the role of empathy, motivation, and collective action.
CO-5	Explore the ethical dilemmas and cultural considerations associated with the study and intervention in social issues.

### UNIT I - MEDIA INFLUENCES ON SOCIAL BEHAVIOUR

**9 Hours**

Depiction of violence and aggression; Surrogate advertisements - Pro-social behaviour – Role of Persuasion and Cognitive Dissonance.

**UNIT II – GENDER AND SEXUALITY****9 Hours**

Cultural construction of feminine and masculine identity in India - Gender differences and Discrimination; Socio-legal issues of Transgender and Homosexuals.

**UNIT III – GROUP CONFLICTS****7 Hours**

Psychological underpinnings - Stereotypes, Prejudices and Discrimination; Racism, Communalism and Terrorism; Socio – Economic and Personality Dynamics; Primary and Secondary Victims.

**UNIT IV – SUICIDES****7 Hours**

Psychological perspectives on suicidal behaviour - Neurobiological basis of Suicidal Ideation; risk factor assessment and prediction - Suicide in India - A case study.

**UNIT V – PSYCHOLOGY AND SUSTAINABLE FUTURE****7 Hours**

Earth's carrying capacity and sustainable lifestyle - Materialism and Consumerism - Post-Materialist Attitudes and Behaviour - Globalisation and its Impact on Human Behaviour.

**Text Books**

- Alexander. R. (2010). Human Behaviour in the Social Environment: A macro, National and International Perspective, Sage Publications.
- Anthony Gale and Antony J. Chapman (1987). Psychology and Social Problems : An Introduction to Applied Psychology, John Wiley and Sons
- Baron, R. A., Branscombe. N. R, Byrne. D. and Bhardwaj. G. (2010). Social Psychology (12th Edition). Pearson Publications

**Reference Books**

- Kumar.U and Mandal.M.K. (2010). Suicidal Behaviour: Assessment of people at Risk, Sage Publications India Pvt. Ltd.
- Sandra K. Ciccarelli and Glen E. Meyer. (2008). Psychology, Sage Publications

**e-Resource**

- <https://www.cairn.info/revue-internationale-de-psychologie-sociale-2010-2-page-5.htm>
- <https://open.lib.umn.edu/socialproblems/chapter/1-1-what-is-a-social-problem/>
- <https://www.jstor.org/stable/2762270>

**COURSE OUTCOMES**

<b>CO No.</b>	<b>On completion of the course, the student will be able to</b>	<b>Bloom's Level</b>
CO-1	Infer the psychology of group conflicts	K1,K2
CO-2	Utilize psychological perspectives to predict various risk factors.	K3
CO-3	Analyze each situation rationally and take decisions better	K4
CO-4	Explain the influence of media impact on our cognitive processes	K5
CO-5	Design several intervention programmes to address social problems.	K6

## CO – PSO MAPPING

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	1	2	0	2	1
CO 2	3	3	3	2	2	1
CO 3	3	1	3	1	3	1
CO 4	3	3	2	2	2	2
CO 5	3	3	3	1	3	3

<b>High Correlation</b>	<b>47%</b>
<b>Medium Correlation</b>	<b>27%</b>
<b>Low Correlation</b>	<b>23%</b>
<b>No Correlation</b>	<b>3%</b>

## III AND IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
I	Major Core I / DSC I	PPSM 101	Advanced General Psychology	Assignment	Chart Work
I	Major Core II / DSC II	PPSM 102	Applied Social Psychology	Assignment	Case Study
I	Major Core III / DSC III	PPSM 103	Lifespan Psychology	Group Study	Chart Work
I	Major Core IV / DSC IV	PPSO 101	Bio-Psychology	Assignment	Chart Work
I	Major Core V / DSC V	PPSO 102	Community Psychology	Assignment	Seminar
I	Non-major Elective	PPSE 201	Personality Development	Assignment	Chart Work
II	Major Core VI / DSC VI	PPSM 201	Theories of Personality	Group Study	Seminar
II	Major Core VII / DSC VII	PPSM 202	Psychological Statistics.	Problem Solving	Seminar
II	Major Core IX / DSC IX	PPSO 201	Counselling Skills	Assignment	Chart Work
II	Major Core X / DSC X	PPSO 202	Positive Psychology	Assignment	Seminar
II	Non-major Elective	PPSE 201	Psychology for Social Problems	Assignment	Chart Work

## SOFT SKILLS

### PREAMBLE

Course Profile and Syllabi for Soft Skills offered to under Graduate Students is presented in this Booklet .This comes into Effect for **2023 – 2026** Batch – I & II Semester

### UG - COURSE PROFILE FOR SOFT SKILLS

Semester	Part	Course code	Course title	Contact Hour/Week	Credit
I	IV	USKS103	Communication Skills	2	2
		USKS 104	Effective Communication Skills	2	2
II	IV	USKS203	Business English	2	2
		USKS204	Interview Skills	2	2

## COMMUNICATION SKILLS

### USKS103

<b>Semester</b>	<b>: I</b>	<b>Credit</b>	<b>: 1</b>
<b>Category</b>	<b>: Soft Skill</b>	<b>Hours / Week</b>	<b>: 2</b>
<b>Class &amp; Major</b>	<b>: I UG</b>	<b>Total Hours</b>	<b>: 26</b>

#### Objectives

##### To enable the students

- To understand and learn the nuances of the use of English.
- To acquire LSRW skills.
- To develop effective communication skills.

**Unit – I** **5 Hrs**

Listening to casual conversation & responding.

**Unit – II** **5 Hrs**

Reading & Comprehending.

**Unit – III** **5 Hrs**

Learning Techniques

**Unit – IV** **5 Hrs**

Techniques of Note - Taking and Summarizing.

**Unit – V** **6Hrs**

Description – people, places, things and events.

**Text Books:**

1. Dutt,P.Kiranmani and et.al, A Course in Communication Skills, Cambridge University Press, New Delhi, 2008.
2. Francis Thamburaj, Communication Soft Skills, Grace Pub, Trichy, 2009

**Evaluation Components**

- 1.Listening comprehension - 20 Marks
- 2. Reading comprehension - 20 Marks
- 3.Written Quiz - 20 Marks
- 4 Note Making - 20 Marks
- 5. Describing a chart model - 20 Marks

**Learning Outcomes:**

**On completion of the course the student will be able to**

- Develop effective oral and writing skills.
- Enable them to communicate effectively through their body language.
- Achieve excellence in both personal and professional life.

**EFFECTIVE COMMUNICATION SKILLS**

**USKS104**

<b>Semester</b>	<b>: I</b>	<b>Credit</b>	<b>: 1</b>
<b>Category</b>	<b>: Soft Skill</b>	<b>Hours / Week</b>	<b>: 2</b>
<b>Class &amp; Major</b>	<b>: I UG</b>	<b>Total Hours</b>	<b>: 26</b>

**Objectives**

**To enable the students**

- To understand and enhance the soft skills of the students.
- To develop effective oral and writing skills of the students.
- To enable them to communicate effectively through their body language

<b>Unit – I</b>	<b>4Hrs</b>
Listening – News, Films, Speech.	
<b>Unit – II</b>	<b>4Hrs</b>
Reading & Comprehension, Tongue Twisters.	
<b>Unit – III</b>	<b>6Hrs</b>



Dialogues

**Unit – IV**

**6Hrs**

Group Discussion.

**Unit – V**

**6 Hrs**

Skit, Creative Writing.

**Text Books:**

- 1 Hancock and Mark, English Pronuciation in UK, Cambridge University Press, New Delhi, 2008.
2. Francis Thamburaj, Communication Soft Skills, Grace Pub, Trichy, 2009

**Evaluation Components**

1. **Listening Comprehension** - 20 Marks
2. **Reading Comprehension** - 20 Marks
3. **Dialogue Making** - 20 Marks
4. **Group Discussion** - 20 Marks
5. **Staging a Skit** - 20 Marks

**Learning Outcomes:**

**On completion of the course the student will be able to**

- Make effective presentations and showcase mastery in communication.
- Achieve excellence in both personal and professional life.
- Prepare their own resume and understand the importance of preparing resume.

**BUSINESS ENGLISH**

**USKS203**

**Semester : II**

**Credit : 2**

**Category : Soft Skills**

**Hours/week : 2**

**Class : I UG**

**Total Hours : 26**

**Objectives:**

**To enable the students**

- To communicate effectively in English
- To improve their ability to write and speak English in both social and professional interaction.
- To develop presentation Skill in English.

**UNIT - I SELF - INTRODUCTION**

**6 Hours**

Self – Introduction – Conversation - Group Discussions- Models of greeting, requesting, thanking, introducing and giving opinions

**UNIT – II BUSINESS MEETINGS**

**5 Hours**

Vocabulary and skill related to participating in meetings – email writing and Business communication, Job Application(CV & Cover Letter).

**UNIT - III BUSINESS PLANNING & NEGOTIATING**

**5 Hours**

Languages and Strategies for successful negotiation –identify and resolve customer issues after negotiation has taken place.

**UNIT - IV MAKING PRESENTATION**

**5 Hours**

Effective presentation in English- Present information in an organized and engaging way- use persuasive language in presentation.

**UNIT - V CAPSTONE PROJECTS.**

**5 Hours**

Competence in writing and presenting a plan using skill and language appropriate for business.

**Text Books**

- Dutt, P.Kiranmani, and et al, A Course in Communication Skills, Cambridge University Press, New Delhi, 2008.
- Francis Thamburaj, Communication Soft Skills, Grace Pub, Trichy, 2009.
- **English Conversation Practice by Grant Taylor - 2001, Published by Mc GrawHill education**

**EVALUATION COMPONENTS**

1. Self-Introduction	-	30 Marks
2. Email writing	-	30 Marks
3. Writing a Business Plan	-	40 Marks
		-----
<b>Total</b>		<b>100 Marks</b>
		-----

**Learning Outcomes:**

**On completion of this course the student will be able to**

- Understand to communicate effectively in English in professional contexts.
- Identify the different type’s business negotiations.
- Identify the skills for writing reports and emails and Professional Presentation

## INTERVIEW SKILLS USKS204

<b>Semester</b>	<b>: II</b>	<b>Credit</b>	<b>: 2</b>
<b>Category</b>	<b>: Soft Skills</b>	<b>Hours/week</b>	<b>: 2</b>
<b>Class</b>	<b>: I UG</b>	<b>Total Hours</b>	<b>: 26</b>

### Objectives:

#### To enable the students

- To develop presentation skills
- To develop GD Skills
- To improve their self- confidence.

**UNIT - I PRESENTATION SKILL INTRODUCTION** **4 Hours**  
Meaning – Types of Presentation – Essential Skills required for presentation

**UNIT - II ART OF PRESENTATION** **4 Hours**  
Creating and Delivering Presentation – Effective methods or information -events

**UNIT - III GROUP DISCUSSION** **6 Hours**  
Introduction- Different types of GD topics- Do’ and Don’ts of GD

**UNIT - IV INTERVIEW TECHNIQUES** **6 Hours**  
Interview Preparation - Do’s and Don’ts of Interview- Types of Interview- Facing Interview

**UNIT - V INTERVIEW SKILLS** **6 Hours**  
Facing Interview - Mock Interview- Videography and observation and feedback

### Text Books

- Dutt, P.Kiranmani, and et al, *A Course in Communication Skills*, Cambridge University Press, New Delhi, 2008.
- Francis Thamburaj, *Communication Soft Skills*, Grace Pub, Trichy, 2009.

### EVALUATION COMPONENTS

1. Poster Presentation	-	30 Marks
2. Topic presentation	-	30 Marks
3. Group Discussion	-	40 Marks
		-----
<b>Total</b>		<b>100 Marks</b>
		-----

**Learning Outcomes:****On completion of this course the student will be able to**

- Identify the different types of presentation.
- To inculcate interpersonal relationship
- To develop the overall personality

**SOFT SKILLS****PREAMBLE**

Course Profile and Syllabi for Soft Skills offered to under Graduate Students is presented in this Booklet. This comes into Effect for **2022 – 2025** Batch **IV Semesters**.

**UG - COURSE PROFILE FOR SOFT SKILLS**

<b>Semester</b>	<b>Part</b>	<b>Course code</b>	<b>Course title</b>	<b>Contact Hour/Week</b>	<b>Credit</b>
IV	IV	USKS403	Life Skills	2	2
		USKS404	Professional Development	2	2

**LIFE SKILLS****USKS 403****Semester : IV****Credit : 2****Category : Soft Skills****Hour/Week : 2****Class : II UG****Total Hours : 26****Objectives****To enable the students**

- Overcome Fear and Anger,
- Overcome Failure and Criticism.
- Develop Confidence.

**UNIT – I FEAR****6 Hours**

Definition – Symptoms of Fear – Causes of fear – Impact of fear – Types of Fear - How to overcome fear.

**Exercise:** Students to prepare list of current life situation that regret fear.

**Reference :** [www.counsellingzone.com](http://www.counsellingzone.com)

Swami Sukhabodhandha, *Oh, Mind Relax Please!*, Author House, 2005.

## **UNIT – II ANGER**

**5 Hours**

Meaning – Definition – Causes of Anger – Effects of Anger - Ways of Determining Your Anger Responses – Strategies to Control Anger.

**Exercise:** Students to identify five ways to handle anger.

**Reference:** Les Carter. Frank B. Minirth. (1998). *The Anger Work Book*. T. Nelson.

Swami Sukhabodhandha, *Oh, Mind Relax Please!*, Author House, 2005.

## **UNIT – III FAILURE**

**5 Hours**

Meaning – Definition – Causes for Failure – Effects of Failure – Ways to overcome failure – How to respond to failures in life.

**Exercise:**

- Brainstorming session to identify the reason for the failure.
- To identify attitude of students towards failure.

**Reference:** Chandru Gidwani. (2001). *Ten Secrets to a Balanced Successful and Happy Life*. Mumbai. Better Yourself Book.

## **UNIT - IV CRITICISM**

**5 Hours**

Meaning - Definition of Criticisms – Types of Criticism – Response to Criticism – Coping with Criticism – Self Criticism.

**Exercise:**

- On types of criticism
- On how to overcome criticism.

**Reference:** Chandru Gidwani. (2001). *Ten Secrets to a Balanced Successful and Happy Life*. Mumbai. Better Yourself Book.

## **UNIT – V STRESS MANAGEMENT**

**5 Hours**

Meaning – Definition – Symptoms of Stress - Causes of Stress – Types of Stress – Situations that cause Stress – Stages of Response to Stress – How to Control Stress and Manage Stress.

**Exercise:**

- Students to Identify Stress, they are undergoing Currently.
- To Identify Stressful Situations and Responses to Situation.

**Reference:** Les Carter. Frank B. Minirth, (1998). *The Anger Work Book*. T. Nelson.

## EVALUATION COMPONENTS

- |    |                     |            |
|----|---------------------|------------|
| 1. | Poster Presentation | - 30Marks  |
| 2. | Chart Presentation  | - 30Marks  |
| 3. | Group Discussion    | - 40 Marks |

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**Total      100 Marks**  
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### Learning Outcomes:

**On completion of this course the student will be able to**

- Understand symptoms of fear and how to overcome it.
- Identify the different types of criticism ways to cope with criticism..
- Identify the symptoms of stress and how to Control and Manage Stress.

## PROFESSIONAL DEVELOPMENT

**USKS404**

**Category : Soft Skills**

**Class : II UG**

**Credit: 2**

**Hour/Week : 2**

**Total Hour: 26**

### Objectives:

**To enable the students**

- Overcome barriers to communication..
- Create Self Acceptance and Positive Attitude.
- Develop Professional Skills.

### UNIT - I Communication

**5 Hour**

Meaning – Definition – Types of Communication – Barriers to Communication.

### UNIT - II Professional Communication

**5 Hour**

Meaning – Definition – Good manners and Etiquettes – Professional Grooming and Presentation skills.

### UNIT - III Resume Writing

**6 Hour**

Meaning – Definition – Basic of Resume Formats – Types of Resume – Chronological, Functional and Mixed Resume – Steps in preparation of Resume.

### UNIT – IV Interview Skills

**5 Hour**

Meaning – Definition – Preparation for Interview – Common Interview questions – Attitude – Body Language – Mock Interview.

**UNIT – IV Group Discussion**

**5 Hour**

Meaning – Definition – The salient features of GD- Factors that influence GD – Preparation of GD – Tips for success in GD - Outcome of GD.

**Reference Books**

- Aggarwal, R.S. 2010. A Modern Approach to Verbal and Non Verbal Reasoning. S.Chand, New Delhi.
- Covey, Stephen. 2004. 7 Habits of Highly effective people, Free Press. Egan, Gerard. (1994).
- The Skilled Helper (5th Ed). Pacific Grove, Brooks/Cole.
- Khera ,Shiv 2003. You Can Win. Macmillan Books , Revised Edition.
- Melchias G, Balaiah John, John Love Joy (Eds), 2018. Winners in the Making: A primer on soft skills. SJC, Trichy.

**Other books**

- Murphy, Raymond. 1998. Essential English Grammar. 2nd ed., Cambridge University Press.
- Sankaran, K., & Kumar, M. Group Discussion and Public Speaking. M.I. Pub, Agra, 5th ed., Adams, Media. 3. Trishna’s 2006. How to do well in GDs & Interviews, Trishna Knowledge Systems.
- Yate, Martin. 2005. Hiring the Best: A Manager’s Guide to Effective Interviewing and Recruiting

**EVALUATION COMPONENTS**

- 1. CV Preparation - 30 Marks
- 2. Group Discussion - 30 Marks
- 3. Mock Interview - 40 Marks

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**Total 100 Marks**  
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**Learning Outcomes:**

**On completion of this course the student will be able to**

- Understand the concept of Professional Grooming.
- Know to Turn Negative Thinking Patterns into Positive.
- Realize the Importance of Communication Skills.

## SOFT SKILLS

### PREAMBLE

Course Profile and Syllabi for Soft Skills offered to under Graduate Students is presented in this Booklet. This comes into Effect for **2021 – 2024** Batch - **VI Semester**.

### UG - COURSE PROFILE FOR SOFT SKILLS

Semester	Part	Course code	Course title	Contact Hour/Week	Credit
VI	IV	USKS603	Job Literacy Skills	2	2
		USKS604	Employability Skills	2	2

### JOB LITERACY SKILLS

#### USKS 603

**Semester :V**

**Category :Soft Skills**

**Class : III UG**

**Credit: 2**

**Hour/Week : 2**

**Total Hour: 26**

#### Objectives:

##### To enable the students

- Achieve Emotional Intelligence.
- Create Self - Image.
- Develop Job Literacy Skills.

#### UNIT -I Emotional Intelligence

**5 Hours**

Meaning – Definition – Essentials of emotional intelligence - Intelligence Quotient (IQ ) or Emotional Quotient ( EQ ) – Components of Emotional Intelligence – Applying Emotional Intelligence at Home and Work – Ways to improve Emotional Intelligence..

**Reference:** Prashant Sharma. (2018).*Soft Skills Personality Development for Life Success*. BPB Publications. New Delhi.

#### UNIT – II Self – Image Management

**5 Hours**

Meaning - Definition – What is first impression – Parts of first impression – Types of first impression – effects of first impression – Self-image and first impression – Factors that affect one’s Self – Image – Beautiful on the inside – Ways to make the best First Impression –



Developing your Personal Brand.

**Exercise:** SWOT Analysis.

**Reference:** Prashant Sharma. (2018). *Soft Skills Personality Development for Life Success*. BPB Publications. New Delhi.

### **UNIT - III Job Literacy**

**6 Hours**

Meaning – Definition – What is Job Literacy – Job Title – Job Mandate – Functional Affiliation – Key Responsibilities and Key Result Areas – Job Functions – Job Description – Understand Activities in a Workday – Job and Person Specifications – Application of Job Literacy.

**Exercise:** Interview any of your friend or relatives working in the corporate world and analyse their job.

**Reference:** R. Anand (2018). *Job Readiness For IT & ITES* McGraw Hill Education ( India ) Private Limited, New Delhi

### **UNIT – IV Selection Process and Preparation Tips**

**5 Hours**

Meaning – Definition- Selection Process – Four Major Profiles – All about the written Test – Group Discussion – All about the Technical Interview – All about the HR Interview.

**Exercise:** Create a question bank.

**Reference:** R. Anand (2018). *Job Readiness For IT & ITES* McGraw Hill Education ( India ) Private Limited, New Delhi

### **UNIT – V Navigating the first year of your Career**

**5 Hours**

The Campus to Corporate Transition – The Phases – Pre- Joining to orientation – Allocated to a Role – After the first assignment – Your End Review.

**Exercise:** Interview your close friend about his or her first year on the job

**Reference:** R. Anand (2018). *Job Readiness For IT & ITES* McGraw Hill Education (India) Private Limited, New Delhi

### **EVALUATION COMPONENTS**

SWOT analysis	30 Marks
Group Discussion on Preparation Tips for Job	30 Marks
Group Discussion on Career Prospects	40 Marks
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	100 Marks
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### **Learning Outcomes:**

**On completion of this course the student will be able to**

- Understand the concept emotional intelligence.

- Know to develop Personal Brand.
- Realize the Importance Job Literacy Skills.

## **EMPLOYABILITY SKILLS**

### **USKS 604**

**Category :Soft Skills**  
**Class : III UG**

**Credit: 2**  
**Hour/Week : 2**  
**Total Hour: 26**

#### **Objectives:**

##### **To enable the students**

- Achieve Soft Skills.
- Create Positive Attitude.
- Develop employability Skill.

#### **UNIT -I Soft Skills**

**5 Hours**

Meaning – Definition – Importance of Soft Skills- Soft Skill Vs Hard Skills- Industry Need- Disruptive technologies and Soft Skill – The most important soft skills required for Life Success- How to develop Soft Skills – Government push for Skill development – Global Perspective.

**Reference:** Prashant Sharma. (2018). *Soft Skills Personality Development for Life Success*. BPB Publications. New Delhi.

#### **UNIT – II Attitude**

**5 Hours**

Meaning - Definition – The Power of Positive Thinking –Positive self-talk – Attitude in the Workplace –Building a Positive attitude – Testing your Attitude – Adaptability.

**Exercise:** Story of Positive Thinking.

**Reference:** Shiv Kera. (1998). *You Can Win*. MacMillan India Ltd. New Delhi.  
Sabina Pillai, Agna Fernandez (2018). *Cambridge University Press*, New Delhi.

#### **UNIT - III Time Management**

**6 Hours**

Meaning – Definition –What is time management? – Prioritisation – Time stressors – Time Stealers- Strategies for effective time management – The four D’s of Time Management.–.

**Exercise:** Case Studies of Achievers in Great Leaders to Examine their Motives.

**Reference:** Sabina Pillai, Agna Fernandez (2018). *Cambridge University Press*, New Delhi

#### **UNIT – IV Goal Setting**

**5 Hours**

Meaning – Definition- What is a Goal? What are SMART goals ? How does SMART goal setting work?- Goals as commitment – Useful guidelines for goal setting- Types of goals.

**Exercise:** Each Group gets Ball and a Bucket or Box. Each one of the Group takes a Turn and Tries to Throw the Ball into the Bucket from the Distance of 5 meter.

**Reference:** : Sabina Pillai, Agna Fernandez (2018). *Cambridge University Press*, New Delhi

**UNIT – V Employability Skills**

**5 Hours**

Introduction – What are these coveted employability skills? Why is employability such an important concern? How to raise your employability quotient – Importance of researching your prospective workplace.

**Exercise:** Students could be asked to be in Groups of Six and go through the process of deciding their employability skills and making them to develop their employability skills.

**Reference:** Sabina Pillai, Agra Fernandez (2018). *Cambridge University Press*, New Delhi

**EVALUATION COMPONENTS**

Oral Presentation (of Self Mission, Goals) 30 Marks

Group Discussion on Time management 30 Marks

Group Discussion on employability skills 40 Marks

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100 Marks

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**Learning Outcomes:**

**On completion of this course the student will be able to**

- Understand the concept of Soft skills.
- Know to Turn Negative Thinking Patterns into Positive.
- Realize the Importance Employability Skills.

## PART IV – VALUE EDUCATION

### PREAMBLE

Course Profile and Syllabi for value education offered to under Graduate Students is presented in this Booklet. This comes into Effect from 2023 – 2026 Batch onwards

Semester	Part	Category	Course Code	Course Title	Contact Hrs/ Week	Credit
III	IV	Value Education	UESV311	Fundamental Rights in Indian Constitution	2	1
			UESV312	<b>Fundamentals of Humanity</b>	2	1
			UESV313	<b>Environmental Studies</b>	2	1
			UESV314	<b>Fundamental of Human Rights</b>	2	1
			UESV315	<b>Gandhian Ideologies</b>	2	1
V	IV	Value Education	UWSV505	Cyber Security	2	1
			UWSV506	<b>Women’s Education</b>	2	1
			UWSV507	<b>Women’s Rights</b>	2	1
			UWSV508	<b>Women’s Health and Hygiene</b>	2	1

### UESV 312 FUNDAMENTALS OF HUMANITY

**Semester : III**

**Category : Value Education**

**Class & Major : I UG**

**Credit : 1**

**Hours / Week : 2**

**Total Hours : 26**

#### Objectives

##### To enable the students

- Understand the values, features and approaches to value education.
- Examine the development changes happening in the course of their life.
- Analyses the characteristic of a Responsible parent.

#### Unit - I Need of Value Education

**9 Hours**

Introduction to values – Characteristics of value education – approaches to value education – Value Clarification – Moral development. **Human Personality Development-** Personality – Introduction – Theories of Personality development –Factors affecting Personality –Power of Positive thinking.

#### Unit – II Human Development Dimensions

**9 Hours**

Areas of Development – Physical – Intellectual – Emotional – Social Development – Moral Development

& Spiritual Development. **Parenthood Responsibility** - Marriage and Family – Sex and Love – Characteristics of Responsible Parent – Causes of Marriage disharmony – Art of wise parenting.

### **Unit -III Gender Equality**

**8 Hours**

Historic perspective – Status of Women in family and society – Crimes against Women –Women’s Achievement in India.

#### **Reference Books**

- Mani Jacob. Ed Resource Book for Value Education, Institute for Value Education, New Delhi,2012.
- Department of Human Excellence Essentials of Humanity, St. Joseph’s College, Tiruchirappali-02,2021.
- Kalam Abdul APJ. You Are Unique, Bangalore: Punya Publishing, 2012.

#### **Web Sources**

- <http://livingvalues.net>.Accessed 05 Mar.2021.
- <https://www.apa.org/topics/personality#>.Accessed 05 Mar 2021.
- [https://www .peacecorps.gov/educators/resources/global-issues-gender-equality-and –women’s-empowerment/](https://www.peacecorps.gov/educators/resources/global-issues-gender-equality-and-women-s-empowerment/).Accessed 05 2021.

#### **Evaluation Components of CIA**

1. Assignment - 30 Marks
2. Case Study - 30 Marks
3. Poster Presentation - 40 Marks

#### **Learning Outcomes:**

**On completion of the course the student will be able to**

- Understand the Need and Importance of Value Education & Education for Human Values.
- Analyze themselves as responsible men and women.
- Create a constructive approach to life.

### **UESV313 ENVIRONMENTAL STUDIES**

<b>Semester</b>	<b>: III</b>	<b>Credit</b>	<b>: 1</b>
<b>Category</b>	<b>: Value Education</b>	<b>Hours / Week</b>	<b>: 2</b>
<b>Class &amp; Major</b>	<b>: II UG</b>	<b>Total Hours</b>	<b>: 26</b>

#### **Objectives:**

**To enable the students**

- Environment conscious.
- Understand the environmental issues and its impact on human health.
- Provide them with value based environmental education.

### **Unit – I Introduction to Environmental Studies**

**9 Hours**

Meaning - Definition of Environmental Studies - Scope – Importance of environmental awareness – Suggestions to conserve environment. Natural Resources -Water Resources – Food Resources – Mineral Resources – Land Resources - Forest Resources- Energy Resources.

**Unit - II Ecosystems, Biodiversity and Conservation** **9 Hours**

General Structure of ecosystem- Functions of Ecosystem- Levels of Biodiversity – Value of Biodiversity- Threats to Biodiversity – Conservation of Biodiversity. **Environmental Pollution** - Air Pollution – Water Pollution – Oil Pollution – Soil Pollution – Noise Pollution – Thermal Pollution – Radiation Pollution.

**Unit - III Environmental Organizations and Treatise** **8 Hours**

United Nations Environment Program ( UNEP ) – International treaties on Environmental protection- Ministry of Environment, Forest and Climate Change – important National Environmental Acts and rules.

**Reference Books**

- Kaushik & Kaushik Perspectives in Environmental Studies – New Age International Publishers.
- Department of Human Excellence Environmental Studies, St. Joseph’s College, Tiruchirappali- 02,2021.
- Rather.V.S.and Rather.B.S Management of Natural Resources for Sustainable Development, New Delhi : Daya Publishing House,2013.

**Web Sources**

- <https://www.unep.org/>. Accessed 05 Mar.2021
- <http://mosef.gov.in/en/Accessed 05 Mar.2021>.
- <https://www.ipcc.ch/reports/>. Accessed 05 Mar.2021.

**Evaluation Components of CIA**

1. Assignment - 30 Marks
2. Case Study - 30 Marks
3. Poster Presentation - 40 Marks

**Learning Outcomes:**

**On completion of the course the student will be able to**

- Understand the Need for Public Awareness and Methods to Propagate Environment Awareness.
- Identify the Environment Issues and its Impact on Human Health.
- Realize the role of Information Technology in Value Based Environmental Education

**UESV314 FUNDAMENTALS OF HUMAN RIGHTS**

<b>Semester</b>	<b>: V</b>	<b>Credit</b>	<b>: 1</b>
<b>Category</b>	<b>: Value Education</b>	<b>Hours / Week</b>	<b>: 2</b>
<b>Class &amp; Major</b>	<b>: III UG</b>	<b>Total Hours</b>	<b>: 26</b>

## **Objectives:**

### **To enable the students**

- Develop Awareness on how Human Right can be translated into Social and Political Reality.
- Gain Knowledge about Constitutional Law.
- Evaluate the rights of children and women

### **Unit - I Human Rights – An Introduction**

**9 Hours**

Meaning - Definition of Human Rights – Scope of Human Rights - Characteristic of Human Rights – Challenges for Human Rights in the 21<sup>st</sup> Century. **Historical Development of Human Rights** - Human Rights in Pre-World War Era - Human Rights in Post-World War Era – Evolution of International Human Rights Law – The General Assembly Proclamation

### **Unit – II Fundamental Rights in Indian Constitution**

**9 Hours**

Introduction – Classification of Fundamental Rights – Salient Features of Fundamental Rights and Fundamental Duties. **Human Rights of Women and Children** - Contemporary Issues on Human Rights – Children Rights – Women’s Rights – Issues related to Women’s Rights - Bonded Labor & Wages

### **Unit – III Human Rights Violation and Organizations**

**8 Hours**

Human Rights Violations - Human Rights Violations in India - Human Rights Organizations – National Human Rights Commission.

### **Reference Books**

- International Bill of Human Rights, Amnesty International Publication.
- Department of Human Excellence, Techniques of Social Analysis : Fundamentals of Human Rights, St. Joseph’s College, Tiruchirappali - 02,2021.
- Ravi T.S. Human Rights, Margham Publication, Chennai, 2021.

### **Web Sources**

- <https://www.un.org/en/universal-declaration-human-rights/>, Accessed 05 Mar 2021.
- <https://www.ilo.org/global/lang-en/index.htm>. Accessed 05 Mar 2021.
- <https://www.amnesty.org/en/>. Accessed 05 Mar 2021.

### **Evaluation Components of CIA**

1. Assignment - 30 Marks
2. Case Study - 30 Marks
3. Group Discussion - 40 Marks

### **Learning Outcomes:**

#### **On completion of the course the student will be able to**

- Develop Awareness on Rights of Children, Women, Bonded Labour and Wages.

- Gain Knowledge about Constitutional Law.
- Realize the Directive Principle of State Policy and National Human Rights Commission

### **UESV315 GANDHIAN IDEOLOGIES**

<b>Semester</b>	<b>: III</b>	<b>Credits</b>	<b>1</b>
<b>Category</b>	<b>: Value Education</b>	<b>Hours/Week</b>	<b>2</b>
<b>Class &amp; Major</b>	<b>:II UG</b>	<b>Total Hours</b>	<b>:26</b>

#### **Objectives**

##### **To enable students to**

- Understand and appreciate the principles and practices of Gandhi and their relevance in the contemporary times.
- Develop character and attitude to follow Gandhian values and responsibilities in their personal and social life.

#### **Unit I- Introduction**

**8 Hours**

Early life in India – London Phase – South African Adventure - Struggle for total freedom in India – Martyrdom

#### **Unit II Gandhian Philosophy**

**9 Hours**

Concepts of Gandhi’s Philosophy, Truth and Nonviolence, Ends and Means, Right and Duties, Simply Living and High Thinking, Communal harmony, removal of untouchability and Equality.

#### **Unit III Gandhian Policies**

**9 Hours**

Sarvodaya, Satyagraha, Santhi Sena Constructive Work, Decentralization of power, Gram Swaraj (Panchayatui Raj) and good governance- Economics of Swadeshi, Trusteeship, Bread Labour and Self-employment.

#### **Reference Books:**

- M.K. Gandhi: (1983), An Autography of the Story of My Experiments with Truth, Navajivan Publishing House, Ahmedabad.
- M.K. Gandhi: (1951), Satyagraha in South Africa: Navajivan Publishing House, Ahamadabad.
- M.K. Gandhi: Basic Education, Navajivan Publishing House, Ahamadabad.
- M.K. Gandhi: (2001), India of my Dreams, Navajivan Publishing House, Ahamadabad.
- Arunachalam: Gandhi: (1985), The Peace Maker, Gandhi Samarak Nidhi, Madurai
- R.R. Prabhu & UR Rao. The Mind of Mahatma Gandhi, Navajivan Publishing House.

#### **E- Resources:**

- <https://www.mkgandhi.org/ebks/An-Autobiography.pdf>
- [https://www.mkgandhi.org/ebks/satyagraha\\_in\\_south\\_africa.pdf](https://www.mkgandhi.org/ebks/satyagraha_in_south_africa.pdf)



- <https://www.mkgandhi.org/ebks/India-Dreams.pdf>
- <https://www.mkgandhi.org/ebks/self-restraint-self-indulgence.pdf>
- <https://www.mkgandhi.org/ebks/mindofmahatmagandhi.pdf>

#### **Evaluation Components of CIA**

1. Album Making - 30 Marks
2. Poster Presentation - 30 Marks
3. Group Discussion - 40 Marks

#### **Learning Outcomes:**

##### **On completion of the course the student will be able to**

- Understanding of Mahatma Gandhi's early life in India.
- Explore Gandhi's ideas regarding the relationship between Ends and Means, and the ethical dimensions of political and social action.
- Emphasis on decentralization of power and his vision of Gram Swaraj.

### **UWSV 505 CYBER SECURITY**

<b>Semester</b>	: V	<b>Credit</b>	: 1
<b>Category</b>	: Value Education	<b>Hours / Week</b>	: 2
<b>Class &amp; Major</b>	: III UG	<b>Total Hours</b>	: 26

#### **Objectives:**

##### **To enable the students**

- Understand the concepts of cyber security attacks in many applications.
- To identify the full range of cybercrimes, including data fraud.
- Establishing filters to scan messages for malicious content or attachments as well as to identify potential phishing attempts.

#### **Unit - I Introduction 8 Hours**

Cyber Security - Applications of Cyber Security - Cyber Attacks and their Classification. Cyber security in Finance - Safe Browsing - Tips for buying online

#### **Unit – II Cybercrime 9 Hours**

Cybercrime - Classification of Cybercrimes - Reasons of Cybercrimes - Kinds of Cybercrime- Data Frauds.

#### **Unit - III Web Security 8 Hours**

Web Security - E-mail Security - Mobile Device Security - Social Media Security. Malware - Type of Malware - Antivirus - Securing computer using free antivirus.

#### **Text Book**

- Jeetendra Pande. Introduction to Cyber Security

## E- Resources

- [https://heimdalsecurity.com/pdf/cyber\\_security\\_for\\_beginners\\_ebook.pdf](https://heimdalsecurity.com/pdf/cyber_security_for_beginners_ebook.pdf)
- <http://larose.staff.ub.ac.id/files/2011/12/Cyber-Criminology-Exploring-Internet-Crimes-andCriminal-Behavior.pdf>
- <http://www.uou.ac.in/sites/default/files/slm/FCS.pdf>
- [https://cyber-cops.com/book\\_detail](https://cyber-cops.com/book_detail)

## Evaluation Components of CIA

1. Assignment - 30 Marks
2. Case Study - 30 Marks
3. Group Discussion - 40 Marks

## Learning Outcomes:

### On completion of the course the student will be able to

- Analyze and evaluate the cyber security needs of an organization
- Measure the performance and troubleshoot cyber security systems.
- Protect and defend computer systems and networks from cybersecurity attacks.

## UWSV506 WOMEN'S EDUCATION

<b>Semester</b>	<b>: V</b>	<b>Credit</b>	<b>: 1</b>
<b>Category</b>	<b>: Value Education</b>	<b>Hours / Week</b>	<b>: 2</b>
<b>Class &amp; Major</b>	<b>: III UG</b>	<b>Total Hours</b>	<b>: 26</b>

### Objectives:

#### To enable the students

- Understand about the Need of Women's Education.
- Empower Themselves through Education.
- Analyze gender inequality in education and its negative effects.

### Unit - I Introduction

**9 Hours**

Education – Meaning – Definition - Concept of Women Education – Women's Education in Today's World. **Status of Women** - Gender Bias – Work related Issues - Existing Prejudices - Gender Discrimination- Political Participation - Lack of Women's Representation.

### Unit – II Sexism in Education

**9 Hours**

Sexism in Education – Education is an Agent to Change the Sex Role Stereo –type – Gender Inequality in Education - **Women in Educational Development** - Right to Education - Women’s Education – Education System for raising the Status of Women - Eradication of Literacy – Eradicating gender inequality.

**Unit – III Social Integration and Women**

**8 Hours**

Global Challenges – The Future of Women – The responsibility of the Educated Youth - Women in Decision Making – Sustainable Human Development – Integration with Global Markets.

**Reference Books**

- Agarwal, S.P. (2001). Women’s Education In India. Guwahati. Eastern Book House.
- Gupta, N.L. (2001). Women Education through Ages. Guwahati Eastern Book House
- Narasimha Sakuntala. (1999). Empowering Women. New Delhi. Sage Publications.
- Singh, N.K. (1999). Women Education. New Delhi. Sage Publications

**Evaluation Components of CIA**

1. Assignment - 30 Marks
2. Case Study - 30 Marks
3. Group Discussion - 40 Marks

**Learning Outcomes:**

**On completion of the course the student will be able to**

- Understand the concept of Women’s Empowerment.
- Maintain Work-Life Balance.
- Reorganize the Education System for Raising the Status of Women

**UWSV 507 WOMEN’S RIGHTS**

**Semester : V**

**Category : Value Education**

**Class & Major : III UG**

**Credit : 1**

**Hours / Week : 2**

**Total Hours : 26**

**Objectives**

**To enable the students**

- Understand about how Constitution Protects Women.
- Understand the sections dealing with working condition of women.
- Gain Knowledge about the Women’s Rights.

## **Unit - I Introduction**

**9 Hours**

Rights – Meaning – Definition - Introduction to Women Rights - Characteristics – Importance of rights- How Constitution Protects Women. **Equal Pay** - Meaning – Definition of Equal Pay – Directive Principles affecting Women – Equal Remuneration Act – Social Security – Maternity Benefits – Provident Fund and Gratuity – Bonus.

## **Unit – II Working Condition**

**9 Hours**

Working Condition under Factories Act – Plantation Labour Act - Working Journalism (Condition of the Service) Act and the Shops and Establishment Acts. **Job Security** - Meaning – Definition – Retirement on Superannuation – Simple Termination- Dismissal for Misconduct –Lay-Off – Retrenchment – Closure – Probation Period - Confidential Report.

## **Unit – III Women Rights in Criminal & Civil Law**

**8 Hours**

Misdeeds by Police – Rights of an Accused – Harassment Through Courts – Protection in Jail- Defamation in Civil Law – Contempt of Court - Right of Privacy.

### **Reference Books**

- M.J.Antony , Women’s Rights , Hind Pocket Books ( P ) Ltd New Delhi.
- Marjorie Agosin ed. (2005). Women Gender and Human Rights. Global Perspective. Rawal- Publication New Delhi.
- Mohini Chatterjee. (2004). Feminism and Women’s Human Rights-Vol.2.Aavishkar Publication, Jaipur
- [www.pucl.org/topics/gender/2003-pucl Bulletin](http://www.pucl.org/topics/gender/2003-pucl%20Bulletin,%20July%202003.%20Aug%202004), July 2003. Aug 2004 Agarwal, S.P. (2001). Women’s Education In India. Guwahati. Eastern Book House.

### **Evaluation Components of CIA**

1. Assignment - 30 Marks
2. Case Study - 30 Marks
3. Group Discussion - 40 Marks

### **Learning Outcomes:**

#### **On completion of the course the student will be able to**

- Understand the Working Condition for Women.
- Gain Knowledge about the various Acts for the Cause of Women.
- Realize the Women’s Rights in Criminal and Civil Law.

## UWSV 508 WOMEN'S HEALTH AND HYGIENE

<b>Semester</b>	<b>: V</b>	<b>Credit</b>	<b>: 1</b>
<b>Category</b>	<b>: Value Education</b>	<b>Hours / Week</b>	<b>: 2</b>
<b>Class &amp; Major</b>	<b>: III UG</b>	<b>Total Hours</b>	<b>: 26</b>

### Objectives:

#### To enable the students

- Understand the organs of the human reproductive system
- To identify and assess high risk behaviors exhibited by adolescents and how it can impact them
- To promote awareness and encourage positive conversations about menstrual hygiene among people of all ages.

#### Unit – I INTRODUCTION

**9 Hours**

Sexual Reproduction in Human – Introduction – Organs of the reproductive system – Primary - Secondary **Reproductive Organ** - Female Reproductive Organ - Structure of Ovary – Structure of Human Sperm – Structure of Human Ovum. **Introduction to Puberty** - Meaning – Definition - Menstrual Cycle – Process of Ovulation – Events of Menstrual Cycle and the Role of Hormones. **Fertilization** - Meaning – Definition - Stages of Pregnancy – Need of Regular Checkup – Child Birth – Population Explosion and Family Planning.

#### Unit - II Counselling for Adolescents

**9 Hours**

High Risk Behaviours, Developmental Changes in Adolescents, Key Issues of the Adolescents, need for Counselling, Nature of Counselling, Counselling Goals, Does helping help? The Good and the Bad news, Importance of Career Guidance Counselling.

#### Unit - III Personal Hygiene

**8 Hours**

Body Hygiene – Toilet Hygiene – Menstrual and Napkin Hygiene – Health related issues, Health Care in India vs Developed Countries, Health and Heredity, Public Health- objectives of public health in India.

#### Reference Books

- Aryasadhana. (2000). Women, Gender Equity and the State. Deep and Deep Publications. New Delhi.
- Behraman, J. Deoalikal, A. (2002). Health and Nutrition Handbook of Development Economics. North Hooland. Amsterdam.
- Diana M. Fraser (2004). Myles Text Book for Midwives. Churchill Livingtance.
- Eliza.B.Hurlock, Development Psychology: A Life – Span Approach, New Delhi, Tata McGraw-Hill, 1981, 5<sup>th</sup> Edition, August 18,2001.

**Evaluation Components of CIA**

1. Assignment - 30 Marks
2. Case Study - 30 Marks
3. Group Discussion - 40 Marks

**Learning Outcomes:****On completion of the course the student will be able to**

- Know about the Physiology of Women.
- Understand the Importance of Nutritional Diet and Post Pregnancy Care.
- Realize the Role of Gender in Women's Health Issue.

## VALUE ADDED COURSE PROFILE

### PREAMBLE:

**UG:** Programme Profile & the syllabi of value added courses offered in the I and II year (with effect from 2023 - 2024 onwards).

S.NO	DEPARTMENT	COURSE CODE	CERTIFICATE (50 Hours)	DIPLOMA (80 Hours)	Theory/ Practical	Hours	Credits
1	English	VOCC201	Content writing (External)	-	T	2	2
2	Business Administration	VOCD401	-	Social media marketing	T	3	3
3	Commerce	VOCD402	-	Entrepreneurial Development	T	3	3
4	Mathematics	VOCD403	-	Aptitude skills in Mathematics	T	3	3
5	Chemistry	VOCC202	Sugar Technology	-	T	2	2
		VOCD404	-	Water Management Technology	T	3	3
6	Biochemistry	VOCC203	Mushroom cultivation	-	T+P	2	2
7	Computer Science	VOCC204	MSME Embedded Technology Using IOT (External)	-	P	2	2
		VOCD405		Advanced MS Excel	P	3	3
8	Psychology	VOCD406	-	Cognitive behavioral therapy	T	3	3
10	Costume and Fashion Design	VOCD407	-	Basic Painting Types	P	3	3
11	Journalism and Mass Communication	VOCC205	Anchoring and News casting	-	T	2	2
12	Clinical Nutrition and Dietetics	VOCD408	-	Food safety & consumers Education	T	3	3
13	Tamil	VOCC206	Blog creation	-	T	2	2
14	Physics	VOCC207	First Aid (External)	-	T	2	2
15	General Course	VOCC208	Health & Fitness (External)	-	T	2	2
		VOCC209	Hindi(External)	-	T	2	2
		VOCC210	Band Music (External)	-	P	2	2

## GUIDELINES FOR CERTIFICATE/ VALUE ADDED COURSES

Certificate	:	50 hours/80 hours
Hours	:	2 / 3
Credit	:	2/3
Part	:	VI
Hands on Training	:	Field Visit with collaborating Industries according to the nature of the course
Question Paper Setting & Valuation	:	Internal/ External
Maximum marks/Duration	:	70 marks / 2 hours
		Marks & Credit will be entered in TACW Mark Statements
		Certificate will be issued by the college
Exam Pattern	:	Marks : $2 * 10 = 20$ $5 * 4 = 20$ $10 * 3 = 30$
Theory	:	Internal: 30 External:70
Practical	:	Internal:60 External:40
Valuation	:	External Courses valued by External MoU Agency Internal Courses valued by Internal Course Incharges



**CONTENT WRITING  
VOCC201**

**Semester : I**  
**Category : Value Added courses**  
**Class & Major: I BA English**

**Credits:2**  
**Hour/Week: 2 Hrs**  
**Total Hour: 50**

**Course Objectives**

<b>CONo.</b>	<b>To enable the students</b>
CO-1	Understand about Basic knowledge of content writing
CO-2	Acquire the knowledge of various styles and techniques of writing and editing.
CO-3	Develop style in visual content in writing.
CO-4	Enhance their creative skill & employability.
CO-5	Evaluate the language skills especially in the areas of grammar and pronunciation.

**Unit I: Basics of Content writing**

**7Hours**

Introduction - The Concept of Content Writing and its relevance-. Role and Functions of Content Writers- Print and Web Content Writing- Scope and Types of Content Writing - Principles and processes of content writing

**Unit II: Types of Content writing**

**12Hours**

- The process of Content Writing – getting the brief, ideating, researching, structuring, formatting, Editing and Proof-Reading—following company style sheet, grammar, copyflow, restructuring, market research.
- Writing Styles - Non-fiction (Essays, Reports), Advertising, Newspapers, Writing blogs, case studies, white papers.
- Corporate Communications – Writing for business to business (B2B), business to consumer (B2C), press releases, newsletters – focus on language, jargon, writing style, target audience, formal and informal language

**Unit III: Visual Content & Interactive Content**

**10 Hours**

**A. Visual Content**

- Info-graphics- Importance and relevance
- Images, Screenshots
- Videos, Memes, GIFs, 30 degree videos
- Product Demonstrations
- Interactive Content
- Quizzes
- Polls
- Interactive white papers

**Unit IV: Tools of the trade**

**11 Hours**

**A. Social Media**

- Understanding the basics of social media
- Understanding social media content writing
- Understanding PR

**B. Plagiarism laws in Content Writing**

- What is plagiarism, rules on plagiarism
- How to write plagiarism-free copies

**Unit V: E Content**

**10 Hours**

Writing for newspaper, E Magazine, blog, Social networking sites, Future of E Content

**Text Book:**

- Raman ,Usha. *Writing For The Media*, Oxford University Press

**Reference Books:**

- Handley, Ann. *Everybody Writes*, Pan Macmillan India.
- Anjana Naira Dev, Anuradhamarwaha And Swati Pal, Pearson, *Creative Writing: A Beginner's Manual*

**Course Outcomes:**

CONo.	On completion of the course the student will be able to	Bloom'sL evel
CO-1	Understand different types of writing and writing processes.	K1
CO-2	Acquire the skills and techniques to make writing faster and better	K3
CO-3	Identify and use rhetorical concepts to analyze and write about a variety of texts.	K2
CO-4	Equip students with demands of the digital world with global competency.	K5
CO-5	Evaluate the language skills especially in the areas of grammar and pronunciation.	K6

**SOCIAL MEDIA MARKETING**

**VOCD401**

**Semester : III**

**Credit : 2**

**Category : Value Added course**

**Hours /Week : 3**

**Class & Major: II UG**

**Total Hours : 80**

**Course Objectives:**

CO1	Provide basic knowledge about Social media marketing.
CO2	Understand and develop various Social media marketing tools used for business.

CO3	Know about the marketing analytics and measurement tools used for Social Media marketing.
CO4	Familiarise with online and Social media marketing
CO5	Understand various data analytics and measurement tools in marketing

### Unit 1 INTRODUCTION

**16 Hours**

Introduction - Introduction to Social Media, What is Social Media? - How Social Media developed, Managing Information – Aggregators, Google Alerts, Blogs.

### Unit 2 BLOGS

**16 Hours**

Blogs – Blogger, Tumblr, WordPress, and Influencers Who are they? How to find them How to use them to benefit your brand.

### Unit 3 SOCIALMEDIA

**16 Hours**

Facebook & Instagram- Creating groups and pages, Tips and Guides – Posts, Paid Promotion Ads, Contests. Twitter - Set-up and usage Tips. LinkedIn - Tips and Guides Review of profiles

### Unit 4 YOUTUBE

**16 Hours**

Set-up and management of YouTube and the Video Revolution. YouTube Long - form video platforms, setting up a channel, YouTube Channel Basics and Video Tips. The Three Uses of Video: Supportive, SEO, and Viral. Deliverable: a YouTube Marketing Plan

### Unit 5 COLLABORATIVE MARKETING

**16 Hours**

Collaborative Marketing & Crowd sourcing - Consumer-generated content (Encouraged Organic), New Technologies – Chat Bots/Messenger Bots and Artificial Intelligence.

#### Text Books:

- *Social Marketing in India* 1st Edition (Sameer Deshpande, Philip Kotler, Nancy R. Lee)

#### Reference Books:

- *Social Media Marketing* 1st Edition (Michael R. Solomon, Tracy Tuten)
- *The Art of Social Media: Power Tips for Power Users* (Guy Kawasaki, Peg Fitzpatrick)
- *Marketing with Social Media* (Linda Coles)
- *The Social Media Marketing Book* (Dan Zarrella)

#### Course Outcomes

CO No.	On completion of the course the student will be able to	Bloom's Level
CO1	Discuss Social media marketing and its framework	K1
CO2	Identify, use appropriately and explain Social media marketing tools	K2

<b>CO3</b>	Explain social media marketing and crowd sourcing	K3
<b>CO4</b>	Discuss online reputation management and its influence	K4
<b>CO5</b>	Identify the various data analytics and measurement tools in social media marketing	K5

## **ENTREPRENEURSHIP DEVELOPMENT**

### **V OCD402**

**Semester : III**

**Credits: 2**

**Category : VALUE ADDED COURSES**

**Hours/Week: 3**

**Class &Major: II B.COM**

**Total Hours: 80**

#### **Course Objectives:**

<b>CO No.</b>	<b>To enable the students</b>
CO 1	Understanding of entrepreneurship development
CO 2	Get an insight into the idea generation and opportunity identification
CO 3	Assess the barrier of business model development
CO 4	Evaluate the women entrepreneur and team building
CO 5	Know the government support for women entrepreneurs

#### **UNIT: I INTRODUCTIONS OF ENTREPRENEURSHIP**

**16 Hours**

Definition – characteristics – the role of entrepreneur in the economy – entrepreneurial mindset and traits – developing creativity and innovation skills – overcoming challenges and embracing failure

#### **UNIT: II IDEA GENERATION & OPPORTUNITY IDENTIFICATION**

**16 Hours**

Techniques for generating business ideas – identifying market gaps and opportunities – assessing the potential of business ideas – assessing the financial viability of business ideas – evaluating risks and rewards.

#### **UNIT: III BUSINESS MODEL DEVELOPMENT**

**16 Hours**

Understanding business models and value propositions – designing and refining business models – lean startup methodologies and minimum viable product (MVP) development.

#### **UNIT: IV WOMEN ENTREPRENEUR AND TEAM BUILDING**

**16 Hours**

Women entrepreneur – barriers and challenges faced by women –cultivating self-confidence and overcoming imposter syndrome - legal and regulatory considerations for women entrepreneurs – schemes for entrepreneurs – state and central schemes.

**UNIT: V ENTREPRENEURSHIP ELIGIBILITY & QUALITIES 16 Hours**

Essential skills and competencies for entrepreneurial success – assessing and developing key – entrepreneurial skills, such as creativity, problem solving, business expo and communication – successful stories of women entrepreneurs – various schemes for women entrepreneurs – central schemes - PMMY (pradhanmandri mudra yojana), Stand-up India scheme, Annapurna scheme, Mahila coir yojana, Udyogini scheme, Narishakthipuraskar – state government schemes – TNWED scheme, TNEDS scheme, Tamilnaduindustrial guidance and export promotion bureau (Guidance bureau), TNCDW, TIIC etc.,

**ACTIVITIES**

1. Assign students to conduct market research for a specific industry or target market to identify trends, customer preferences and potential opportunities,
2. Conduct a business model canvas workshop where students create and refine business models for their entrepreneurial ideas.
3. Students to develop a minimum viable product (MVP) for their business ideas.
4. Idea generation session for students for the better understanding of their creativity
5. Business simulation games – strategic planning, financial management, marketing campaigns and operational decision-making within a simulated business environment.
6. Design thinking challenges – involves empathy, ideation, prototyping and testing
7. Cross – disciplinary collaborations such as design, engineering or marketing.

**Text Book**

- David A.Kirby, “ *Entrepreneurship* “ Tata McGRaw Hills

**Reference Books**

- Khanka, S.S, “*Entrepreneurship Development*”, S. Chand & company
- Vasant Desai, “*Fundamentals of Entrepreneurship* “Himalaya Publishing House.,
- JasmersinghSain, “*Entrepreneurship and small Business*” Deep and Deep publication
- Shankar Raj, “*Entrepreneurship Theory and Practice*” Vijay Nicole Imprints Pvt ltd.

**Course Outcomes**

CO No.	On completion of the course the student will be able to	Cognitive Level
CO 1	Identify the basic and necessities of Entrepreneurs	K1
CO 2	Apply the knowledge on idea and opportunity identification	K2
CO 3	Acquire knowledge on business model development	K3
CO 4	Explain the women entrepreneurship and team building	K4
CO 5	Examine the Recent Trends in entrepreneurship	K5

**APTITUDE SKILLS IN MATHEMATICS**  
**VOCD403**

<b>Semester</b>	<b>: III</b>	<b>Credit</b>	<b>:2</b>
<b>Category</b>	<b>:Value Added Course</b>	<b>Hours/Week:</b>	<b>3</b>
<b>Class &amp;Major</b>	<b>:II UG</b>	<b>Total Hours:</b>	<b>80</b>

**Course Objectives:**

<b>CO No.</b>	<b>To enable the students</b>
CO 1	Understand the basic concepts of quantitative ability
CO 2	Understand the basic concepts of logical reasoning Skills
CO 3	Acquire satisfactory competency in use of reasoning
CO 4	Solve campus placement aptitude papers covering Quantitative Ability, Logical Reasoning Ability
CO 5	Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC,GPSC etc.

**UNIT-I : Quantitative Ability (Basic Mathematics) 16 Hours**

Number Systems-LCM and HCF- Decimal Fractions –Simplification- Square Roots and Cube Roots- Average- Problems on Ages- Surds & Indices- Percentages- Problems on Numbers

**UNIT– II: Quantitative Ability (Applied & Engineering Mathematics) 16 Hours**

Logarithm- Permutation and Combinations- Probability- Profit and Loss- Simple and Compound Interest - Time, Speed and Distance - Time& Work – Ratio and Proportion- Area- Mixtures and Allegation.

**UNIT– III : Data Interpretation 16 Hours**

Data Interpretation- Tables- Column Graphs- Bar Graphs- Line Charts- Pie Chart- Venn Diagrams.

**UNIT– IV : Logical Reasoning 16 Hours**

Analogy- Blood Relation- Directional Sense- Number and Letter Series- Coding– Decoding- Calendars- Seating Arrangement- Syllogism- Mathematical Operations.

**UNIT– V : Mensuration 16 Hours Mensuration-**  
Volume and Surface area- Cylinder- Cone- Sphere.

**Text Book :**

- Dr.R. S Aggarwal. (2022). *A Modern Approach To Verbal & Non Verbal Reasoning*.

**Reference Books:**

- Dr.R. S. Aggarwal. (2017). *Quantitative Aptitude for Competitive Examinations*, S.Chand Publications.

- Peeyush Bhardwaj. (2015). *Analytical Reasoning & Logical Reasoning for CAT, MAT, CMAT, BANK(PO/CLERK), UPSC, etc.*, Arihant Publications.
- B.S.Sijwali . (2018). *A New Approach to Reasoning Verbal, Non-Verbal & Analytical*, Arihant Publications India limited.

### Course Outcomes

CO No.	The student will be able to	BloomsLevel
CO 1	Recall the shortcuts of Quantitative Ability.	K1
CO 2	Apply the formulas in Quantitative Ability.	K3
CO 3	Apply the Data Interpretation with Using Graphs, chart and Venn Diagram.	K3
CO 4	Analyze the Logical Reasoning.	K4
CO 5	Analyze the verbal Reasoning.	K4

## SUGAR TECHNOLOGY VOCC202

**Semester : I**

**Credit : 2**

**Category : Value Added Course**

**Hours/Week : 2**

**Class & Major: I UG**

**Total Hours :50**

### Course objectives:

CO	To enable students
CO1	To study about the sources of sugar
CO2	Advances methods of sugarcane preparative devices
CO3	Study about the sugarcane harvesting
CO4	Examine the cane handling equipments
CO5	Analyze the sugar derivatives

### Unit – I Introduction

**10Hours**

Etymology, History (accent time & middle age) Modern History. Chemistry of sugar, Constituents of sugar, Natural polymers of sugars, Flammability of sugar. Types of sugar, Monosaccharide– Glucose, Fructose, Disaccharides – Sucrose, maltose, Lactose.

**Sources of sugar-** Sugar beet, sugarcane, Refining of sugars, Sugar production countries.

### Unit – II Health effects10Hours

Forms of sugar and its use Consumption Health effects of sugar- Blood glucose level – Obesity and diabetes – Cardiovascular disease- Alzheimer’s disease – Tooth decays – Addiction forming – Hyper activity- Measurement.

**Unit – III Sugarcane harvesting****10Hours**

Introduction, structure of cane, methods of juice extraction, definition of technical terms, Sugarcane harvesting – manual & mechanical, advantages & disadvantages.

**Unit – IV Sugarcane handling equipments 10Hours**

Description of feeder table, cane carrier, kicker. Preparatory devices– knives, shredder, fibrizer, preparatory index. Cane carrier, donnelly chute, pressure feeders.

**Unit –V Sugar manufacture****10Hours**

Evaporation-Principal & different configuration of evaporator sets, single effect and multiple effect evaporation, vapour cell, vapour bleeding, scale formation their removal and effect on the efficiency of evaporation, removal of condensate and incondensable gases.

Molding of jaggery, Blood glucose level testing and Industrial Visit.

**Text Book**

- Advanced organic chemistry : Reactions, Mechanism & Structure Jerry march.

**Reference Books**

- J.M. Patura by products of the cane sugar industry 2<sup>nd</sup> ed. 1981 p.34.
- Cane sugar handbook by Meade & C.P. Chen 10<sup>th</sup> Ed. 1977 p.103
- “Cane Sugar” by Noel Deerr 1921 p. 101.
- Text book of practical organic chemistry : A.I. Vogel.

**Course Outcome:**

CO	To enable students	Bloom's Level
CO1	Described the forms of sugar and its use consumption health effects of sugar	K1
CO2	Discussed the preparation method devices of cane	K2
CO3	Generalize the harvesting methods of sugarcane	K3
CO4	To know about the sugarcane handling equipment	K4
CO5	To know about the sugar derivatives	K5

**WATER MANAGEMENT AND TECHNOLOGY****VOCD404****Semester : I****Credit : 2****Category : Value Added Course****Hours/ Week : 3****Class & Major: I UG****Total Hours : 80****Course Objectives:**

CO No.	On completion of the course the student will be able to
CO-1	Understand water quality standards The student acquires mastery in computing population and water demand



CO-2	Understand water quality standards, describes types of water supply schemes, water quality parameters and standards.
CO-3	Design treatment units for water supply scheme.
CO-4	Provides the knowledge on the principles, design of unit operations and processes in water distribution system.
CO-5	Understands the need for exposure to the recent trends in water treatment and supply system.

### **Unit-I: Introduction of water**

**16 hours**

Water Sources, need for water supply, schemes - types and objectives. Drinking water quality parameters, soft and hard water, methods of removal of hardness-water pollution- Estimation of hardness of water using EDTA.

### **Unit- II: Industrial requirements**

**16 hours**

Requirements of an industry - location - water - industrial water treatment - safety measures - Hardness of water: temporary and permanent hardness, disadvantages of hard water -Softening of hard water - Zeolite process.

### **Unit- III: Purification technology of water**

**16 hours**

Rate of water supplies for urban and rural systems. Demineralization process and reverse osmosis - Purification of water for domestic use: use of chlorine, ozone and UV light – definition and determinations of BOD and COD.

### **Unit- IV: Water treatment design**

**16 hours**

Design principles and criteria: aeration, Parshall flume, flash mixer, coagulation – flocculation systems, types of settling, sedimentation, tube settlers, pulsators, filtration, disinfection processes – numerical problems. Cross flow systems, Green flocculants.

### **Unit- V: Recent trends of water technology practicals**

**16 hours**

- i) Alum recovery in filter backwash.
- ii) New underflow designs in filtration systems.
- iii) Determination of COD of waste water.
- iv) Determination of Chloride content in water sample.
- v) Estimation of hardness of water using EDTA

### **Text Book**

- Dara S.S., *Text book of Environmental chemistry and Pollution Control*, S.Chand and Co., New Delhi, 2006.

### **Reference Books**

- Howard S. Peavy, Donald R. Rowe, George T, (2015), “*Environmental Engineering*” -McGraw Hill International Edition. New York.
- David Hendricks, (2010), “*Fundamentals of Water Treatment Unit Processes*”: Physical, Chemical, and Biological, CRC Press.

- Edward M. Motley, Guang Zhu, Syed R. Qasim, (2000), “*Water Works Engineering*”: Planning, Design and Operation, Prentice Hall.

### **COURSE OUTCOMES:**

<b>CO No.</b>	<b>On completion of the course the student will be able to</b>	<b>Bloom’s Level</b>
CO-1	Understand water quality standards and parameters and solve numerical problems related to population forecasting and basics of unit operations and processes	K1&K2
CO-2	Analyze the flow schemes, Hardness of water: temporary and permanent hardness.	K1&K2
CO-3	Design the various treatment units for water supply scheme.	K3
CO-4	Gain an in-depth knowledge of water supply network system.	K4
CO-5	Understands the need for advanced water treatment with automation in treatment.	K5

### **CERTIFICATE COURSE IN MUSHROOM CULTIVATION (VOCC203)**

<b>Semester</b>	<b>: I &amp; II</b>	<b>Credits</b>	<b>: 2</b>
<b>Category</b>	<b>: Value Added</b>	<b>Hours / week</b>	<b>: 2</b>
<b>Class &amp; Major</b>	<b>: I UG</b>	<b>Total Hours</b>	<b>: 50</b>

### **COURSE OBJECTIVES**

<b>CO</b>	<b>To enable the students to</b>
<b>CO1</b>	Study the morphology types of Mushrooms.
<b>CO2</b>	Know the nutrient value of mushroom and Aware the identification of edible and poisonous Mushrooms.
<b>CO3</b>	Understand the Diseases and Post harvesting techniques of Mushrooms
<b>CO4</b>	Facilitate self-employment and entrepreneurship through practicals.
<b>CO5</b>	Know the spawn production technique through field visit.

#### **UNIT- I INTRODUCTION TO MUSHROOMS AND ITS LIFE CYCLE                      7 Hours**

History of mushroom cultivation. Morphology, classification - edible and poisonous mushrooms. Wild and cultivated mushrooms. Life cycle of *Agaricus* spp, characteristics and importance of *Volvariella* spp., *pleurotus* spp., *Calocybe* spp., and *Lentinus* spp.

#### **UNIT- II CULTIVATION AND BIOLOGICAL IMPORTANCE                                      8 Hours**

Conditions for tropical and temperate countries - isolation, spawn production, growth media, spawn running and harvesting of mushrooms. Medicinal and nutritional value of mushrooms. Composting: importance in waste recycling

Spawn & Spawning: Facilities required for spawn preparation, Preparation of spawn substrate, preparation of pure culture, media used in raising pure culture, culture maintenance, and storage of spawn.

**UNIT- III DISEASES AND POST HARVEST TECHNOLOGY****10 Hours**

Diseases and pest affecting mushroom. Post-harvest technology: Refrigeration – Freeze, drying, canning, irradiation and entrepreneurship. Principles of composting, machinery required for compost making, materials for compost preparation. Methods of Composting - Long method of composting (LMC) & Short method of composting (SMC).

**UNIT- IV MUSHROOM CULTIVATION (PRACTICALS)****15 Hours**

Bed and shed preparation, sowing seedlings, pest control, fumigation and harvesting Cultivation of Button, Oyster and Straw Mushrooms: Collection of raw materials, compost & composting, spawn & spawning, casing & case run, cropping & crop management, picking & packing. Visit to relevant Labs/Field Visits

**UNIT - V MUSHROOM RECIPIES (PRACTICALS) & HEALTH BENEFITS OF MUSHROOM****10 Hours**

Mushroom soup, Mushroom pickle, Mushroom Pulav, Mushroom Chips Health benefits of Mushroom: Antiviral value, antibacterial effect, antifungal effect, anti-tumor effect, haematological value cardiovascular & renal effect, in therapeutic diets, adolescence, for aged persons & diabetes mellitus.

**Text book**

- Nita Bahl. (2009). *Hand book of Mushroom*. (4<sup>th</sup> Ed.) Vijay primlani for oxford Publication Co. Pvt Ltd, New Delhi.

**Reference Books**

- Chang.T.S. & Hayes. W.A. (2007). *The biology and Cultivation of Edible Mushrooms*. (2<sup>nd</sup> Ed.). Academic Press, New York.
- Ignacimuthu.S. (2008). *Applied Plant Biotechnology*. (3<sup>rd</sup> Ed.). Oxford & IBH Publishing Co.Pvt.Ltd, New Delhi.
- Nair M.C &Gokulapalan. C and Lulu das. (2008). *Topics on Mushroom Cultivation*. (3<sup>rd</sup> Ed.) Scientific Publishers, Jodhapur, India.

**COURSE OUTCOMES**

CO	On completion of the course the student will be able to
CO1	Students can start small scale industry of Mushroom cultivation.
CO2	Students will be able produce spawn on their own.
CO3	Learned the prospects and scope of mushroom cultivation in small scale industry.
CO4	Studied the morphology and types of Mushrooms and technique of Mushroom cultivation.
CO5	Understood the Diseases. Post harvesting techniques of Mushrooms.

**EMBEDDED SYSTEM WITH IOT****VOCC204****Semester : I/ II****Category : Value Added course****Class &Major: I year****Hour/Week: 2****Total Hour: 50**

## COURSE OBJECTIVES

CO No.	To enable the students
CO-1	To understand fundamentals of IoT and embedded system including essence, basic design strategy and process modeling.
CO-2	To introduce students a set of advanced topics in embedded IoT and lead them to understand research in network.
CO-3	To develop comprehensive approach towards building small low cost embedded IoT system.
CO-4	To learn to implement secure infrastructure for IoT
CO-5	To learn real world application scenarios of IoT along with its societal and economic impact using case studies

### UNIT – I FUNDAMENTALS

**10 Hours**

Fundamentals of Embedded Systems - Application Areas - Embedded System Hardware Design - Design and Development of Embedded Software.

### UNIT – II INTRODUCTION

**10 Hours**

Real Time Embedded System - Microprocessor & Microcontroller - Introduction to CISC & RISC Architecture - Memory Organization - Introduction PIC Microcontroller

### UNIT – III ARCHITECTURE

**10 Hours**

Architecture and Instruction Set - Compiler-Hitech - IDE- Mplab - I/O Ports and SFRs - Interrupts - Timers and ADC.

### UNIT – IV PROTOCOLS

**10 Hours**

Serial Communication Protocols - USART, SPI, I2C ARDIUNO Programming - ARDIUNO Architecture - Programming Principles.

### UNIT – V APPLICATION

**10 Hours**

Interfacings - Introduction to IoT - IoT Applications - IoT communication protocols  
Projects using ESP8266 Node MCU - Sensor interfacing with ESP8266

#### Text Book:

- Perry Xiao “*Designing Embedded Systems and the Internet of Things (IoT) with the ARM mbed*” (Wiley - IEEE) Hardcover – Import, 20 July 2018.

#### Reference Books:

- Raj Kamal “*EMBEDDED SYSTEMS*”, 4<sup>th</sup> EDITION, August 2020.
- Alexander G. “*Embedded Systems Fundamentals with Arm Cortex M Based Microcontrollers: A Practical Approach*”, March 2017.
- Klaus Elk “*Embedded Software for the IoT*”, Published by De Gruyter, December 2018.

## COURSE OUTCOMES

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Explain the real time embedded system and its components	K1
CO-2	Solve the given societal challenge using IoT	K2
CO-3	Understand basic components and building blocks of Internet of Things.	K3
CO-4	Apply skills to conduct interfacing of embedded boards with components, actuators and sensors.	K4
CO-5	Summarize the programming and instructions sets of ARM embedded processor.	K5

## ADVANCED EXCEL VOCD405

Semester : III/ IV

Category : Value Added course

Class & Major : II year

Hour/Week: 3

Total Hour: 80

## COURSE OBJECTIVES

CO No.	To enable the students
CO-1	Understanding basic Formulas and Functions
CO-2	Practice of Analysis and Business Intelligence in excel
CO-3	Understanding about different Functions
CO-4	Illustrate knowledge in Tables and Charts
CO-5	Create Applications using advance excel tools

### UNIT – I Basic Functions

15 Hours

**Operations with Formulas and Functions:** Sum, Average, Count, Max, Min. **Text Function:** Format the text as RIGHT, LEFT, MID, UPPER, LOWER, PROPER functions, CONCATENATE function. **Date and Time Function:** NOW, TODAY, YEAR, MONTH, DAY, and Date Difference functions. **Custom Data Formats and Validation:** Create custom number formats - Populate cells by using advanced Fill Series options- Configure data validation – flash fill -. Remove duplicates - Drop Down Lists in Excel -Hyperlinks in Excel. **Conditional Formatting and Filtering:** Create custom conditional formatting rules- Create conditional formatting rules that use formulas- Manage conditional formatting rules.

### UNIT – II Data

15 Hours

**Data Validations:** Specifying a valid range of values for a cell - Specifying a list of valid values for a cell - Specifying custom validations based on formula for a cell. **Sorting and Filtering Data:** Sorting tables - Using multiple-level sorting - Using custom sorting - Filtering data for selected view - AutoFilter - Using advanced filter options. **Data Analysis and Business Intelligence:** Import,

transform, combine, display, and connect to data - Consolidate data - Perform what-if analysis by using Goal Seek and Scenario Manager - Calculate data by using financial functions-PMT, IPMT,PPMT,NPV,XNPV,IRR,XIRR,MIRR,NPER,RATE function.

### **UNIT – III Conditional Logic in Excel**

**16 Hours**

**Conditional Functions:** The IF Function –CountIF - Count IFS –SUMIF -SUMIFS-AVERAGEIF. **Logical Function:** AND,OR,NOT. LookUp and Reference Function:VLOOKUP, HLOOKUP, MATCH, INDEX,OFFSET/INDIRECT.

### **UNIT – IV Microsoft Excel Charts& Tables**

**17 Hours**

**Charts:** Formatting Charts - Using 3D Graphs - Using Bar, Pie,Column and Line Chart together - Using Secondary Axis in Graphs. **Pivot Tables:** Create PivotTables - Modify field selections and options - Create slicers - Group PivotTable data - Add calculated fields. **Pivot Charts:** Create **PivotCharts-** Manipulate options in existing Pivot Charts- Apply styles to PivotCharts- Drill down into PivotChart details.

### **UNIT – V Advanced Excel**

**17 Hours**

**Data Analysis:** Descriptive Statistics, Histogram, Correlation, Anova. Data Forms in Excel - **VBA and Macros:** Copy macros between workbooks -Reference data in other workbooks - Enable macros in a workbook - Create and modify simple macros - Record simple macros - Name simple macros - Edit simple macros -Insert and configure form controls. Creating Forms -Using Controls and their Properties - Moving to Other Cells - Editing Specific Cells - Storing Data in Variables - declare variables - Selecting data types -Fixed and dynamic arrays –Constants.

### **PRACTICALS:**

- Student Markstatement Preparation
- Electricity Bill Preparation
- Passbook Creation
- Monthly Expenses / Budget
- Loan EMI Calculator

### **Text Book:**

- Mike Smart, “*Learn Excel 2016 Expert Skills with The Smart Method: Courseware Tutorial teaching Advanced Techniques*”, March 3, 2016.

### **Reference Books:**

- Jordan Goldmeier, “*Advanced Excel Essentials*”, November 2014
- L. Winston Wayne, “*Microsoft Excel 2019: Data Analysis & Business Model*”, October 2019
- Oz du Soleil & Bill Jelen, “*Guerrilla Data Analysis Using Microsoft Excel: 2nd Edition Covering Excel 2010/2013*”, Second Edition.
- Mark Harmon, “*Step-By-Step Optimization with Excel Solver - The Excel Statistical Master*”, Excel Master Series publisher, April 2, 2012.

### **COURSE OUTCOMES**

<b>CO No.</b>	<b>On completion of the course, the student will be able to</b>	<b>Bloom's Level</b>
CO-1	Use advanced budgeting functions to use Excel for loan analysis	K1
CO-2	Create templates after writing complex worksheets and workbooks	K2
CO-3	To apply mathematical function to get accurate results	K3
CO-4	Execute data tables and scenario management	K4
CO-5	Develop Projects using Advance excel tools	K5

**COGNITIVE BEHAVIOURAL THERAPY  
VOC406**

**Semester : III**  
**Category : Diploma**  
**Class & Major : II UG**

**Credit : 3**  
**Hours/ week : 3**  
**Total hours : 80**

**COURSE OBJECTIVES**

<b>CO No.</b>	<b>To enable the students</b>
CO-1	Defining the basic strategies employed in practice for clinical monitoring.
CO-2	Demonstrate provision of psychoeducation to intervention to their peers in a cognitive behaviour group format.
CO-3	Determining automatic thoughts, assumptions, rules, and core beliefs in a group or individual therapy format.
CO-4	Illustrate how to assign, assess, and problem-solve therapeutic homework.
CO-5	Facilitate the development of an exposure hierarchy and the implementation of exposure intervention in a group or individual therapy format.

**UNIT I - INTRODUCTION**

**16 Hours**

Myths and Facts about CBT; Importance of developing the therapeutic relationship; CBT theories for anxiety and depressive disorders.

**UNIT II – CBT PRINCIPLES**

**16 Hours**

Case Formulation & Therapeutic Monitoring - Assignment: Case formulation assigned

**UNIT III – PSYCHO-EDUCATION**

**16 Hours**

Psycho-education in CBT & Therapeutic Homework - Assignment: Demonstrate Psycho-education.

**UNIT IV – IDENTIFICATION OF THOUGHT**

**16 Hours**

Behavioural Activation in CBT - Identification of Thoughts in CBT - Assignment: Demonstrate identification of thoughts.

## UNIT V – EXPOSURE

16 Hours

Challenging thoughts in CBT - Exposure to CBT - Assignment: Demonstrate the use of exposure interventions.

### Text Book

- Beck, Judith (2011). Cognitive Behavior Therapy, Second Edition: Basics and Beyond. New York: Guilford.

### Reference Books

- Cormier, S., Nurius, P. S., & Osborn, C. J. (2013). Interviewing and change strategies for helpers (7th ed.). New York: Brooks/Cole.
- Cormier, S., Nurius, P. S., & Osborn, C. J. (2002). Interviewing and change strategies for helpers (5th ed.). New York: Brooks/Cole.
- Goldfried, M. R., & Davison, G. C. (1994). Clinical behaviour therapy. New York: Wiley.
- Bieling, P. J., McCabe, R. E., & Antony, M. M. (2006). Cognitive-behavioral therapy in groups. New York: Guilford
- Leahy, R. L., & Holland, S. J. (2000). Treatment plans and interventions for depression and anxiety disorders. New York: Guilford.

### e-Resource

- <https://www.verywellmind.com/what-is-cognitive-behavior-therapy-2795747>
- <https://www.mayoclinic.org/tests-procedures/cognitive-behavioral-therapy/about/pac-20384610>
- <https://www.apa.org/ptsd-guideline/patients-and-families/cognitive-behavioral>
- <https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/cognitive-behaviour-therapy>
- <https://my.clevelandclinic.org/health/treatments/21208-cognitive-behavioral-therapy-cbt>

## COURSE OUTCOMES

CO No.	On completion of the course, the student will be able to	Bloom's Level
CO-1	Outlining theories and theoretical assumptions associated with cognitive-behavioral therapy.	K1
CO-2	Understand and describe CBT adaptations to a variety of psychological problems.	K2
CO-3	Implementing initial skills in applying CBT strategies.	K3
CO-4	Illustrating the critical elements of a cognitive-behavioural case formulation.	K4
CO-5	Assessing a cognitive-behavioural case formulation using the elements of a case formulation.	K5



**BASIC PAINTING TECHNIQUES**  
**VOCD407**

**Class & Major: II year**

**Credit: 2**

**Category: Value Added course**

**Hour/Week: 3**

**Total Hour: 80**

**Course Objectives**

<b>CO No.</b>	To enable the students
CO 1	Identify about the different types of basic pencil shading
CO 2	learn about different types of painting techniques
CO 3	Compile various techniques in fabric painting & Display of fabric paintings in exhibitions
CO 4	study the basic fabric paint in apparel industry
CO 5	Classify creativity and learn techniques of fabric painting

**UNIT: I BASIC PENCIL SKETCHING**

**16 Hours**

Movement of Pencil, -Freehand Drawing (Basic), -Shades & Shading, -Methods & Materials

**UNIT: II BASIC COLOR THEORY**

**16 Hours**

Primary colors - Secondary Colors - Tertiary Colors - Color mixing & brushes - methodology & types - Selection of cloths & painting,

**UNIT: III TYPES OF PAINTINGS**

**16 Hours**

Drawing, Pencil Shading - Nature Work - Creative Designs - Finger Painting, -Painting on Pillow Cover - Bed covers - Painting on saree - Painting on handkerchief.

**UNIT: IV POT PAINTINGS**

**16 Hours**

3 Types - single color, double color and three color

**UNIT: V CANVAS PAINTING**

**16 Hours**

3 Types - single color, double color and three color

**Text Book**

- Raviraj. (2007). *Pencil Shading, Basic Techniques*. New Century Book House Pvt Ltd. Chennai.

**Reference Books**

- Pundalik Vaze. (2002). *Draw and Paint. I Edition*. Jyotsna Prakashan. Pune.
- Gopal Nandurkar. (2004). *Colour pencil*. Rahul Deshpande. I Edition. Jyotsna Prakashan. Pune.
- Bina Abling. (2005). *Fashion Sketch Book. 4<sup>th</sup> Edition*. Om Books International. New Delhi.
- Steven Stipelman. (2005). *Illustrating Fashion Concept to Creation. 2<sup>nd</sup> edition*. Fairchild publication. New York.
- Colour in Fashion Illustration: “*Drawing and Painting Techniques*”, Paperback – Illustrated, 1 September 2018 by Tiziana Paci (Author)
- How to Paint: *A Complete Beginner's Guide to Watercolors, Acrylics, and Oils*, Authors Angela Gair, Ian Sidaway Fox Chapel Publishing, 2019

- Pooja Khurana& Monika Sethi . (2007). *Introduction to Fashion Technology*. Firewall Media Pvt.LtdNewDelhi.
- RanjanaSinghal and KannakiBharali. (2010). *Fashion Rendering*. Om books Internationals. Noida.

### Course Outcomes

CO No.	The student will be able to	CognitiveLevel
CO 1	Familiarize with the Process of pencil shading	K1
CO 2	Learn about the Classification of fabric painting	K2
CO 3	Functional of pencil & brush stroke	K3
CO 4	Understand the color techniques	K4
CO 5	Understand Applying of different brush stroke	K5
CO 6	Develop skills, and create creative design for the patterns	K6

### ANCHORING AND NEWSCASTING VOCC205

**Semester: I**

**Category: Value Added Course**

**Class and Major: I UG**

**Credit : 2**

**Hours/Week: 2**

**Total Hours: 50**

### COURSE OBJECTIVES

CO. NO.	Course Objectives To enable the students
CO-1	Develop an understanding of the roles and responsibilities of live and recorded television presenters.
CO-2	Demonstrate effective language skills, including correct diction, pronunciation, and enunciation for clear communication
CO-3	Cultivate skills in utilizing voice, speech, and breath exercises to enhance delivery and projection
CO-4	Utilize appropriate body language techniques to convey confidence and professionalism on camera.
CO-4	Familiarize oneself with the technical parameters of camera operation, multi-camera setups, lighting, and sound in a broadcasting environment.

### UNIT I ROLES OF LIVE AND RECORDED TELEVISION PRESENTERES 10 Hours

Understanding the various roles of live & recorded television presenters, Do's and don'ts for the presenter. Developing language skills. Correcting diction, Voice, speech and breath exercise, Body Language, Familiarization with the technical parameters of camera, multi camera setups, light and sound.

### UNIT II MASTERING THE ART OF ENGAGING WITH THE UNSEEN AUDIENCE

Creating a bond with the unseen audience, performing with makeshift Teleprompters. Overcoming glitches, Preparing and researching for your subjects, Interviews skills, Live reporting, Grooming and make-up.

**UNIT III THE BROADCAST NEWS INDUSTRY** **10 Hours**

Control room, newsroom staff descriptions, write a story and discuss, review a newscast. Discuss news standards, the business of broadcast news, the lineup meeting, structuring a newscast, writing for a newscast; analyze an actual Prime Time and technical orientation.

**UNIT IV NAVIGATING THE BROADCAST NEWS WORLD** **10 Hours**

Story meeting, technical orientation, practice at positions including anchoring, interviewing and narrating, lineup meeting, writing and producing a simulated newscast.

**UNIT V PRODUCING A DYNAMIC LIVE NEWSCAST** **10 Hours** Produce a LIVE newscast: lineup meeting, gather material, writing, rehearsing functions, broadcast LIVE.

**Activities:**

1. Reading exercise: Presentation of audio and video script.
2. Voice over.
3. Compering.
4. Phone in program
5. Radio jockeying.
6. Anchoring - extempore skills.
7. Piece to Camera.
8. Presentation of Radio News.
9. Presentation of Television News.

**Textbook**

- Reardon, N., & Flynn, T. (2014). *On Camera: How To Report, Anchor & Interview*. Oxfordshire, England: Taylor & Francis.

**Reference Books**

- Kalra, R. J. (n.d.). *The ABC of News Anchoring*. Delhi, India: Pearson Education India.
- Zachariah, A. (2009). *Radio Jockeying And News Anchoring*. Kanishka Publishers.
- Mdoe, S. (2019). *TV News Anchoring: A Guide to Professional Newscasting*. Kenya: SwalehMdoe.
- Nagpal, B. (2020). *Working For Media: Handbook For Building A Career In Journalism: Learn The Art Of Anchoring, Reporting And News-Making*. (n.p.): Amazon Digital Services LLC - KDP Print US.

**Course Outcome:**

CO. NO.	On the completion of the course the student will be able to	Bloom's Level
CO-1	Describe different formats and genres in television presenting.	K1,K2
CO-2	Identify proper diction, pronunciation, and enunciation techniques for clear communication.	K3

<b>CO-3</b>	Demonstrate voice exercises to improve projection and vocal quality in television presenting.	K4
<b>CO-4</b>	Apply body language techniques to engage the audience during television presenting.	K5
<b>CO-4</b>	Assess the role of lighting and sound in enhancing storytelling and conveying information effectively in television broadcasting.	K6

**FOOD SAFETY & CONSUMER EDUCATION  
VOCD408**

**Semester : III**

**Credit : 2**

**Category : Value Added course**

**Hour/Week: 3**

**Class & Major: II year**

**Total Hour: 80**

**COURSE OBJECTIVES**

<b>CO NO</b>	<b>To enable the students to</b>
<b>CO-1</b>	Learn the various aspects and programmes related to food safety
<b>CO-2</b>	Understand the available food laws and regulations
<b>CO-3</b>	Be familiar with the problems in buying and consumer legislations.
<b>CO-4</b>	Become aware of marketing conditions and the means for problem redresses.
<b>CO-5</b>	Create awareness on various consumer buying problems.

**UNIT I INTRODUCTION TO FOOD SAFETY**

**15 Hours**

Food Safety, definition of food safety and food spoilage, factors affecting food safety and food spoilage.

**UNIT II FOOD ADULTERATION**

**15 Hours**

Definition, types of adulteration in various foods-intentional, incidental and metallic contaminants

**UNIT III CURRENT FOOD SAFETY STANDARDS IN INDIA**

**15 Hours**

Current Food Safety regulations 2011, Food Safety and Standards Authority of India, objectives of developing Food Safety Standards. ISI, BIS, Agmark, HACCP

**UNIT IV CONSUMERISM AND CONSUMER BUYING PROBLEM**

**15 Hours**

Definition and the concept of consumerism – consumer, producer and market. Characteristics of consumers, role of consumers in the Indian economy. Malpractices – Incorrect weights and measures. Misleading Advertisement and Misbranding.

**UNIT V CONSUMER DECISION MAKING PROCESS AND CONSUMER PRODUCT ACT**

**15 Hours**

Types of consumer decisions, process of decision making, factors determining and influencing consumer behavior, guidelines for wise buying practices Consumer Law, Concept, Features, Objectives and Scope, Ways and Means of consumer's productions in India, Nutrition Labelling and Education Act.

**References:**

- Gupta, C.B. and Nair, R.N (2004). *Marketing Management*: Sultan Chandand Sons,
- Juliana, M (2011). *Green consumerism*, United States: SAGE Publishers.
- Kathiresan, S. Radha, V (2004), *Marketing*: Chennai, Prasanna Publisher.

**e-LearningResources:**

- <http://www.jagograhakjago.com/consumer-rights/>
- <https://consumeraffairs.nic.in/organisation-andunits/division/bureau-indian-standards>

**COURSEOUTCOMES**

CO NO	To enable the students to	Blooms Level
CO-1	Understand the national and international programmes and Jaws on food safety and standards	K1
CO-2	Recognize the role of food handlers, food safety officers and health personnel.	K2
CO-3	Implement wise buying practices.	K3
CO-4	Explain consumer protection legislations and standards.	K4
CO-5	Assess the quality of a product based on the knowledge gained.	K5 & K6

**வலைப்பதிவுஉருவாக்கம்  
(VOCC206)**

வகுப்பு: இளங்கலைத்தமிழ்முதலாமாண்டு தரம்: 02

பிரிவு: தொழிற்கல்விப்பாடம்

மணிநேரம்/ வாரம் : 02

மொத்தமணிநேரம்: 50

அலகு 1 வலைப்பதிவுதோற்றம்வளர்ச்சி 10 மணிநேரம்  
 வலைப்பதிவுபொருள் - வரையறை - வெப்லாக்-  
 வலைப்பதிவுநிறுவனங்கள் - தொடக்காலவலைப்பதிவிற்பாகங்கள்.

அலகு 2 வலைப்பதிவினைஉருவாக்கும்முறைகள் 10 மணிநேரம்  
 வலைப்பதிவுதளம்செல்லுதல் -  
 புதியவலைப்பதிவினைதேர்ந்தேடுத்தல் - பெயரிடல் - சேமித்தல் -  
 வலைப்பதிவுபக்கங்களைஉருவாக்கும்முறைகள் - திருத்தும்முறைகள் -  
 நிர்வகிக்கும்முறைகள் - நீக்கும்முறைகள்.

அலகு 3 வலைப்பதிவிற்வகைகள் 10மணிநேரம்  
 கல்வி - அரசியல்- தனிநபர் - சமூகம் - கலை - பொழுதுபோக்கு -  
 விழிப்புணர்வு - நூல் - திறனாய்வு - சிறுவர் - படைப்பு - இலக்கியம் - கற்றல் .

அலகு 4 தமிழில்பயனுள்ளவலைப்பதிவுகள் 10 மணிநேரம்

வரிசைஎண்	கற்றலிற்நோக்கம்
கற்றலிற்நோக்கம் 1	வலைப்பதிவுகுறித்துஅறியச்செய்தல்.
கற்றலிற்நோக்கம் 2	வலைப்பதிவிற்வகைகளுக்குறித்துபுரிந்துகொள்ளுதல்.
கற்றலிற்நோக்கம் 3	வலைப்பதிவிற்சிறப்பையும்தனித்தன்மைகளையும்உணர்தல்.
கற்றலிற்நோக்கம் 4	வலைப்பதிவிற்படைப்பாக்கத்திறன்களைமதிப்பீடுசெய்தல்.
கற்றலிற்நோக்கம் 5	வலைப்பதிவுகுறித்துமுழுமையாகஅறிந்துவலைப்பதிவுகளைஉருவாக்குதல்மற்றும்படைப்புக்களைதரவேற்றம்செய்யும்திறன்பெறுதல்.

திண்ணை - பதிவுகள் - வல்லமை - கீற்று

அலகு 5 வலைப்பதிவுகளில்படைப்புதரவேற்றப்பயிற்சி 10 மணிநேரம்  
 புதியகணக்குகளைஉருவாக்கும்முறைகள்-  
 படைப்புகளைசேர்க்கும்முறைகள்இடுகைகளைஉருவாக்கும்முறைகள் -  
 படம், காணொளிச்சேர்த்தல் - கருத்துக்களைநிர்வகிக்கும்முறைகள்.

வரிசைஎண்	கற்றலின்பயன்
கற்றலின்பயன் 1	வலைப்பதிவுகுறித்துவிரிவாகஅறிந்துகொள்வர்.
கற்றலின்பயன் 2	வலைப்பதிவின்வகைகளுக்குறித்துபுரிந்துகொள்வர்
கற்றலின்பயன் 3	வலைப்பதிவின்சிறப்பையும்தனித்தன்மைகளையு ம்உணர்ந்துகொள்வர்.
கற்றலின்பயன் 4	வலைப்பதிவின்படைப்பாக்கத்திறன்களைமதிப்பீ டுசெய்யும்திறன்பெறுவர்
கற்றலின்பயன் 5	வலைப்பதிவுகுறித்துமுழுமையாகஅறிந்துவலைப் பதிவுகளைஉருவாக்குதல்மற்றும்படைப்புக்களைத ரவேற்றம்செய்யும்திறன்பெறுவர்.

## FIRST AID

### VOCC207

**Semester : 1**

**Credits: 2**

**Category : Value Added course**

**Hour/Week: 2Hr**

**Class & Major : 1UG Total Hour: 50**

### Course Objectives

CO No.	To enable Students
CO-1	Understand about basic knowledge of first aid
CO-2	Demonstrate skills in rendering first aid in case of injury emergencies
CO-3	Learn about the environmental emergencies
CO-4	Develop the life-saving skills
CO-5	Understanding community emergencies and planning

### Unit-1: First Aid in emergencies

**17 Hours**

Introduction- Definition- Aims and Importance of first aid- Rules/ General principles of First Aid- Preparation of First Aid kit. Medical emergencies: Heart attack- Stroke- hypoglycemia- Fainting- Epilepsy- Asphyxia- nose bleed- Choking.

### Unit-2: Injury emergencies

**13 Hours**

Wounds and Bleeding- Injuries to the Bones- Joints and Muscle-fractures- sprains- strains- hanging-falls. Dressing- bandaging and splinting (spiral, reverse spiral- figure of 8 spica- shoulder- ankle- single and double eye- single and double ear)- triangle bandage uses. Transportation of the injured- Head & spine.

**Unit-3: Environmental emergencies**

**7 Hours**

Burns and scalds- Poisoning – ingestion- inhalation- bites and stings- Foreign body in eye- ear,-nose and Heat Stroke.

**Unit-4: Cardio Pulmonary Resuscitation**

**7 Hours**

First Aid Algorithm- Adult & Children: Mouth- Nose- Mouth to Mouth- Chest Compressions- Use Of AED.

**Unit-5: Community Emergencies & Community Resources**

**6 Hours**

Fire, explosion, floods, earth-quakes, famines etc,- Community Resources – Police, Ambulance services – Voluntary agencies – local, state national and international- Rehabilitation.

**Text Book**

1. The Voluntary Aid Societies- St John Ambulance, St Andrew's First Aid and the British Red Cross, “*First Aid Manual*”, The Sun Published On: 2014-05-08

**Reference Books:**

1. Clement I., “*Textbook on First Aid & Emergency Nursing Second Edition*”, Jaypee Brothers Medical Publishers, New Delhi - 110 002, INDIA 2018.
2. Prasad, “*First Aid For Nurses*”, Jaypee Brothers Medical Publishers, New Delhi - 110 002, INDIA 2012.

<b>CONO.</b>	<b>To enable the students</b>
CO-1	To provide a well-conceived and all-embracing short term Yoga Teacher Training Programme to healthy and intelligent individuals, thus enabling them to impart effective training in yoga practices to persons of average health.
CO-2	To provide a proper perspective and insight in to various aspects of yoga education to the trainees.
CO-3	To spread the message of positive health as taught in yoga to maximum number of people in systematic and scientific manner.
CO-4	To produce well-trained yoga teachers.

**Course outcomes:**

<b>CO. No</b>	<b>On completion of the course the students will be able to</b>
CO-1	Describe the importance and principle of first aid
CO-2	Demonstrate skill in first aid techniques
CO-3	Describe first aid in common emergencies
CO-4	Demonstrate skill in automated external defibrillator
CO-5	List various community emergencies and community resources.



**HEALTH & FITNESS  
VOCC208**

<b>Semester</b>	<b>:</b>	<b>I</b>	<b>Credit</b>	<b>: 2</b>
<b>Category</b>	<b>:</b>	<b>Value Added Course</b>	<b>Hours/Week</b>	<b>: 2</b>
<b>Class &amp; Major:</b>		<b>I UG</b>	<b>Total Hours</b>	<b>: 50</b>

**Course objectives:**

**Unit-I** **5Hours**

Meaning of Yoga, Concept of Yoga, Definition of Yoga, Different Kinds of Yoga.

**Unit-II** **7 Hours**

Introduction of Thirumoolar, Patanjali, Comparison between Patanjali Yoga Sutras. ThirumoolarThirumanthiram.

**Unit-III** **3 Hours**

Explain Chakra, Kosha, Yoga Nadies.

**Unit-IV** **5 Hours**

Meaning of Asanas, Types of Asanas, Meaning of Pranayana, Types of Pranayana,

**Yoga Practicals**

**Unit-I** **5 Hours**

1. Padmasana
2. Vajrasana
3. Gomukhasana

**Relaxative Asanas**

4. Savasana
5. Makarasana

**Unit-I I Cultural Asanas** **8 Hours**

6. Suriyanamaskaram
7. Paschimottanasana
8. Bhujangasana
9. Shalabhasana
10. Dhanurasana
11. Saravangasana
12. Matsyasana
13. Halasana
14. Ushtraasana

**Unit-III Cultural Asanas (Contd.,)** **5 Hours**

15. Parivarthaparsuvakonnaasanam
16. Parivarthathirikonnaasanam.
17. Arathakatisakraasanam

18. Chakrasana
19. Navasanam
20. Mandugasanam
21. Utkatasanam

**Pranayamas**

**5 Hours**

22. Nadi Sudi Pranaya
23. Bramari Pranayama
24. Chitali and Chitakari Pranaya
25. Anuloma – Viloma Pranayama
26. Ujjayi Pranayama
27. Bhastrika Pranayama

(All without or with the minimal Kumbhaka Phase)

**Lesson Planning & Practice Teaching**

**5 Hours**

1. Order of teaching the Yogic Practices. Do's and Don't of specific Yoga Techniques.
2. Comparison of the pattern of Yoga Lesson Plan with similar Lesson Plans.
3. Elements of a Yoga Lesson Plan. Models of Yoga Lesson Plans. Preparations for and actual conduct of instructional sessions using lesson plans.

**Book for Reference**

Asanas - MDNIY (National Yoga Research Centre ), New Delhi.

Pranayama - MDNIY (National Yoga Research Centre ), New Delhi.

**Course Outcomes**

CO. No	On completion of the course the students will be able to
CO-1	Demonstrate an understanding of the physiological benefits of movement physical activity and wellness
CO-2	Understand and apply the knowledge of basic sequencing, and effective group management
CO-3	Identify the major muscle groups and their application to Fitness
CO-4	Improve personal fitness through participation in yoga, muscular, strength, and muscular endurance activities.
CO-5	Understand and correctly apply biomechanical and physiological principles elated to exercise and training.

<b>CONO.</b>	<b>To enable the students</b>
CO-1	To Promote and develop Hindi as the lingua franca of India and to unite the diverse linguistic and cultural region of the nation
CO-2	It creates a necessity to learn the languages to survive in society apart from southern India
CO-3	You will be in good company
CO-4	It makes picking up new words and developing your vocabulary much easier
CO-5	Enhanced employability of students by developing the linguistic competence.

**HINDIVOCC209**

**Semester : I**

**Category : Value Added Course**

**Class & Major: I UG**

**Credit : 2**

**Hours/Week : 2**

**Total Hours :50**

**Course objectives:**

<b>प्राथमिक पाठ्य पुस्तक</b>	
<b>विषय सूची</b>	
	पृष्ठ संख्या
<b>भाग - 1 बोधिनी</b>	... 6 - 56
<b>भाग - 2 पद्य</b>	... 57 - 72
1. वंदना	... 58
2. बलवान बनो	... 60
3. छोटा-सा दीप जला दो	... 62
4. घर अपना	... 64
5. सीखो	... 66
6. कल्पना	... 68
7. दोहे (कंठस्थ)	... 70
<b>भाग - 3 गद्य</b>	... 73 - 94
1. पेशेवर	... 74
2. विटामिन	... 77
3. कन्याकुमारी	... 79
4. हमारा स्कूल	... 82
5. पालतू जानवर	... 85
6. चलो, बाजार चलें	... 88
7. महात्मा गांधीजी	... 92
<b>भाग - 4 कहानी</b>	... 95-108
1. कवि और कजूस	... 96
2. दूध में पानी	... 98
3. दर्जी और हाथी	... 100
4. सौदागर और भालू	... 101
5. एकता का फल	... 103
6. न्याय ही तो ऐसा	... 105
7. मेहनत की कमाई	... 107
<b>भाग - 5 रचना</b>	... 109-148
<b>भाग - 6 अनुवाद अभ्यास</b>	... 149-160

**Text Book:**

Dhakshina Bharath Hindi Prachar Sabha.

**Course Outcomes:**

CO. No	On completion of the course the students will be able to
CO-1	Improved understanding of second language acquisition
CO-2	Increased cultural awareness
CO-3	Enhance career opportunities
CO-4	Improved Language Skills
CO-5	Access to a wider range of literature and Media

**BAND MUSIC**

**VOCC210**

**Semester : I**

**Credit : 2**

**Category : Value Added Course**

**Hours/Week : 2**

**Class & Major: I UG**

**Total Hours :50**

**Course Objectives**

CO No.	To enable Students
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CO-1	To produce a characteristic tone on individual instruments
CO-2	To identify and demonstrate a knowledge of musical notation
CO-3	To demonstrate fingerings, posture, and positions for the practical range of individual instruments
CO-4	To develop good individual practice habits
CO-5	To Demonstrate a basic understanding of the elements of Music

**Unit – I** **10 Hours**

Introduction of Ines Space ship-scale plot

**Unit-II** **10 Hours**

Major-D-Major-F Major

**Unit – III** **5 Hours**

G- Major – E, Major

**Unit-IV** **10 Hours**

Bengal- Rana walls -Rastian walls

**Unit – V** **15Hours**

J K March – Sarten- National Anthem- Jaremacch

**Outcome:**

<b>CO. No</b>	<b>On completion of the course the students will be able to</b>
CO-1	Students will demonstrate the use of basic concepts, tools, techniques, and procedures to develop a composition from concept to finished product.
CO-2	Students will demonstrate the tools necessary for the realization of compositions from completion to performance.
CO-3	Students will demonstrate a basic knowledge of economics, accounting, business law, management and marketing.
CO-4	Demonstrate the difference between singing and speaking voice
CO-5	Students will demonstrate the conducting and technical skills necessary them.

**Practical Components**

**Weightage**

BaseDrum , side Drum & Major

20 Marks

J K March &jare March

10 Marks

Peugal Scale

5 Marks

Rana Walls & Rajasthan Walls

15 Marks

**ASSESSMENT COMPONENTS AND WEIGHTAGE FOR VOCATIONAL COURSE  
(CERTIFICATE / DIPLOMA COURSE)**

<b>Theory</b>		<b>Practical</b>		<b>Theory Cum Practical</b>	
<b>Components</b>	<b>Weightage</b>	<b>Components</b>	<b>Weightage</b>	<b>Components</b>	<b>Weightage</b>
Component-I (Assignment/ Model Preparation/ Poster presentation)	15	Component-I (Daily Practical Assessment)	15	Component-I (Assignment/ Model Preparation/ Poster presentation)	15
Component-II (Assignment/ Model Preparation/ Poster presentation)	15	Component-II (Daily Practical Assessment)	15	Component-II (Practical)	15
Component-III (Written Test)	70	Component-III (Practical Test)	70	Component-II ( Written Test)	70
<b>Total</b>	<b>100</b>	-	<b>100</b>	-	<b>100</b>