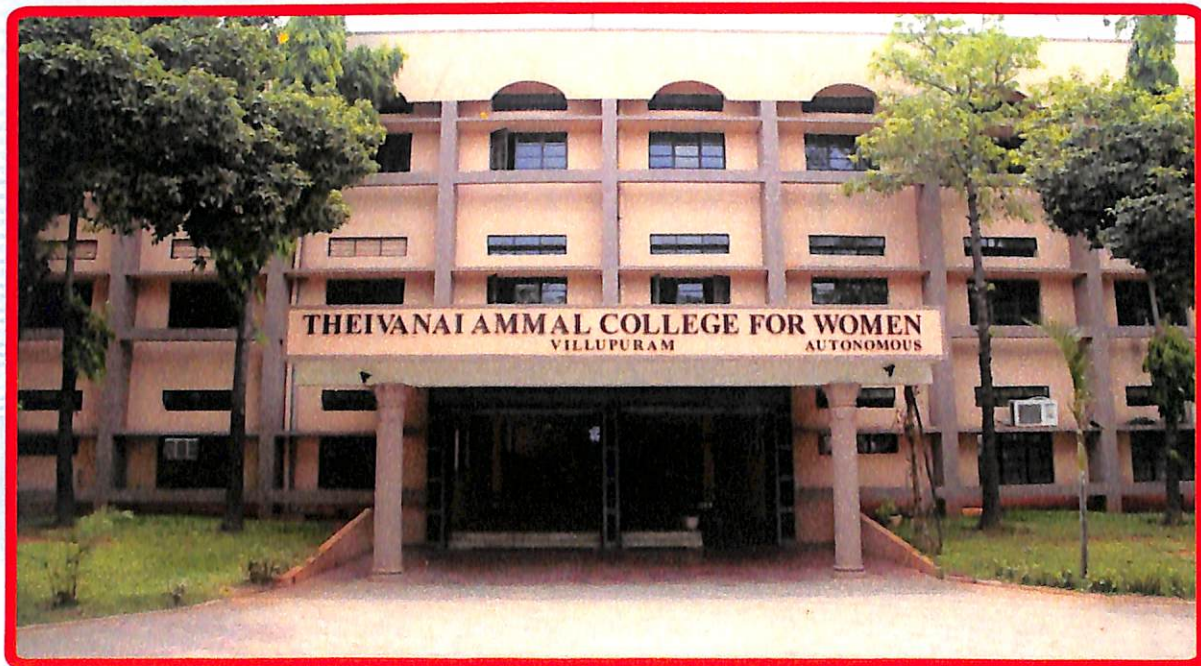# THEIVANAI AMMAL COLLEGE FOR WOMEN (AUTONOMOUS)

(Permanently Affiliated to the Thiruvalluvar University - Vellore)
(Re-Accredited by NAAC (3rd Cycle) with CGPA of 3.2/4 at 'A' Grade)
(Recognized under 2(f) and 12(B) by UGC)
Villupuram, Tamilnadu

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THEIVANAI AMMAL COLLEGE FOR WOMEN
VILLUPURAM   AUTONOMOUS

14th September 2019

தமிழாய்வுத்துறை

முகவுரை

இளங்கலைத்தமிழ்

ஆறு பருவங்களுக்குரிய பாடத்திட்ட வடிவமைப்பு இடம்பெற்றுள்ளது. மூன்று மற்றும் நான்காம் பருவங்களுக்குரிய பொதுத்தமிழ், சிறப்புத்தமிழ், முதன்மைப்பாடங்களுக்கு உரிய பாடத்திட்டங்கள் இடம்பெற்றுள்ளன. அகமதிப்பீட்டுக்கூறுகள் III & IV இரண்டு பருவங்களுக்கு உரியவை மட்டும் இடம்பெற்றுள்ளன. (2018 - 2021ஆம் கல்வியாண்டு முதல் பயிலும் மாணவியருக்கு உரியது).

முதுகலைத்தமிழ்

நான்கு பருவங்களுக்குரிய பாடத்திட்ட வடிவமைப்பு இடம்பெற்றுள்ளது. மூன்று மற்றும் நான்காம் பருவங்களுக்குரிய முதன்மைப்பாடம், பல்துறை சார்புப் பாடம் ஆகியவற்றின் பாடத்திட்டங்கள் இடம்பெற்றுள்ளன. அகமதிப்பீட்டுக்கூறுகள் III & IV இரண்டு பருவங்களுக்கு மட்டும் இடம்பெற்றுள்ளன. (2018 - 2020ஆம் கல்வியாண்டு முதல் பயிலும் மாணவியருக்கு உரியது).

பாடத்திட்ட அமைப்பு : B.A. (இளங்கலைத்தமிழ்)

- இலக்கண, இலக்கிய வகைமைகளை அறிந்து கொண்டு, தன்னை படைப்பாளராக உருவாக்கிக் கொள்ளுதல்.
- தமிழ் மொழியின் தொன்மை, வடிவம் ஆகியவற்றைப் பற்றி அறிந்து மொழியியலாளராக மேம்படுத்திக்கொள்ளல்.
- ஊடகங்களில் பணிவாய்ப்பினை பெறுவதற்கான தனித்திறமைகளை வளர்த்துக்கொள்ளுதல்.
- தமிழ் இலக்கியங்கள் வழி வாழ்வியல் முறைமைகள் பற்றி அறிந்துகொண்டு சமூகத்தை மேம்படுத்துதல்.

பருவம்	பிரிவு	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	வாரம் மணி நேரம்	தரம் Min	தரம் Max
I	I	தமிழ்	UTAL105/ UTAL106/ UFRL101/ UHIL101	பொதுத்தமிழ் I / சிறப்புத்தமிழ் I / French I / Hindi I	4	2	3
	II	ஆங்கிலம்	UENL107/ UENL108	General English I / Advanced English I	5	3	4
	III	முதன்மைப்பாடம்-I	UTAM102	நன்னூல்- எழுத்ததிகாரம்	6	5	5
		முதன்மைப்பாடம்-II	UTAM106	தமிழக வரலாறும் பண்பாடும்	6	5	5
		முதன்மைப்பாடம்-III	UTAM108	நவீன இலக்கியங்கள்	5	4	4
		முதன்மைப்பாடம்-IV	UTAM109	மொழித்திறன்	2	1	1
	IV	மதிப்பீட்டுக் கல்வி			2	1	1
மொத்தம்					30	21	23
II	I	தமிழ்	UTAL205/ UTAL 206/ UFRL201/ UHIL201	பொதுத்தமிழ் II / சிறப்புத்தமிழ் II / French II/ Hindi II	4	2	3
	II	ஆங்கிலம்	UENL207/ UENL208	General English II/ Advanced English II	5	3	4
		முதன்மைப்பாடம்-V	UTAM202	நன்னூல் - சொல்லதிகாரம்	5	5	5
		முதன்மைப்பாடம்-VI	UTAM205	மொழி வரலாறு	4	4	4

	III	முதன்மைப்பாடம்-VII	UTAM206	சிற்றிலக்கியங்கள்	4	4	4
		முதன்மைப்பாடம்-VIII	UTAR201	பயிற்சி பட்டறை I	2	1	1
	IV	துறை சாரா விருப்பப்பாடம்-I			4	2	2
		திறன்சார்கல்வி			2	1	1
	V	கூடுதல் செயல்பாடு (Extension Activites)			-	1	2
				மொத்தம்	30	23	26
III	I	தமிழ்	UTAL 305/ UTAL306/ UFRL301/ UHIL301	பொதுத்தமிழ் III / சிறப்புத்தமிழ் III / French III/ Hindi III	4	2	3
	II	ஆங்கிலம்	UENL 307/ UENL 308	General English III / Advanced English III	5	3	4
	III	முதன்மைப்பாடம்-IX	UTAM303	யாப்பருங்கலக்காரிகை	6	5	5
		முதன்மைப்பாடம்-X	UTAM304	காப்பியங்கள்	5	5	5
		முதன்மைப்பாடம்-XI	UTAM306	மொழியியல்	6	5	5
	IV	முதன்மைப்பாடம்-XII	UTAR301	பயிற்சி பட்டறை II	2	1	1
		மதிப்பீட்டுக்கல்வி			2	1	1
				மொத்தம்	30	22	24
IV	I	தமிழ்	UTAL405/ UTAL406/ UFRL401/ UHIL401	பொதுத்தமிழ் IV/ சிறப்புத்தமிழ் IV / French IV/ Hindi IV	4	2	3
	II	ஆங்கிலம்	UENL407/ UENL 408	General English IV/ Advanced English IV	5	3	4
	III	முதன்மைப்பாடம்-XIII	UTAM401	புறப்பொருள் வெண்பாமாலை	5	5	5
		முதன்மைப்பாடம்-XIV	UTAM405	அற இலக்கியங்கள்	5	5	5
		முதன்மைப்பாடம்-XV	UTAM404	தமிழ் இலக்கண நூல்கள்	4	4	4
		முதன்மைப்பாடம்- XIX	UTAP501/ UTAM508	திட்டக்கட்டுரை/தகவல் தொடர்பியல்	2	-	-
	IV	துறைசாரா விருப்பப்பாடம்-II (Online Course)		Online Course (Spoken Tutorial/NPTEL)	3	1	2
		திறன்சார்கல்வி			2	1	1
	V	கூடுதல் செயல்பாடு (Extension Activites)				-	2
				மொத்தம்	30	21	26
V	III	முதன்மைப்பாடம்-XVI	UTAM505	இதழியல்	6	5	5
		முதன்மைப்பாடம்-XVII	UTAM506	சமய இலக்கியம்	6	6	6
		முதன்மைப்பாடம்-XVIII	UTAM509	நம்பியகப்பொருள்	6	5	5
		முதன்மைப்பாடம்- XIX	UTAP501/ UTAM508	திட்டக்கட்டுரை/தகவல் தொடர்பியல்	4	4	5
		சார்புப் பாடம்	UCSA505	தமிழ்க்கணினி	6	5	5
	IV	மதிப்பீட்டுக்கல்வி			2	1	1
				மொத்தம்	30	26	27
VI		முதன்மைப்பாடம் -XX	UTAM603	இலக்கியத் திறனாய்வியல்	5	5	5
		முதன்மைப்பாடம் -XXI	UTAM604	சொற்பொழிவுக்கலை	5	5	5
		முதன்மைப்பாடம்-XXII	UTAM607	தண்டியலங்காரம்	6	5	5
		முதன்மைப்பாடம்-XXIII	UTAM609	சங்க இலக்கியம்	5	4	4

	III	முதன்மைப்பாடம்-XXIV	UTAR602	பயிற்சி பட்டறை III	2	1	1
	III	துறை சார் விருப்பாடம்	UTAO601 UTAO602 UTAO603	நாட்டுப்புறவியல் செம்மொழி பண்புகள் பதிப்பியல்	5	5	5
	III	புறவாய்மொழித்தேர்வு	UTAC606	மீள் ஆய்வு		1	1
	VI	திறன்சார்கல்வி			2	1	1
	V	கூடுதல் செயல்பாடு (Extension Activites)				-	2
				மொத்தம்	30	27	29
				கூட்டு எண்ணிக்கை	180	140	155

(EXTRA CREDIT)
கோடைக்கால பயிற்சி (விருப்பம் உள்ள மாணவியருக்குரியது)

பருவம்	பிரிவு	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	மணி நேரம்	தரம்	
						Min	Max
II	III	முதன்மைப்பாடம்	UTAI201	கோடைக்கால பயிற்சி வகுப்பு	ஒரு மாதம்	-	1
IV	III	முதன்மைப்பாடம்	UTAI401	கோடைக்கால பயிற்சி வகுப்பு	ஒரு மாதம்	-	1

தன்விருப்பப்பாடம் - SELF STUDY PAPER
(விருப்பம் உள்ள மாணவியருக்குரியது)

பருவம்	பிரிவு	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	வாரம் மணி நேரம்	தரம்	
						Min	Max
V	III	முதன்மைப்பாடம்	UTAS501	பதிப்பியல்	26	-	1
			UTAS502	கல்வெட்டியல்			
			UTAS503	தகவல் தொடர்பியல்			

துறை சாரா விருப்பப்பாடம் (பிறதுறை மாணவியர்க்கு மட்டும்)

பருவம்	பிரிவு	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	வாரம் மணி நேரம்	தரம்	
						Min	Max
II	IV	துறை சாரா விருப்பப்பாடம் - I	UTAE202	படைப்புக்கலை	4	2	2
			UTAE203	தமிழ்ப் பெண்படைப்பாளர்களின் படைப்புகள்			
			UTAE204	தமிழ்ப் பண்பாட்டு வரலாறு			

UTAM303 யாப்பருங்கலக்காரிகை

பருவம் : மூன்றாம் பருவம்	தரம் : 05
பிரிவு : முதன்மைப்பாடம் -IX	மணிநேரம்/வாரம் : 06
வகுப்பு : **II B.A.** தமிழ்	மொத்த மணிநேரம் : 78

நோக்கம்

மாணவியர்

- மரபுக் கவிதைகளின் அடிப்படைக் கூறுகளையும் அதன் இலக்கணங்களையும் அறிதல்.
- தற்கால நிகழ்வுகளை யாப்பு வடிவில் படைக்கும் திறனை வளர்த்தல்.
- தமிழ் மொழியின் தொன்மைச் சிறப்புகளைக் கண்டறிதல்.

அலகு - I உருபியல் 15 மணிகள்

உருபியல் - எழுத்து, அசை, சீர்.

அலகு – II உருபியல் 17 மணிகள்

உருபியல் - தளை, அடி, தொடை.

அலகு - III செய்யுளியல் 15 மணிகள்

செய்யுளியல் - பாவுக்குரிய அடியும் ஓசையும்

அலகு - IV செய்யுளியல் 15 மணிகள்

செய்யுளியல் - வெண்பா, ஆசிரியப்பா வகையும், அதன் இனங்களும்

அலகு – V செய்யுளியல் 16 மணிகள்

செய்யுளியல் - கலிப்பா, வஞ்சிப்பா, மருட்பாவும் அதன் இனங்களும்.

பாடநூல்கள்

- வெங்கடசாமி நாட்டார் ந.மு.வே.,*யாப்பருங்கலக்காரிகை* கழக வெளியீடு, சென்னை, 2010.

பார்வை நூல்கள்

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- திருஞான சம்பந்தம்.முனைவர்.ச, *யாப்பருங்கலக்காரிகை,* கதிர் பதிப்பகம், திருவையாறு, 2007.

UTAM 304 காப்பியங்கள்

பருவம் : மூன்றாம் பருவம்	தரம் : 05
பிரிவு : முதன்மைப்பாடம் -X	மணிநேரம்/வாரம் : 05
வகுப்பு : **II B.A.** தமிழ்	மொத்த மணிநேரம் : 65

நோக்கம்

மாணவியர்

- வரலாற்று நிகழ்வுகளைக் கண்டறிவதற்கும், புராணக் கருத்துக்களை அறிந்து கொள்வதற்குமான வழிமுறைகளை எடுத்துரைத்தல்.
- காப்பியங்களின் தொன்மையினையும் சிறப்புக் கூறுகளையும் கண்டறிதல்.
- வரலாற்று நிகழ்வுகளைப் பற்றிய புரிதலைப் பெறுதல்.

அலகு - I சிலப்பதிகாரம்					15 மணிகள்

சிலப்பதிகாரம் - மதுரைக்காண்டம் - வழக்குரை காதை - ஊர்சூழ் வரி.

அலகு – II சீவக சிந்தாமணி					13 மணிகள்

சீவக சிந்தாமணி – நாமகள் இலம்பகம் (50 பாடல்கள்)

அலகு - III பெரிய புராணம்					13 மணிகள்

பெரிய புராணம் - காரைக்காலம்மையார் (1-65 பாடல்கள்).

அலகு - IV கம்பராமாயணம்					14 மணிகள்

கம்பராமாயணம் - அயோத்தியா காண்டம் - குகப் படலம். (50 பாடல்கள்)

அலகு – V தேம்பாவணி					10 மணிகள்

தேம்பாவணி - வளன் சனித்த படலம் (1-34 பாடல்கள்) குணங்குடி மஸ்தான் சாகிபு - பராபரக் கண்ணி (50 கண்ணிகள்)

பாடநூல்கள்

- வெங்கடசாமி நாட்டார். ந.மு. - *சிலப்பதிகாரம்*, கழக வெளியீடு, சென்னை, 2012.
- மாணிக்கவாசகன்.ஞா, *சீவக சிந்தாமணி*, மாணிக்கவாசகர் பதிப்பகம், சென்னை, 2010.
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- *கம்பராமாயணம்,* கம்பன் கழகம், கோவை, 2003.

பார்வை நூல்கள்

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- இராசமாணிக்கனார், *பெரியபுராண ஆராய்ச்சி*, அலமு பதிப்பகம், 2014.
- சிவஞானம்.ம.பொ, *சிலப்பதிகார ஆய்வுரை*, பூங்கொடி பதிப்பகம், சென்னை, 2015.
- சீனிச்சாமி. து, *தமிழில் காப்பியக் கொள்கை*, கழக வெளியீடு, சென்னை, 2001.
- ஜெகந்நாதன். கி.வா, *தமிழ்க் காப்பியங்கள் ஆராய்ச்சி*, அமுத நிலையம், 2003.

UTAM306 மொழியியல்

பருவம் : மூன்றாம் பருவம்		தரம்	: 05
பிரிவு : முதன்மைப்பாடம் -XI		மணிநேரம்/வாரம்	: 06
வகுப்பு : II B.A. தமிழ்		மொத்த மணிநேரம்	: 78

நோக்கம்

மாணவியர்

- மொழிகளுக்கிடையே உள்ள பொதுவான அமைப்புக்கூறுகளை அறிந்து கொள்ளுதல்.
- மொழிகளில் உள்ள ஒலிப்புமுறைகளை வேறுபடுத்திக் காணுதல்.
- உச்சரிக்கும் மொழித்திறனை வளர்த்துக் கொள்ளுதல்.

அலகு - I மொழியியல் அறிமுகம்					15 மணிகள்

மொழியியல் அறிமுகம் - மொழியும் சமுதாயமும் - மொழியும் கருத்துப்பரிமாற்றமும் - மொழியும் இலக்கியமும்.

அலகு – II மொழியும் மொழியியலும்					17 மணிகள்

மொழியும் மொழியியலும் - மொழியியலின் பிரிவுகள் - விளக்க மொழியியல் - வரலாற்று மொழியியல் - ஒப்புமை மொழியியல் - கோட்பாட்டு மொழியியல் - பயன்பாட்டு மொழியியல் - சமுதாய மொழியியல்.

அலகு - III ஒலி, ஒலியியல், ஒலியனியல்   **15 மணிகள்**

ஒலி, ஒலியியல், ஒலியனியல் - விளக்கம், ஒலியியல் வகைகள் - பேச்சொலி வகைகள் - ஒலியியல் எழுத்துமுறை - ஒலியன் முதன்மைக்கொள்கைகள் - துணைக்கொள்கைகள் - ஒலியன்களைக் கண்டறியும் கொள்கைகள்.

அலகு - IV உருபனியல்   **15 மணிகள்**

உருபன் - வரையறை, விளக்கம், கோட்பாடு, உருபு, உருபன், மாற்றுருபன், உருபனைக் கண்டறியும் வழிமுறைகள் - நைடாவின் ஆறு விதிகள் - உருபன் வகைகள் விளக்கம் - உருபுகளின் வகைகள் - உருபொலியனியல் - விளக்கம் வரையறை - உருபொலியனியல் மாற்றம், உருபொலியனியல் விதிகள் - தொடரியல் - விளக்கம், வரையறை - தொடர், வாக்கியம் - அண்மை உறுப்பு வகைகள் - மயக்கும் அண்மை உறுப்பு - அண்மை உறுப்புப் பகுப்பாய்வு.

அலகு – V மொழி அமைப்பு வரையறை   **16 மணிகள்**

முதன்மொழி - இரண்டாம் மொழி - அயன்மொழி கற்பித்தல் - மொழிக் கற்பித்தலின் அடிப்படைத் தேவைகள் - கற்றல் கற்பித்தல் அணுகுமுறை - கேட்டல், எழுதுதல், அறிதல் முறை - ஓரினமொழி கற்பிக்கும் முறை - இருமொழி அணுகுமுறை - மொழி அமைப்பு வேறுபாடுகள் - இரண்டாம் மொழி கற்பித்தல் சிக்கல் - பண்பாட்டுக்கூறு கற்பித்தல் சிக்கல் - மொழித்திறன் வளர்த்தல்.

பாடநூல்கள்

- ஜெயா.வ, *பொது மொழியியல்*, நர்மதா பதிப்பகம், சென்னை, 2010.

பார்வை நூல்கள்

- பரமசிவம்.கு, *இக்காலமொழியியல் அறிமுகம்*, திருநெல்வேலி தென்னிந்திய சைவ சித்தாந்த நூற்பதிப்புக் கழகம், சென்னை, 2007.
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- வரதராசன்.மு, *மொழி நூல்*, திருநெல்வேலி தென்னிந்திய சைவ சித்தாந்த நூற்பதிப்புக் கழகம், சென்னை, 2004.

UTAR301 பயிற்சி பட்டறை – II

பருவம் : மூன்றாம் பருவம்		தரம்	: 01
பிரிவு : முதன்மைப்பாடம் -XII		மணிநேரம்/வாரம்	: 02
வகுப்பு : II B.A. தமிழ்		மொத்த மணிநேரம்	: 26

நோக்கம்
மாணவியர்

- செய்தி தயாரிப்பதற்கான அடிப்படைப் பயிற்சியினைப் பெறுதல்.
- செய்தி வாசித்தல் முறைகளைப் பின்பற்றுதல்.
- நிருபராகும் திறனை வளர்த்துக் கொள்ளுதல்.

அலகு - I நேர்காணல்   **5 மணிகள்**

நேர்காணல் - பயிற்சி அளித்தல் - வினாநிரல் தயாரித்தல் - பேட்டி எடுத்தல்.

அலகு – II செய்தி சேகரித்தல்   **5 மணிகள்**

ஊடகங்களின் வாயிலாக தரவுகளை சேகரிக்க - பயிற்சி அளித்தல்.

அலகு - III செய்தி எழுதுதல்   **6 மணிகள்**

மொழிப்பயன்பாடு - நிறுத்தற்குறிகள் - கருத்துப்புலப்பாடு - தலைப்பு - பயிற்சி அளித்தல்

அலகு -**IV** செய்தி வாசித்தல்   6 மணிகள்
உச்சரிப்பு - வாசிக்கும் திறன் - மெய்ப்பாடு - பயிற்சி அளித்தல்.

அலகு $-$**V** நாடகம்   4 மணிகள்
நடிப்புத்திறன் - தனிநபர் நடிப்பு $-$ குழுநடிப்பு- பயிற்சி அளித்தல்.
பாடநூல்கள்

* இராசா.கி, *தகவல் தொடர்பியல்,* வானதி பதிப்பகம், சென்னை, 2008.
* பரந்தாமனார்.அ.கி, *நல்ல தமிழ் எழுத வேண்டுமா?,* பாரி நிலையம், 184 பிரகாசம் சாலை, சென்னை, 2000.

UTAM 401 புறப்பொருள் வெண்பாமாலை

பருவம் : நான்காம் பருவம்	தரம்	:	05
பிரிவு : முதன்மைப்பாடம் -**XIII**	மணிநேரம்/வாரம்	:	05
வகுப்பு : **II B.A.** தமிழ்	மொத்த மணிநேரம்	:	65

நோக்கம்
மாணவியர்

* புறத்திணை இலக்கணங்களைஅறிந்து கொள்ளுதல்.
* தொன்மை இலக்கியங்களின் புறப்பாடல்களை உணர்ந்து கொள்ளுதல்.
* புறத்திணையின் சிறப்புகளையும் அதன் வைப்பு முறைகளையும் திறனாய்வுச் செய்தல்.

அலகு -**I** வெட்சி, கரந்தை   15 மணிகள்
வெட்சிப்படலம், கரந்தைப் படலம்.

அலகு $-$**II** வஞ்சி, காஞ்சி   13 மணிகள்
வஞ்சிப்படலம், காஞ்சிப்படலம்

அலகு - **III** நொச்சி, உழிஞை   13 மணிகள்
நொச்சிப்படலம், உழிஞைப்படலம்

அலகு - **IV** தும்பை   14 மணிகள்
தும்பைப்படலம்

அலகு $-$**V** வாகை   10 மணிகள்
வாகைப்படலம்

பாடநூல்கள்
* ஐயனாரிதனார், *புறப்பொருள் வெண்பாமாலை,* கழக வெளியீடு, சென்னை, 2012.

பார்வை நூல்கள்

* கந்தசாமி. சா.நா, *புறத்திணை வாழ்வியல்,* கழக வெளியீடு, சென்னை, 2004
* துரைசாமி பிள்ளை.ஒளவை.சு,*புறப்பொருள் வெண்பாமாலை,* கழக வெளியீடு,சென்னை,2006

UTAM405 அற இலக்கியங்கள்

பருவம் : நான்காம் பருவம்	தரம்	:	05
பிரிவு : முதன்மைப்பாடம் - **XV**	மணி நேரம்/வாரம்	:	05
வகுப்பு : **II B.A** தமிழ்	மொத்த மணி நேரம்	:	65

நோக்கம்
மாணவியர்
- தமிழிலக்கியங்களில் காணப்படும் அறக்கருத்துகளை அறிந்து கொள்ளுதல்.
- அறக் கருத்துக்களின் வழி தம்மையும் சமூகத்தையும் செம்மைப்படுத்திக் கொள்ளுதல்.

அலகு – 1   திருக்குறள்   15 மணிகள்
        திருக்குறள் - பொருட்பால் முதல் 5 அதிகாரம் (இறைமாட்சி, கல்வி, கல்லாமை, கேள்வி, அறிவுடைமை) - நாலடியார்- அறன்வலியுறுத்தல், தூய்த் தன்மை பாடல் 31 முதல் 50 வரை.

அலகு – 2 பழமொழி நானூறு   15 மணிகள்
        பழமொழி நானூறு – முதல் 25 பாடல்கள் (கல்வி, கல்லாமை, அவையறிதல்) முடியவுள்ள 25 பாடல்கள்.

அலகு – 3 சித்தர் பாடல்கள்   10 மணிகள்
        சிவவாக்கியர் - முதல் 50 பாடல்கள்.

அலகு – 4 நீதிநெறி விளக்கம்   10 மணிகள்
        நீதிநெறி விளக்கம் - "நீரிற் குமிழி" முதல் ''களைகாணா'' முடியவுள்ள 40 பாடல்கள்.

அலகு – 5 நன்னெறி   15 மணிகள்
        சிவப்பிரகாசர் - நன்னெறி (40) பாடல்கள்

பாடநூல்கள்
- அறவாணன்.க.ப, *பதினெண் கீழ்க்கணக்கு நூல்கள்*, தமிழ்க் கோட்டம், சென்னை, 2010.
- சிவவாக்கியர், *சிவவாக்கியர் பாடல்கள்*, காசித்திருமடம் வெளியீடு, திருபனந்தாள், 2012.
- குமரகுருபரர், *நீதிநெறி விளக்கம்*, காசித்திருமடம் வெளியீடு, திருபனந்தாள், 2012.
- சிவப்பிரகாசர், *நன்னெறி*, பொம்மபுரம் ஆதின வெளியீடு, மயிலம், 2014.

பார்வை நூல்கள்
- ராஜ்கௌதமன், *தமிழ்ச் சமூகத்தில் அறமும் ஆற்றலும்*, விடியல் பதிப்பகம், கோவை, 2008.
- பொன்னுசாமி. மு, *தமிழ் நீதி இலக்கிய வரலாறு*, இந்து பதிப்பகம், கோவை, 2008.

UTAM404 தமிழ் இலக்கண நூல்கள்

பருவம்   :   நான்காம் பருவம்   தரம்   : 04
பிரிவு   :   முதன்மைப்பாடம் -XIV   மணி நேரம் / வாரம் : 04
வகுப்பு   :   **II B.A தமிழ்**   மொத்த மணி நேரம்   : 52

நோக்கம்
மாணவியர்
- தமிழ் இலக்கண நூல்களின் வரலாற்றினை அறிந்து கொள்ளுதல்.
- காலந்தோறும் மாற்றத்திற்கு உட்பட்ட இலக்கண முறைமைகளைக் கண்டறிதல்.
- இலக்கண வேறுபாடு கண்டு புதிய இலக்கணம் உருவாக்க முயலுதல்.

அலகு - 1 இலக்கணத் தோற்றம்   **10 மணிகள்**

இலக்கணத்தின் தோற்றம் - இலக்கணத்தேவை - தமிழ் இலக்கண வகைகள் அறிமுகம் - தொல்காப்பியம் - இறையனார் அகப்பொருள் - புறப்பொருள் வெண்பாமாலை.

அலகு - 2 இலக்கண நூல்கள்   **12 மணிகள்**

யாப்பருங்கலக்காரிகை – வீரசோழியம் - நேமிநாதம் - வெண்பா பாட்டியல். தண்டியலங்காரம் - நன்னூல் - அகப்பொருள் விளக்கம் - நிகண்டு நூல்கள் - சேந்தன் திவாகரம் - பிங்கல நிகண்டு.

அலகு - 3 பாட்டியல் நூல்கள்   **10 மணிகள்**

இலக்கிய வகைமை அடிப்படையிலான இலக்கண நூல்கள் அறிமுகம் - பன்னிரு பாட்டியல், நவநீதப்பாட்டியல், வரையறுத்தப் பாட்டியல், சிதம்பரப் பாட்டியல்.

அலகு- 4 பாவினங்கள்   **10 மணிகள்**

மாறனலங்காரம் - மாறனகப் பொருள் - பா பாவினம் - சிதம்பரச் செய்யுட் கோவை – பிரயோக விவேகம் - இலக்கண விளக்கம் - இலக்கணக் கொத்து - தொன்னூல் விளக்கம் - பிரபந்த தீபிகை - முத்துவீரியம் - சாமிநாதம்.

அலகு - 5 மறைந்து போன இலக்கண நூல்கள்   **10 மணிகள்**

அகத்தியம், காக்கைப்பாடினியம், அவிநயம், மயேச்சுரம், பல்காப்பியம் - கிறித்தவர்களின் இலக்கண நூல்கள் - தமிழ் இலக்கண நூல்கள்.

பாட நூல்

- இளங்குமரன்.இரா, *தமிழ் இலக்கண வரலாறு,* மணிவாசகர் பதிப்பகம், சிதம்பரம், 2009.

பார்வை நூல்கள்

- இளவரசு.சோம, *இலக்கண வரலாறு,* மெய்யப்பன் பதிப்பகம், சிதம்பரம், 2007.
- சண்முகம்.செ.வை, *இலக்கண உருவாக்கம்,* மணிவாசகர் பதிப்பகம், சிதம்பரம், 2004.

UTAM508 தகவல் தொடர்பியல்

பருவம் : நான்காம் பருவம்		தரம்	: 04
பிரிவு : முதன்மைப் பாடம் -XIX		மணிநேரம்/வாரம்	: 2+4
வகுப்பு : III B.A.தமிழ்		மொத்த மணிநேரம்	: 78

நோக்கம்

மாணவியர்

- தகவல் தொடர்பியல் வரலாற்றினை அறிதல்.
- ஊடகங்களின் வாயிலாகப் பயிற்சி பெறுதல்.
- ஊடகங்களில் வேலைவாய்ப்பினைப் பெறுதல்.

அலகு – I தகவல் தொடர்பியல்   **15 மணிகள்**

தகவல் தொடர்பு - விளக்கம் - பண்புகள் மொழிநடை - தொலைக்காட்சி நாடகங்கள் எழுதுதல் - பேட்டிகள் - நேரடி ஒளிபரப்புகள் - தொலைக்காட்சி விளம்பரங்கள்.

அலகு – V திரைப்படம்   **15 மணிகள்**

திரைப்படம் - திரைப்படத்தின் செல்வாக்கு - தொலைக்காட்சியும் திரைப்படங்களும் - திரைப்படத்தின் மொழி - படத்தொகுப்பு - பாடல்- வகைகள் - ஊடகங்கள் - ஊடக வகைகள்

தகவல் தொடர்பு - தகவல் தொடர்பின் அடிப்படைகள் - மரபு வழித் தகவல் தொடர்பு - விளைவுகள் - ஊடகத் தொடர்பியல் கோட்பாடுகள் - ஊடகங்களின் வகைகள் - அச்சுவழி, மரபு வழி, மின் வழி.

அலகு – II இதழியல் 15 மணிகள்

இதழியல் - விளக்கம் - இதழியல் வகைகள் - செய்தி - செய்தி வகைகள் - இதழியல் பணிகள் - பயன்பாடு - உத்திகள். தமிழ் இதழ்களின் வகைகள் - இலக்கிய இதழ்களும் அவற்றின் பணியும் - தமிழ் இதழ்களின் முன்னோடிகளும் அவர்களின் பணிகளும் - செய்தி எழுதும் முறைகள் - செம்மையாக்கம் - ஆசிரியர் - ஆசிரியர் குழு - பணிகள் - இதழ்களுக்கு எழுதும் முறை.

அலகு – III வானொலி 13 மணிகள்

வானொலி நிகழ்ச்சிகள், அகில இந்திய வானொலி - பண்பலை - நாடகம் - உரை - பேச்சு - கலந்துரையாடல் - பேட்டி - இசை நிகழ்ச்சி - நிகழ்ச்சித் தயாரிப்பு - வானொலியில் செய்தி ஒலிபரப்பு - மொழிநடை.

அலகு – IV தொலைக்காட்சி 20 மணிகள்

தொலைக்காட்சி - பொதிகைத் தொலைக்காட்சி - தனியார் அலைவரிசைகள் - நிகழ்ச்சிகள் - கல்வி - வேளாண்மை - தொழிலாளர் நலம் - பெண்களுக்கான நிகழ்ச்சிகள் - குழந்தைகள் நிகழ்ச்சி - நாடகம், விளம்பரங்கள் - தொலைக்காட்சி ஒளிபரப்பு - தொலைக்காட்சி நிகழ்ச்சித் தயாரிப்பு - கள் இயற்றுதல் - திரைப்பட உத்திகள் - செய்திப் படங்கள் - குறும்படங்கள் - திரைப்படப் பொருண்மைகள், உத்திகள் - இணைய தள இதழ்கள் - ஊடகப் பயன்பாட்டின் நிறை குறைகள்.

பாட நூல்கள்

- ஈஸ்வரன்.ச, *தகவல் தொடர்ப்பும் நெறிமுறைகளும்*, சாரதா பதிப்பகம், சென்னை, 2012.
- குருசாமி.மா.பா., *இதழியல் கலை*, ஆதித்தனார் கல்லூரி, திருச்செந்தூர், 2005.

பார்வை நூல்கள்

- இராசா.கி, *மக்கள் தகவல் தொடர்பியல்*, பாவை பப்ளிகேஷன்ஸ், சென்னை, 2010.
- ஈஸ்வரன்.ச, சபாபதி.இரா, *இதழியல் ஓர் அறிமுகம்*, சாரதா பதிப்பகம், சென்னை, 2000.

UTAL305 பொதுத்தமிழ் - III

பருவம் : மூன்றாம் பருவம்		தரம்	: 02
பிரிவு : பொதுத்தமிழ்		மணிநேரம்/ வாரம்	: 04
வகுப்பு : **II UG (Basic Level)**		மொத்த மணி நேரம	: 52

நோக்கம்
மாணவியர்

- காப்பிய இலக்கியங்களை அறிந்து கொள்ளுதல்
- சிற்றிலக்கிய வகைகளை அறிந்து கொள்ளுதல்.
- இலக்கிய வேறுபாட்டினை ஒப்பிடுதல்.

அலகு – 1 காப்பியங்கள் 12 மணிகள்

சிலப்பதிகாரம் - மனையறம் படுத்த காதை - சீவகசிந்தாமணி - நாமகள் இலம்பகம் (முதல் 20 பாடல்கள்) - கும்பகர்ணன் வதைப்படலம் - (முதல் 20 பாடல்கள்).

அலகு – 2 இலக்கிய வரலாறு   08 மணிகள்

ஐம்பெருங்காப்பியம் - ஐஞ்சிறுங்காப்பியம் - சிற்றிலக்கியம் - (பரணி, உலா, தூது, பிள்ளைத்தமிழ், பள்ளு, கலம்பகம், குறவஞ்சி).

அலகு – 3 சிற்றிலக்கியங்கள்   12 மணிகள்

கலிங்கத்துப்பரணி - காளிக்கு கூளி கூறியது (முதல் 10 பாடல்கள்) - தமிழ்விடுதூது - தமிழின் சிறப்பு - குற்றாலக்குறவஞ்சி - குறத்தி குறி கூறுதல்.

அலகு – 4 புதினம்   10 மணிகள்

பிரபஞ்சன் - சந்தியா   (முழுவதும்)

அலகு – 5 பயிற்சி   10 மணிகள்

விமர்சனம் எழுதுதல், மேடைப்பேச்சு, வல்லினம் மிகும் இடம், வல்லினம் மிகா இடம்.

பாட நூல்கள்

- வரதராசனார்.மு, *தமிழ் இலக்கிய வரலாறு*, ஜனகா பதிப்பகம், சென்னை, 2000.
- புலியூர்கேசிகன், *கலிங்கத்துப்பரணி*, சாரதா பதிப்பகம், சென்னை, 2012.
- செம்பியன், *வலிமிகும் இடம் வலிமிகா இடம்*, சாரதா பதிப்பகம், மயிலாடுதுறை, 2001.
- குமரி ஆனந்தன், *நீங்களும் பேச்சாளராகலாம்*, வானதி பதிப்பகம், சென்னை, 2012.

பார்வை நூல்கள்

- கதிர் மகாதேவன், *சிலப்பதிகாரம்*, கதிரகம் பதிப்பகம், சென்னை, 2006.
- பிரபஞ்சன், *பிரபஞ்சன் நாவல்கள்*, மீனாட்சி புத்தக நிலையம், சென்னை, 2004.

UTAL306 சிறப்புத்தமிழ் - III

பருவம் : மூன்றாம் பருவம்   தரம்   : 03
பிரிவு   : சிறப்புத்தமிழ்   மணிநேரம்/வாரம் : 04
வகுப்பு : **II UG (Advanced Level)**   மொத்த மணிநேரம் : 52

நோக்கம்
மாணவியர்

- காப்பியங்கள் மற்றும் சிற்றிலக்கியம் பற்றி அறிந்து கொள்ளுதல்.
- காப்பியங்களைப் புதினத்துடன் ஒப்பிட்டு உணர்தல்.
- ஊடகங்களில் பணிவாய்ப்பினைப்பெற பயிற்சி பெறுதல்.

அலகு – 1 காப்பியங்கள்   10 மணிகள்

சிலப்பதிகாரம்   - கானல் வரி முழுவதும் - சீவகசிந்தாமணி - விமலையார் இலம்பகம் - கம்பராமாயணம் - குகப்படலம்.

அலகு – 2 இலக்கிய வரலாறு   10 மணிகள்

ஐம்பெருங்காப்பியம் - ஐஞ்சிறுங்காப்பியம் - சிற்றிலக்கியம் (பரணி, உலா, தூது, கலம்பகம், பிள்ளைத்தமிழ், பள்ளு).

அலகு – 3 சிற்றிலக்கியம்   12 மணிகள்

கலிங்கத்துபரணி - காடுபாடியது, தமிழ்விடுதூது - தமிழின் பெருமை , மீனாட்சியம்மை குறம் - முதல் 10 பாடல்கள்.

அலகு – 4 புதினம்   10 மணிகள்

ஜெயகாந்தன் - ஒரு நடிகை நாடகம் பார்க்கிறாள் (முழுவதும்).

அலகு – 5 பயிற்சி   **10 மணிகள்**

வானொலி, பத்திரிக்கை, தொலைக்காட்சிக்கு செய்திகள் எழுதுதல் - தலையங்கம் எழுதுதல் - திரைப்பட விமர்சனம் எழுதுதல் - வல்லினம் மிகும் இடம், மிகா இடம் - தொகைகள்.

பாட நூல்கள்

- வரதராசனார்.மு, *தமிழ் இலக்கிய வரலாறு*, ஜனகா பதிப்பகம், சென்னை, 2014.
- குமரகுருபரர். *மீனாட்சியம்மை குறம்*, காசித்திருமடம் பதிப்பகம், திருபனந்தாள், 2004.

பார்வை நூல்கள்

- கதிர் மகாதேவன், *சிலப்பதிகாரம்*, கதிரகம் பதிப்பகம், சென்னை, 2006.
- ஜெயகாந்தன், *ஜெயகாந்தன் குறுநாவல்கள்*, மீனாட்சிபுத்தக நிலையம், சென்னை, 2004.
- செம்பியன், *தொகைகள்*, சாரதா பதிப்பகம் மயிலாடுதுறை, தஞ்சை, 2001.

UTAL405 பொதுத்தமிழ் - IV

பருவம் : நான்காம் பருவம்   தரம்   : 02
பிரிவு   : பொதுத்தமிழ்   மணிநேரம் /வாரம்   : 04
வகுப்பு : **II UG (Basic Level)**   மொத்த மணி நேரம் : 52

நோக்கம்
மாணவியர்

- சங்க இலக்கியத்தை அறிந்து கொள்ளுதல்.
- பதினெண்கீழ்க்கணக்கு நூல்களை அறிந்து கொள்ளுதல்.
- ஊடகங்களில் பணிவாய்ப்பினைப் பெற பயிற்சி பெறுதல்.

அலகு – 1 பழந்தமிழ் இலக்கியம்   **12 மணிகள்**

நற்றிணை - குறிஞ்சித்திணை 5 பாடல்கள் (204,209,213,217,225) - குறுந்தொகை - முல்லைத்திணை 5 பாடல்கள் (66,167,183,186,188) - ஐங்குறுநூறு - மருதத்திணை முதல் ஐந்து பாடல்கள் - புறநானூறு (231) - அகநானூறு (140).

அலகு – 2 அற இலக்கியம்   **08 மணிகள்**

திருக்குறள் - வினைத்திட்பம் - ஏலாதி - முதல் பத்து பாடல்கள் - நாலடியார் முதல் பத்து பாடல்கள்.

அலகு – 3 தமிழ் இலக்கிய வரலாறு   **10 மணிகள்**

பதினெண்மேற்கணக்கு நூல்கள் - பதினெண்கீழ்க்கணக்கு நூல்கள்.

அலகு – 4 நாடகம்   **12 மணிகள்**

அறிஞர் அண்ணா - வேலைக்காரி (முழுவதும்).

அலகு – 5 பயிற்சி   **10 மணிகள்**

நேர்காணல் - மயங்கொலி பிழை அறிதல், இலக்கணக்குறிப்பு அறிதல்.

பாட நூல்கள்

- நாகராசன். வி, (ப.ஆ) *குறுந்தொகை*, நியூசெஞ்சுரி புத்தக நிலையம், சென்னை, 2004.
- மாணாக்கனார்.ஆ, *பதினெண்கீழ்க்கணக்கு நூல்கள்*, மாணவர் பதிப்பகம், சென்னை, 2014.
- வரதராசனார்.மு, *தமிழ் இலக்கிய வரலாறு*, ஜனகா பதிப்பகம், சென்னை, 2014.

பார்வை நூல்கள்

- நாகராசன். வி, (ப.ஆ) *நற்றிணை*, நியூசெஞ்சுரி புத்தக நிலையம், சென்னை, 2009.
- நாகராசன். வி, (ப.ஆ) *புறநானூறு*, திருநெல்வேலி தென்னிந்திய சைவசித்தாந்த நூற் பதிப்புக்கழகம், சென்னை, 2002.
- மாணாக்கனார்.ஆ, (உரை) *ஐங்குறுநூறு*, சாரதா பதிப்பகம், சென்னை, 2009.

UTAL406 சிறப்புத்தமிழ் - IV

பருவம்	: நான்காம் பருவம்	தரம்	: 03
பிரிவு	: சிறப்புத்தமிழ்	மணிநேரம்/வாரம்	: 04
வகுப்பு	: II UG (Advanced Level)	மொத்த மணிநேரம்	: 52

நோக்கம்

மாணவியர்

- சங்க இலக்கியங்களைப் பற்றி அறிந்து கொள்ளுதல்
- சங்க இலக்கியங்களை நாடகத்துடன் ஒப்பிட்டு உணர்தல்.
- ஊடகங்களில் பணிவாய்ப்பினைப் பெற பயிற்சி பெறுதல்.

அலகு – 1 பழந்தமிழ் இலக்கியம்   10 மணிகள்

நற்றிணை - குறிஞ்சித்திணை (32, 151), குறுந்தொகை - முல்லைத்திணை (65, 167) - ஐங்குறுநூறு - மருதத்திணை - புனலாட்டுப் பத்து - கலித்தொகை - பாலைக்கலி (9) - புறநானூறு - ஒளவையார் (87, 95) - அகநானூறு - பாலைத்திணை (101).

அலகு – 2 அற இலக்கியம்   10 மணிகள்

சிறுபஞ்சமூலம் - முதல் பத்து பாடல்கள் - நாலடியார் - நல்லினம் சேர்தல் - முதல் 10 பாடல்கள் - திருக்குறள் - அமைச்சு, சொல்வன்மை, காதல் சிறப்புரைத்தல்.

அலகு – 3 தமிழ் இலக்கிய வரலாறு   12 மணிகள்

எட்டுத்தொகை - பத்துப்பாட்டு - பதினெண்கீழ்க்கணக்கு.

அலகு – 4 நாடகம்   10 மணிகள்

சுகிசிவம் - மாங்கல்ய பிச்சை - அறிஞர் அண்ணா - ஓர் இரவு

அலகு - 5 பயிற்சி   10 மணிகள்

ஓரங்க நாடகம் எழுதுதல் (கலித்தொகை) - நூல் மதிப்புரை எழுதுதல் - மயங்கொலி பிழை அறிதல், இலக்கண குறிப்பு அறிதல்.

பாட நூல்கள்

- நாகராசன்.வி, (ப.ஆ) *குறுந்தொகை*, நியூசெஞ்சுரி புத்தக நிலையம், சென்னை, 2004.
- மாணாக்கனார்.ஆ, (ப.ஆ) *பதினெண்கீழ்க்கணக்கு நூல்கள்*, மாணவர் பதிப்பகம், சென்னை, 2014.

பார்வை நூல்கள்

- நாகராசன்.வி, (ப.ஆ) *நற்றிணை*, நியூசெஞ்சுரி புத்தக நிலையம், சென்னை, 2004.
- நாகராசன்.வி, (ப.ஆ) *புறநானூறு*, திருநெல்வேலி தென்னிந்திய சைவசித்தாந்த நூற் பதிப்புக்கழகம், சென்னை, 2002.
- மாணாக்கனார்.ஆ, (உரை) *ஐங்குறுநூறு* , சாரதா பதிப்பகம், சென்னை, 2009.

இளங்கலைத்தமிழ்

பருவம்	பிரிவு	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	III உட்கூறுகள்	IV உட்கூறுகள்
III	I	தமிழ்	UTAL305/ UTAL306	பொதுத்தமிழ் - III / சிறப்புத்தமிழ் -III	ஒப்படைப்புத்தாள்	தலையங்கம் எழுதுதல்
	III	முதன்மைப்பாடம் –IX	UTAM303	யாப்பருங்கலக்காரிகை	ஒப்படைப்புத்தாள்	வெண்பா இயற்றுதல்
		முதன்மைப்பாடம் –X	UTAM304	காப்பியங்கள்	ஒப்படைப்புத்தாள்	வினாடிவினா
		முதன்மைப்பாடம்- XI	UTAM305	மொழியியல்	தகவல் அட்டவணை	உச்சரிப்பு பயிற்சி
IV	I	தமிழ்	UTAL405/ UTAL406	பொதுத்தமிழ் - IV / சிறப்புத்தமிழ் - IV	ஒப்படைப்புத்தாள்	நேர்காணல் எழுதுதல்
	III	முதன்மைப்பாடம் –XIII	UTAM401	புறப்பொருள் வெண்பாமாலை	ஒப்படைப்புத்தாள்	வினாடிவினா
		முதன்மைப்பாடம் –XIV	UTAM405	அற இலக்கியங்கள	ஒப்படைப்புத்தாள்	வினாடிவினா
		முதன்மைப்பாடம் –XV	UTAM404	தமிழ் இலக்கண நூல்கள்	தகவல் அட்டவணை	தெரிவு வினாக்கள் தயாரித்தல்
		முதன்மைப்பாடம் -XVI	UTAM508	தகவல் தொடர்பியல்	தகவல் அட்டவணை	தலையங்கம் எழுதுதல் / திரைப்பட விமர்சனம் எழுதுதல்

அகமதிப்பீட்டிற்கான உட்கூறுகள்
பயிற்சி பட்டறை II

பருவம்	பிரிவு	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	உட்கூறுகள்
IV	III	முதன்மைப்பாடம்	UTAR401	பயிற்சி பட்டறை	1.நேர்காணல் 2.செய்தி எழுதுதல் 3.மேடைப் பேச்சு 4.செய்தி வாசித்தல் 5.தரவு சேகரித்தல் 6 தனி நபர் நடிப்பு 7.பிற மொழி கலப்பின்மை 8. நேரடி வர்ணனை 9.கதைமாந்தர் சித்தரிப்பு 10. நாடகம் எழுதுதல்

மதிப்பெண் வழங்கும் முறை:
CIA : **60** மதிப்பெண்
தொடர் மதிப்பீடு (DPA) : 30 மதிப்பெண்
தேர்வு I : 10 மதிப்பெண்
புறவாய்மொழித் தேர்வு-I : 05 மதிப்பெண்
தேர்வு II : 10 மதிப்பெண்
புறவாய்மொழித் தேர்வு-II : 05 மதிப்பெண்

பருவத்தேர்வு (ESE) : **40** மதிப்பெண்
பதிவேடு : 10 மதிப்பெண்
செய்முறைத்தேர்வு(Pratical) : 20 மதிப்பெண்
புறவாய்மொழித் தேர்வு-II : 10 மதிப்பெண்

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

பருவம்	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	வாரம் மணி நேரம்	தரம்	
					Min	Max
I	முதன்மைப்பாடம் -I	PTAM102	தொல்காப்பியம் - எழுத்ததிகாரம்	6	5	5
	முதன்மைப்பாடம் -II	PTAM104	தொல்லியல்	6	5	5
	முதன்மைப்பாடம் -III	PTAM109	ஒப்பிலக்கியம்	6	4	4
	முதன்மைப்பாடம் -IV	PTAM108	தமிழ் இலக்கியச் சூழலில் பெண்ணியம்	5	4	4
	முதன்மைப்பாடம் -V	PTAM110	நவீன இலக்கியம்	6	5	5
			நூலகம்	1	-	-
			மொத்தம்	30	23	23
II	முதன்மைப்பாடம் -VI	PTAM203	தொல்காப்பியம் - சொல்லதிகாரம்	5	4	4
	முதன்மைப்பாடம் -VII	PTAM209	திறனாய்வுக்கோட்பாடுகள்	5	4	4
	முதன்மைப்பாடம் -VIII	PTAM210	அற இலக்கியங்கள்	4	3	3
	முதன்மைப்பாடம் -IX	PTAM211	அகராதியியல்	5	3	3
	முதன்மைப்பாடம் -X	PTAM212	காப்பியங்கள்	5	4	4
	துறைசாரா விருப்பப் பாடம் - II	PTAE201/ PTAE202	ஊடகத்தமிழ் சுற்றுலாவியல்	5	4	4
	SERVICE LEARNING	PTAX202	பயன்பாட்டுத்தமிழ்	-	1	1
			நூலகம்	1	-	-
			மொத்தம்	30	23	23
III	முதன்மைப்பாடம் - XI	PTAM301	தொல்காப்பியம்-பொருளதிகாரம் - I	6	5	5
	முதன்மைப்பாடம் - XII	PTAM305	ஆராய்ச்சி நெறிமுறைகள்	6	5	5
	முதன்மைப்பாடம் - XIII	PTAM306	உரையாசிரியர்கள்	5	5	5
	முதன்மைப்பாடம் - XIV	PTAM310	சிற்றிலக்கியங்கள்	5	4	4
	பல்துறை சார்புபாடம் -I	PTAI301	மொழிபெயர்ப்பியல்	5	4	4
	திட்டக்கட்டுரை	PTAP401	ஆய்வு திட்டக்கட்டுரை	2	-	-
			நூலகம்	1	-	-
			மொத்தம்	30	23	23
IV	முதன்மைப்பாடம் - XV	PTAM401	தொல்காப்பியம்-பொருளதிகாரம் -II	6	5	5
	முதன்மைப்பாடம் - XVI	PTAM404	ஊடகவியல்	6	4	4
	முதன்மைப்பாடம் - XVII	PTAM406	தமிழ்க்கணினி பயன்பாட்டியல்	6	4	4
	முதன்மைப்பாடம் -XVIII	PTAM409	சங்க இலக்கியம்	6	4	4
	திட்டக்கட்டுரை	PTAP401	ஆய்வு திட்டக்கட்டுரை	4	4	4
			நூலகம்	2	-	-
			மொத்தம்	30	21	21
			கூட்டு எண்ணிக்கை	120	90	90

PTAM301 தொல்காப்பியம் - பொருளதிகாரம் I

பருவம் : மூன்றாம் பருவம்	தரம்	: 05
பிரிவு : முதன்மைப்பாடம் - XI	மணி நேரம்/வாரம்	: 06
வகுப்பு : **II M.A தமிழ்**	மொத்த மணிநேரங்கள்	: 78

நோக்கம்

மாணவியர்

* பிற மொழிகளில் இல்லாத தமிழ் மொழிக்கே உரிய மக்களுடைய வாழ்க்கையை அடிப்படையாகக் கொண்டு எழுதப்பட்ட இலக்கணத்தினைக் கற்பித்தல்.

அலகு-1   12 மணிகள்

    அகத்திணையியல்

அலகு-2   18 மணிகள்

    புறத்திணையியல்

அலகு-3   16 மணிகள்

    களவியல்

அலகு-4   16 மணிகள்

    கற்பியல்

அலகு-5   16 மணிகள்

    பொருளியல்

பாடநூல்

* *தொல்காப்பியம்-பொருளதிகாரம்,* இளம்பூரணர் உரை தமிழ்மண் பதிப்பகம் சென்னை,2003.

பார்வை நூல்கள்

* சண்முகம் பிள்ளை. மு. - *தொல்காப்பியம் பொருளதிகாரம்,* 184, பிராட்வே, முல்லை நிலையம், சென்னை, 2003.
* சிவலிங்கனார். ஆ. - *தொல்காப்பியர் உரை வளம்,* உலகத் தமிழ் ஆராய்ச்சி நிறுவனம், தரமணி, சென்னை, 1982.
* சுந்தரமூர்த்தி.கு. - *தொல்காப்பியம்-பொருளதிகாரம்,* அண்ணாமலைப் பல்கலைக்கழகம், சிதம்பரம்,மு.ப.1986.
* சுப்ரமணியன். ச.வே. - *தொல்காப்பியம்- பொருளதிகாரம் (உரை வளங்கள்)* உலகத் தமிழ் ஆராய்ச்சி நிறுவனம், சென்னை, 2008.

PTAM305 ஆராய்ச்சி நெறிமுறைகள்

பருவம் : மூன்றாம் பருவம்	தரம்	: 05
பிரிவு : முதன்மைப்பாடம் - XII	மணி நேரம் /வாரம்	: 06
வகுப்பு: **II MA தமிழ்**	மொத்த மணிநேரங்கள்	: 78

நோக்கம்

மாணவியர்

- தமிழில் ஆராய்ச்சி நெறிமுறைகளைப் பற்றி ஆய்வு மாணவர்களுக்கு அறிமுகப்படுத்துதல்.

அலகு-1   16 மணிகள்

ஆராய்ச்சி – ஒரு விளக்கம்- ஆய்வாளர் தகுதிகள் - ஆய்வுச்சிக்கல்கள்.

அலகு-2   15 மணிகள்

ஆராய்ச்சி முறைகள் - ஆய்வில் உத்திகள் - கருதுகோள்.

அலகு-3   15 மணிகள்

களஆய்வு –நேர்காணல் -வினாநிரல்

அலகு-4   16 மணிகள்

நூலகப்பயன்பாடு -ஆய்வேட்டின் கட்டமைப்பு - மேற்கோளும் - அடிக்குறிப்பும்

அலகு-5   16 மணிகள்

குறியீடு – பிழைகளை அகற்றுதல் - ஆய்வுக்குரிய தலைப்புகள் -20ஆம் நூற்றாண்டு தமிழியல் ஆய்வுகள்.

பாடநூல்

- முனைவர். கு.வெ. பாலசுப்பிரமணியன் ,*ஆய்வியல் நெறிகள்* , உமா நூல் வெளியிட்டகம். தஞ்சாவூர் ,2007.

பார்வை நூல்

- டாக்டர் பொற்கோ ,*ஆராய்ச்சி நெறிமுறைகள்*, ஐந்திணைப் பதிப்பகம், சென்னை - 2004.

PTAM306 உரையாசிரியர்கள்

பருவம் :	மூன்றாம் பருவம்		தரம் :	05
பிரிவு :	முதன்மைப்பாடம் - XIII		மணி நேரம்/வாரம் :	05
வகுப்பு :	II M.A தமிழ்		மொத்த மணிநேரங்கள் :	65

நோக்கம்

மாணவியர்

- இலக்கிய, இலக்கண உரையாசிரியர்களின் ஆராய்ச்சி வரலாற்றினை அறிந்து கொள்ளுதல்.
- உரையாசிரியர்களின் உரைகளுக்கிடையிலான வேறுபாட்டினைக் கண்டறிதல்.
- இலக்கிய இலக்கணத்திற்குப் புதிய உரை எழுதுவதற்கான திறன் பெற்று எழுதுதல்.

அலகு - 1 உரை பொதுவிளக்கம்   13 மணிகள்

உரை வரையறை - விளக்கம் - உரை வகைகள் - இலக்கண, இலக்கிய உரைகள் - அதன் உள்வகைகள் - எழுத்துரை - வாய்மொழி உரை - பொழிப்புரை - பதவுரை - குறிப்புரை - விருத்தியுரை - செய்யுள் உரை - மூலநூலாசிரியர் உரை - வேறு ஆசிரியர் உரை - உடன்பாட்டுரை - மறுப்புரை - உரைக் கூறுகள் - கருத்துரை - மூலபாடம் - அருஞ்சொற்பொருள் - எடுத்துக்காட்டு - பாடபேதம் - விளக்கம் - ஒப்பிட்டு விளக்குதல் - காரண, காரிய விளக்கம் - பலபொருள் சொல் வழக்குக் கூறுதல் - உரை, உரைநடை வேறுபாடு - உரைக்கூறு அடிப்படையில் வகைமை - நய உரை.

அலகு - 2 இலக்கண உரைகள்   **12 மணிகள்**

வகைமை அடிப்படையில் உரையாசிரியர் - எழுத்திலக்கண, சொல்லிலக்கண, பொருளிலக்கண, யாப்பிலக்கண, அணியிலக்கண உரைகள் - நூல் அடிப்படையில் உரை - தொல்காப்பியம் நன்னூல் முதலாக இலக்கண உரைகளுக்கு இடையே உள்ள பொதுத்தன்மைகள் - இலக்கண உரை வரலாறு.

அலகு - 3 இலக்கிய உரைகள்   **14 மணிகள்**

வகைமை அடிப்படையில் உரைகள் - சங்க இலக்கியம், அற இலக்கியம், காப்பியம், புராணம், பக்தி, சிற்றிலக்கிய உரைகள் - சைவ, வைணவ, பௌத்த, சமண இலக்கிய உரைகள் - நூல் அடிப்படை வகை - புறநானூறு, சிலப்பதிகாரம், திருக்குறள் முதலான உரைகள் - சமய உரைகள் - தத்துவ உரைகள் - கிறித்துவ உரை - சமண உரை - சைவ உரை - வைணவ உரை.

அலகு - 4 உரை ஆய்வுகள்   **13 மணிகள்**

உரை வளம் - உரைக் கொத்து - தொகுப்புரைகள் - மதிப்பீடுகள் - உரையின் வரலாற்றுப் பின்னணி - இலக்கண இலக்கியம் முதலான வகைமை நோக்கில் ஆய்வு வரலாறு - ஒரு உரையாசிரியரின் பல உரைகள் பற்றிய ஆய்வு வரலாறு - ஒரு நூலுக்கு எழுதப்பட்ட உரைகளின் ஆய்வு வரலாறு - உரை மொழி - உரை அமைப்பு பற்றிய ஆய்வுகள் - உரைகளைப் பற்றிய ஆராய்ந்தவர்கள் - உரை ஆராய்ச்சியின் வகைமைகள் - உரையின் மொழி குறித்த ஆய்வுகள் - மொழிக்கலப்பு - மணிப்பிரவாளம் முதலான மரபு உரை ஆய்வுகள் - நூலமைப்பு பற்றிய உரைக்கருத்துகள் ஆராய்தல்.

அலகு - 5 உரை ஆளுமைகள் - தனித்தன்மைகள்   **13 மணிகள்**

இலக்கண உரையாசிரியர்கள் - இளம்பூரணர், பேராசிரியர், நச்சினார்க்கினியர், சேனாவரையர், கல்லாடனார், மயிலைநாதர், சிவஞானமுனிவர், ஆறுமுகநாவலர், கு.சுந்தரமூர்த்தி, ஆ.சிவலிங்கனார், ஆ.பூவராகம்பிள்ளை, தேவநேயப்பாவாணர், பாலசுந்தரம், புலியூர்க்கேசிகன், நக்கீரர், தமிழண்ணல், இலக்கிய உரையாசிரியர்கள் - நச்சினார்க்கினியர் அடியார்க்குநல்லார், பரிமேலழகர், மணக்குடவர், காளிங்கர், சி.கே.சுப்பிரமணியம், உ.வே.சாமிநாதையர், பெருமழைப்புலவர், சோமசுந்தரனார், ஒளவை சு.துரைசாமிப்பிள்ளை, மு.வ.

பாடநூல்கள்

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* மோகன் இரா,சொக்கலிங்கம் ந, *உரைமரபுகள்*, மெய்யப்பன் பதிப்பகம், சென்னை, 2003.

பார்வை நூல்கள்

* சுப்பிரமணியன்.சு.வெ, *அடியார்க்குநல்லார் உரைத்திறன்*, மெய்யப்பன் பதிப்பகம், சிதம்பரம், 2006.
* அரங்கராஜன்.இரா, *திருவாய் மொழிப் பேருரையாளர் நம்பிள்ளை உரைத்திறன்*, மெய்யப்பன் தமிழாய்வகம், சிதம்பரம், 2002.
* சிவலிங்கராஜா.எஸ், *ஈழத்துத் தமிழ் உரை மரபு*, குமரன் புத்தக இல்லம் சென்னை, 2003.
* சுப்பிரமணியன்.ச.வே, *அடியார்க்குநல்லார் உரைத்திறன்*, மெய்யப்பன் பதிப்பகம், சிதம்பரம், 2005.

PTAM310 சிற்றிலக்கியங்கள்
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பருவம் : மூன்றாம் பருவம்		தரம்	: 04
பிரிவு : முதன்மைப் பாடம் -XIV		மணிநேரம்/வாரம்	: 05
வகுப்பு : **II M.A தமிழ்**		மொத்த மணிநேரம்	: 65

நோக்கம்

மாணவியர்

- தமிழிலுள்ள சிற்றிலக்கியங்களைப் பற்றி அறிந்து கொள்ளல்.
- சிற்றிலக்கியங்களில் இடம்பெற்றுள்ள வாழ்வியல் நெறிகளை தெரிந்து கொள்ளல்.
- சிற்றிலக்கியத்தின் கூறுகளை பிற இலக்கியத்துடன் ஒப்பிட்டு பார்த்தல்.

அலகு- I சிற்றிலக்கிய அறிமுகம்   13 மணிகள்

சிற்றிலக்கியங்களின் தோற்றமும் வளர்ச்சியும் - பாட்டியல் நூல்களில் காணலாகும் சிற்றிலக்கிய இலக்கணங்கள் - சிற்றிலக்கியங்கள் பெயர் பெறும் முறை, பொருளமைதி - கட்டமைப்பு.

அலகு- II சிற்றியலக்கிய வகைகள்   13 மணிகள்

குலோத்துங்க சோழன் உலா (முழுவதும்), - முக்கூடற் பள்ளு (சிங்கன் சிங்கி உரையாடல் நீங்கலாக).

அலகு- III சிற்றியலக்கிய வகைகள்   14 மணிகள்

முத்துக்குமாரசுவாமி பிள்ளைத்தமிழ் (பருவம் தோறும் முதல் 5 பாடல்கள் (50 பாடல்கள்).

அலகு- IV சிற்றியலக்கிய வகைகள்   13 மணிகள்

அபிராமி அந்தாதி – முதல் 20 பாடல்கள், பழமொழி விளக்கம் என்னும் தண்டலையார் சதகம் - முதல் 20 பாடல்கள்

அலகு- V புதுவகை சிற்றியலக்கியங்கள் அறிமுகம் (கிருத்துவம், இசுலாமியம்)   12 மணிகள்

கலம்பகம், மாலை, அந்தாதி, அம்மானை, கோவை (கிருத்துவ இலக்கியங்கள்), கிஸ்ஸா, மஸ்அலா, முனாஜத்து, நாமா (இசுலாமிய இலக்கியங்கள்).

பாட நூல்கள்

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- கதிர்முருகு.முனைவர், *பழமொழி விளக்கம் என்னும் தண்டலையார் சதகம்*, சாரதா பதிப்பகம், சென்னை, 2009.

பார்வை நூல்கள்

- செயராமன் ந.வீ. *சிற்றிலக்கியச் செல்வம்*, மணிவாசகர் பதிப்பகம் சிதம்பரம், 2007.
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PTAI301 மொழிபெயர்ப்பியல்

பருவம் : மூன்றாம் பருவம்		தரம்	: 04
பிரிவு : பல்துறை சார்புப் பாடம் -I		மணிநேரம்/வாரம்	: 05
வகுப்பு : பிறத்துறை மாணவியர்கள்		மொத்த மணிநேரம்	: 65

நோக்கம்

மாணவியர்

- மொழிபெயர்ப்பின் கூறுகளை அறிந்து கொள்ளல்.
- இலக்கிய வடிவங்களை மொழிபெயர்க்கும் முறையினை தெரிந்து கொள்ளுதல்.
- மொழிபெயர்ப்புத் துறையில் வேலைவாய்ப்பினைப் பெறுதல்.

அலகு - I மொழியின் பயன்பாடு   13 மணிகள்

மொழிபெயர்ப்பின் இன்றியமையாமை - மொழியின் பயன்பாடு - மொழிபெயர்ப்பு - மொழிபெயர்ப்பின் நோக்கம். (ஆகிய பகுதிகள் மட்டும்)

அலகு - II மொழிபெயர்ப்பு வகைகள்   13 மணிகள்

மொழி பெயர்ப்பும் மொழிபெயர்ப்பாளரும் - மொழிபெயர்ப்பு விளக்கம் - மொழிபெயர்ப்பின் இயல்புகள் - மொழி மரபு - மொழிபெயர்க்கும் முறை - மூலச் சொல்லும் மொழிபெயர்ப்புச் சொல்லும் - அகராதி அறிவு மொழிபெயர்ப்பாளர் - மொழிபெயர்ப்பாளருக்கான அடிப்படைத் தகுதிகள் - உரிமைகள் - மொழிபெயர்ப்பாளர் வகைப்பாடுகள். (ஆகிய பகுதிகள் மட்டும்).

அலகு - III மொழிபெயர்ப்பு உத்திமுறைகள்   14 மணிகள்

மொழிபெயர்ப்பு முறைகளும் உத்திகளும் - மொழிபெயர்ப்பில் உள்ள பிரிவுகள் - கவிதை மொழி பெயர்ப்பு - கவிதை மொழிபெயர்ப்பும் உரைநடை மொழிபெயர்ப்பும் - சொல்லாக்கம் - துறைச் சொல்லாக்க சிறப்புப்பெயர்கள் - இலக்கிய மொழிபெயர்ப்பின் இடர்பாடுகள் - இலக்கிய இயல்பு - மரபுச் சிக்கல். (ஆகிய பகுதிகள் மட்டும்)

அலகு - IV பயிற்சி அளித்தல்   (ஆங்கிலத்தில் மொழிபெயர்த்தல்)   13 மணிகள்

இலக்கியப் பொன்மொழிகள் - கலைச் சொல்லாக்கம் - மரபுத்தொடர்கள் - பழமொழிகள் - விடுகதைகள் - வழக்குச் சொற்கள் - விளம்பரம்.

அலகு - V பயிற்சி அளித்தல் (ஆங்கிலத்தில் மொழிபெயர்த்தல்)   12 மணிகள்

கட்டுரை மொழிபெயர்ப்பு கவிதை மொழிபெயர்ப்பு - சிறுகதை மொழிபெயர்ப்பு.

பாட நூல்கள்

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பார்வை நூல்கள்

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PTAP401 ஆய்வு திட்டக்கட்டுரை

	தரம் : 04
பருவம் : மூன்று மற்றும் நான்காம் பருவம்	மணி நேரம் வாரம் : 02+ **04**
பிரிவு : திறன் சார் திட்டக்கட்டுரை	மொத்த மணிநேரங்கள் : 26

நோக்கம்

மாணவியர்

- மாணவிகளிடம் ஆய்வு பார்வையை அறிமுகப்படுத்துதல்.

ஒரு குறிப்பிட்ட பொருண்மையைத் தெரிவு செய்து அது தொடர்பாக ஆசிரியர்களின் நெறிபடுத்துதல்துணையோடு சுமார் 50 பக்க அளவில் திட்டக்கட்டுரையைச் சமர்ப்பிப்பர்.

PTAM401   தொல்காப்பியம்-பொருளதிகாரம் - II

பருவம் : நான்காம் பருவம்	தரம் :05
பிரிவு : முதன்மைப்பாடம் - XVI	மணி நேரம்/வாரம் :06
வகுப்பு : II M.A தமிழ்	மொத்த மணி நேரங்கள் :78

நோக்கம்

மாணவியர்

- பிற மொழிகளில் இல்லாத தமிழ் மொழிக்கே உரிய மக்களுடைய வாழ்க்கையை அடிப்படையாகக் கொண்டு எழுதப்பட்ட இலக்கணத்தினைக் கற்பித்தல்.

அலகு-1	**12 மணிகள்**

மெய்ப்பாட்டியல்

அலகு-2	**13 மணிகள்**

உவமவியல்

அலகு-3	**20 மணிகள்**

செய்யுளியல் (நூற்பா 1-73)
   (அசை, சீர், அடி,)

அலகு-4	**20 மணிகள்**

செய்யுளியல் (நூற்பா 74 -147)
   (தொடை, வெண்பா முதல் கலிப்பா வரை)

அலகு-5	**13 மணிகள்**

மரபியல்

பாடநூல்

- தொல்காப்பியம்-பொருளதிகாரம் இளம்பூரணர் உரை.

பார்வை நூல்கள்

- சண்முகம் பிள்ளை.மு., *தொல்காப்பியம் பொருளதிகாரம்* சென்னை 2006.

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PTAM 404 ஊடகவியல்

பருவம் : நான்காம் பருவம்	தரம் : 04
பிரிவு : முதன்மைப்பாடம் - XVII	மணிநேரம்/ வாரம் : 06
வகுப்பு : II M.A தமிழ்	மொத்த மணி நேரம் : 78

நோக்கம்

மாணவியர்

- ஊடகங்களையும் அவற்றின் செயல்பாடுகளையும் அறிந்துகொள்ளும் திறனை வளர்த்துக் கொள்ளுதல்.
- ஊடகத்துறையில் பணிவாய்ப்புகளை உருவாக்கிக் கொள்ளுதல்.
- ஊடகத்தை உருவாக்கும் தனித்திறனை வளர்த்துக் கொள்ளுதல்.

அலகு – 1 ஊடகம் - அறிமுகம்   16 மணிகள்

ஊடகம் விளக்கம் - தகவல் தொடர்பு – அடிப்படைகள் - விளைவுகள் - பணிகள் - தடைகள் - தகவல் ஏற்போரின் தகுதிகள் - தகவல் தொடர்பு கோட்பாடுகள்.

அலகு – 2 செய்தித்தாள்   16 மணிகள்

செய்தி இலக்கணம் - செய்தி எழுதும் முறை – செய்தி நிறுவனங்கள் - செய்தித்தாள் வரலாறு - இதழியல் சட்டங்கள் - செய்தித்தாள் தொடங்குவதற்கான வழிமுறைகள் - இதழ் நிர்வாக அமைப்பு – செய்திகளைச் செப்பனிடுதல் நுட்பங்கள்- செய்தியின் கட்டமைப்பு – பக்க வடிவமைப்பு- அச்சுப்படி திருத்துதல்

அலகு – 3 வானொலி   15 மணிகள்

வானொலியின் வரலாறு – வானொலி நிகழ்ச்சி – செய்தி ஒலிபரப்பு – கிராம ஒலிபரப்பு – நாடகங்கள் - உரைக்கோவை – நகர்வலம் - நேர்காணல் - கலந்துரையாடல் - பிறநாட்டு தமிழ் ஒலிபரப்புகள் - வானொலியும் தன்னாட்சியும் - அரசு, தனியார் வானொலி சேவை ஒப்பீடு, இணைய வானொலி.

அலகு – 4 தொலைக்காட்சி   15 மணிகள்

தொலைக்காட்சி வரலாறு –பல்வேறு நிகழ்ச்சிகள் - தயாரிப்பு முறை – நேரடி ஒளிபரப்பு – தொலைக்காட்சியும் பிற தகவலியல் சாதனங்களும் - தகவல் ஒளிப்படங்கள் - அரசு, தனியார் ஒளிபரப்பு ஒப்பீடு – தொலைக்காட்சியால் ஏற்படும் மன உணர்வுகள்.

அலகு – 5 திரைப்படங்கள்   16 மணிகள்

திரைப்படம் தோற்றம் - வளர்ச்சி -இந்தியாவில் திரைப்பட வளர்ச்சி –தமிழில் படத் தயாரிப்புகள் - தணிக்கைகள் - தேசியப் படச்சுருள் - திரைப்பட விழாக்கள் - ஊடகங்களில் இணையம், மின்னஞ்சல், வரைகலை, (கிராபிக்ஸ்), அசைவுபடம் (அனிமேஷன்) தொழில்நுட்பங்கள் - பல்லூடகம், மின்னிதழ், வலைப்பூ.

பாடநூல்கள்

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பார்வை நூல்கள்

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- அ .சாந்தா. மோகன்.வீ., (பதி.ஆ) , "*மக்கள் ஊடகத் தொடர்பியல் அடிப்படைகள்*", மீடியா பப்ளிகேஷன்ஸ், மதுரை. மு.ப -2007.

- சுரேஷ் பால், *மீடியா உலகம்*, தீபிகா, சென்னை ,1999.
- கோ.செல்வம், *உங்கள் வானொலி*, புவனம் பதிப்பகம், சென்னை, 1992.
- பவா.சமத்துவன் , *தொலைக்காட்சி உலகம்* , புதுயுகம் செய்முறை செம்மையாக்கம், சென்னை, 2007.

PTAM409 சங்க இலக்கியம்

பருவம் : நான்காம் பருவம்	தரம்	: 04
பிரிவு : முதன்மைப்பாடம் - 3	மணி நேரம்வாரம்:	06
வகுப்பு : I M.A. தமிழ்	மொத்த நேரங்கள	78

நோக்கம்

மாணவியர்

- பழந்தமிழ் இலக்கியங்களைத் தெரிந்து கொள்ளல்,
- சங்க கால மக்களின் வாழ்க்கை முறையினை அறிந்து கொள்ளுதல்,
- இலக்கிய மரபுகளைப் பின்பற்றுதல்

அலகு 1   **16 மணிகள்**

குறுந்தொகை - 10 பாடல்கள் (221 - 230 பாடல்கள்) - நற்றிணை - 10 பாடல்கள் (31 – 40 பாடல்கள்) - அகநானூறு - 5 பாடல்கள் - (241 – 245 பாடல்கள்)

அலகு 2   **16 மணிகள்**

புறநானூறு – 15 பாடல்கள் - (201 – 210 பாடல்கள்) - பதிற்றுப்பத்து - 10 பாடல்கள் (ஆறாம் பத்து)

அலகு 3   **15 மணிகள்**

திருமுருகாற்றுப்படை (முழுவதும்)

அலகு 4   **15 மணிகள்**

கலித்தொகை – 20 பாடல்கள் (குறிஞ்சிக்கலி – 10 பாடல்கள், மருதக்கலி - 10 பாடல்கள்)

அலகு 5   **16 மணிகள்**

பரிபாடல் - 3 பாடல்கள் - (செவ்வேள் - 8ஆவது பாடல், வையை -10ஆவது பாடல், திருமால் - 15 ஆவது பாடல்)

பாடநூல்கள்

1. எஸ். வையாபுரிப்பிள்ளை   :   சங்க இலக்கியம்,

                                                                  பாரி நிலையம், சென்னை,

                                                                  2-ஆம் பதிப்பு, 1967.

2. வ.சுப. மாணிக்கனார்   :   தமிழ்க் காதல்,

                                                                  பாரி நிலையம், சென்னை,

                                                                  3-ஆம் பதிப்பு, 1980 -

பார்வை நூல்கள்

1. பெ. மாதையன்   =   அகத்திணைக் கோட்பாடுகள்,

                                      நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை.

2. அம்மன்கிளி முருகதாஸ்   :   சங்க அகத்திணை மரபும் மாற்றமும்

                                        குமரன் புத்தகநிலையம், சென்னை.

3. கா. சிவத்தம்பி   :   பண்டைத் தமிழ்ச் சமூகம் - வரலாற்றுப் புரிதலை நோக்கி

                                        மக்கள் வெளியீடு,சென்னை.

4. க. கைலாசபதி   :   தமிழ் வீரநிலைக் கவிதை,

                                        குமரன் புத்தக நிலையம், சென்னை, 2012.

<div align="center">

அகமதிப்பீட்டிற்கான உட்கூறுகள்
முதுகலைத்தமிழ்

</div>

பருவம்	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	III உட்கூறுகள்	IV உட்கூறுகள்
III	முதன்மைப்பாடம்-XI	PTAM301	தொல்காப்பியம்-பொருளதிகாரம்-I	கருத்தரங்கம்	இலக்கண ஒப்பீடு
	முதன்மைப்பாடம்-XII	PTAM305	ஆராய்ச்சி நெறிமுறைகள்	நூல் மதிப்பீடு	களஆய்வு
	முதன்மைப்பாடம்-XIII	PTAM306	உரையாசிரியர்கள்	கருத்தரங்கம்	நூல் மதிப்பீடு
	முதன்மைப்பாடம்-XIV	PTAM310	சிற்றிலக்கியங்கள்	தகவல் அட்டவணை	தல வரலாறு
	முதன்மைப்பாடம்-XV	PTAI301	மொழிபெயர்ப்பியல்	கவிதை மொழிபெயர்ப்பு	சிறுகதை மொழி பெயர்ப்பு
IV	முதன்மைப்பாடம்-XV	PTAM401	தொல்காப்பியம்-பொருளதிகாரம்-II	கருத்தரங்கம்	இலக்கணக் குறிப்பினைக் கண்டறிதல்
	முதன்மைப்பாடம்-XVI	PTAM404	ஊடகவியல்	கருத்தரங்கம்	தலையங்கம் எழுதுதல் திரைப்பட விமர்சனம் எழுதுதல்
	முதன்மைப்பாடம்-XVII	PTAM406	தமிழ்க்கணிணி பயன்பாட்டியல்	கருத்தரங்கம்	
	முதன்மைப்பாடம்-XVIII	PTAM409	சங்க இலக்கியம்	கருத்தரங்கம்	இலக்கிய ஒப்பீடு

DEPARTMENT OF ENGLISH

PREAMBLE

UG: Course Profile and the syllabi of courses offered in the third and fourth semester along with evaluation components III & IV (With Effect from 2018-2021 batch onwards) and

PG: Course Profile and the syllabi of courses offered in the third and fourth semester along with evaluation components III & IV (With Effect from 2018-2020 batch onwards) are presented in this booklet.

PROGRAMME PROFILE B.A. ENGLISH

PSO 1: Ability to apply the critical pondering in different forms of literature.

PSO 2: Analysis of the socio-political aspects in literary texts.

PSO 3: Capability to compare the cultural context in different literature in analyzing the literary text.

PSO 4: Ability to pronounce and transcribe the sounds of English language and making Perfect stress and intonation

Semester	Part	Category	Course Code	Course Title	Contact Hrs/Week	Credit	
						Min	Max
I	I	Language	UTAL105/ UTAL106/ UHIL 101/ UFRL101	Basic Tamil I Advanced Tamil I Hindi I/ French I	4	2	3
	II	English	UENL107 / UENL108	General English I / Advanced English I	5	3	4
	III	Core I	UENM105	Foundation Course to English	2	1	1
	III	Core II	UENM108	Poetry	6	5	5
	III	Core III	UENM109	Prose	6	5	5
	III	Allied I	UENA103	Literary Terms and Forms	5	5	5
	IV	Value Education			2	1	1
				TOTAL	**30**	**22**	**24**
II	I	Language	UTAL205/ UTAL206/ UHIL 201/ UFRL 201	Basic Tamil II Advanced Tamil II Hindi II/ French II	4	2	3
	II	English	UENL207 / UENL208	General English II / Advanced English II	5	3	4
	III	Core IV	UENM207	Drama	5	5	5
	III	Core V	UENM208	Fiction	5	5	5
	III	Allied II	UENA203	Social History of England	5	5	5

	IV	Non-Major Elective			4	2	2
	IV	Soft Skills			2	1	1
	V	Extension Activity/ Physical Education/ NCC			-	1	2
				TOTAL	**30**	**24**	**27**
III	I	Language	UTAL305/ UTAL306/ UHIL 301/ UFRL301	Basic Tamil III Advanced Tamil III / Hindi III/ French III	4	2	3
	II	English	UENL307 / UENL308	General English III / Advanced English III	5	3	4
	III	Core VI	UENM305	Indian Writing in English	5	5	5
	III	Core VII	UENM306	American Literature	5	5	5
	III	Allied III	UENA303	History of English Literature - I	6	5	5
	IV	Online Course		Online Course (NPTEL/ Spoken Tutorial)	3	1	2
	IV	Value Education			2	1	1
				TOTAL	**30**	**22**	**25**
IV	I	Language	UTAL405/ UTAL406/ UHIL 401/ UFRL401	Basic Tamil IV / Advanced Tamil IV / Hindi IV/ French IV	4	2	3
	II	English	UENL407 / UENL408	General English IV Advanced English IV	5	3	4
	III	Core VIII	UENM405	Diasporic Literature	6	5	5
	III	Core IX	UENM407	Language and Linguistics	5	5	5
	III	Allied IV	UENA403	History of English Literature - II	6	5	5
	III	Core XIII	UENM513/ UENP501	Basics of Translation / Project	2	-	**-**
	IV	Soft Skills			2	1	1
	V	Extension Activity/ Physical Education/ NCC			-	-	2
				TOTAL	**30**	**21**	**25**
V	III	Core X	UENM509	English Language Teaching	6	5	5
	III	Core XI	UENM510	Commonwealth Literature	6	5	5
	III	Core XII	UENM512	Literary Criticism- I	6	6	6

	III	Core XIII	UENP501/ UENM513	Project/ Basics of Translation	4	3	3
	III	Core XIV	UENM514	Post Colonial Literature	6	4	4
	IV	Value Education			2	1	1
				TOTAL	**30**	**24**	**24**
VI	III	Core XV	UENM609	English Phonetics	6	5	5
	III	Core XVI	UENM610	Twentieth Century Literature	5	5	5
	III	Core XVII	UENM611	Literary Criticism- II	6	6	6
	III	Core XVIII	UENM612	Shakespeare	6	5	5
	III	Core XIX	UENC602	Comprehensive Viva Voce	-	1	1
	III	Major Elective	UENO603	Journalism	5	4	4
			UENO604	Mass Communication			
	IV	Soft Skills			2	1	1
	V	Extension Activity/ Physical Education/ NCC			-	-	2
				TOTAL	**30**	**27**	**29**
				GRAND TOTAL	**180**	**140**	**154**

EXTRA CREDIT EARNING PROVISIONS

Semester	Part	Category	Course Code	Course Title	Hrs/week	Credit
II	III	Core	UENI201	Summer Internship	-	1
IV	III	Core	UENI401	Summer Internship	-	1
V	III	Core	UENS501	Mini-Project (Self-Study)	-	1
V	III	Core	UENS502	Practice of Translation (Self-Study)	-	1

UENM305 INDIAN WRITING IN ENGLISH

Semester	**: III**	**Credits** **: 5**
Category	**: Core VI**	**Hours/week : 5**
Class &Major	**: II B.A English**	**Total Hours : 65**

Objectives
To enable the students
- Understand the importance of Indian English literature and its culture.
- Illustrate Indian socio-political issues in Indian literature in English.
- Analyse the different Genres used in Indian writing in English

UNIT- I POETRY   **13 Hrs**

Henry Derozio	:	The Harp of India
Toru Dutt	:	The Lotus, Our Casuarina Tree
Rabindranath Tagore	:	Gitanjali- Lyrics (1-10)
Sarojini Naidu	:	Indian Weavers
K.Ramanujan	:	Obituary.

UNIT- II PROSE   **13 Hrs**

Ananda Coomarasamy	:	The Dance of Shiva (an extract from the collection The Dance of Siva.)
Arundhati Roy	:	Democracy's Failing Light.

UNIT- III SHORT STORIES   **13 Hrs**

R.K.Narayan	:	An Astrologers Day
Ruskin Bond	:	The Eyes Have it

UNIT- IV DRAMA   **13 Hrs**

Girish Karnad	:	The Fire and the Rain.

UNIT- V FICTION   **13 Hrs**

Shashi Deshpande	:	In the Country of Deceit
Arundhati Roy	:	God of Small Things

Reference Books
- Dhavan R.K, *Explorations in Modern Indo-English Fiction,* Bahri Publications, New Delhi, 2002.
- Srinivasa Iyengar K.R, *Indian Writing in English,* Sterling Publishers, Madras, 2012.
- Bruce King, ed, *Modern Indian Poetry in English,* OUP, New Delhi, 2005.

E -Resources
- https://archive.org
- www.outlookindia.com/magazine/story/democracys-failing-light/250418

UENM306 AMERICAN LITERATURE

Semester : III   **Credits** : 5
Category : Core VII   **Hours/week :** 5
Class & Major : II B.A English   **Total Hours :** 65

Objectives
To enable the students
- Identify the impression of American Literature on society.
- Analyse various devices used by the American writers.
- Criticize the works of great writers and thinkers of America.

UNIT- I POETRY   **12 Hrs**

Edgar Allan Poe	:	Raven
Walt Whitman	:	I Sit and Look Out
Emily Dickinson	:	Because I Could Not Stop for Death
Robert Frost	:	The Mending Wall
E.E.Cummings	:	The Cambridge Ladies

UNIT- II PROSE   **14 Hrs**

Ralph Waldo Emerson	:	The American Scholar
Henry David Thoreau	:	Civil Disobedience

UNIT- III SHORT STORIES   **15 Hrs**

Edgar Allan Poe	:	The Cask of Amontillado
Scott Fitzgerald	:	Babylon Revisited

UNIT- IV DRAMA   **12 Hrs**

Arthur Miller	:	All My Sons

UNIT- V FICTION   **12 Hrs**

Mark Twain	:	The Adventures of Tom Sawyer
Joseph Heller	:	Catch 22

Reference Books
- William J. Fisher, ed, *American Literature of the Nineteenth Century: An Anthology*, Eurasia Publishing House, New Delhi, 2012.
- Egbert Oliver, ed, *American Literature 1890-1965 : An Anthology*, S.Chand& Co Ltd, New Delhi, 2009.
- George Perkins & Barbara Perkins, *The American Tradition in Literature*, Penguin Publishing House, New Delhi, 2011.

UENA303 HISTORY OF ENGLISH LITERATURE - I

Semester : III	**Credits** : 5
Category : Allied III	**Hours/Week** : 6
Class &Major : II B.A. English	**Total Hours** :78

Objectives
 To enable the students
- Identify the historical events in The History of English literature.
- Understand the impact of different on English literature.
- Examine the major historical achievements in different ages of literature.

UNIT- I CHAUCERIAN AGE   **15 Hrs**
      John Wycliffe, Geoffrey Chaucer, Edmund Spenser, William Caxton

UNIT- II ELIZABETHAN AGE   **16 Hrs**
      Thomas Kyd, Francis Bacon, Christopher Marlowe, Ben Jonson, John Donne

UNIT- III JACOBEAN AGE   **16 Hrs**
      John Milton, Samuel Butler, John Bunyan, John Dryden, Jonathan Swift

UNIT- IV PURITANISM   **15 Hrs**
      Daniel Defoe, Alexander Pope, Samuel Johnson, Thomas Gray.

UNIT– V RESTORATION AND NEO-CLASSICAL AGE   **16 Hrs**
      William Congreve, Richard Brinsley Sheridan, George Gordon Lord Byron, Sir Walter Scott, T.S. Eliot.

Text Book
- Edward Albert, *History of English Literature,* Oxford University Press, New Delhi, 2009.

Reference Books
- Hudson W.H, *An Introduction to the study of English Literature*, Emerald Publishers, New Delhi, 2001.
- Hudson W.H., *An Outline History of English Literature,* Maple Press, New Delhi, 2012.
- William Long J., *History of English Literature*, Bibliolife, Charleston, 2007.

UENL307 GENERAL ENGLISH- III

Semester : III	**Credits** : 3
Category : Language	**Hours/Week** : 5
Class & Major : II UG	**Total Hours** : 65

Objectives
To enable the students

- Understand the importance of language.
- Acquire knowledge of different genres.
- Enhance their grammatical skills in English Language.

UNIT- I POETRY   **13 Hrs**

Sir Philip Sidney	:	The Nightingale
Thomas Campion	:	Never Love Unless You Can
Abraham Cowley	:	The Wish
William Collins	:	Ode to the Evening

UNIT– II PROSE   **13 Hrs**

Winston Churchill	:	A Troublesome Boy
Sir Richard Livingstone	:	Socrates

UNIT- III DRAMA   **12 Hrs**

William Shakespeare	:	The Funeral Oration (From *Julius Caesar* Act-III Scene- II)

UNIT- IV FICTION   **12 Hrs**

Jonathan Swift	:	Voyage to Lilliputans (From *Gullivers Travels*)

UNIT- V GRAMMAR& COMPOSITION   **15 Hrs**

Gender, Verb Forms, Prepositions, Phrasal verbs and patterns with prepositions, Correction of Errors- Paragraph Writing, Hints Developing, Story Telling, Expansion of Proverbs.

Reference Books
- David Green, *The Winged Word,* Macmillan India Limited, New Delhi, 2013.
- Jonathan Swift, *Complete Works of Jonathan Swift,* Biblios Classics, London, 2010.
- William Shakespeare, *Julius Caesar*, Maple press, New Delhi, 2013.
- Wren & Martin, *Key to High School English Grammar and Composition,* S. Chand, New Delhi, 2006.

UENL308 ADVANCED ENGLISH - III

Semester : III	**Credits : 4**
Category : Language	**Hours/Week: 5**
Class & Major : II UG	**Total Hours :65**

Objectives
To enable the students
- Identify the trends and movements in drama across times.
- Compare the socio-cultural aspects of dramatists.
- Assess the plot, characterization, themes and techniques of Drama.

UNIT- I INTRODUCTION   **13 Hrs**
     Drama- Definition, Origin & Growth of Drama – Kinds of Drama.

UNIT- II BRITISH DRAMA   **13 Hrs**
     John Osborne   :   *Look Back in Anger.*

UNIT- III AMERICAN DRAMA   **13 Hrs**
     Eugene O Neill   :   *The Hairy Ape.*

UNIT- IV INDIAN ENGLISH DRAMA   **13 Hrs**
     Mahesh Dattani   :   *Tara.*

UNIT- V GRAMMAR AND COMPOSITION   **13 Hrs**
     Tenses, Sentences – Simple, Complex and Compound, Note Making, Dialogue Writing, Story Writing, Letter Writing.

Reference Books
- Birjadish Prasad, *A Background to the Study of English Literature,* Trinity Press, Bangalore, 2011.
- Harold Bloom, ed, *Modern American Drama,* Chelsea House Publishers, USA, 2005.
- Santwana Haldar, *Mahesh Datatani's Tara - A Critical Study*, Prestige Books, New Delhi, 2009.
- John, Osborne, *Look Back in Anger*, Faber & Faber, London, 1978.
- Wren & Martin, *Key to High School English Grammar and Composition,* S. Chand, New Delhi, 2006.

UENM405 DIASPORIC LITERATURE

Semester **: IV**	**Credits** **: 5**
Category **: Core VIII**	**Hours/Week: 6**
Class &Major : II B.A. English	**Total Hours :78**

Objectives
To enable the students
- Understand Diasporic Literature.
- Infer the culture across the continents through the study of Diasporic Literature.
- Analyse the richness of Diasporic Literature.

UNIT– I INTRODUCTION TO DIASPORIC LITERATURE   **15 Hrs**
     Introduction –defining diaspora- origin of diaspora writing- historical perspective- major themes in diasporic literature.

UNIT–II POETRY   **15 Hrs**
     Judith Wright   :   Bullocky
     David Diop   :   Your Presence
     A.K. Ramanujam   :   Elements of Composition

| Vikram Seth | : | The Frog and the Nightingale |
| Taslima Nasreen | : | Women Breaking Bricks |

UNIT- III SHORT STORY   16 Hrs
| Rohinton Mistry | : | The Ghosts of Firozsha Baag (an extract from the Collection of Tales from Firozsha Baag) |
| Jhumpa Lahiri | : | This Blessed House (an extract from the collection of *Interpretor of Maladies*) |

UNIT- IV DRAMA   16 Hrs
| Vijay Tendulkar | : | *Silence, the Court is in Session* |

UNIT– V: FICTION   16 Hrs
| Bharathi Mukherjee | : | *Desirable Daughters* |
| Amitav Ghosh | : | *The Shadow Lines* |

Reference Books
- Mark Shackleton, ed, *Diasporic Literature Theory and Where Now?,* Cambridge Scholars Publishing, UK, 2008.
- Shrivastava R.N, *Literary Criticism in Theory and Practice*, Atlantic Publications, New Delhi, 2004.
- Vijay Tendulkar, *Silence! The Court Is in Session* (Three Crowns), Tr. Priya Adarkar, Oxford University Press, London, 1979.

E - Resources
- www.mrsbamber.com/uploads/1/2/9/1/.../ghost_of_firozsha_baag.pdf
- jhou.weebly.com/uploads/3/0/8/0/.../interpreter_of_maladies.pdf

UENM407 LANGUAGE AND LINGUISTICS

Semester   : IV   **Credit   : 5**
Category   : Core IX   **Hours/Week : 5**
Class &Major: III B.A English   **Total Hours : 65**

Objectives
To enable the students
- Understand the various stages in the evolution of English Language and Linguistics.
- Analyse the variations in English sounds for perfect pronunciation.
- Write appropriate sentence by the application of Linguistics.

UNIT- I LANGUAGE   10 Hrs
Introduction to Language, Characteristics of Language, Theories on origin of Language – Bow wow Theory, Ding Dong Theory, Pooh Pooh Theory and Gesture Theory.

UNIT- II LINGUISTICS   10 Hrs
Linguistics as a science, Scope of linguistics, Branches of linguistics.

UNIT- III LANGUE/PAROLE   **15 Hrs**

The nature of the Linguistic sign and sign/symbol distinction, Diachronic and synchronic Approaches

UNIT- IV MORPHOLOGY & PHONOLOGY   **16 Hrs**

Morphology – Definition –Segmentation – Free and Bound morphemes Phonology – Phonemes – Phones- Allophones – Consonants – Vowels – Manner of Articulation

UNIT- V SEMANTICS   **14 Hrs**

Semantics – Definition – Terms and distinctions in semantics

Text Book
- George Yule, *The Study of Language*, Cambridge University Press, Cambridge, 1985.

Reference Books
- Balasubramanian T, *A Textbook of English Phonetics for Indian Students*, Macmillan Publishers, New Delhi, 1981.
- John Lyons, *Language and Linguistics: An Introduction,* Cambridge University Press, Cambridge, 2012.
- Shyamala, *A Textbook of English Phonetics and Structure for Indian Students*, Sharath Ganga, Trivandrum, 2010.
- Wood F.T, *An Outline History of English Language,* Trinity, New Delhi, 2014.

UENA403 HISTORY OF ENGLISH LITERATURE - II

Semester   : IV   **Credits   : 5**
Category   : Allied IV   **Hours/week : 6**
Class & Major : II B.A. English   **Total Hours : 78**

Objectives
To enable the students
- Understand the perspectives of the history of English Literature.
- Analyse the aesthetic sense and appreciate literary forms of the period.
- Create literary works.

UNIT- I AGE OF   TRANSITION   **16 Hrs**

Samuel Richardson, Henry Fielding, Samuel Johnson, Thomas Gray, Oliver Goldsmith.

UNIT- II ROMANTIC AGE   **16 Hrs**

William Wordsworth, Charles Lamb, Jane Austen, Thomas De Quincy, Percy Bysshe Shelley.

UNIT- III VICTORIAN AGE   **16 Hrs**

Elizabeth Barrett Browning, Alfred Lord Tennyson, Charles Dickens, George Eliot, Robert Browning.

UNIT- IV TWENTIETH CENTURY   **15 Hrs**
     Thomas Hardy, Henry James, George Bernard Shaw, Joseph Conrad, Rudyard Kipling.

UNIT- V CONTEMPORARIES   **15 Hrs**
     Doris Lessing, Peter Ackroyd, Martin Amis, Sara Maitland, David Almond.

Text Book
- Edward Albert, *History of English Literature,* OUP, New Delhi, 2009.

Reference Books
- Hudson W.H, *An Outline History of English Literature,* Atlantic Publishers, New Delhi, 2007.
- Pramod Nayar K, *A Short History of English Literature*, Foundation Books, New Delhi, 2001.

UENM513 BASICS OF TRANSLATION

Semester : IV & V   **Credits** : 3
Category : Core XIII   **Hours/Week : 2+4**
Class &Major: II B.A. English & III B.A. English   **Total Hours : 26+52**

Objectives
To enable the students
- Understand the origin and development of translation.
- Acquire knowledge on various theories and techniques of translation.
- Enhance the conceptual and practical dimensions in Translation.

UNIT- I INTRODUCTION   **14 hrs**
     Origin and development of Translation – Types of Translation- History of Bible Translation.

UNIT- II THEORIES OF TRANSLATION   **12 hrs**
     Theodore Savory- C.J Catford -Eugene Nida**.**

UNIT- III SOURCE LANGUAGE TO TARGET LANGUAGE   **18 hrs**
     Problems and Techniques - Decoding and Recoding- Problems and Equivalence.

UNIT- IV TRANSLATION IN DIFFERENT GENRE   **18 hrs**
     Translation of poetry, Prose, Translating Dramatic Texts.

UNIT– V PERFORMANCE AND ASSESMENT   **16 hrs**
     Prose, Poetry, Fiction, Short Story and Drama- Student can choose any work from English Literature and to be translated from English to Tamil.
Text Book
- Susan Bassnett, *Translation Studies,* Routledge Publication, 2014

Reference Books

- Jeremy Munday, *Introduction to Translation Studies: Theories and Application* Routlege Publication, 2012.
- J.C Catford, *Linguistic Theory of Translation,* Oxford University press, 2010.
- Savoury Theodore, The Art of Translation, John Benjamins Publishing Company, 2011
- A.K. Ramanujan's, *The Interior Landscape: Love Poems from a Classical Tamil Anthology* , Oxford University press, 2010

e - Resources

- https://www.youtube.com/watch?v=q4ytZjrlgts
- https://www.youtube.com/watch?v=EfjwKPIx480
- https://www.youtube.com/watch?v=BCvQw3gKJOU

Note:

- For CIA I (Unit I & II) , Component III will be conducted in the IV semester
- CIA II, Component IV (from Unit III & IV) and End semester exam will be conducted in the V Semester (Unit I - V).

UENP 501 PROJECT

Semester   : IV & V   **Credits   : 3**
Category   : Core XIII   **Hours/Week : 2+4**
Class &Major: II B.A. English   & III B.A. English   **Total Hours :26+52**

Objectives
To enable the students

- Select research problem and prepare research proposal.
- Understand the methods and mechanics of Research Report Writing.
- Prepare the academic research report.

UNIT- I INTRODUCTION   **6 Hrs**
Introduction to project writing – Research writing and Academic Writing

UNIT- II NEED FOR RESEARCH   **5 Hrs**
Selecting a Topic - Preparing a Thesis Statement - Language and Style – Plagiarism.

UNIT- III MATERIAL COLLECTION   **5 Hrs**
Sources of Information – Primary Source and Secondary Sources

UNIT- IV DOCUMENTATION   **6 Hrs**
Text of a thesis: Introduction – Body of a thesis– Summation – Work cited or consulted – Format of the Research paper

UNIT- V WORKING BIBLIOGRAPHY   **4 Hrs**
Preparation of a Working Bibliography

Text Book
- Joseph Gibaldi, et. al, *MLA Handbook for Writers of Research Papers*, Seventh ed, 2009.

Reference Book
- Janathan Anderson, Berry H. Durston and Milicent Poole, *Thesis and Assignment Writing, Wiley Eastern Ltd*, New York, 2010.

Note:
- ESE Project submission will be conducted during V Semester.
- 4 Hours will be utilized for research writing.

e - Resources
- "Literature Reviews: An Overview for Graduate Students." *YouTube*, youtu.be/t2d7y_r65HU.
- http://www.writing.utoronto.ca/advice/specific-types-of-writing/literature-review
- https://youtu.be/gDY4ZHyo5iw

Note
- Two hours per week will be taken during IV semester and remaining four hours per week will be utilized for project during Vth semester.
- Project should submit in end of the Vth semester.

UENL407 GENERAL ENGLISH- IV

Semester : IV	**Credits** : 3
Category : Language	**Hours/week** : 5
Class &Major: II UG	**Total Hours** :65

Objectives
To enable the students
- Understand different genres like Prose, Poetry and Short Story.
- Accomplish the basic elements of English Grammar.
- Enhance the grammatical enlightenment in the Language.

UNIT- I POETRY   **13 Hrs**

Robert Bridges	:	Nightingale
D. H. Lawrence	:	The Mosquito
Edmund Blunden	:	Report on Experience
Charles Madge	:	Ode

UNIT- II PROSE   **13 Hrs**

Francis Bacon	:	Of Studies
A.G Gardiner	:	The Rule of the Road

UNIT- III DRAMA 12 Hrs
    William Shakespeare   :   A Court of Justice
           (From the *Merchant of Venice* Act IV Scene I)

UNIT- IV FICTION 12 Hrs
    George Orwell   :   *Animal Farm*

UNIT- V GRAMMAR AND COMPOSITION 15 Hrs
    Transformation of sentences, Punctuation Marks, Bio-Data, Report Writing, Writing Email, Writing News Stories, Resume Writing.

Reference Books
- David Green, *The Winged Word,* Macmillan India Limited, New Delhi, 2013.
- *Prentice Hall Literature,* Pearson Education Publishing, New Jersey, 2003.
- Wren &Martin, *Key to High School English Grammar and Composition,* S. Chand, New Delhi, 2006.

UENL408 ADVANCED ENGLISH - IV

Semester   : IV   **Credits   : 4**
Category   : Language   **Hours/week : 5**
Class &Major: II UG   **Total Hours : 65**

Objectives
To enable the students
- Define the manifold shades of fiction.
- Understand various types of fiction.
- Interpret the inevitable evolution of the Genre – Fiction.

UNIT- I CHILDREN'S FICTION 14 Hrs
    J.K. Rowling   :   *Harry Potter and the Chamber of Secrets*

UNIT- II DETECTIVE FICTION 13 Hrs
    Agatha Christie   :   *Murder on the Orient Express*

UNIT- III ADVENTURE FICTION 13 Hrs
    Mark Twain   :   *The Adventures of Tom Sawyer.*

UNIT- IV INDIAN FICTION 13 Hrs
    Thakazhi Sivasankara Pillai :   *Chemmeen.*

UNIT- V GRAMMAR AND COMPOSITION 12 Hrs
    Transformation of Sentences, Correction of Errors, Expansion of Proverbs, Report Writing, Article Writing.

Text Books
- Agatha Christie, *Murder on the Orient Express,* Harper, New York, 2011.

- Thakazhi Sivasankara Pillai, *Chemmeen,* Uttar Pradesh, Harper Collins, 2011.
- Rowling J.K, *Harry Potter and the Chamber of Secrets,* Scholastic Paperbacks, New York, 2000.
- Mark Twain, *The Adventures of Tom Sawyer,* Dover Publications, New York, 1998.

Reference Books
- Cedric Cullingford, *Children's Literature and its Effects: The Formative Years*, Cassel, London, 1998.
- Hugh Kenner, *Home Made World: The American Modernist Writers,* Allied Publications, Bombay, 1975.
- Martin Priestman, ed., *The Cambridge Companion to Crime Fiction,* Cambridge University Press, Cambridge, 2003.

UG III & IV Evaluation Components of CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
III	Language	UENL307 / UENL308	General English III	Assignment	Poster Presentation
			Advanced English III	Assignment	Role Play
	Core – VI	UENM305	Indian Writing in English	Seminar	Assignment
	Core VII	UENM306	American Literature	Assignment	Seminar
	Allied III	UENA303	History of English Literature - I	Assignment	Album Making
IV	Language	UENL407 / UENL408	General English IV	Assignment	Poster Presentation
			Advanced English IV	Album Making	Poster Presentation
	Core VIII	UENM405	Diasporic Literature	Assignment	Seminar
	Core X	UENM407	Language and Linguistics	Album Making	Seminar
	Allied IV	UENA403	History of English Literature - II	Assignment	Album Making
IV & V	Core XIII	UENM513	Basics of Translation	Poem Translation	Translating speech of personalities

UENP 501 PROJECT

Mark Allotment:

CATEGORY	CIA MARKS	END SEMESTER MARKS
Survey of Literature	10	-
Research Proposal	10	-
Collection of Data/ Experimentation	10	-
Analysis of Data/Experimentation result	10	-
Project Report	10	30
Viva Voce	10	10
Total (100 marks)	**60**	**40**

PROGRAMME PROFILE: M.A. ENGLISH

PSO 1: Critical appreciation of the different literature and its values since 16th century to 21st century.

PSO 2: Interpretation of the classical literary text and its rich translation.

PSO 3: Usage of strategies of textual interpretation appropriate to different literary genres.

PSO 4: Development of the Pronunciation skills through phonetics and linguistics terms.

PSO 5: Ability to defend equalities in the feminist literary writings and its values

Semester	Category	Course Code	Course Title	Contact Hours/ Week	Credit Min	Credit Max
I	Core I	PENM113	English Literature From 1300 – 1660	6	4	4
	Core II	PENM114	American Literature	6	4	4
	Core III	PENM 210/ 115	English Phonetics: Theory and Practice	6	4	4
	Core IV	PENM211/ 116	Language and Linguistics	6	4	4
	Core V	PENM212/ 117	Principles of Literary Criticism	6	4	4
			TOTAL	**30**	**20**	**20**
II	Core VI	PENM209	Restoration and Eighteenth Century English Literature	5	4	4
	Core VII	PENM214	Feminist Writing in English	5	4	4
	Core VIII	PENM215	Indian Writing in English	5	4	4
	Core IX	PENM112/ 216	Shakespeare	5	4	4
	Core X	PENM409/ 217	Postcolonial Literature	5	4	4
	Non-Major Elective			5	4	4
	Service Learning			-	1	1
			TOTAL	**30**	**25**	**25**
III	Core XI	PENM309	Romantic and Victorian Age	6	4	4
	Core XII	PENM311	Research Methodology	5	4	4
	Core XIII	PENM213/314	Diasporic Studies	6	4	4
	Core XIV	PENM315	Women's Studies in English	6	4	4
	Core XV	PENI301	Translation: Theory and Practice	5	4	4
	Core XXI	PENP401	Project	2	-	-
			TOTAL	**30**	**20**	**20**
IV	Core XVI	PENM408	Twentieth Century Literature	6	4	4
	Core XVII	PENM411	Journalism	5	3	3
	Core XVIII	PENM412	Canadian Literature	5	4	4
	Core XIX	PENM312/ 413	Literature in Translation	5	4	4
	Core XX	PENM414	Thinking, Cognition and Metacognition in English	5	4	4
	Core XXI	PENP401	Project	4	6	6
			TOTAL	**30**	**23**	**23**
			Grand Total	**120**	**90**	**90**

PENM309 ROMANTIC AND VICTORIAN AGE

Semester : III

Category : Core XI

Class &Major: II MA English

Credits : 4

Hours/Week : 6

Total Hours :78

Objectives

To enable the students

- Understand Romantic and Victorian Society and its culture.
- Differentiate the political and socio-cultural forces during the ages.
- Analyse the cultural and moral values of the period.

UNIT- I POETRY   **16 Hrs**

William Wordsworth	:	Ode on Immortality
Samuel Taylor Coleridge	:	Kubla Khan
John Keats	:	Ode on a Grecian Urn,
Percy Bysshe Shelley	:	Ode to the West Wind,
Alfred Lord Tennyson	:	All Things Will Die
Matthew Arnold	:	Growing Old

UNIT- II PROSE   **15 Hrs**

| Charles Lamb | : | Essays of Elia - Christ's Hospital, The South Sea House, |
| Matthew Arnold | : | The Preface to Culture and Anarchy |

UNIT- III SHORT STORIES   **15 Hrs**

Charles Dickens	:	A Message from the Sea
Thomas Hardy	:	A Tragedy of Two Ambitions
Oscar Wilde	:	The Devoted Friend

UNIT- IV DRAMA   **16 Hrs**

| Richard Brinsley Sheridan | : | *The School for Scandal* |
| Oscar Wilde | : | *An Ideal Husband* |

UNIT- V FICTION   **16 Hrs**

Jane Austen	:	*Sense and Sensibility*
Walter Scott	:	*Waverley*
Charles Dickens	:	*Great Expectations*

Reference Books

- Bowra C.M,*Romantic Imagination*, OUP, London, 2006.
- David Green, *The Winged Word,* Macmillan India Limited, New Delhi, 2013
- Abrams M.H, *English Romantic Poets: Modern Essays in Criticism*, OUP, New York, 2000.
- Sethuraman V.S & C.T Indra eds., *Victorian Prose*, Macmillan India Ltd, Chennai, 2006.

PENM311 RESEARCH METHODOLOGY IN ENGLISH

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

Objectives
To enable the students
- Select research problem and prepare research proposal.
- Understand the methods and mechanics of Research Report Writing.
- Prepare the academic research report.

UNIT- I INTRODUCTION TO RESEARCH METHODOLOGY   13 Hrs
Definition, Origin and History of Rhetoric-Nature of Rhetoric, Discourse Analysis-Exposition and Its Methods – Argumentation, Description, Narration and Effective Writing (Diction – Sentence – Paragraph) -Modes of Persuasion

UNIT- II NEED FOR RESEARCH   10 Hrs
Need for Research - Literary Research - Selecting a Topic - Preparing a Thesis Statement- Explication - Interpretation – Analysis –Evaluation - Outlining - Writing Drafts - Language and Style -Plagiarism – Forms of Plagiarism - Readability and Effectiveness.

UNIT - III MATERIAL COLLECTION   13 Hrs
Sources of Information – Primary Source and Secondary Sources- Using Library - Web Sources- Review of Earlier Researches – Note Taking (on Cards)

UNIT - IV DOCUMENTATION   16 Hrs
Text of a thesis: Introduction – Body of a thesis– Summation – Work cited or consulted – Format of the Research paper- Title page – Certificate – Abstract - Preface or Acknowledgement – Mechanics of Writings – Revising – Proof reading – Parenthetical documentation (in text).

UNIT- V WORKING BIBLIOGRAPHY   13 Hrs
Preparation of a Working Bibliography, MLA style - Citing Print Publications, Non Periodical Print Publications, Web Publications and Additional Common Sources.

Text Book
- Joseph Gibaldi, et. al, *MLA Handbook for Writers of Research Papers,* Seventh ed, 2009.

Reference Book
- Janathan Anderson, Berry H. Durston and Milicent Poole, *Thesis and Assignment Writing,* Wiley Eastern Ltd, New York, 2010.

PENM213/314 DIASPORIC STUDIES

Semester : III   **Credits** : 4
Category : Core XIII   **Hours/Week** : 6
Class & Major: I MA English   **Total Hours** : 78

Objectives
To enable the students
- Understand the feelings of immigrants through Literature.
- Explore the Culture of Immigrant people and apply in their research.
- Make out the origin and multiple heritage of Diasporic writing.

UNIT- I INTRODUCTION   **16Hrs**
        Introduction –defining diaspora-enforced and shared diasporas-scope and parameters of diaspora writing-origin of diaspora writing- historical perspective- multiple heritage -victims and beneficiaries of transnational displacement-major themes in diasporic literature.

UNIT- II POETRY   **15Hrs**
     A. K. Ramanujan   :   Small Scale Reflections on a Great House
     Cyril Dabydeen   :   December in Winter
     R. Parthasarathy   :   Home Coming
     Allen Curnow   :   House and Land

UNIT- III PROSE   **15Hrs**
     William Herbert New   :   The Disappointed Decade
     D. J. Enright   :   In a Free State

UNIT- IV DRAMA   **16Hrs**
     Uma Parameswaran   :   Sita's Promise (A Dance Drama)

UNIT – V FICTION   **16Hrs**
     Jumpa Lahari   :   Namesake
     Chitra Bannerjee Divakaruni :   The Unknown Errors of our Life

Reference Books
- Manaroma Trikha., *Twentieth Century Canadian Poetry,* Pencraft International, New Delhi, 2001.
- Michael Murphy., *Multiculturalism: A Critical Introduction,* Routledge, London, 2012.
- Emmanuel Nelson., (ed.), *Reworlding: The literature of the Indian Diaspora*, Green Wood, NY, 2003.
- Uma Parameswaran., *Asian American Drama,* Alexander Street Press, Alexandria, 2004.
- Jana Evens Braziel*., Diaspora: An Introduction,* Wiley-Blackwell, USA, 2008.

PENM315 WOMEN'S STUDIES IN ENGLISH

Semester : III   **Credits** : 4
Category : Core XIV   **Hours/Week** : 6
Class &Major: II MA English   **Total Hours** : 78

Objectives
To enable the students
- Define origin and growth of new theories in Feminism.
- Analyse the concepts and social patterns of different feminist writers.
- Assess the patriarchal society and to create self-identity.

UNIT- I INTRODUCTION   **16 Hrs**

Feminism – five waves of feminism- Feminist Literature – Feminist Criticism, Post feminism, Black feminism

UNIT- II POST COLONIAL CRITICISM   **16 Hrs**

Shulamith Firestone	:	The Dialectic of Sex
Anne Summer	:	An Extract from Damned Whores and God's Police

UNIT- III AFRICAN AMERICAN CRITICISM   **15Hrs**

Audre Lorde	:	Age, Race, Class and Sex: Women Redefining Difference
Zora Neale Hurston	:	How it Feels to be Colored Me

UNIT- IV BRITISH CRITICISM   **15 Hrs**

Mitchele Barret	:	Ideology and the cultural production Of Gender
Virginia Woolf	:	Profession for Women

UNIT– V INDIAN CRITICISM   **16Hrs**

Sharmila Rege	:	Writing Caste/Writing Gender: Narrating Dalit Women's Testimonios
Chandra Talpade Mohanty	:	Under Western Eyes

Reference Books
- Wilbur Scott, *Five Approaches of Literary Criticism,* Collier Books, New York, 2009.
- Sharmila Rege, *Writing* Caste/Writing Gender: Narrating Dalit Women's Testimonios, Zubaan, New Delhi, 2014.
- Mirchele Barret, "Ideology and the Cultural production of Gender" *Women's Oppression Today,* Verso, New York, 1989.
- Beauvoir, Simon, *The Second Sex,*Paperback, US, 1997.

e -Resources
- http://s.spachman.tripod.com/Woolf/professions.html

- http://xroads.virginia.edu/-ma01/grand-jean/hurston/chapters/how.html
- https://teoriaevolutiva.files.wordpress.com/2013/10/firestone-shulamith-dialectic-sex-case-feminist-revolution.pdf

PENI301 TRANSLATION: THEORY AND PRACTICE

Semester   : III
Category   : Core XV
Class &Major: II MA English

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

Objectives
To enable the students
- Familiarize learners with the history and theories of Translation.
- Introduce learners to the techniques involved in translation of literary and n on literary texts.
- Enhance the employability of the learners as translators.

UNIT- I INTRODUCTION   13 Hrs

Brief History of Translators and Translation Theory- Aspects of Translation Theory- Types of Translation Procedures- Communication and Semantic Translation.

UNIT- II PROCEDURES & PROCESS   13 Hrs

Translation Procedures- Translation Process and Synonymy- Translation and the Meta Lingual Function of Translation.

UNIT- III PROBLEMS IN TRANSLATION   13 Hrs

Linguistics and Translation- Theories of Translation- Equivalence in Translation- Problems in Translation – Untranslatability.

UNIT- IV PRACTICE I   (ENGLISH TO TAMIL TRANSLATION)   13 Hrs

Proverb Translation -   Thirukkurral Translation (For Thirukkurral Translation students can choose any one of the chapters for practice).

UNIT- V PRACTICE II   (ENGLISH TO TAMIL TRANSLATION)   13 Hrs

Poetry, Paragraph, Essay, Short Story

Text Books
- Bassnett, Susan. *Translational Studies*. Methuen, London, 2002.

Reference Books
- Malmkjar, Kirsten, And Kevin Windle. *The Oxford Handbook of Translation Studies*.   Oxford,UP,2011.
- Munday, Jeremy. *Translation: An Advanced Resource Book*. Taylor & Francis 2004.
- Venuti, Lawrence. *The Translation Studies Reader*. New York: Routledge, 2004.
- Tiruvaḷḷuvar , and M. Rajaram. *Thirukkural: Pearls of Inspiration*. Rupa & Co., 2009.

Note
- Unit I, II and III will be handled by English department.
- Unit IV and V will be handled by Tamil department.
- English department will set Question paper

PENM408 TWENTIETH CENTURY LITERATURE

Semester : IV		**Credits** : 4
Category : Core XVI		**Hours/Week: 6**
Class &Major: II MA English		**Total Hours :78**

Objectives
To enable the students
- Understand the trend in 20th Century Literature.
- Evaluate the themes of 20th Century literary works.
- Write the literary antecedents of modernism.

UNIT- I POETRY   **18 Hrs**

Thomas Hardy	:	The Darkling Thrush
W.B.Yeats	:	A Prayer for My Daughter
T.S. Eliot	:	Journey of the Magi
W.H. Auden	:	The Unknown Citizen
Thom Gunn	:	On the Move
Seamus Heaney	:	The Tollund Man

UNIT- II PROSE   **13 Hrs**

Bertrand Russell	:	Knowledge and Wisdom
D.H. Lawrence	:	Why the Novel Matters
George Orwell	:	Why I Write

UNIT- III SHORT STORY   **14 Hrs**

H.G. Wells	:	The Country of the Blind
A.J. Cronin	:	The Turning Point of My Life
Roald Dahl	:	The Umbrella Man

UNIT- IV DRAMA   **16 Hrs**

George Bernard Shaw	:	*Arms and Man*
Samuel Beckett	:	*Waiting for Godot*

UNIT- V FICTION   **17 Hrs**

Virginia Woolf	:	*The Waves*
Graham Greene	:	*The Power and the Glory*
William Golding	:	*The Inheritors*

Reference Books
- Hugh Kenner, ed, *A Collection Critical Essays*, Prentice Hall, USA, 2000.
- Laura Nicholls Peter Marcus, *The Cambridge History of Twentieth Century Literature*, Cambridge University Press, UK, 2004.
- Haldar Santwanal, ed, *A Twenty First View*, Atlantic Publishers, USA, 2006.

PENM411 JOURNALISM

Semester : IV	**Credits** : 3
Category : Core XVII	**Hours/Week** : 5
Class & Major: II MA English	**Total Hours** : 65

Objectives
To enable the students
- Understand the importance of media in day today life.
- Develop the media skills in the field of journalism.
- Write, edit, proof read and publish articles.

UNIT- I INTRODUCTION – PRINCIPLES OF JOURNALISM   **10 Hrs**

Introduction - Nature and Scope – Principles of Journalism – Definition – Career aspects of Journalism.

UNIT– II NEWS WRITING AND REPORTING   **16 Hrs**

News writing – tools and techniques – types of writing – feature writing – editorial writing – review writing – profile writing – comic strips – writing- advertising. Reporting - Responsibilities & aptitudes of a reporter – Diversities in reporting– Interviews –News Features.

UNIT- III ELECTRONIC MEDIA   **14 Hrs**

Radio broadcasting - Radio practices - Television broadcasting - Television practices - Visual communication - Tele conferences - Tele lectures - audio recordings - multimedia presentations - slide presentations - CD-ROM and Online content.

UNIT- IV EDITING   **15 Hrs**

Role of an editor - types of editor - duties of editor - responsibilities and qualification of an editor – importance of editing- Tools and techniques in editing – principles of editing – sources of copy – Proofreading – page making – newspaper glossary.

UNIT- V PRACTICALS   **10 Hrs**

Article Writing - Review- writing - Report writing, Editorial Writing, Proof Reading and Editing and cartooning.

Reference Books
- Ahuja B.N & Chabra S.S, *Principles and Techniques of Journalism*, Surjeet Publications, New Delhi, 2005.
- Rangaswami Parthasarathy, *Basic Journalism*, Macmillan, New Delhi, 2009.

- Gupta O.M. & Ajay S. Jasra, *Internet Journalism In India*, Kanishka Publishers, New Delhi, 2002.

PENM412 CANADIAN LITERATURE

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

Objectives
To enable the students
- Understand the tone and expression in Canadian literary genres.
- Examine the socio-political issues in Canadian literature.
- Determine the trends emerging in Canadian literature.

UNIT- I POETRY   **13 Hrs**

E.J. Pratt	:	The Dying Eagle
F. R. Scott	:	The Canadian Authors Meet
A.J.M. Smith	:	Ode on the Death of William Butler Yeats
P.K Page	:	First Neighbours
A.M. Klein	:	Indian Reservation: Caughnawaga
Leonard Norman Cohen	:	Two went to sleep

UNIT- II PROSE   **13 Hrs**

Northrop Frye	:	Anatomy of Criticism
Stephen Leacock	:	The Apology of Professor

UNIT- III SHORT STORIES   **13 Hrs**

Margaret Laurence	:	The Loons
Alice Munro	:	Deep Holes
Joseph Boyden	:	Born with a Tooth

UNIT- IV DRAMA   **13Hrs**

George Ryga	:	*Ecstasy of Rita Joe*
Judith Clare Thompson	:	*Lost and Delirious*

UNIT- V FICTION   **13 Hrs**

Margaret Atwood	:	*Stone Mattress*
Margaret Laurence	:	*The Diviners*
Michael Ondaatje	:	*The Cat's Table*

Text Books

- Narasimhaiah C.D, *An Anthology of Commonwealth Poetry,* Macmaillan, New Delhi, 2010.
- Stephen Leacock, *Essays and Literary Studies*, JJ Little & Ives Company, Toronto, 2011.

Reference Books
- Domnic K.V, *Studies in Contemporary Canadian Literature,* Sarup Book Pub. Pvt. Ltd., New Delhi, 2010.
- Sinha P.K, *History of Canadian Literature*, Common wealth Pub. Pvt. Ltd, New Delhi, 2011.

e – Resources
- https://lsletten.wordpress.com/2012/10/06/the-loons-by-margaret-laurence/
- https://www.newyorker.com/magazine/2008/06/30/deep-holes

PENM312/413 LITERATURE IN TRANSLATION

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

Objectives
To enable the students
- Understand the richness of other culture.
- Evaluate the reflections of tradition in translated works.

UNIT- I INTRODUCTION 10 Hrs

Language and Culture - Types of Translation – Decoding and Recoding – Problems of Equivalence – Loss and Gain – Untranslatability

UNIT- II POETRY 15 Hrs

Thiruvalluvar	:	Thirukkural (Chapters 11, 13, 19, 44, 104)
Dante	:	Inferno (Circle 1 & 2)
Alexander Pushkin	:	Remembrance

UNIT- III PROSE 15 Hrs

| Khalil Gibran | : | The Prophet |
| Holy Bible | : | *The Book of Ruth, The Book of Esther* |

UNIT-IV SHORT STORIES 13 Hrs

Leo Tolstoy	:	A Lost Opportunity
Hjalmar Soderberg	:	The Burning City
Karel Capek	:	The Shirts

UNIT- V DRAMA 12 Hrs

| Henrik Ibsen | : | *A Doll's House* |

Reference Books
- Alponso J, Karhala, *Indian Literature in Translation,* Penguin Publications, London, 2009.
- Susan Bassnett, *Translation Studies,* Macmillan Publishers, London, 2011.

- Wilke B and Hurt J., *Literature of the Western World,* Macmillan Publishers, London, 2007.
- Willhardt M and Parker A. M, *Who's who in the Twentieth Century Poetry*, Routledge Publication, London, 2002.

PENM414 THINKING, COGNITION AND METACOGNITION IN ENGLISH

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

Objectives
To enable the students
- Understand the perspectives on thinking, cognition and metacognition in English
- Reflect on their own thinking, cognition and metacognitive processes.
- Analyse the various perceptions of LSRW skills to the learners.

UNIT- I INTRODUCTION 12 Hrs
    Definition and Theory of Thinking, Cognition and Metacognition in English.

UNIT- II THINKING 13 Hrs
    Nature of Thinking - The Process of Thinking – Problem solving – Reasoning – Decision making – Nature and Process of creative thinking – developing creative thinking – thought and language – Development of Language and Language use.

UNIT- III COGNITION 13 Hrs
    Concept of Cognition and Language – Connectionism – cognitive linguistic – the cognitive movements.

UNIT- IV METACOGNITION 15 Hrs
    Conceptual Evolution of Metacognition – Components of Metacognition - Metacognitive skills - Metacognitive & Importance of Metacognitive strategies – The Problem Solving cycle.

UNIT-V PRACTICAL 12 Hrs
    Community Language Learning-Thinking, Cognition and Metacognition-LSRW Activities.

Reference Books
- Mayer, Richard E. *Thinking, Problem Solving, Cognition*. New York: W.H. Freeman, 1983.
- Kruse, C. G. *Thinking about Cognition: Concepts, Targets, and Therapeutics*. Amsterdam: IOS, 2006.
- Bruner, Jerome S. *A Study of Thinking*. New York: Wiley, 1956. Print. 4.*Approaches and Methods in Language Teaching Richards and Rodgers, Cambridge University Press*

EVALUATION COMPONENTS

PG III & IV Evaluation Components of CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
III	Core XI	PENM309	Romantic and Victorian Age	Seminar	Assignment
	Core XII	PENM311	Research Methodology in English	Assignment	Research Proposal
	Core XIII	PENM 213/314	Diasporic Literature	Paper Presentation	Assignment
	Core XIV	PENM 315	Women's Studies in English	Assignment	Presentation on social issues relevant to women
	Core XV	PENI 301	Translation: Theory and Practice	Translation of poetry	Translation of short story
IV	Core XVI	PENM 408	Twentieth Century Literature	Seminar	Paper Presentation
	Core XVII	PENM 411	Journalism	Seminar	Report Writing
	Core XVIII	PENM 412	Canadian Literature	Assignment	Review writing
	Core XIX	PENM 312/413	Literature in translation	Paper Presentation	Seminar
	Core XX	PENM 414	Thinking Cognition and Meta cognition in English	PPT Presentation	Group Discussion

DEPARTMENT OF BUSINESS ADMINISTRATION

PREAMBLE

UG : Course profile and syllabus of courses offered in semester III and IV along with its evaluation components (With effect from 2018 – 2021 batch onwards).

PROGRAMME PROFILE: BBA

PSO 1: Development of communication skills, interpersonal relationships and ability to work as a team.

PSO 2: Analysis of the business scenario, organizational context and capability to apply management principles

PSO 3: Ability to apply the inter-disciplinary approach to solve business problems.

PSO 4: Cultivation of rational approach to make decisions for optimal use of resources and Maximize returns.

Sem	Part	Category	Course Code	Course Title	Contact Hrs/ Week	Credit	
						Min	Max
I	I	LANGUAGE-I	UTAL105/ UTAL106	Basic Tamil I/Advanced Tamil I/ French I /Hindi I	4	2	3
	II	ENGLISH-I	UENL107/ UENL108	General English I/Advanced English-I	5	3	4
	III	Core-I	UBAM105	Management Thoughts and Thinkers	2	1	1
		Core-II	UBAM106	Business Organization	5	4	4
		Core-III	UBAM108\ UCOM104\ UCCM102	Financial Accounting	6	5	5
		Allied - I	UCEA103	Business Economics	6	5	5
	IV	Value Education			2	1	1
				TOTAL	**30**	**21**	**23**
II	I	LANGUAGE-II	UTAL205/ UTAL206	Basic Tamil II/Advanced Tamil II/ French II /Hindi II	4	2	3
	II	ENGLISH-II	UENL207/ UENL208	General English II/Advanced English	5	3	4
		Core-IV	UBAM206	Business Environment	4	4	4
		Core-V	UBAM207	Principles of Management	5	5	5
		Core-VI	UBAR201	Workshop on Decision Making	1	1	1
		Allied - II	UCOA203	Accounting Package Theory	2	2	2
		Allied Practical I	UCOR 203	Accounting Package Practical	3	2	2
	IV	Non Major Elective			4	2	2
		Soft skill			2	1	1
	V	Extension activity			-	1	2

			/ Physical Education/NCC				
				TOTAL	**30**	**23**	**26**
III	III	Core-VII	UBAM308	Marketing Management	5	4	4
		Core-VIII	UBAM310/ UCOM305/ UCCM305	Cost Accounting	5	4	4
		Core –IX	UBAM311	Business Communication	4	3	3
		Core –X	UBAM312	Creativity For Innovative Management	4	2	2
		Core –XI	UBAM313	Organizational Behaviour	5	4	4
		Allied-II	UMAA301	Business Statistics	5	4	4
	IV	Value Education			2	1	1
				TOTAL	**30**	**22**	**22**
IV	III	Core-XII	UBAM405	Production & Materials Management	5	4	4
		Core-XIII	UBAM406	Micro, Small And Medium Enterprises	**6**	**5**	**5**
		Core-XIV	UBAM407	Human Resource Management	5	4	4
		Allied-III	UMAA410	Quantitative Techniques In Business	5	4	4
		Allied-IV	UCSA407	Cyber security in Finance	3	3	3
		Allied Practical II	UCSR413	Cyber security Lab	3	2	2
		CORE –XV	UBAR401	Workshop On Creative Thinking Skill	1	1	1
	IV	Soft Skill			2	1	1
	V	Extension activity / Physical Education/NCC			-	-	2
				TOTAL	**30**	**24**	**26**
V	III	Core-XVI	UBAM507	Research Methodology in Business	2	2	2
		Core-XVII	UBAM508	Services Marketing	6	5	5
		Core-XVIII	UBAM509	Mercantile Law	6	5	5
		Core-XIX	UBAM504/ UCOM507/ UCCM507	Management Accounting	6	5	5
		Core-XX	UBAM510	Business Informatics	5	5	5
	IV	Online Courses		NPTEL/Spoken Tutorial	3	1	2
	IV	Value Education			2	1	1
				TOTAL	**30**	**24**	**25**
	III	Core-XXI	UBAM608	Strategic Management	5	4	4
		Core-XXII	UBAM611/ UCOM614/ UCCM614	Financial Management	6	5	5
		Core-XXIII	UBAM612	Business Analytics for Managers	**5**	**5**	**5**
		Core –XXVI	UBAR601	Workshop On Leadership Skills	1	1	1

		Core-XXV	UBAP601	Project	6	4	4
		Viva-Voce	UBAM611	Comprehensive Viva	-	1	1
VI		Major Elective	UBAO609	Consumer Affairs			
			UBAM309/ UBAO610	Financial Markets and Services			
			UBAO604	Customer Relationship Management	5	5	5
			UBAO605	Retail Management			
			UBAO606	Emerging Business Practices In India			
			UBAO607	Industrial Relations			
			UBAO608	Rural Marketing			
	IV	Soft Skill			2	1	1
	V	Extension activity / Physical Education/NCC			-	-	2
		TOTAL			30	26	28
		GRAND TOTAL			180	140	150

ALLIED COURSES OFFERED TO OTHER DEPARTMENTS

Semester	Class	Category	Course Code	Course Title	Contact/ Week	Credit	
						Min	Max
II	I ISM	ALLIED	UBAA202	Business Communication	5	5	5

NON MAJOR ELECTIVES

Semester	Part	Category	Course Code	Course Title	Contact/ Week	Credit	
						Min	Max
II	IV	Non major Elective –I	UBAE202	Leadership Skills	4	2	2
III	IV	Non major Elective-II	UBAE304	Rural Management	4	2	2

EXTRA CREDIT EARNING PROVISION

Semester	Category	Course code	Course Title	Credit	
				Min	Max
II	Internship	UBAI201	Summer Internship	-	1
IV	Internship	UBAI401	Summer Internship	-	1

SELF STUDY PAPER

Semester	Category	Course code	Course Title	Contact / Week	Credit	
					Min	Max
III	CORE-XXVI	UBAS201	Office Management	2	1	1
IV	CORE-XXVII	UBAS401	Travel and Tourism Management	2	-	1
V	CORE-XXVIII	UBAS501	Business Ethics	2	-	1
VI	CORE- XXIX	UBAS502	Corporate Social Responsibility	2	-	1

UBAM308 MARKETING MANAGEMENT

Semester   : III   **Credit**   :   4
Category   : Core VII   **Hours/Week**   :   5
Class & Major : II B. Com. & II BBA   **Total Hours**   :   65

Objectives
To enable the students
- Understand different concept in marketing.
- Realize the significance of marketing mix decisions in capturing market share.
- Analyze the marketing strategies of companies for market segmentation & positioning.

UNIT - I FUNDAMENDALS OF MARKETING   13 Hrs
Marketing: Meaning - Classification - Functions- approaches- Relationship of marketing with other functional areas- Various Environmental factors affecting the marketing functions—Market Mix –Meaning of marketing management

UNIT - II PRODUCT AND PRICING   13 Hrs
Product – Characteristics – Classification- Product mix – process of New Product development - Product life cycle – Branding – Packaging- Pricing strategies -Factors influencing pricing decisions – Kinds of pricing- Pricing objectives – Pricing policies.

UNIT - III PROMOTION   13 Hrs
Promotion mix- Advertising – Publicity – Public relations – Personal Selling – Sales Promotion Administration- Physical distribution – Importance of various kinds of distribution channels- Case studies

UNIT - IV BUYER BEHAVIOR AND SALES FORECASTING   14 Hrs
Buying motives – Buyer Behavior models – Buying Decision Process -Factors influencing Buyer behavior- Market segmentation – Need and basis of segmentation, targeting- positioning– Marketing strategy- Various methods of sales forecasting

UNIT - V MARKETING RESEARCH   12 Hrs
Meaning – Steps involved in Market Research –Marketing Information System- organization involved in marketing research in India –Case studies

Text Book
- Philip Kotler, *"Marketing Management"* , Prentice Hall of India, 2006

Reference Books
- Varshney .L and Gupta SL , *"Marketing Management",* 2009
- Saxena , *"Marketing Management",* Tata Mc Graw Hill Pub – 2008

E-Resources
- www.businessdictionary.com/definition/marketingmanagement.html

UBAM311 BUSINESS COMMUNICATION

Semester : III   **Credit** : 3
Category : Core IX   **Hours/Week** : 4
Class & Major : II BBA   **Total Hours** : 52

Objectives
To enable the students
- Develop their communication skill.
- Inculcate the basics skills in writing and reading.
- Prepare agenda and minutes.

UNIT I INTRODUCTION TO COMMUNICATION   **10 Hrs**

Meaning and importance of business communication – Methods - Types – Communication process – Objectives – Principles of Effective Communication.

UNIT II BUSINESS LETTERS   **10Hrs**

Business letters – Structure of a letter – Qualities of a good business letter – Business enquiries Bank correspondence – Insurance correspondence.

UNIT III PROMOTIONAL LETTERS   **12Hrs**

Collection letters - Circular letters – Offer and Quotations – Orders – Execution of orders– Letters of complaints -Application for situations- Sales letters- Goodwill letters.

UNIT IV COMMUNICATION MEDIA   **10 Hrs**

Communication media – Telephone, Fax, Email, Internet, Intranet Extranet, Mobile phones- Video Conferencing-

UNIT V CORRESPONDENCE OF A COMPANY SECRETARY   **10 Hrs**

Correspondence of a company secretary – Preparation of Agenda and Minutes- Report writing and types of reports.

Text Book
- Rajendra Pal and Korlahalli – "*Essentials of Business Communication*", S.Chand Publications,2009.

Reference Books
- Ramesh M.S. PattanShetty "*Effective Business English and correspondence*", S.Chand & Son,2006.
- Shurter," *Effective letters and Business law*", TMH Publications, 2008.

e-Resources
- https://bbamantra.com/business-communication-introduction
- https://www.slideshare.net/.../business-communication-435495..

UBAM312 CREATIVITY FOR INNOVATIVE MANAGEMENT

Semester   **: III**   **Credit**   **:**   **2**
Category   **: Core X**   **Hours/Week**   **:**   **4**
Class & Major: II BBA   **Total Hours**   **:**   **52**

Objectives
To enable the students
- Understand the various aspects of creativity and innovation.
- Hands on experience in applying creativity in problem solving.

UNIT-I CREATIVE THINKING   **10 Hrs**
       Creativity-Meaning - Definition – Characteristics -Types of Creativity-Components of Creativity- Various Methods of creativity - – Individual and Group Creativity – Convergent Thinking – Divergent Thinking – Reasoning Problem Solving.

UNIT-II TECHNIQUES OF CREATIVITY   **10Hrs**
       Creativity Exercises – Mental Gym – The Way the Mind Works – Lateral and Vertical Thinking - Difference between Lateral and Vertical Thinking – Attitudes Towards Lateral Thinking – Basic Nature of Lateral Thinking – Techniques – The Generation of Alternatives – Challenging Assumptions - Generation of Creative Ideas.

UNIT-III METHODS OF CREATIVITY   **10Hrs**
       Thinking Hats Methods –Benefits - Redefinition Techniques – Random Stimulus – Generation of Creative Ideas in Groups – Brainstorming – Process – Stages – Creative Problem Solving - Reverse Brainstorming –Synaptic – Morphological Method.

UNIT-IV INNOVATION   **10 Hrs**
       Innovation – Sources of Innovation – Making sense of Innovation- Categories of Innovation - Types of innovation, Barriers to Innovation, Innovation process - Establishing criterion for assessment of creativity & innovation – difference between Innovation & Invention.

UNIT-V INNOVATION OF PROBLEM SOLVING   **12 Hrs**
       Achieving Creativity –Introduction to TRIZ methodology of Inventive Problem Solving - the essential factors –Innovator's solution –creating and sustaining successful growth – Disruptive Innovation model –Segmentive Models –New market disruption - Managing the Strategy Development Process –Cases for Innovation.

Text Books
- Davis Gary , " *Training Creative Thinking* ", Scott New York Pub.2006.
- Dr.P.Rizwan Ahmed ,"*Creativity and Innovation Management*" , Margham Publication.2015.
- Peter Drucker, "Innovation and Entrepreneurship: Practice and Principles " ,Harper Business Publications,2016

Reference Books
- Clayton M. Christensen and Michael E. Raynor, "*The Innovator's Solution: Creating and Sustaining Successful Growth*", Wall Street Journal and New York Times. Recorded Books LLC.2016.

e-Resources
- https://www.open.edu/...management/creativity...innovation/al.
- www.trm.chu.edu.tw/.../LEC5-INNOVATIONANDENTREPR..

UBAM313 ORGANIZATIONAL BEHAVIOUR

Semester : III	**Credit** : 4
Category : Core XI	**Hours/Week** : 5
Class & Major: II BBA	**Total Hours** :65

Objectives
To enable the students
- Acquire knowledge of theories of Organisation, individual and group behavior.
- Understand the motivation techniques, group dynamics & work environment in organizations.
- Function effectively in teams.

UNIT - I INTRODUCTION   **12 Hrs**
Organization: Meaning - Importance- scope - Theories; Organizational Behaviour: Meaning – Importance- scope - Organizational Behaviour models.

UNIT - II INDIVIDUAL BEHAVIOUR   **13Hrs**
Individual differences- Personality – concept- theories- Perception- attitudes - values – Beliefs – ethics- Power - Definition– Types – Case studies

UNIT - III MOTIVATION   **13 Hrs**
Definition - Financial and non financial motivational techniques –Theories of Motivation - job satisfaction – meaning – factors influencing techniques – measurement – morale – importance- case studies.

UNIT - IV GROUP DYNAMICS   **13 Hrs**
Group – meaning-Types – Size and status- Group dynamics- Concept –features- Group forms – Role position status-Group decision making- Process and Techniques

UNIT -V WORK ENVIRONMENT – TEAMS   **14 Hrs**
Work environment –meaning- impact of technology; Team - meaning – types- difference between team and group - Conflict –meaning - Resolution –process- Counseling - Mentoring– Importance - Types - Information need for counseling.

Text Book
- S.S.Khanka , "*Organizational Behaviour*" , Sulthan Chand and Sons - 2004

Reference Books
- B.S.Moshal, *"Organisational theory & Behaviour"*, Ane Books Pvt ltd , 2006
- L.M.Prasad , *"Organizational Behaviour"* , Sulthan Chand and Sons - 2004
- K. Ashwathappa, *"Organisational Behaviour*", Himalaya Publishing house , 2002

e-Resources
- www.b-u.ac.in/sde_book/msc_organ.pdf

UBAM405 PRODUCTION AND MATERIALS MANAGEMENT

Semester : IV	**Credit** : 4
Category : Core XII	**Hours/week** : 5
Class & Major: II BBA	**Total Hours** : 65

Objectives
To enable the students
- Understand the basic concepts of production.
- Analyses the various methods of production planning and control techniques.
- Apply the production process using store keeping & material handling procedures

UNIT I- INTRODUCTION   **10 Hrs**
Production system – Introduction – Production –Productivity – Production management –Objectives – Functions – Scope –Relationship with other functional areas.

UNIT II- PRODUCTION PLANNING AND CONTROL   **15 Hrs**
Production planning and control – Routing and scheduling – Dispatching – Maintenance management – Types of maintenance – Breakdown – Preventive – Routine – Maintenance scheduling.

UNIT III - WORK STUDY   **10 Hrs**
Work and method study – Importance of work study – Work study procedures – Time study – Human considerations in work study – Introduction to method study – Objectives of method study – Steps involved in method study.

UNIT IV - MATERIALS MANAGEMENT   **15 Hrs**
Materials management - Definition - function – Importance of materials management. Integrated materials management – The concept – Service function advantages – Inventory control – Function of inventory - Importance – Replenishment   stock – Material demand forecasting – MRP – Basis tolls – Inventory Management – ABC – VED – FSN   analysis – Inventory control of spares and slow moving items – EOQ – EBQ – Stores planning.

UNIT V- MATERIALS HANDLING   **15 Hrs**
Store keeping and materials handling –   Objectives – Function – Store keeping – Stores responsibilities – Location of store house – Centralized store room – Equipment – Security measures – Protection and prevention of stores, Methods of store keeping.

Text Book
- P. Saravanavel and S. Sumathi , *Production and Materials Management*, Margam Publications, Chennai, 2002

Reference books
- Gopalakrishnan & Sundaresan , *Materials Management* , Margham Publication,Chennai, 2004
- Varmam, *Materials Management* , S.Chand,New Delhi,1999
- Dutta, *Integrated Materials Management* , Vikhas Publications,Chennai,2003

e- Resources
- http:// gurukpo.com/.../production_and_Material_Manageme...
- https://www.slideshare.net/.../production-and-materials-manag...

UBAM406 MICRO, SMALL AND MEDIUM ENTERPRISES

Semester	: IV	**Credit**	: 5
Category	: Core XIII	**Hours/week**	: 6
Class & Major:	II BBA	**Total Hrs**	: 78

Objectives
To enable the students
- Understand the concept of small scale business
- Identify various financial schemes
- Prepare business ideas to establish SMEs

UNIT I- SETTING UP MSME   **13 Hrs**

Evolution, Definition of SME's – Characteristics Advantages of MSME and its Role and significance in economic development – Need of SMEs. Forms of Organizations – Establishing SMEs –Environmental scanning – market assessment – Technology –Selection of site – organizational structures – Rules and Regulations.

UNIT II - MSMEs AND CLUSTER DEVELOPMENT   **16 Hrs**

Policy – Regulatory and Legal & Policy frame work for SMEs – Policy sift – Regulatory frame work – Laws and Regulation for SMEs – LLP Act – Changing policy frame work - Types of Clusters – Advantages and Disadvantages – Role of Clusters – Approaches to develop Clusters Strategies – Policy Environment.

UNIT III - INSTITUTIONAL FRAME WORK AND MSME FINANCING   **15 Hrs**

Institutions – Central Government- SSI Board – SIBO – SISI – PPDCs – RTC – State Government –Directorate of Industries - DICs – SFCs – SIDC – SIIC – Financial Institution and Banks – Commercials Banks – RRBs – Co – Operatives Banks

UNIT IV- FINANCING OPTIONS & MODELS   **16Hrs**

Sources of Finance - Methods of Financing – Relevance of Quasi Capital and own money in business – Ventures Capital – Hybrid capital – Assessment of Term Finance – Collaterals -

Documentation – Inspection - Follow up and Monitoring Review – Credit Scoring Models - Mudra Bank – Structure Approach to Financing SMEs.

UNIT V- GLOBAL OPPORTUNITIES MSME   18 Hrs
Micro Finance Approach to SMEs - Linkages with Agriculture and industry - IT and SMEs - Relationship banking and its impact in SME development - WTO issues, impact on SMEs – globalization issues, impact, intermediation opportunities and Emerging issues affecting SMEs. Challenges & opportunities of MSME under current scenario-Case Sudies.

Text Book

- M. B. Shukla., "*Entrepreneurship And Small Business Management*", Kitab Mahal; 7th Edition edition (2007)

References
- Barrow C, "*The Essence of Small Business*", Prentice Hall of India, New Delhi, 1997.
- Bedapatai Mohanty, "*Economics of Small Scale Industries*", Ashish, New Delhi, 1986
- Charantimath P.M., "*Entrepreneurship Development and Small Business Enterprises*", Pearson Education, New Delhi, 2006.

e- Resources
- https://www.oecd.org/cfe/smes/2090740.pdf
- http://en.wikipedia.org/wiki/Small_business

UBAM407 HUMAN RESOURCE MANAGEMENT

Semester : IV	**Credit** : 4	
Category : Core XIV	**Hours/week** : 5	
Class & Major : II BBA	**Total Hours** : 65	

Objectives
To enable the students
- Identify the significance of Human Resources
- Understand the concepts in Human Resource Management.
- Gain awareness on contemporary HR practices in Industry

UNIT - I INTRODUCTION   14 Hrs
Definition – Objectives – Functions – evolution and growth of HRM – Qualities of a good HR manager – changing roles of a HR manager– problems and challenges of a HR manager.

UNIT - II HUMAN RESOURCE PLANNING   12 Hrs
Definitions of human resource planning –objectives –   steps in human resources planning - job analysis – job description – job specification.

UNIT - III RECRUITMENT & SELECTION   13 Hrs

Concept, objectives of recruitment – sources- internal and external recruitment – Selection-application blank – testing – interviews – induction- Case studies.

UNIT - IV TRAINING AND DEVELOPMENT   13 Hrs

Concept, principles of training – assessment of training needs – on the job training methods – off the job training methods – evaluation of effectiveness of training programs-MDP - Career Planning.

UNIT - V PERFORMANCE APPRAISAL & COMPENSATION   13 Hrs

Concept, process – methods of performance appraisal –Compensation-Wages-Salaries-Fringe Benefits–Transfer, promotion Termination of service. Case studies.

Text Book
- K.Aswathappa., "*Human Resource Management*", Tata Mc Graw Hill, Delhi,2009.

Reference Books
- Subba Rao., "*Human Resource Management*", Konark Publishers, 2009.
- C.B.Gupta, "*Human Resource Management*", S. Chand Publishers, Delhi, 2010.
- S.S.Khanka, "*Human Resource Management*", S. Chand Publishers, Delhi, 2008.

e- Resources
- www.whatishumanresource.com/human-resource-management
- www.managementstudyguide.com/human-resource-management.html
- www.investopedia.com/.../HRM.asp

UBAR401 WORKSHOP ON CREATIVE THINKING SKILLS

Semester : IV	**Credit**	: 1
Category : Core XV	**Hours/week**	: 1
Class & Major : II BBA	**Total Hours**	: 13

Activities related to following topics
- Building self Knowledge – self analysis
- Linking problems, solution and activities –Group discussion and case studies
- Quick thinking   - Quiz
- Analytical thinking – Management games
- Creative thinking -Management activities

e- Resources
- spers.ca/wp.../50-activities-for-developing-critical-thinking-skills.pdf
- www.thinkingclassroom.co.uk/ThinkingClassroom/Creativity.aspx
- www.glencoe.com/sec/busadmin/entre/teacher/creative/ edu.

III & IV EVALUATION COMPONENTS OF CIA

Sem	Category	Course Code	Course Title	Component III	Component IV
III	CORE-VII	UBAM308	Marketing Management	Creating new Product	Advertisement
	CORE –IX	UBAM311	Business Communication	Assignment	Album making
	CORE –X	UBAM312	Creativity for Innovative Management	Poster Presentation	Album Making
	CORE –XI	UBAM313	Organizational Behaviour	Assignment of OB Model	Case studies
IV	CORE-XII	UBAM405	Production & Materials Management	Poster presentation	Album making
	CORE-XIII	UBAM406	Micro, Small And Medium Enterprises	Project preparation	Case Studies
	CORE-XIV	UBAM407	Human Resource Management	Assignment	Case studies

DEPARTMENT OF COMMERCE

PREAMBLE

UG : Programme profile and Syllabi of courses offered in semester III and IV along with III and IV evaluation components (With effect from 2018 – 2021 batch onwards) and

PG : Programme profile and Syllabi of courses offered in semester III and IV along with III and IV evaluation components (With effect from 2018 – 2020 batch onwards) are Presented in this booklet.

PROGRAMME PROFILE: B.Com.

PSO1: Develop understanding the accounting concepts and convention.

PSO2: Ability to apply the practical tools of finance required in decision making.

PSO3: Ability to apply contextual knowledge to assess social, health, safety, legal aspects relevant to the professional accounting practice.

PSO4: Development of accounting and entrepreneurial skills.

Semester	Part	Category	Course Code	Course Title	Contact/Week	Credit Min	Credit Max
I	I	Part I	UTAL105/UTAL106/ UFRL101/UHIL101	Basic Tamil – I/ Advanced Tamil – I/ French – I/Hindi - I	4	2	3
	II	Part II	UENL107/UENL108	General English -I / Advanced English- I	5	3	4
	III	Core I	UCOM103/UCCM103	Fundamentals of Commerce	2	1	1
		Core II	UCOM104/UCCM102	Financial Accounting	6	5	5
		Allied	UCEA103	Business Economics	6	5	5
		Allied	UMAA112	Business Mathematics	5	4	4
	IV	Value Education			2	1	1
				TOTAL	**30**	**21**	**23**
II	I	Part I	UTAL205/UTAL206/ UFRL201/UHIL201	Basic Tamil – II/ Advanced Tamil –II/ French – II/Hindi - II	4	2	3
	II	Part II	UENL207/UENL208	General English II/ Advanced English II	5	3	4
	III	Core III	UCOM204/UCCM203	Business Correspondence	4	4	4
		Core IV	UCOM206/UCCM206 UCOM507/UCCN507	Management Accounting	5	4	4
		Allied	UCEA202	Indian Economic Development	5	4	4
		Core V	UCOR205	Commerce Workshop	1	1	1
	IV	Non Major Elective			4	2	2
		Soft skills			2	1	1

	V	Extension Activity/ Physical Education/NCC			-	1	2
				TOTAL	**30**	**22**	**25**
III	III	Core VI	UCOM305/ UCCM305/UBAM310	Cost Accounting	5	4	4
		Core VII	UCOM306 / UCCM306/ UBAM308	Marketing Management	5	4	4
		Core VIII	UCOM307/UBAMhi309	Financial Markets & Services	6	4	4
		Core IX	UCOM308/UCCM308	Accounting for Non - Trading Concerns	4	4	4
		Online course		NPTEL/ Spoken Tutorial	3	1	2
		Allied	UMAA301	Business Statistics	5	4	4
		Value Education			2	1	1
				TOTAL	**30**	**22**	**23**
IV	III	Core X	UCOM407	Banking Law & Practice	5	5	5
		Core XI	UCOM408/ UCCM408	Corporate Accounting	5	4	4
		Core XII	UCOM409/ UCCM409	Business law	5	4	4
		Core XIV	UCOR411	Commerce Workshop	1	1	1
		Core XIII	UCOM412 / UCCM412	Security Analysis & Portfolio Management	4	4	4
		Core XXI	UCOP501/UCCP501 UCOM511/UCCM511	Project/Principles and Practice of Insurance	2	-	-
		Allied	UCSA407	Cyber Security in Finance	3	3	3
		Allied	UCSR413	Cyber Security - Lab	3	2	2
	IV	Soft Skills			2	1	1
	V	Extension Activity Physical Education/NCC			-	-	2
				TOTAL	**30**	**24**	**26**
V	III	Core XVI	UCOM506/ UCCM506	Company Law	6	4	4
		Core XVII	UCOM508	Practical Auditing	6	5	5
		Core XVIII	UCOM509/ UCCM509	Income Tax Law & Practice I	6	5	5
		Core XIX	UCOM510/ UCCM510/	Accounting Package	3	2	2
		Core XX	UCOR501/ UCCR501	Accounting Package - Lab	3	3	3
		Core XXI	UCOP501/UCCP501 UCOM511/UCCM511	Project/Principles and Practice of Insurance	4	4	4
	IV	Value Education			2	1	1
				TOTAL	**30**	**24**	**24**
VI	III	Core XXII	UCOM612/ UBAM609	Women Entrepreneurship	5	5	5
		Core XXIII	UCOM614/ UCCM614/	Financial Management	6	5	5

	Category	Course Code	Course Title			
		UBAM610				
	Core XXIV	UCOM615/ UCCM615	Service Marketing	5	5	5
	Core XXV	UCOR615/ UCCR615	Commerce Workshop	1	1	1
	Core XXVI	UCCM616/ UCOM616	Goods and Service Tax	6	5	5
	Viva Voce	UCOM607/ UCCM607	Comprehensive Viva	-	1	1
	Major Elective	UCOO605/ UCCO605	1. E-Marketing	5	4	4
		UCOO606/ UCCO606	2. Income Tax Law & Practice II			
		UCOO607/ UCCO607	3. Consumer Protection			
IV	Soft skills			2	1	1
V	Extension Activity/ Physical Education/NCC			-		2
			TOTAL	**30**	**27**	**29**
			GRAND TOTAL	**180**	**140**	**150**

NON MAJOR ELECTIVE (except B.Com., B.Com. CA & BBA & BCA)

Semester	Category	Course Code	Course Title	Contact/ Week	Credit	
					Min	Max
II	Non Major Elective – I	UCOE202/ UCCE201	Modern Accounting Package	4	2	2
II	Non Major Elective – I	UCOE302/ UCOE203	Women Entrepreneurial Development	4	2	2

COURSES OFFERED TO OTHER DEPARTMENTS

Semester	Category	Course Code	Department	Course Title	Contact / Week	Credit	
						Min	Max
III	Allied III	UCOA303	BCA	Financial Accounting	5	5	5
IV	Allied IV	UCOA403/ UCOR403	BCA	Accounting Package – Theory Accounting Package – Practical	2 3	2 3	2 3

EXTRA CREDIT EARNING PROVISIONS

Semester	Category	Course Code	Course Title	Contact/ Week	Credit	
					Min	Max
II	Core	UCOI201/PCOI201	Summer Internship	-	-	1
IV	Core	UCOI401/ PCOI401	Summer Internship	-	-	1

Experiential Learning (only for interested students)

| Course Title | Course Code | Work Experience | | | Collaborating Agency | Mode of Evaluation |
		Nature of Institution	Proposed Duration of Training	Proposed Period		
Accounting Package	UCOM203/ UCCM202/ UCOA403/ UCOM510/ UCCM510	Tally Training Institution	5 Days	February	ICAT Tally Training Institute, Puducherry	Written Test

UCOM305/UCCM305/UBAM310 COST ACCOUNTING

Semester : III **Credit : 4**
Category : Core VI **Hours/Week : 5**
Class : II B.Com & II B Com CA **Total Hours :65**

Objectives
To enable the students
- Gain knowledge in basic concepts of Cost Accounting.
- Acquaint the students with various methods involved in cost ascertaining system.
- Familiarize students with operating costing techniques.

UNIT-I INTRODUCTION **14 Hrs**
Cost Accounting- Definition, Meaning and Objectives, Advantages and Importance – Distinction between Cost and Financial Accounting –Elements of Cost and Preparation of Cost Sheets, Tenders and Quotations

UNIT-II MATERIALS **13 Hrs**
Materials – Stores Records – Purchase Order – Goods Received Note – Bin Cards – Stores Ledger – Inventory Control – ABC Analysis – Economic Order Quantity – Maximum, Minimum and Reordering levels – Methods of Pricing Issues - Perpetual Inventory System

UNIT –III LABOUR **13 Hrs**
Labour – Importance of Labour Cost Control – Recording labour time - Treatment of "Over Time " and "Idle Time" – Labour Turn Over-Various Methods of Wage payments - Calculation of wages – Methods of Incentives (Bonus) Schemes.

UNIT-IV OVERHEADS **13 Hrs**
Overheads (Factory, Administration, Selling and Distribution) – Definition and meaning of Overheads – Classification – Apportionment of Overheads –Redistribution (Secondary Distribution) – Absorption of Overheads including Machine Hour Rate.

UNIT-V METHODS OF COST ACCCOUNTING **12Hrs**
Methods of Cost accounting – Job Costing – Process Costing – Calculation of Inter Process Profit – Operating Costing.

Text Books
- Reddy & Murthy, *Cost Accounting*, Margham Publications, Chennai.,2009
- Jain &Narang, *Cost Accounting*, Kalyani Publications, Ludhiana,.2008

Reference Books
- Charles T.Horngren, *Cost Accounting- A Managerial Emphasis (19ᵗʰ Edition)* Prentice Hall Of India(P) Ltd, New Delhi.2008
- MaheshwariS.N,*Cost and Management Accounts*, Sultan Chand & Sons, New Delhi,2009
- IyengarS.P,*Cost and Management Accountancy,*Sultan Chand & Sons, New Delhi,2005

e- References
- www.futureaccountants.com
- www.computerizedaccount.tripod.comwww.ce.cmu.edu

UCOM306 / UCCM306 / UBAM308 - MARKETING MANAGEMENT

Semester **: III** **Credit** **: 4**
Category **: Core VII** **Hours/Week : 5**
Class & Major : II B.Com., II B.Com CA & II BBA **Total Hours : 65**

Objectives
To enable the students
- Understand the conceptual framework of Marketing.
- Apply the product and pricing policies and sales promotion techniques in the emerging Marketing scenario.
- Undertake marketing research and apply the outcome for product development.

UNIT - I FUNDAMENTALS OF MARKETING **13 Hrs**
Marketing: Meaning — Classification –Functions- approaches- Relationship of marketing with other functional areas- Various Environmental factors affecting the marketing functions— Market Mix –Meaning of marketing management

UNIT - II PRODUCT AND PRICING **13 Hrs**
Product – Characteristics – Classification- Product mix – process of New Product development - Product life cycle – Branding – Packaging- Pricing strategies -Factors influencing pricing decisions – Kinds of pricing- Pricing objectives – Pricing policies.

UNIT - III PROMOTION **14 Hrs**
Promotion mix- Advertising – Publicity – Public relations – Personal Selling – Sales Promotion Administration- Physical distribution – Importance of various kinds of distribution channels- Case studies –An overview of e-promotion.

UNIT - IV BUYER BEHAVIOR AND SALES FORECASTING   **13 Hrs**

Buying motives – Buyer Behavior models – Buying Decision Process -Factors influencing Buyer behavior- Market segmentation – Need and basis of segmentation, targeting-positioning– Marketing strategy- Various methods of sales forecasting.

UNIT - V MARKETING RESEARCH & RECENT TRENDS IN MARKETING   12 Hrs

Meaning – Steps involved in Market Research –Marketing Information System-organization involved in marketing research in India-Case studies - Recent Trends in Marketing: Tele Marketing Initiatives and requirements - e-marketing – benefits, types and developments.

Text Book

- Philip Kotler, *Marketing Management* , Prentice Hall of India, New Delhi, 2015

Reference Books

- Varshney .L and Gupta SL , *Marketing Management,* Jain Book Agency, New Delhi, 2015
- Saxena , *Marketing Management,* Tata McGraw Hill Publication, New Delhi, 2015

UCOM307 FINANCIAL MARKETS & SERVICES

Semester : III	**Credit : 4**
Category : Core VIII	**Hours/Week: 6**
Class & Major: II B. Com. & II BBA	**Total Hours :78**

Objectives
To enable the students

- Understand the Indian Financial System, its constituents, the principles on which it operates, inter linkages and regulatory concerns.
- Familiarize with various types of financial services and their role in social change.
- Differentiate Innovative financial Services from Traditional financial services.

UNIT-I INTRODUCTION   **18 Hrs**

Financial services - meaning – Financial services and Economic Environment –Legal and Regulatory framework – Financial Institutions and other participants in the Financial Service Sector-Introduction to Leasing – Merits and Demerits – Types of Lease – Hire purchase vs. Lease.

UNIT-II CAPITAL AND MONEY MARKETS   **16 Hrs**

Capital and Money Markets – Instruments – Government – Securities Market – Credit rating agencies –CRISIL, CARE, ICRA – Services – Criteria for rating – Symbols. Objectives, powers and role of SEBI in investor protection.

UNIT-III FACTORING   **10Hrs**

Factoring – Types and feature of factoring agreement – Factoring vs. Bills discounting – Services of factor – Consumer finance and Credit Card Services – Forfeiting.

UNIT-IV VENTURE CAPITAL   **18 Hrs**

Venture Capital – meaning and characteristics – criteria for assistance – Venture capital products/schemes and guidelines – Infrastructure financing – assessment of risk – legal aspects.

UNIT-V MUTUAL FUNDS   **16 Hrs**

Mutual Funds — Types and Features – Management structure and performance evaluation – Growth and recent trends – Investor Services - SEBI Guidelines.

Text Books
- Gurusamy. S, *Financial Markets and Institutions*, Vijay Nicole Imprints Private Ltd., Chennai, 2015
- Khan, M.Y, *Indian Financial Services*, Tata McGraw Hill Publishing Company Limited, New Delhi, 2015

Reference Books
- Balu. V, *Merchant Banking & Financial Services*, Sri Venkateswara Publication, Chennai, 2015
- Bhatia B. S. & Bhatre. G. S., *Management of Capital Markets, Financial services and Institutions,* Deep and Deep Publishers, New Delhi, 2015.
- Bhole L. M*., Finance Institutions and Markets*, Tata McGraw Hill, New Delhi 2015

UCOM308/UCCM308 ACCOUNTING FOR NON - TRADING CONCERNS

Semester   : III   **Credit   : 4**
Category   : Core IX/VIII   **Hours/Week : 4**
Class & Major : II B.Com & II B.Com CA   **Total Hours : 52**

Objectives
To enable the students
- Understand the basic Concepts of Accounting
- Prepare Analyze Income and Expenditure of Non- trading concerns

UNIT- I INTRODUCTION   **11Hrs**

Meaning and characteristics of Non-profit organization – main sources of income – difference between NGO and Non-profit organizations – Receipts and Payments A/c- meaning – need – preparation – advantages – limitations – differences between receipts and payments A/c and cash book.

UNIT- II RECEIPTS AND PAYMENTS ACCOUNTS   **10Hrs**

Income and expenditure account – need and preparation – differences between Receipts and Payments A/C and Income and Expenditure A/C – adjustments: outstanding, prepaid, accrual, unearned incomes, depreciation on asset – Preparation of balance sheet.

UNIT- III ACCOUNTS FOR TRUST   9Hrs

Treatment of peculiar items – legacy-donations – subscription – entrance fees- life membership fees – entrance fees – sale of news paper – sale of sports material- honorarium – special fund – capital fund

UNIT- IV ACCOUNTS FOR EDUCATIONAL INSTITUTIONS   10Hrs

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   12Hrs

Accounting treatments for self help group – cricket association – nursing association – football federation of India – trust – charitable institutions – welfare association.

Text Books
- Grewall, *T.S Accountancy,* S. Chand Publications, Delhi, 9th Edition, 2016.
- John H.Mc Carthy, Nancy E. Shelmon, John Mattie, *Financial and Accounting Guide For Non- Profit Organizations*, John Wiley and Sons Publishers ,8th Edition.
- Jain S P Narang K L, *Accounting Principles*, Kalyani Publishers, 8th Edition, 2015

Reference Books
- Arulanandham, M. A.& Raman K.S, *Financial Accounting*, Himalaya publishing house, New Delhi,2016
- Gupta R.L., & Gupta V.K.,*Financial Accounting*, Sultan Chand & Sons, New Delhi,2014

UCOM407 BANKING LAW AND PRACTICE

Semester : IV   **Credit   : 5**
Category : Core X   **Hours/ Week: 5**
Class   : II B. Com.   **Total Hours :65**

Objectives
To enable the students
- Develop an understanding of the legal aspects involved in banking business.
- Gain knowledge in Banking functions and services.
- Understand the Negotiable Instruments.
- Have knowledge in recent trends in Banking.

UNIT-I BANKER AND CUSTOMER   12 Hrs

Banker and Customer relationship – Meaning, Definition, Functions and Services.

UNIT-II TYPES OF DEPOSIT   13 Hrs

Opening of an account – Types of deposit accounts – Types of Customers (Individual, Firms, Trusts and Companies) – Customer relations – Customer Grievances and Redressal – Ombudsman Schemes.

UNIT-III NEGOTIABLE INSTRUMENTS   14 Hrs

Negotiable Instruments – Promissory Note – Bills of exchange, Cheque, Draft – Definitions, Features – Crossing – Endorsements – Material Alteration – Paying banker – Rights and Duties – Statutory Protection – Dishonour of Cheques – Role of Collecting Banker.

UNIT-IV PRINCIPLES OF LENDING   13 Hrs

Principles of lending – Types of Borrowings – precautions to be taken by a banker

UNIT-V E-BANKING   13 Hrs

E-Banking – ATM Cards, Debit Cards, Personal Identification, Number – On Line Enquiry and Update Facility – Electronic Fund Transfer – Electronic Clearing System.

Text Books
- Nirmala Prasad & Paul Doss., *Banking and Financial System*, Chennai, Himalayan Publications, 2016.
- Santhanam.B.,*Banking And Financial System*,Chennai, Margham Publications. 2016

Reference Books
- Balu.V.,*Banking & Financial System*, Mylapore,Chennai, Sri Venkanteswara Publication. 2017
- Maheswari. *S.N., Banking Law Theory & Practice*, Kalayani Publications.2017
- Sundaram AndVarshney, *Banking Theory, Law And Practice*, New Delhi, Sultan Chand Company.2016

UCOM408/UCCM408 CORPORATE ACCOUNTING

Semester: IV   **Credit   : 4**
Category: Core X I/X   **Hours/Week: 5**
Class   : II B. Com & B.Com CA   **Total hours   : 65**

Objectives
To enable the students
- Impart knowledge on the important aspects of Corporate Accounting.
- Develop skills in the preparation of company accounting statements and in their analysis.
- Gain knowledge in the preparation of Bank Accounts.
- Acquire knowledge and skills in accounting for changes in corporate structure.

UNIT- I FINAL ACCOUNTS   13Hrs

Preparation of Companies Final Accounts – Computation of Managerial Remuneration-Basic knowledge on Accounting Standards

UNIT- II VALUATION OF SHARES AND GOODWILL   12 Hrs

Valuation of Goodwill and Valuation of Shares – Methods.

UNIT- III HOLDING AND SUBSIDARY ACCOUNTS   **12 Hrs**

Accounts of Holding Companies – Minority Interest – Cost of Control – Unrealized profits – Revaluation of assets and liabilities – Consolidated Balance Sheet.

UNIT-IV   BANK ACCOUNTS AND LIQUIDATIONS   **15 Hrs**

Bank Accounts – Preparation of Profit and Loss Account and Balance Sheet With relevant schedule – Liquidation Accounting – Order of payments Banking – Preferential payments – Liquidators final statements of Account – Remuneration – Statements of Affairs & Deficiency Accounts.

UNIT-V INSURANCE COMPANIES ACCOUNT   **13 Hrs**

Insurance Company Accounts: Life Insurance & Fire Insurance only.

Proportion: Theory : 20   Problems: 80

Text Books
- Shukla M.C. &GrewalT.S.,Corporate Accounting, S.Chand & Co. Publications, New Delhi,2009
- Jain P &NarangK.L, *Advanced Accountancy*-Kalyani Publishers,Ludhiana,2008

Reference Books.
- Gupta R.L. &Radhaswamay.M ,*Advanced Accounts*-Sultan Chand & Sons, New Delhi,20015
- Iyengar S.P ,*Advanced Accounting*- Sultan Chand&Sons, New Delhi , 2004
- Reddy T.S.&MurthyA,*CorporateAccounting,*Margham Publications,2009

UCOM409/UCCM409 BUSINESS LAW

Semester : IV		**Credit**	**: 4**
Category : Core XII/ XI		**Hours/Week**	**: 5**
Class : II B. Com & B.Com CA		**Total hours**	**: 65**

Objectives
To enable the students
- Equip the prospective entrepreneurs (businessmen) with knowledge of fundamental in Business Law
- Impart basic knowledge of obligations arising from different types of contracts.
- Acquire knowledge in Laws relating to special Contracts, such as Sale of goods and Negotiable Instruments Act.
- Furnish knowledge on different methods of discharging contracts.

UNIT-I INTRODUCTION TO NATURE OF CONTRACT   **13 Hrs**

Nature and Kinds of Contract – Offer and Acceptance – Consideration – Capacity of parties – Free Consent – Legality of object and Consideration, Void agreement – Contingent Contracts.

UNIT II PERFORMANCE OF CONTRACTS   **12 Hrs**

Performance of Contracts – Discharge of contracts – Remedies for breach including specific performance – Quasi Contracts.

UNIT III SPECIAL CONTRACTS   **13 Hrs**

Indemnity & Guarantee –Features and distinctions-Extent of Surety's Liability-Rights and Discharge of Surety- Bailment & Pledge –features-difference-Rights and Duties of Bailor and Bailee Pawnee-Pledge by non-owners.

UNIT IV SALE OF GOODS ACT   **13 Hrs**

Sale of Goods Act 1930-Formation of Contract-Conditions and Warranties-Transfer of Property-Performance of Contract-Rights of an unpaid seller.

UNIT V CONTRACT OF AGENCY   **14 Hrs**

Contract of Agency-Definition and meaning-Creation-Ratification and Requisites-Rights of Principal and Agent-Relation of Principal with third parties-Personal liability of Agent-Termination of Agency-Irrevocable Agency.

Text Books
- Kapoor. N. D.,*Business Laws*, New Delhi, Sultan Chand & Son.2015
- Sreenivasan. M. R.,*Business Law, Chennai*, Margam Publication.2016

Reference Books
- Kuchhal. M. C, *Mercantile Law*, New Delhi, Vikas Publication.2017
- Pillai R. S. N, *Business Laws*, New Delhi, S.Chand.2016
- Shukla. M. C, *Mercantile Law*, New Delhi , S.Chand Co.2016

UCOR411/ UCCR410 COMMERCE WORKSHOP

Semester : IV	**Credit** : 1
Category : Core XIII /XIV	**Hours/Week:** 1
Class & Major : II B. Com & II B.Com CA	**Total Hours : 13**

Objectives

To enable the students
- Fill-up forms used in Banks, Insurance Companies and other business units.
- Acquire knowledge on documentation procedure.

IV Semester: Training will be given to fill up the following Forms/ Formats/ Challans

List of items used in the day to day banking

1) Application forms for opening Bank Accounts, Cheque Book, Pass Book, Bank Statement
2) Format of Demand Draft
3) Cheque, Truncated Cheque, Travellers Cheque
4) Pay- in slip Form
5) Deposits – All types (All forms / Challans / Formats)
6) Loans – All types (All forms / Challans / Formats)
7) All financial services (Foreign Exchange remittances by banks, Money Exchanges/ Western Money and Bancassurance etc. – (All forms / Challans)
8) E-Banking Services – (All forms / Challans / Formats)
9) Withdrawal Form
10) NEFT/ RTGS Form
11) Insurance Policy Document
12) DEMAT form

Evaluation Pattern for Commerce Workshop
CIA   **60 Marks**
Daily Practical Assessment   : 30 Marks
Test I   : 10 Marks
Viva I   : 05 Marks
Test II   : 10 Marks
Viva II   : 05 Marks

ESE   **40 Marks**
Record   : 10 Marks
Practical Exam   : 20 Marks
Viva voce   : 10 Marks

Total   **100 Marks**

UCOM412 / UCCM412 SECURITY ANALYSIS & PORTFOLIO MANAGEMENT

Semester	**: IV**	**Credit**	**: 4**
Category	**: Core XII / XIII**	**Hours/Week**	**: 4**
Class & Major: II B. Com & II B.Com CA		**Total Hours**	**:52**

Objectives
To enable the students
- Understand the characteristics of security markets and the instruments traded therein.
- Analyze risk and return of securities.
- Manage portfolio of investments.

UNIT- I INTRODUCTION TO SECURITIES   **10 Hrs**

Meaning, Definition, Types of securities – equity based and debt based – derivatives – mutual funds – Concepts of risk and return – valuation of securities – bond and equity valuation – different approaches to valuation – Estimation of net asset value of mutual funds – valuation of option.

UNIT- II SECURITY MARKETS   **11 Hrs**

Security market – legal framework of security markets – organized stock exchanges – listing of securities – trading and operational mechanism of stock exchanges – settlement and clearing – online trading – Dematerialization – Depositories and Depository participants – Internet trading and WAP enabled trading online surveillance – Trading practices on NSE and BSE.

UNIT- III FUNDAMENTAL ANALYSIS   **9 Hrs**

Security Market Analysis – Fundamental Analysis – Economy Analysis - Industry Analysis and Company Analysis.

UNIT- IV TECHNICAL ANALYSIS   **10 Hrs**

Technical analysis – Methods of technical analysis – trends – indicators and patterns – advance decline line – market indices and moving averages – Dow Theory.

UNIT- V PORTFOLIO ANALYSIS, SELECTION AND MANAGEMENT   **12 Hrs**

Portfolio Management – selection of portfolio – Markowitz portfolio selection model – Sharpe's single Index Model and optimal portfolio construction – Capital Asset Pricing Model (CAPM) – Portfolio performance evaluation: Measures of Returns, Formula Plans, Sharpe and Treynor Measures – Portfolio revision

Proportion: 80% Theory; 20% Problem

Text Books
- Preeti Singh, *Investment Management,* Himalaya Publications, Mumbai, 9th Edition, 2015.
- Bhalla V.K., *Investment Management: Security Analysis and Portfolio Management*, Sultan Chand and Sons, New Delhi, sixth edition 2014.

Reference Books
- Fischer, Donald E. and Ronald J. Jordan, *Securities Analysis and Portfolio Management,* Prentice Hall of India, New Delhi, 2015
- Edwin J. Elton and Martin J. Gruber, *Modern Portfolio Theory and Investment*, John Wiley and Sons, Singapore, 2015,
- Dr.Ranganatham , *Securities Analysis and Portfolio Management* , pretence hall of India Newdelhi 2016

UCOM511/UCCM511 PRINCIPLES AND PRACTICE OF INSURANCE

Semester   : IV & V   **Credit   : 4**
Category   : Core XXI/XVIII   **Hours/Week : 6(2+4)**
Class & Major: II & III B. Com & B.Com CA   **Total Hours : 78**

Objectives
To enable the students
- To understand the nature of insurance and the principles that governs general insurance.
- Protect themselves against personal and business risks.

UNIT- I INTRODUCTION TO INSURANCE   10 Hrs
        Insurance – Meaning – Functions– Nature and Principles of Insurance – Growth of insurance business in India – Insurance regulation and IRDAI – Insurance organizations.

UNIT- II LIFE INSURANCE   16 Hrs
        Life Insurance: Meaning – Overview of the Indian life insurance market – Types of life insurance – Personal financial planning and life insurance – Insurance agents and their functions– Investment of Funds – Surrender Value –Bonus Option – Policy Condition – Annuity Contracts.

UNIT- III GENERAL INSURANCE   16 Hrs
        General Insurance: Meaning – Overview of Indian general insurance market – Types of general insurance – General insurance companies in India – Insurance broking firms.

UNIT- IV MARINE &FIRE INSURANCE   18Hrs
        Contract of Marine Insurance – Elements of Marine Insurance –Clause in a Marine Insurance Policy –Marine losses – Fire Insurance – Features of a Fire Insurance – Kinds of Policies – Policy Conditions– Payment of Claims – Reinsurance.

UNIT–V HEALTH & MISCELLANEOUS INSURANCE   18 Hrs
        Health Insurance: Meaning and Importance of Health insurance and Mediclaim policies – Types of health insurance policies – Miscellaneous Insurance – Motor insurance – Agricultural insurance – Personal Accident Insurance.
Note: Unit I & II under IV semester, Remaining III unit to V unit under Vth semester

Text Books
- Mishra M.N., *Insurance Principles and Practice*, S.Chand & Co, New Delhi,2016
- Srinivasan, P*rinciples of Insurance Law*, Ramanujam Publisher, Bangalore,2015

Reference Books
- Varadharajan B, *Insurance Vol.1 and 2* , Tamil nadu Text Book Society,2003
- Sharma RS, *Insurance: Principles and practice* ,Mumbai,2015

UCOP501/UCCP501 PROJECT

Semester : IV & V   **Credit** : 4
Category : Core XXI/XVIII   **Hours/Week: 6(2+4)**
Class & Major: II & III B.Com & B.Com CA   **Total Hours : 78**

Guidelines
- This course is offered as group project
- No of students is limited to 5 to 6

Research Area
- Finance
- Marketing
- Banking

Evaluation Pattern for the project (Internal -60, External -40)

S.No	Components	CIA	ESE
1	Title of the Topic & Research Design	10	
2	Review of Literature	10	
3	Statement of the problem	10	
4	Analysis and Interpretation	10	
5	Viva voce	10	10
6	Project Report	10	30
	Total	**60**	**40**

UCOA303 FINANCIAL ACCOUNTING

Semester : III   **Credit** : 5
Category : Allied III   **Hours/Week: 5**
Class & Major: II BCA   **Total Hours : 65**

Objectives
To enable the students
- Understand the basic rules of accounting and accounting principles.
- Prepare accounting for different types of organizations.
- Analyse and interpret financial statements.

UNIT- I INTRODUCTION TO ACCOUNTING   **12 Hrs**

Meaning and scope of accounting, Basic Accounting concepts and conventions –
objectives of Accounting - Accounting Transactions - Double Entry System of Book Keeping -
Journal, Ledger an Trail Balance.

UNIT- II SUBSIDIARY BOOKS OF ACCOUNTS   **11 Hrs**

Subsidiary Books - Preparation of Individual Subsidiary Books- Purchase Book- Sales Book- Purchase Return Book – Sales Return Book- Cash Book- Simple Cash Book – Petty Cash Book

UNIT- III FINAL ACCOUNTS   **13 Hrs**

Introduction- Manufacturing Account- Trading Account- Profit and Loss Account- Balance sheet- Adjustments

UNIT- IV BRANCH & DEPARTMENTAL ACCOUNTS   **15 Hrs**

Branch Accounts – Dependent Branches – Debtors system – stock & Debtors systems – Independent branch (Excluding Foreign Branch) Departmental Accounting – Basis for allocation of Expenses – inter-departmental transfer at cost or selling price – Treatment of Expenses which cannot be allocated.

UNIT- V FINANCIAL STATEMENTS ANALYSIS   **14 Hrs**

Comparative Statements, Common Size Statements, Trend analysis – Ratio analysis: Liquidity, Operating and Turnover ratios

Proportion: Problem: 80%, Theory: 20%

Text Books
- Gupta R.L.& Gupta.V.K., *Financial Accounting*, Sultan Chand Publication, New Delhi, 2015.
- Reddy T.S. & Murthy.A, *Financial Accounting*, Margham Publication, Chennai, 2015.

Reference Books
- Gupta R.L & Radhaswamy, *Advanced Accounting*, Volume – I, Sultan Chand, New Delhi, 2015.
- Jain &Narang, *Financial Accounting*, Kalyani Publishers, Chennai, 2015
- Shukla & Grewal, *Advanced Accounting*, S.Chand Publications, New Delhi, 2015.

UCOA403 ACCOUNTING PACKAGE - THEORY

Semester   : IV   **Credit   : 2**
Category   : Allied IV   **Hours/Week : 2**
Class & Major : II BCA   **Total hours   : 26**

Objectives
To enable the students
- Gain basic knowledge in computerized accounting.
- Create company data, vouchers and inventories.
- Extract financial and business reports.

UNIT-I INTRODUCTION TO COMPUTERIZED ACCOUNTING   **5 Hrs**

Meaning of Computerized Accounting – Meaning of Computers – Importance of Computerized Accounting – Computerized Accounting Vs Manual Accounting- Introduction to

Architecture of Tally – Creation of Company – Creation of Groups – Various Kinds of Groups – Multiple & Single – Creation of Ledgers – Various Kinds of Ledgers.

UNIT-II CREATION OF VOUCHERS 5 Hrs

Entering Vouchers – Journal Voucher, Purchase Voucher, Sales Voucher, Receipt Voucher, Payment Voucher – Role and the importance of Function Keys.

UNIT-III PREPARATION OF FINAL ACCOUNTS 5 Hrs

Extraction of Trial Balance, Trading Account, Profit and Loss Account and Balance Sheet – Simple Sums with and without Adjustments – Alter-Select –Edit - Delete –Selection of Company.

UNIT-IV CREATION OF INVENTORY 5 Hrs

Introduction to Inventories – Creation of Stock Category – Stock Groups – Stock Items – Editing and Deletion of Stock items – Usage of Stock in Voucher Entry – Stock Voucher or Purchase Orders – Sales Orders - Customer and Supply Analysis – Extracting simple Reports and Graphs.

UNIT- V CREATION OF COST CENTRE 6 Hrs

Introduction to Cost – Creation of Cost Category – Cost Center Category – Editing and Deleting Cost Centre –Usage of Cost Category and Cost Centers in Voucher Entry –Budget Control – Creation of Budgets – Editing and Deleting Budgets – Reports.
Proportion: Problem: 80%, Theory: 20%

Text Books
- Nadhani A.K. and Nadhani K.K , *Implementing Tally*, BPB Publications, New Delhi, 2015.
- Palanivel. S, *Tally Accounting Software*, Margham Publications, Chennai, 2015.

Reference Books
- Vishnu Priya Singh , *Quick Learn Tally*, Computech Publication Pvt., New Delhi, 2015.
- Srinivasa Valaban, *Computer applications in Business*, Sultan Chand & Sons, 2015.

UCOR403 ACCOUNTING PACKAGE– PRACTICAL

Semester : IV	**Credit : 3**
Category : Allied IV - Practical	**Hours/Week : 3**
Class & Major : II BCA	**Total hours : 39**

Objectives
To enable the students
- Gain knowledge on application of computers in accounting.
- Create vouchers, journals and stock groups.

Lab Exercise

1. Creation of Company, alteration and deletion
2. Creation of groups, single and multiple

3. Vouchers and Journals
4. Entering values and preparation of Trial balance, Trading account and Balance Sheet
5. Use of function keys and entering various journals to understand adjustments
6. Preparation of final accounts with adjustments
7. Creation of stock groups, stock category and stock store
8. Entering data in stock groups of a departmental store
9. Multiple stock group
10. Cost Centre

UCOE202/UCCE201 MODERN ACCOUNTING PACKAGE

Semester: II　　　　　　　　　　　　　　　　　　　　**Credit　　: 2**
Category: Non Major Elective - I　　　　　　　　　　**Hours/Week : 4**
　　　　　　　　　　　　　　　　　　　　　　　　　　Total Hours : 52

Objectives
To enable the students
- Understand the basic accounting concepts and conventions
- Prepare trading, profit & loss a/c and balance sheet.
- Enhance the knowledge on accounting with the help of Tally.

UNIT-I INTRODUCTION　　　　　　　　　　　　　　　　　　**10 Hrs**
　　　　Introduction – transaction – Accounting principles, concepts and conventions – double entry system – rules of accounting.

UNIT-II JOURNAL, LEDGER AND TRAIL BALANCE　　　　　　**12 Hrs**
　　　　Journal – ledger trial balance – trading accounting – profit &loss account & balance sheet.

UNIT-III CREATION OF COMPANY IN TALLY　　　　　　　　**10 Hrs**
　　　　Introduction to tally – features of tally – getting functional with tally – creation of company in tally – features – configuration.

UNIT-IV ACCOUTING VOUCHERS　　　　　　　　　　　　　　**10 Hrs**
　　　　Ledger & groups – accounting vouchers – recording transactions of sample data.

UNIT-V INVENTORY VOUCHERS　　　　　　　　　　　　　　**10 Hrs**
　　　　Introduction - trading accounting – profit & loss account – balance sheet – accounts books – day books – Inventory vouchers and books.

Text Books

- Gupta. R.L. & Gupta.G.V., *Advanced Accounting*, New Delhi, Sultan Chand.
- Reddy. T. S. & A. Murthy, *Financial Accounting*, Chennai, Margham Publication.

Reference Books
- Gupta. R. L. & Radhaswamy, *Advanced Accounting, Volume – I*.2016
- Jain & Narang, *Financial Accounting*.2017
- Shukla & Grewal, *Advanced Accounting*, S.Chand Publication, New Delhi.2016
- *Tally financial accounting programme*, volume 1 – Manual. 2016

UCOE203 WOMEN ENTREPRENEURIAL DEVELOPMENT

Semester: II   **Credit   : 2**
Category: Non Major Elective II   **Hours/Week : 4**
                                                                    Total Hours   : 52

Objectives
To enable the students
- Acquire knowledge about women entrepreneurship concepts and development.
- Differentiate various incentives, subsidies and taxation benefits given by government to of SSI units and women entrepreneurs.
- Motivate the students to earn by self employment.

UNIT-I NATURE AND SCOPE   **10 Hrs**

Entrepreneur – meaning and concept – characteristics of an Entrepreneur - Concept of Women Entrepreneurs – function of Women Entrepreneur – growth of Women Entrepreneurship – problems & prospect of Women Entrepreneurs – development of Women Entrepreneurship.

UNIT-II STEPS FOR STARTING A SMALL SCALE BUSINESS   **12 Hrs**

Steps for starting a Small Scale Business – Search for business Idea, sources of Ideas – Project formulation and Design.

UNIT-III WOMEN ENTREPRENEURSHIP   **10 Hrs**

Women Entrepreneurial Behavior: Innovation and Entrepreneur – role of an Entrepreneur in economic growth as an innovator.

UNIT-IV SOURCES OF PROJECT FINANCE   **10 Hrs**

Sources of project finance – short term, medium term and long term finance – role of Banks and other Financial Institutions.

UNIT-V INCENTIVES AND SUBSIDIES   **10 Hrs**

Incentives and Subsidies – Meaning – need and problems – Schemes of Incentives for Women Entrepreneur – Taxation benefits to Women Entrepreneur.

Text Books
- Mishra MN, Insurance Principles and Practice, S.Chand & Co, New Delhi,2009
- Srinivasan,Principles of Insurance Law, Ramanuja Publisher, Bangalore,2005

Reference Book
- Gupta.C.B, *Entrepreneurship Development in India*, Sultan Chand.2015

III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
III	Core VI	UCOM305 /UCCM305	Cost Accounting	Assignment	Problem Solving
	Core VII	UCOM306/ UCCM306/ UBAM308	Marketing Management	Assignment cum presentation	Case Study on Marketing Strategy
	Core VIII	UCOM307/ UBAM309	Financial Markets & Services	Assignment cum presentation	Written Quiz
	Core IX	UCOM308/ UCCA308	Accounting for Non – Trading concerns	Written Quiz	Assignment
	Core X	UCOM407	Banking Law & Practice	Filling up of Banking Instruments & Challans	Album Making
	Core XI / IX	UCOM408/ UCCM408	Corporate Accounting	Assignment	Problem solving
	Core XII / XI	UCOM409/ UCCM409	Business law	Case study	Seminar
	Core XIII / XII	UCOM412 UCCM412	Security Analysis & Portfolio Management	Hands on Training (Filling up of Investment related forms)	Case study
	Core XXI	UCOM511/ UCCM511	Principles and practice of Insurance	Insurance Lab (Filling up the forms)	Seminar

UG III & IV EVALUATION COMPONENTS OF CIA – Non Major Elective

Semester	Category	Course Code	Course Title	Component III	Component IV
II	Non Major Elective I	UCOE202/ UCCE201	Modern Accounting Package	Written Quiz	Problem Solving
II		UCOE203/ UCCE203	Women Entrepreneurial Development	Assignment	Open Book Quiz

UG III & IV EVALUATION COMPONENTS OF CIA

(COURSES OFFERED TO OTHER DEPARTMENTS)

Semester	Category	Course Code	Department	Course Title	Component III	Component IV
III	Allied III	UCOA303	BCA	Financial Accounting	Assignment	Problems Solving
IV	Allied IV	UCOA203/ UCOR203 UCOA403/ UCOR403	BBA BCA	Accounting Package _ Theory Accounting Package – Practical	Assignment	Problems Solving

PROGRAMME PROFILE: B.Com. (CA)

PSO1: Ability to understand the concept of accounting and computer application in Business.

PSO2: Capacity to analyze latest technologies to solve problems in the areas of computer application.

PSO3: Application of the knowledge of accounting fundamentals and accounting specialization in Business.

PSO4: Ability to develop accounting and e- Entrepreneurial skills.

Semester	Part	Category	Course Code	Course Title	Contact /Week	Credit Min	Credit Max
I	I	Part I	UTAL105/UTAL106/ UFRL101/UHIL101	Basic Tamil – I/ Advanced Tamil – I/ French – I/Hindi –I	4	2	3
	II	Part II	UENL107/UENL108	General English -I/ Advanced English-I	5	3	4
	III	Core I	UCCM103/UCOM103	Fundamentals of Commerce	2	1	1
		Core II	UCCM102/UCOM104	Financial Accounting	6	5	5
		Allied	UCSA104	C Programming	3	3	3
		Allied	UCSR110	C Programming – Lab	3	2	2
		Allied	UMAA112	Business Mathematics	5	4	4
	IV	Value Education			2	1	1
				TOTAL	**30**	**21**	**23**
II	I	Part I	UTAL205/UTAL206/ UFRL201/UHIL201	Basic Tamil – II/ Advanced Tamil –II/ French – II/Hindi –II	4	2	3
	II	Part II	UENL207/UENL208	General English/ Advanced English	5	3	4
	III	Core III	UCCM203/UCOM204	Business Correspondence	4	4	4
		Allied	UCSA204	Object Oriented Programming	2	2	2
		Allied	UCSR207	Object Oriented Programming - Lab	3	2	2
		Core IV	UCCM206/ UCOM206/ UCCM407/ UCOM407	Management Accounting	5	4	4
		Core V	UCCR205	Commerce Workshop	1	1	1
	IV	Non Major Elective			4	2	2
	IV	Soft skills			2	1	1
	V	Extension Activity/ Physical Education/NCC			-	1	2
				TOTAL	**30**	**22**	**25**
		Core VI	UCCM305/UCOM305	Cost Accounting	5	4	4
		Core VII	UCCM306/ UCOM306/UBAM308	Marketing Management	5	4	4

III	III	Core VIII	UCCM308/UCOM308	Accounting for Non - Trading Concerns	4	4	4
		Online		NPTEL/ Spoken Tutorial	3	1	2
		Allied	UCSA305	Fundamentals of Block Chain Technology	3	3	3
		Allied Practical	UCSR309	Block Chain Technology using Solidity - Lab	3	2	2
		Allied	UMAA309	Business Statistics	5	4	4
	IV	Value Education			2	1	1
				TOTAL	**30**	**23**	**24**
IV	III	Core IX	UCCM405	e-Banking	5	5	5
		Core X	UCCM408/UCOM408	Corporate Accounting	5	4	4
		Core XI	UCOM409/UCCM409	Business law	5	4	4
		Core XII	UCCR410	Commerce Workshop	1	1	1
		Core XIV	UCOP501 /UCCP501 UCOM511/UCCM511	Project/Principles and Practice of Insurance	2	-	-
		Core XIII	UCOM412 / UCCM412	Security Analysis & Portfolio Management	4	4	4
		Allied	UCSA406	Digital Marketing Analytics	3	3	3
		Allied Practical	UCSR412	Web Design - Lab	3	2	2
	IV	Soft skills			2	1	1
	V	Extension Activity/ Physical Education/NCC			-	-	2
				TOTAL	**30**	**24**	**26**
V	III	**Core XV**	UCCM506/ UCOM506	Company Law	6	4	4
		Core XVI	UCCM509/ UCOM509	Income Tax Law & Practice I	6	5	5
		Core XVII	UCCM510/ UCOM510	Accounting Package	3	2	2
		Core XVII	UCOR501/ UCCR501	Accounting Package - Lab	3	3	3
		Allied	UCSA509	Business Analytics and Intelligence	3	3	3
		Allied	UCSR512	Business Analytics and Intelligence using SAS - Lab	3	2	2
		Core XVIII	UCOP501 /UCCP501 UCOM511/UCCM511	Project/Principles and Practice of Insurance	4	4	4
	IV	Value Education			2	1	1
				TOTAL	**30**	**24**	**24**
	III	Core XIX	UCCM612	E- Entrepreneurship	5	4	4
		Core XX	UCCM614/ UCOM614/ UBAM610	Financial Management	6	5	5
		Core XXI	UCCM615/ UCOM615	Service Marketing	5	5	5

VI		Core XXII	UCCR615/ UCOR615	Commerce Workshop	1	1	1
		Core XXIII	UCCM616/ UCOM616	Goods and Service Tax	6	5	5
		Viva Voce	UCCM607/U COM607	Comprehensive Viva	-	1	1
		Major Elective	UCCO605/UCOO605	1. E-Marketing	5	4	4
			UCCO606/UCOO606	2.Income Tax Law & Practice II			
			UCCO607/ UCOO607	3. Consumer Protection			
	IV	Soft skills			2	1	1
	V	Extension Activity/ Physical Education/NCC			-	-	2
				TOTAL	30	26	28
				GRAND TOTAL	180	140	150

NON MAJOR ELECTIVE (except B.Com., B.Com. CA & BBA & BCA)

Semester	Category	Course Code	Course Title	Contact/ Week	Credit	
					Min	Max
II	Non Major Elective – I	UCOE202/ **UCCE201**	Modern Accounting Package	4	2	2
II	Non Major Elective – I	**UCCE301/** UCOE204	Internet Banking	4	2	2

EXTRA CREDIT EARNING PROVISIONS

Semester	Category	Course Code	Course Title	Contact/ Week	Credit	
					Min	Max
II	Core	UCOI201/PCOI201	Summer Internship	-	-	1
IV	Core	UCOI401/ PCOI401	Summer Internship	-	-	1

UCCM405 e-BANKING

Semester   : IV   **Credit   : 5**
Category   : Core IX   **Hours/Week : 5**
Class & Major: II B. Com CA   **Total Hours : 65**

Objectives
To enable the students
- Understand the e-banking transactions.
- Familiarize with the latest development in the field of Banking and Financial System.
- Assess Strengths, Weaknesses, Opportunities and Threats of e-banking.

UNIT- I MODERN BANKING   13 Hrs
e-Banking – Meaning - Benefits – Internet Banking Services – Drawbacks – Mobile Banking – Features – Drawbacks – Call Centre Banking – Features – Challenges. Core Banking Solutions (CBS) – Benefits – Single Window Concepts – Features.

UNIT- II ELECTRONIC PAYMENT SYSTEM   13 Hrs
Electronic Payment System: Automatic Teller Machine -Types - Features – Benefits – Challenges - MICR Cheques – Benefits MICR equipment – precautions in handling MICR instrument – benefits and limitations.

UNIT- III E-CASH & ELECTORNIC CLEARING   14 Hrs
e-Cash: features – benefits of e-cash – limitations of electronic data interchange – Electronic Fund Transfer – RBI Guidelines - NEFT and RTGS – Benefits to Banker and Customer- SWIFT- CHIPS- CHAPS.

UNIT- IV BANK CARDS   12 Hrs
Credit Cards – Benefits – Constraints – Debit Card – Benefits – Smart Card – Features – Biometric Cards – Features – payment through bank network – electronic pass book – home banking.

UNIT- V CHALLENGES AND OPPORTUNITIES   13 Hrs
e-Banking challenges and opportunities – services offered through e-banking – strengths of e-banking – weaknesses of e-banking – opportunities and threats of e-banking.

Text Books
- M.K.Sharma & S.K.Gupta., *E-Banking and Development of Banks*, Deep and Deep Publications, New Delhi, 2015.
- Gurusamy S, *Banking Theory Law and Practice*, Vijai Nicole Publications, Chennai, 2015.

Reference Books
- Shekhar & Shekhar, *Banking and Financial System*, Margham Publications, Chennai, 2017.
- S.K. Baral, *Modern Bank Management*, Skylark publications, New Delhi, 2015
- Sundaram K. & Sundaram E.N., *Modern Banking*, Sultan Chand & Sons, New Delhi, 2017.

UCOE204 INTERNET BANKING

Semester: II   **Credit   : 2**
Category: Non Major Elective II   **Hours/Week : 4**
                                                    Total Hours : 52

Objectives
To enable the students
- Understand the various banking functions
- Compare the various merits of debit cards and credit cards in modern banking.
- Evaluate the e-Transaction facilities provided by various banks

UNIT – I   INTRODUCTION   9 Hrs
      Introduction – Definition - History of Banking-Kinds of Bank

UNIT – II   FUNCTIONS OF A BANKING   8 Hrs
      Functions – Structure - Importance of Banking

UNIT – III   E-BANKING   14 Hrs
      E-Banking-ATM Cards- Debit Cards- Personal Identification- Gold Card, Smart Card, Petro Cards, Kissan Card

UNIT – IV ELECTRONIC FUND TRANSFER   9 Hrs
      Electronic Fund Transfer- On line Enquiry & update facility- Electronic Clearing System

UNIT – V E-BANKING FACILTITIES   12 Hrs
      Facilities - Booking of Tickets - Account Statement–Mails – Mobile Banking - Home Banking, Tele Banking.

Text Books

- Nirmala Prasad & Chandradass ,*Banking and Financial System*, Himalaya Publications, Chennai, 2007
- Natarajan and Gordon, *Banking And Financial System*, Margham Publications, Chennai, 2002

Reference Books

- Balu.V.,*Banking& Financial System*, Sri VenkanteswaraPublication,Chennai, 2003
- Maheswari. *S.N., Banking Law Theory & Practice*, Kalayani Publications,Ludhiana, 2003
- Sundaram And Varshney, *Banking Theory, Law And Practice*,SultanChand Company, New Delhi, 2005
- Tandon., *Banking Law Theory & Practice*, S.Chand Publications, New Delhi, 2002

UG III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
IV	Core IX	UCCM405	e-Banking	Filling up of e-Banking Instruments & Challans	Album Making

UG EVALUATION COMPONENTS OF CIA – Non Major Elective

Semester	Category	Course Code	Course Title	Component III	Component IV
II	Non Major Elective I	UCOE204	Internet Banking	Assignment	Fill up the Banking Forms

PROGRAMME PROFILE : M.Com.

PSO1 : Identification and usage of practical tools of finance required in decision making.

PSO 2: Ability to assess global opportunities and challenges for business growth.

PSO 3: Capacity to analyzes ethical implications of business practices using advanced levels of ethical reasoning and legal implications

PSO4: Ability to investigate effectively the research tools, apply appropriate tools and draw conclusion.

Semester	Category	Course Code	Course Title	Contact/ Week	Credit	
					Min	Max
I	Core I	PCOM102	Business Environment & Policy	6	4	4
	Core II	PCOM104	Financial Policies and Decision Making	6	4	4
	Core III	PCOM105	Strategic Management	6	4	4
	Core IV	PCOM106	Research Methodology	5	4	4
	Core V	PCOM107	Corporate Governance & Business Ethics	6	4	4
	Library			1	-	-
			TOTAL	**30**	**20**	**20**
II	Core VI	PCOM202	Global Marketing	6	4	4
	Core VII	PCOM205	Managerial Economics	6	4	4
	Core VIII	PCOM207	Operation Research Methods	6	4	4
	Core IX	PCOM208	Advanced Accounting	6	4	4
	Non –Major Elective - II			5	4	4
	Library			1	-	-
	Service Learning	PCOX201	Service Learning – Banking Practices	-	1	1
			TOTAL	**30**	**21**	**21**
III	Core X	PCOM304	Service Marketing	6	5	5
	Core XI	PCOM305	Income Tax & International Taxation	6	5	5
	Core XII	PCOM306	Contemporary Business Legislations	6	5	5
	Core XIII	PCOM308	Computerized Accounting	2	2	2
	Core XIV	PCOR309	Computerized Accounting - Lab	3	2	2
	Core XV	PCID301	E- Commerce	5	5	5
	Project		Project	2		
			TOTAL	**30**	**24**	**24**
IV	Core XVI	PCOM405	Export Import Financing	6	4	4
	Core XVII	PCOM407	Logistics Management	6	4	4
	Core XVIII	PCOM408	Goods and Service Tax (GST)	5	5	5
	Core XIX	PCOM409	Advanced Cost & Management Accounting	6	5	5
	Core XX	PCOR409	Accounting Package in GST	2	1	1
	Project	PCOP401	Project	4	6	6
	Library			1		
			TOTAL	**30**	**25**	**25**
			GRAND TOTAL	**120**	**90**	**90**

PCOM304 SERVICE MARKETING

Semester : III   **Credit** : 5
Category : Core X   **Hours/Week** : 6
Class & Major: II M.Com   **Total Hours** :78

Objectives
To enable the students
- To create awareness about Management of Financial Services.
- To enable the students have an insight into Marketing of Services.
- To provide a comprehensive overview of the new developments in Service Marketing.
- To enhance the students knowledge with regard to CRM.

UNIT I INTRODUCTION   **16 Hrs**

         Service Marketing - Introduction to services – Meaning, need, services and technology, differences between goods and services.

UNIT II MARKETING OF SERVICES   **16 Hrs**

         Marketing of financial services – nature-types – marketing of insurance – mutual fund growth of financial services – services of marketing mix.

UNIT III PRICING OF SERVICES   **15 Hrs**

         Pricing of services – price perception, approaches, strategies

UNIT IV CONSUMER SERVICES   **16 Hrs**

         Consumer Behaviour – Customer perception – Customer expectation – services design – service product.

UNIT V CUSTOMER RELATIONSHIP MANAGEMENT   **15 Hrs**

         Customer Relationship Management – Identifying customer needs – Relationship Marketing – Customer – customer satisfaction.

Text Books
- Valaries A Zeithamal, Mary Jo Bitner, Services Marketing – Integrating Customer Needs, relationship Marketing, Customer satisfaction.2005
- Natarajan . L, Service Marketing, Chennai Margham Publishing House.2005
- Jha.S.M. service Marketing, Chennai, Himalaya Publishing House.2005

Reference Books
- David L Kurdz Kenneth C. Clow, Services Marketing, John wiley & sons.2006
- Christopher love lock , Services Marketing People, Technology, strategy, pearson Education Asia.2008
- Reddy P.N Appamaiah. H.R. S. Anil Kumar, Nirmala, Service Marketing, Himalaya Publishing House.2008
       Philip Kotler & Powl M. Bloom , Marketing Professional services, Prentice Hall.2007

PCOM305 INCOME TAX & INTERNATIONAL TAXATION

Semester : III	**Credit** : 5
Category : Core XI	**Hours/Week** : 6
Class & Major : II M.Com	**Total Hours** : 78

Objectives
To enable the students
- Understand the basic principles of the Income Tax Act
- Compute the taxable income of an Asses
- Apply income tax provisions for tax planning
- Determine arm's length price for domestic and international transactions

UNIT -I BASIC CONCEPTS   15 Hrs

Basic concepts – Definitions – Assesses – Assessment Year – Previous Year – Income – Residential Status – Scope of Total Income – Capital income and expenditure – Revenue income and expenditure.

UNIT- II COMPUTATION OF INCOME FROM SALARIES, HOUSE PROPERTY, BUSINESS OR PROFESSION   16 Hrs

Heads of income – Income from salaries – Income from House Property – Income from Business or Profession.

UNIT- III COMPUTATION OF CAPITAL GAINS AND OTHER SOURCES   16 Hrs

Income under the head Capital Gains – Income from other sources – Deductions from Total Income – Set off and carry forward of losses.

UNIT- IV COMPUTATION OF TOTAL INCOME   15 Hrs

Computation of total income – Individual – Firm – Companies – MAT – Tax Deducted at source – Advance tax – PAN – Rates of Tax. - Assessment Procedure – Income Tax Authorities – Penalties – e-filling.

UNIT –V INTERNATIONAL TAXATION AND TRANSFER PRICING   16 Hrs

Basic concepts: Residency issues, source of income, tax heavens, withholding tax, unilateral relief, double taxation avoidance agreements - Transfer Pricing- concepts, meaning of International transactions and specified domestic transactions - Computation of Arm's length Price – methods - Reference to Companies (Cost Records and Audit) Rules, 2014 in assessment of arm's length price.

Proportion: Problem: 60%, Theory: 40%
Text Books
- Vinod K. Singania, Direct Taxes, Taxmann Publication, New Delhi.2019
- Guar V.P. and Narang K.L., Income Tax Law & Practice, Kalyani Publishers, Chennai.2019

Reference Books
- Dinkar Pagare, Income Tax Law & Practice, Sultan Chand, New Delhi.2019
- Mehrotra H.C. and Goyal S.P., Income Tax Law & Practice, Sahitya Bhawan Publications, Agra 2019

PCOM306 CONTEMPORARY BUSINESS LEGISLATIONS

Semester : III
Category : Core XII
Class & Major : II M.Com

Credit : 5
Hours/Week : 6
Total Hours :78

Objectives
To enable the students
- Acquire knowledge and understanding of major commercial and economic laws.
- Sensitize the importance of Intellectual property rights in the global economy.

UNIT- I INTRODUCTION TO ECONOMIC LAWS   **16 Hrs**
Objectives – Economic development- Industrial policy – Industrial policy 1991 – Policy measures for Small, Tiny, Handloom and Village industries. –SME sector – initiatives by Government.

UNIT- II FOREIGN EXCHANGE MANAGEMENT ACT, 1999   **15 Hrs**
Objectives of FEMA – scope and coverage of FEMA – Key definitions – Management of foreign exchange - current and capital account transactions – Authorized person – Export of goods and services – Directorate of Enforcement – penal provisions – Adjudication and appeals.

UNIT - III COMPETITION ACT, 2002   **15 Hrs**
Objectives of the Act – scope and coverage – Key definitions under Competition Law – Prohibition of Agreements – Anti –competitive agreements – prohibition of abuse of dominant position – combination – regulation of combination – Competition Commission of India (CCI) – composition, powers and duties – Enquiries and proceedings of CCI.

UNIT -IV ENVIRONMENT AND CONSUMER PROTECTION   **16 Hrs**
Objects of the Environment (Protection) Act, 1986 – Key definitions used in the Act – General powers of the Central Government – prevention, control and abatement of Environmental pollution –Environmental Labs – penalty provisions - Environment Audit (ii) Consumer Protection Act, 1986 – objects of the Act – rights of consumers – Key definitions used in the Act – consumer protection councils – Redressal machinery under the Act – Nature and scope of remedies under the CPA – Right to Information Act 2005.

UNIT- V INTELLECTUAL PROPERTY RIGHTS   **16 Hrs**
Intellectual property – features – Need for IPR - Types of IPR – Designs, Trademarks – Copyright – Geographical indications – Trade secrets – Patents – Layout designs of integrated circuits

Text Books
- Kapoor, *G.K, Economic and other legislations*, Sultan Chand & Sons, New Delhi. 2015.
- Balachandran V, *Economic and other legislations*, Vijay Nicole Imprints, Chennai, 2015.
- Singh, Avtar, The Principles of Mercantile Law, Eastern Book Company, Lucknow, 2015

Reference Books
- Datey V.S., *Economic Laws*, Taxmann Publications, New Delhi, 2015.

- Kapoor N.D., *Mercantile Law*, Sultan Chand, New Delhi. 2015
- Sharma J. P and Sunaina Kanojia, *Business Laws*, Ane Books Pvt. Ltd, New Delhi, 2015

PCOM308 COMPUTERIZED ACCOUNTING - THEORY

Semester : III
Category : Core XIII
Class & Major : II M.Com

Credit : 2
Hours /Week : 2
Total Hours : 26

Objectives
To enable the students
- Understand the accounting concepts and conventions
- Familiarize in Inventory report, cost report & tax filling procedure.

UNIT- I INTRODUCTION TO COMPUTERIZED ACCOUNTING   **4 Hrs**
       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 Hrs**
       Creation of company– alteration– deletion– creation of groups– alteration– deletion– creation of ledger – creation of vouchers in tally– preparation of final accounts with adjustment

UNIT-III INVENTORY REPORT   **6 Hrs**
       Stock groups– stock categories– purchase order summary– altering a purchase order– deleting a purchase order– sales order summary– altering a sales order– deleting entries in sales order– invoice entry– invoice configuration

UNIT- IV COST REPORT   **5 Hrs**
       Bill of materials – Introduction – creation of manufacturing Journal – top portion of manufacturing Journal – Lower portion of Manufacturing Journals – Cost centers and cost categories– multiple currencies

UNIT-V TAX REPORTS   **6 Hrs**
       Tax Deduction at source in Tally and Payroll Report – Bank reconciliation – Interest calculations– budget and controls
Proportion: Problem: 80%, Theory: 20%

Text Books
- Nadhani A.K. and Nadhani K.K , *Implementing Tally*, BPB Publications, New Delhi, 2015
- Palanivel S, *Tally Accounting Software,* Margham Publications, Chennai, 2015.

Reference Books
- Vishnu Priya Singh , *Quick Learn Tally*, Computech Publication Pvt., New Delhi, 2015
- SrinivasaValaban, *Computer applications in Business*, Sultan Chand & Sons, 2015

PCOR309 – COMPUTERIZED ACCOUNTING – PRACTICAL

Semester : III
Category : Core Practical XIV
Class & Major : II M.Com.

Credit : 2
Hours/Week : 3
Total hours : 39

Objectives
To enable the students
- Understand the use and application of computers in accounting.
- Prepare financial statements and reports using accounting software.

Lab Exercises
1. Creation of company , Groups and Ledger
2. Creation of vouchers and Journals
3. Preparation of final accounts with adjustment
4. Entering data in stock groups and category
5. Creating a purchase order and sales order
6. Preparation of invoice entry and invoice configuration
7. Creation of bill-wise details
8. Creation of cost centers and cost categories
9. Using multiple currencies
10. Preparation of Bank Reconciliation Statement
11. Calculation of interest
12. Preparation of budget and control system
13. Payroll report

Evaluation Pattern

Internal Assessment	
Component	**Maximum Marks**
CIA I	10
CIA II	10
Daily Practical Assessment(DPA)	30
Viva Voce	10
Total	**60**
External Assessment	
Component	**Maximum Marks**
Record	20
Viva Voce	10
Result	10
Total	**40**

PCID301 E- COMMERCE

Semester : III   **Credit** : 5
Category : Core XV   **Hours/Week** : 5
Class & Major: II M.Com   **Total Hours** : 65

Objectives
To enable the students
- Understand the theories and concepts underlying e-Commerce
- Gain knowledge about e -commerce and its various components.

UNIT- I INTRODUCTION   14 Hrs
Introduction to e – Commerce – Meaning – Working of e – Commerce – Electronic Business – Categories of e – Commerce Application – global Trading Environment and Adoption of e – Commerce – Product suitability – Comparison between Traditional and Electronic Commerce – Advantages and Disadvantages of e– Commerce.

UNIT - II BUSINESS MODELS   14 Hrs
Business Models of e – Commerce – Major challenges of B2C e Commerce – Meaning of B2B Exchanges – Development of B2B e – Commerce – Types of B2B Markets – Difference between B2C and B2B Commerce.

UNIT- III WEB MARKETING STRATEGIES   13 Hrs
Different types of Marketing strategies (product Based and Customer Based) – Communicating with different Market segments–Advertising on the web.

UNIT - IV ELECTRONIC DATA INTERCHANGE   12 Hrs
Introduction on EDI, EDI on internet Supply Chain Management– its software– online payment– payment cards– advantages and disadvantages of Payment cards.

UNIT - V INTERNET SECURITY   12 Hrs
Computer Security its Types–Threats– Hackers–Classification of Computer security (Security, Integrity, Necessity) – Security Policy and Integrated Security.

Text Books
- SrinivasaVallabhan. S.V , *E-Commerce* ,Vijay Nicole Imprints Private Ltd.2016
- Gary P. Schnider , *Electronics Commerce*, fourth annual edition.2016

Reference Books
- Marily n Greenstein and ToddM Feinman, *Electronic Commerce* ,2016
- Kamlesh K. Bajaj and Debjani nag , *E-Commerce* ,2016

PCOM405 EXPORT IMPORT FINANCING

Semester: IV   **Credit** : 4
Category : Core XVI   **Hours/Week** : 6
Class & Major : II M.Com.   **Total hours** : 78

Objectives
To enable the students
- To make the students know and apply the documentation formalities related to export -import.
- To acquaint students with the procedures of export – import transaction
- To enable students acquire knowledge in international trade and its practice in our country
- To enable the students to learn the significance of foreign exchange and computation of exchange rate

UNIT-I: INTRODUCTION TO EXPORT DOCUMENTS **15 Hrs**
Documentation frame work – Export import controls and policy – types and characteristics of documents – Export contract- Processing of an export order – Export Financing methods and terms of Payment

UNIT-II: NEGOTIATIONS OF EXPORT BILL **16 Hrs**
Negotiations of export bill – Methods of payment in international trade – Documentary credit and collection — Pre-post shipment export credits – Bank guarantees – Foreign exchange regulations and procedures

UNIT-III: RISKS IN EXPORT BUSINESS **16 Hrs**
Credit and Exchange Risks – Marine insurance – need, types and procedure – ECGC schemes for risk coverage, and procedure for filing claims – Quality Control and pre-shipment Inspection Schemes – Process and procedures – Excise and customs clearance – regulations, procedures and documentation.

UNIT-IV: EXPORT&IMPORT BUSINESS **16 Hrs**
Planning and Methods of Procurement for Exports- Procedure for procurement through Imports- Import financing- Customs clearance of import cargo – managing risks involved in importing –transit risk, credit risk and exchange risk.

UNIT-V: EXPORT INCENTIVES **15 Hrs**
Export Incentives - Overview of export incentives – duty drawbacks, duty exemption schemes, tax incentives – procedures and documentation
Text Books
- Jeevanandham.C, Foreign Exchange, Sulthan Chand, New Delhi,2005
- Mahajan, MI, Export – Do it yourself, Snow white Publications, Mumbai,2004

Reference Books
- Parasuram, *Export, What, Where and How?* Anupam Publications, New Delhi , 2003
- *Handbook of Export Import Procedure*, Ministry of Commerce, Government of India Vols.I &II,NewDelhi,2002
- *Export – Import Policy, Ministry of Commerce, Government of India Bulletin,*2003

PCOM407 LOGISTICS MANAGEMENT

Semester   : IV   **Credit**   : 4
Category   : Core XVII   **Hours/Week** : 6
Class & Major: II M.Com   **Total Hours** : 78

Objectives
To enable the students

- To create Knowledge of Logistics.
- To impart knowledge of Supply Chain Management.
- To make the students to understand the comprehensive nature of logistics management.
- To impart knowledge with regard to the legal provision applicable under Motor Vehicles Act.

UNIT INTRODUCTION TO LOGISTICS   **15 Hrs**

Logistics: Definition – Scope – Functions – Objectives of Logistics Management – Customer service and Logistics.

UNIT II SUPPLY CHAIN MANAGEMENT   **15 Hrs**

Supply Chain: Supply Chain - Components – Role of Logistics in supply chain – Warehousing – Functions – Types – Warehouse Layout – Material handling and Logistics – inventory management.

UNIT III TRANSPORTATION   **16 Hrs**

Transportation – Infrastructure – Freight Management – Transportation Network – Route Planning – Containerization

UNIT IV LOGISTICS OUTSOURCING   **16 Hrs**

Logistics Packaging – Logistics Information Needs – Logistics Design for Distribution channels – Logistics outsourcing.

UNIT V GOVERNMENT POLICIES AND REGULATIONS   **16 Hrs**

Government policies and regulations – Motor Vehicles Act, Carriage by Air, Sea Multimodal Transportation etc. , Documentation – Air way Bill , Railway Receipt, Lorry Receipt, Bill of Lading etc.,

Test Books

- Satis C.Ailawadi, Rakesh Singh , Logistics Management, Prentice Hall of India. 2006
- Vinod V.Spole, Logistics Management, Pearson Education.2006

Reference Books

- Ronal H.Ballou, Business Logistics/Supply Chain Management, , Pearson Education Prentice Hall, New Delhi.2007
- Sunil Choper & Peter Meindi, Supply Chain Management / Strategy planning and operation, Pearson Education Asia, New Delhi.2007

PCOM408 GOODS AND SERVICES TAX (GST)

Semester	**: IV**	**Credit**	**: 5**
Category	**: Core XVIII**	**Hours/Week**	**: 5**
Class & Major: II M.Com.		**Total Hours**	**: 65**

Objectives
To enable the students

- Understand the concept of GST Policy and Procedure
- Apply Principles for practicing GST in the firm.

UNIT - I INTRODUCTION   14 Hrs

Constitutional framework of Indirect Taxes before GST (Taxation Powers of Union & State Government); Concept of VAT: Meaning, Variants and Methods; Major Defects in the structure of Indirect Taxes prior to GST; Rationale for GST; Structure of GST (SGST, CGST, UTGST & IGST); GST Council, GST Network, State Compensation Mechanism, Registration.

UNIT - II LEVY AND COLLECTION OF GST   13 Hrs

Taxable event- "Supply" of Goods and Services; Place of Supply: Within state, Interstate, Import and Export; Time of supply; Valuation for GST- Valuation rules, taxability of reimbursement of expenses; Exemption from GST: Small supplies and Composition Scheme; Classification of Goods and Services: Composite and Mixed Supplies.

UNIT - III INPUT TAX CREDIT   14 Hrs

Eligible and Ineligible Input Tax Credit; Apportionments of Credit and Blocked Credits; Tax Credit in respect of Capital Goods; Recovery of Excess Tax Credit; Availability of Tax Credit in special circumstances; Transfer of Input Credit (Input Service Distribution); Payment of Taxes; Refund; Doctrine of unjust enrichment; TDS, TCS. Reverse Charge Mechanism, Job work.

UNIT- IV PROCEDURES   12 Hrs

Tax Invoice, Credit and Debit Notes, Returns, Audit in GST, Assessment: Self-Assessment, Summary and Scrutiny.

UNIT- V SPECIAL PROVISIONS   12 Hrs

Taxability of E-Commerce, Anti-Profiteering, Avoidance of dual control, E-way bills, zero-rated supply, Offences and Penalties, Appeals

Text Books

- Mehrotra HC and Agarval Vp, *Goods and Services Tax GST*,4th edition,Sahitya bhawan Publication,Agara 2019.
- Viond K Singhania,*Students Guide to GST & customs Law*,3rd Edition,Taxman Publications,New Delhi,2019

Reference Books
- Halakandhi, S., *G.S.T (Vastu and Sevakar) (Hindi) Vol-1,* 2017
- Gupta, S.S., *Vastu and Sevakar,* Taxmann Publications, 2017

PCOM409 ADVANCED COST & MANAGEMENT ACCOUNTING

Semester : IV	**Credit : 5**
Category : Core XIX	**Hours/Week : 6**
Class & Major : II M.Com	**Total Hours : 78**

Objectives
To enable the students
- Understand the cost accounting techniques for evaluation, analysis and application in managerial decision making.
- Compare and contrast marginal costing in respect of profit reporting.
- Prepare and interpret budgets.

UNIT- I INTRODUCTION TO COST & MANAGEMENT ACCOUNTING   15 Hrs

Concepts of cost and Management Accounting, Relevant and irrelevant costs for decision making– Cost sheet – Methods of costing Unit costing.

UNIT- II COSTING METHODS   16 Hrs

Process Costing – Joint Products- Treatment of Equivalent Units – Inter-Process Profit. Overheads – Collection, classification, allocation, apportionment- absorption – Over and under absorption- machine hour rate.

UNIT -III BUDGETARY CONTROL & COST REDUCTION & COST CONTROL

16 Hrs

Budgetary Control – Functional Budgets – Production, Sales, Cash, Flexible Budgets– Master Budget - ZBB– Cost reduction and cost control – Various Techniques of cost reduction - work study, Time study & Motion study.

UNIT- IV MARGINAL COSTING   15 Hrs

Marginal Costing – Break-Even Analysis – Cost– Volume – Profit Analysis – Break-Even Charts – Application of Marginal Costing – Differential costing– Direct Costing– Standard Costing.

UNIT-V INTRODUCTION TO ADVANCED MANAGEMENT ACCOUNTING   16 Hrs

Introduction – Meaning of ratios – Advantages of ratio – Classification of ratio – Profitability ratio – turnover ratio - Solvency Ratio – re arrangement of Financial statements – concept of fund flow statement – changes in working capital – applications and sources of funds – Meaning and importance of cash flow statements – Difference between fund flow and cash flow statement.

(Proportion: 40% Theory and 60% Problems)

Text Books
- Jain S.P. and Narang K.L., *Advanced Cost Accounting,* Kalyani Publishers, Chennai, 2015.
- Reddy T.S. and Reddy Y.H., *Cost & Management Accounting,* Margam Publications, Chennai, 2015.

Reference Books
- Horngren C.T, *Cost Accounting,* Pearson Education, New Delhi, 2015.
- Saxena V. K. and Vashist C. D., *Cost Management,* Sultan Chand & Sons, New Delhi, 2015.

PCOR409 ACCOUNTING PACKAGE IN GST

Semester : IV	**Credit** : 1
Category : Core XX	**Hours/Week** : 2
Class & Major: II M.Com	**Total Hours** : 26

Objectives
To enable the students
- Familiarize with the existing GST Policy and Procedure
- Compute GST and File return

Lab Exercises
1. Creation of company, Create Company and Activate GST in Company Level
2. Creating Master and Set GST – Rates .
3. Creating Tax Ledgers -Transferring.
4. Creating GST Taxes & Invoices
5. Creating GST Number for Suppliers
6. Creating GST Number for Customers
7. Creating Intra -State Purchase Entry in GST (SGST + CGST)
8. Creating Inter-State Purchase Entry in GST (IGST)
9. Creating Intra- State Sales Entry in GST (SGST + CGST)
10. Creating Inter-State Sales Entry in GST (IGST)
11. Applications for Registration for GST
12. GST - Return Filing
13. GST Computation Report

Text Books
- Mehrotra HC and Agarval Vp, *Goods and Services Tax GST*,4th edition,Sahitya bhawan Publication,Agara 2019.
- Dr.Rajescheda , *Learn tally ERP-9 with GST,* Ahc's students Edition.2019

Evaluation Pattern for Project

Internal Assessment	
Component	**Maximum Marks**
CIA I	10
CIA II	10
Daily Practical Assessment(DPA)	30
Viva Voce	10
Total	**60**
External Assessment	
Component	**Maximum Marks**
Record	20
Viva Voce	10
Result	10
Total	**40**

III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
III	Core X	PCOM304	Service Marketing	Assignment	Seminar
	Core XI	PCOM305	Income Tax and International Taxation	Fill up IT Forms	Seminar
	Core XII	PCOM306	Contemporary Business Legislations	Assignment	Open Book Quiz
	Core XIII	PCOM308	Computerized Accounting	Assignment	Problem solving
	Core XIV	PCOR309	Computerized Accounting - Practical	Assignment	Problem solving
	Core XV	PCID301	E- Commerce	Assignment	Seminar
IV	Core XVI	PCOM405	Export Import Financing	Case study	Seminar
	Core XVII	PCOM407	Logistics Management	Open Book Quiz	Seminar
	Core XVIII	PCOM408	Goods and Service Tax	Hands on Training (Collecting Circulars & Notifications form the Concern Tax Department)	Recent changes in GST
	Core XIX	PCOM409	Advanced cost and management Accounting	Assignment	Problem solving
	Core XX	PCOR409	Accounting Package in GST	Assignment	Problem solving

DEPARTMENT OF BIOCHEMISTRY

PREAMBLE

UG : Programme profile and syllabi of courses offered in semester III and IV along with its evaluation components (With effect from 2018 - 2021 batch onwards) and

PG : Programme profile and syllabi of courses offered in semester III and IV along with its evaluation components (With effect from 2018 - 2020 batch onwards) are presented in this booklet

PROGRAMME PROFILE B.Sc. (Biochemistry)

PSO1 : Understand the applications of Biochemistry in various fields such as Clinical Biochemistry, Genetic Engineering, and Molecular biology & Biotechnology.

PSO2 : Acquire practical skills for a future career in the field of Biological Science.

PSO3 : Ability to analyze the various biological components through analytical tools in living cells.

PSO4 : Development of practical laboratory skills and strong speculative foundation in the across discipline of Chemistry, Microbiology & Bioinformatics.

Semester	Part	Category	Course code	Course Title	Hours per week	Credit Min	Credit Max
I	I	Language	UTAL105/ UTAL106/ UHIL101/ UFRL101	Basic Tamil I/ Advanced Tamil I/ Hindi I / French I	4	2	3
	II	English I	UENL107/ UENL108	General English I/ Advanced English I	5	3	4
	III	Core I	UBCM106	Fundamentals of Biochemistry	2	1	1
		Core II	UBCM105/ UBCM201	Cell Biology	6	5	5
		Core practical I	UBCR101	Cell Biology Practical	3	3	3
		Allied I	UCHA102	Allied Chemistry - I	5	4	4
		Allied I practical	UCHR103/ UCHR403	Volumetric and Organic Analysis	3	2	2
	IV	Value education			2	1	1
				TOTAL	**30**	**21**	**23**
II	I	Language	UTAL205/ UTAL206/ UHIL201/ UFRL201	Basic Tamil II/ Advanced Tamil II/ Hindi II/ French II	4	2	3
	II	English II	UENL207/ UENL208	General English II/ Advanced English II	5	3	4
	III	Core III	UBCM202	Biomolecules	5	5	5
		Core practical II	UBCR201	Qualitative analysis of	3	3	3

				Biomolecules			
		Allied II	UMBA201	Microbiology	4	4	4
		Allied II practical	UMBR201	Microbiology Practical	3	2	2
	IV	Non Major elective			4	2	2
		Soft skill			2	1	1
	V	Extension activity/ Physical Education/ NCC			-	1	2
				TOTAL	**30**	**23**	**26**
III	I	Language	UTAL305/ UTAL306/ UHIL301/ UFRL301	Basic Tamil III/ Advanced Tamil III/ Hindi III/ French III	4	2	3
	II	English III	UENL307/ UENL308	General English III/ Advanced English III	5	3	4
	III	Core IV	UBCM304	Biochemical Techniques	6	6	6
		Core practical III	UBCR301	Biochemical Techniques practical I	5	5	5
		Allied III	UMAA305	Biostatistics	5	4	4
	IV	Online courses		NPTEL/Spoken Tutorial	3	1	2
		Value Education			2	1	1
				TOTAL	**30**	**22**	**25**
IV	I	Language	UTAL405/ UTAL406/ UHIL401/ UFRL401	Basic Tamil IV/ Advanced Tamil IV/ Hindi IV/ French IV	4	2	3
	II	English IV	UENL407/ UENL408	General English IV/ Advanced English IV	5	3	4
	III	Core V	UBCM403	Immunology	6	6	6
		Core VI	UIDM401	Pharmaceutical chemistry	6	6	6
		Core practical IV	UBCR401	Biochemical Techniques Practical II	5	5	5
		Core X	UBCP501	Project	2	-	-
	IV	Soft skill			2	1	1
	V	Extension activity/ Physical Education/NCC			-	-	2
				TOTAL	**30**	**23**	**27**
V	III	Core VII	UBCM501	Enzymes & Intermediary metabolism	6	6	6
		Core VIII	UBCM502	Human Physiology	6	6	6
		Core IX	UBCM503	Basics of Bioinformatics	6	6	6
		Core practical V	UBCR501	Enzymology practical	6	3	3

		Core X	UBCP501	Project	4	4	4
		Value education			2	1	1
				TOTAL	**30**	**26**	**26**
VI	III	Core X1	UBCM601	Introduction to Biotechnology	5	4	4
		Core XII	UBCM602	Clinical Biochemistry	5	5	5
		Core XIII	UBCM603	Molecular Biology	5	5	5
		Core XIV	UBCM604	Comprehensive Viva voce	-	1	1
		Core practical VI	UBCR601	Clinical Biochemistry practical	5	3	3
		Core practical VII	UBCR602	Hematology & Urine analysis	3	2	2
		Major Elective	UBCO604	Stem cell Biology	5	4	4
			UBCO605	Molecular Endocrinology			
			UBCO606	Pathobiology of Human Diseases and Disorders			
			UIDM601	Nanotechnology in medicine			
	IV	Soft skill			2	1	1
	V	Extension activity/ Physical Education/NCC			-	-	2
				TOTAL	**30**	**25**	**27**
				GRAND TOTAL	**180**	**140**	**154**

PROGRAMME OFFERED TO OTHER DEPARTMENTS
NON MAJOR ELECTIVES

Semester	Part	Category	Course code	Course Title	Contact Hour/ Week	Credit	
						Min	Max
II	IV	Non Major Elective	UBCE202	Biomedical Techniques	4	2	2
			UBCE401/UBCE203	Nutrition & Health			
			UBCE502/UBCE204	Women's Health, Nutrition & Disorders			
			UBCE304/UBCE208	Mushroom Cultivation			
			UBCE209	Clinical Diagnostics			
			UBCE210	Reproductive Biology			

EXTRA CREDIT EARNING PROVISION (Only for Interested Students)

Semester	Category	Course Code	Course Title	Credit
II	Internship	UBCI201	Summer Internship	1
IV	Internship	UBCI401	Summer Internship	1

UBCM304 BIOCHEMICAL TECHNIQUES

Semester   : III   **Credit   : 6**
Category   : Core IV   **Hours/ Week : 6**
Class & Major : II B.Sc. Biochemistry   **Total Hours : 78**

Objectives
To enable the students
- Gain knowledge on various laboratory techniques.
- Apply the techniques in various biochemical analysis.

UNIT-I ELECTROCHEMICAL PARAMETERS   15 Hrs
Definition of pOH, pH, Acid-base balance, Hendersons Hasselbach equation. Determination of pH- Hydrogen electrode, Oxygen electrode, Glass electrode, Ion sensing electrode, Buffers in body fluids.

UNIT-II CENTRIFUGATION TECHNIQUES   15 Hrs
Basic principle of Sedimentation - centrifugal force, sedimentation rate, Svedberg unit. Types of Centrifuge, types of rotors – fixed angle, vertical, swinging bucket, zonal, elutriator rotors. Preparative ultracentrifuge- Differential centrifugation, Density gradient, Rate zonal, Isopycnic centrifugation. Analytical ultracentrifugation - determination of molecular weight by sedimentation.

UNIT-III CHROMATOGRAPHIC TECHNIQUES   17 Hrs
General principles of chromatography – partition and adsorption chromatography. Paper chromatography – principle, sample application, development – ascending, descending and radial, detection of amino acids and sugars. Thin layer chromatography – principle, instrumentation and applications (separation of alkaloids). Column chromatography – principle, factors affecting resolution. Basic principles and applications of Affinity chromatography and HPLC.

UNIT-IV ELECTROPHORETIC TECHNIQUES   15 Hrs
Electrophoresis- Principle, Instrumentation and Applications of Paper, Agarose, SDS-PAGE, Cellulose acetate, Immunoelectrophoresis, isoelectric focusing. Blotting techniques – Southern, Northern, Western.

UNIT-V PHOTOMETRY AND DETECTION METHODS   16 Hrs
Beer-Lambert's law, UV-Visible Spectrophotometry- principle, instrumentation and applications. Flame photometry- Flame emission Spectrophotometry and Atomic absorption Spectrophotometry. ELISA technique and Chemiluminescence immunoassay (CLIA) technique.

Text books
- Upadhyay-Upadhyay Nath., *Biophysical chemistry,* 3rd revised edition, Himalaya publications, 2009.
- Keith Wilson and John Walker, *Principle and techniques of Practical biochemistry,* 7th edition Cambridge press, 2010.

- Keith Wilson and Goulding, K.H. *A biologists guide to principles and techniques of practical biochemistry*, 3rd edition, ELBS, London, 1993.

Reference books

- Hezl & Peck, *Analytical Biochemistry*, 3rd edition, Prentice Hall, 2016.
- Sadasivam S and A.Manickam, *Biochemical methods*, 2nd edition, New Age International (P) Ltd publisher, 2008.
- Subramanian M.A, *Biophysics: Principle and techniques*, 1st edition, MJP publishers, 2006.

e-Resources

- https://www.pdfdrive.com/analytical-biochemistry-3rd-ed-david-holme-hazel-peckpdf-e20263959.html
- http://ecoursesonline.iasri.res.in/mod/page/view.php?id=42656
- https://www.ebooks.com/en-us/95946455/wilson-and-walker-s-principles-and-techniques-of-biochemistry-and-molecular-biology/hofmann-andreas-clokie-samuel/

UBCR301 BIOCHEMICAL TECHNIQUES PRACTICAL I

Semester : III   **Credit : 5**
Category : Core Practical III   **Hours/ Week : 5**
Class & Major : II B.Sc. Biochemistry   **Total Hours : 65**

Objectives
To enable the students
- Understand the principles involved in the study area.
- Attain technical competence in the specific discipline.

VOLUMATRIC ANALYSIS
1. Estimation of iron, oxalates, nitrite and chromates using potassium permenganate.
2. Estimation of calcium from milk and urine.
3. Estimation of copper and potassium dichromate by Iodometry method.

CHROMATOGRAPHY TECHNIQUES
1. Separation and detection of aminoacids and simple sugars by Paper chromatography.
2. Separation of polar and non polar aminoacids by Thin layer chromatography.

Text Books

- David T Plummer, *An introduction to practical biochemistry*, 3rd edition, Tata Mac Graw hill Publication, 2008.
- Keith Wilson, John Walker, *Principles and Techniques of Practical Biochemistry and Molecular Biology,* 7th edition, Cambridge University Press, 2010.

Reference Books

- Jayaraman.J. *Laboratory manual in Biochemistry*, 2nd edition, New Age International Limited publication, 2011.

- Sadasivam.S and Manickam.A *Biochemical Methods*, 3rd edition, New Age International publication, 2008.
- K. Wilson, K. H. Goulding Hodder & Stoughton *Principles and Techniques of Practical Biochemistry*, 3rd edition, 1993.

e-Resources

- http://elte.prompt.hu/sites/default/files/tananyagok/IntroductionToPracticalBiochemistry/book.pdf
- https://www.pinterest.com/pin/746049494494648558/
- https://www.academia.edu/28271882/An_Easy_Guide_for_Practical_Biochemistry

UBCM403 IMMUNOLOGY

Semester : IV		**Credit** : 6
Category : Core V		**Hours/ Week** : 6
Class & Major : II B.Sc. Biochemistry		**Total Hours** : 78

Objectives

To enable the students

- Understand the immunological basis of immune response**.**
- Comprehend about the host defense against infection and over reaction of immune system.

UNIT-I INTRODUCTION   **15 Hrs**

Antigen: Property, specificity, cross reactivity, antigenicity, immunogenicity, antigen determinants, haptens, adjuvants, .Antibody: Property, classes & subclasses of Ig: structure specificity & distribution.

UNIT-II LYMPOID ORGANS   **16 Hrs**

Primary & Secondary lymphoid organs- Bone marrow, thymus, bursa of fabricus, lymphnode, spleen &MALT. Cells of the lymphoreticular system.

UNIT-III IMMUNITY   **16 Hrs**

Types of immunity- Innate & acquired immunity – Active & Passive Immunity, Immune response. Humoral and cell mediated immunity, Immunization schedule, immunity to infection.

UNIT-IV IMMUNE RESPONSE   **16 Hrs**

Hypersensitivity reactions- types and mechanism. Autoimmunity.Transplantation-types-allograft rejection mechanism and prevention of graft rejection- immune-suppressive drugs. HLA-immune response genes- HLA molecules.

UNIT-V IMMUNO TECHNIQUES   **15 Hrs**

Immunoelectrophoresis, Immunoprecipitation, RIA, ELISA ,Immunoblotting, avidin-biotin mediated immunoassay, immunohistochemistry, monoclonal antibodies & hybridoma techniques.

Text books

- N.Arumugam, *Immunology*, Saras publication, 2007.
- Ananthanarayanan .K &jayaramapanikar, *Text book of microbiology & Immunology*, 8th edition, 2005

Reference books

- RoittIvanna, Jonathan Brastoff, David Nale, *Immunology*, 3rd edition, Blackwel publishing Lit.1993.
- Janis Kuby, *Immunology*, 4th edition, W.H.Freeman and company, 2000
- Peter Delves, Seamusmartin, Dennis burton, Ivanna Rotti, *Essentials of immunology*, 13th edition, wiley Blackwell publication, 2006.

e-Resources

- http://sacema.org/uploads/Essential-Clinical-Immunology.pdf
- http://www.louisbolk.org/downloads/1822.pdf
- https://www.roswellpark.org/sites/default/files/thanavala_9-4 14_innate_immunity_part_1.pdf
- http://www.dphu.org/uploads/attachements/books/books_5451_0.pdf
- http://www.helmberg.at/immunology.pdf

UIDM401 PHARMACEUTICAL CHEMISTRY

Semester : IV	**Credit** : 6
Category : Core VI	**Hours/ Week** : 6
Class & Major : II B.Sc. Biochemistry	**Total Hours** : 78

Objectives
To enable the students

- Understand the ADMET properties of drugs
- Analyze the functional groups responsible for the action of drugs
- Acquire knowledge about drug metabolic pathways, adverse effect and therapeutic value of drugs

UNIT-I INTRODUCTON TO PHARMACEUTICAL CHEMISTRY   15 Hrs

Drugs – definition, source and nature, classification and nomenclature, ADMET - routes of drug administration, absorption and distribution of drugs, factors influencing drug absorption and elimination of drugs. determination of ED50 and LD50 values.

UNIT-II DRUGS AND RECEPTORS   16 Hrs

Drug- Receptor interactions: Receptor- definition, Types of receptor - G-protein coupled receptor, Receptors with intrinsic ion channel and Enzymatic receptors .Forces in drug, receptor theories. Agonist and antagonist of drugs.

UNIT-III DRUG METABOLISM   15 Hrs

Phase I reactions - role of Cytochrome P450.Microsomal and Non microsomal reactions. Phase II reactions-Conjugation reactions. Physiological importance of xenobiotic metabolism.

UNIT-IV DRUGS ACTING ON VARIOUS SYSTEMS   **16 Hrs**

     Drugs acting on various systems: Respiratory system – cough, bronchial – asthma, pulmonary tuberculosis. CNS-sedative- hypnotic, GI tract drugs for peptic ulcer, diarrhea and constipation. Adverse drug reactions and drug induced side effects, biological effects of drug abuse and drug dependence, drug tolerance and intolerance.

UNIT-V DRUG TESTING   **16 Hrs**

     Biological testing and bioassays – Invitro and invivo. In-silico using SWISS-PDB. New Biological Targets for Drug Development. Novel Drug Screening Strategies.

Text Books
- K. D. Tripathi, *Essentials of Medical Pharamacology*, 7th edition, Jaypee Publishers, 2010.
- Jayashree Ghosh. *A Textbook of Pharmaceutical Chemistry*, 3rd edition, Jayashree Ghosh, S.Chand & Company Ltd., New Delhi, 2010.
- Donald Cairns ,*Essentials of Pharmaceutical Chemistry*, 4th edition, Pharmaceutical Press, 2012

Reference Books
- Satoskar R.S and Bhandar S.D, *Pharmacology and Pharmacotherapeutics*, 14th edition, 1995.
- Gary Waish, *Biopharmaceuticals: Biochemistry & biotechnology*, 1st edition, John wiley Sons, New York, 1998.
- Bertram Katzung, *Basic and Clinical Pharmacology,* 12th edition, Lange Publishers, 2012.

e- Resources
- www.eso.sankaranethralaya.org/pdf/course_content/pharmacology.pdf
- https://www.omicsonline.org/conference-proceedings/2161-0444-C1-031-010.pdf
- www.meddean.luc.edu/lumen/meded/therapy/homepage/IntroCourse2015_2016.pdf

UBCR401 BIOCHEMICAL TECHNIQUES PRACTICAL II

Semester : IV	**Credit**	: 5
Category : Core Practical IV	**Hours/ Week**	: 5
Class & Major : II B.Sc Biochemistry	**Total Hours**	: 65

Objectives
To enable the students
- Apply the principles of volumetric and electrophoretic techniques in biochemical analysis.
- Develop technical competence.

VOLUMETRIC ANALYSIS
1. Estimation of amino acids by Sorenson formal titration method.
2. Estimation of ascorbic acid by Titrimetric method
3. Determination of Saponification value, Iodine value and Acid number using edible oil.
4. Estimation of reducing sugar by Benedict's method.
5. Estimation of chloride by Mohr's method.

ELECTROPHORETIC TECHNIQUE (DEMONSTRATION)
1. Separation of proteins by SDS PAGE.

Text Book
- David T.Plummer, An *introduction to practical biochemistry*, 3rd edition, Mc Graw Hill, London, 1987.

Reference Books

- J.Jayaraman, *Laboratory mamual in biochemistry*, 2nd edition, New Age international limitated publication.
- Sadasivam.S and a.manickam, *Biochemical methods,* 3rd edition, New Age International Limited publication, 2008.

e-Resources
- http://elte.prompt.hu/sites/default/files/tananyagok/IntroductionToPracticalBiochemistry/book.pdf
- https://www.pinterest.com/pin/746049494494648558/
- https://www.academia.edu/28271882/An_Easy_Guide_for_Practical_Biochemistry

UBCP501 PROJECT

Semester : IV		**Credit** : 1
Category : Core XV		**Hours/ Week** : 2
Class & Major : III B.Sc Biochemistry		**Total Hours** : 26

Objectives
To enable the students
- Acquire knowledge in life science research.
- Develop problem solving and decision making skills.

Guidelines

- Mini project is offered for final year B.Sc Biochemistry students in semester VI.

- Project can be done according to area of interest outside the class hours.

- Project should done either as individual or as group with maximum of three /four students.

- Project can be field study, survey, experimentation, extraction of components from medicinal plants and waste water treatment.

- Evaluation scheme for the project will be Internal 60 and External 40.

Assessment

S.No	Internal			External	
	Component	**Marks**	**Component**	**Marks**	
1	Review of the Literature	10	Dissertation	10	
2	Area of Research	10	Presentation	20	
3	Methodology	10	Viva - voce	10	
4	Accuracy of result	10		-	
5	Result and Discussion	10		-	
6	Report preparation	10		-	
	Total	**60**		**40**	
	Maximum marks		**100**		

III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
III	Core IV	UBCM304	Biochemical Techniques	Model preparation	Seminar
	Core Practical III	UBCR301	Biochemical Techniques Practical I	DPA	Viva Voce
IV	Core V	UBCM403	Immunology	Poster presentation	Seminar
	Core VII	UIDM401	Pharmaceutical Chemistry	Assignment	Seminar
	Core Practical IV	UBCR401	Biochemical Techniques Practical II	DPA	Viva Voce

PROGRAMME PROFILE M.Sc. (Bio Chemistry)

PSO1: Acquire the scientific basis of life process and orientation towards the application of knowledge in solving clinical problem.

PSO2: Enhance student's skills & employability through academic, research and internship opportunities (PG service learning).

PSO3: Exposure to basic research through the provision of PG research project.

PSO4: Development of analytical and cognitive skills in Biochemistry that allow independent exploration of biological science through research methods.

PSO5: Explore the impact of life science in society.

PSO6: Analyse & interpret the investigation data in life science.

Semester	Category	Course code	Course title	Contact Hours / Week	Credit	
					Min	Max
I	Core I	PBCM101	Bimolecular Chemistry	6	4	4
	Core II	PBCM102	Cell Biology	6	4	4
	Core III	PBCM203/105	Microbiology	6	5	5
	Core IV	PBCM204/106	Molecular Biology	6	4	4
	Core Practical I	PBCR201/102	Microbiology and Molecular Biology Practical	6	5	5
			TOTAL	**30**	**22**	**22**
II	Core V	PBCM201	Metabolism & Regulation	5	4	4
	Core VI	PBCM202	Human Physiology	5	4	4
	Core VII	PBCM103/205	Analytical Biochemistry	5	4	4
	Core VIII	PBCM104/206	Endocrinology	4	4	4
	Core Practical II	PBCR101/202	Analytical Biochemistry Practical	6	5	5
	Core IX	PBCX201	Mushroom cultivation (Service Learning)	-	1	1
	NME			5	4	4
			TOTAL	**30**	**26**	**26**
III	Core X	PBCM301	Enzymology and Enzyme Technology	6	5	5
	Core XI	PBCM303	Immunology	6	5	5
	Core XII	PBCM304	Research Methodology in Biochemistry	5	4	4
	Core Practical III	PBCR301	Enzymology & Clinical Diagnostics	6	5	5
	Core XVI	PBCP401	Project	2	-	-
	Core XIII	PBCI301	Plant Biochemistry& Pharmaceutical chemistry	5	4	4
			TOTAL	**30**	**23**	**23**
IV	Core XIV	PBCM401	Genetics & Genetic Engineering	6	5	5
	Core XV	PBCM402	Clinical Biochemistry	6	5	5
	Core XVI	PBCP401	Project	18	9	9
			TOTAL	**30**	**19**	**19**
			GRAND TOTAL	**120**	**90**	**90**

COURSES OFFERED TO OTHER DEPARTMENTS

NON MAJOR ELECTIVES

Semester	Category	Course code	Course Title	Contact Hours/ Week	Credit	
					Min.	Max.
II	Non major elective	PBCE101/201	Pharmaceutical Biochemistry	5	4	4
		PBCE102/202	Reproductive Biology & Disorders			
		PBCE103/203	Modern Life style associated diseases			

PBCM301 ENZYMOLOGY & ENZYME TECHNOLOGY

Semester : III   **Credit** : 5
Category : Core X   **Hours/ Week** : 6
Class & Major : II M.Sc. Biochemistry   **Total Hours** : 78

Objectives
To enable the students

- Understand the properties and importance of enzymes and its action in biochemistry
- Interpret the role of enzymes in disease diagnosis and therapeutic measures.

UNIT - I ENZYME AS BASIS OF LIFE   **15 Hrs**

Enzyme as biocatalyst, Properties, factors affecting enzyme activity, Types of Specificity, Enzyme turnover. Fundamentals of enzyme assay – enzyme Units, coupled kinetic assay, Enzyme localization. Nomenclature and classification of enzymes according to IUB. Monomeric enzyme – chymotrypsin, Typsin and carboxy peptidase. Oligomeric enzymes – Isoenzymes – LDH.

UNIT - II MECHANISM OF ENZYME ACTIVITY   **16 Hrs**

Active site, Lock and key theory, induced fit model. Collision & transition state theories. Mechanism of catalysis: Proximity and orientation effects, general acid-base catalysis, concerted acid - base catalysis, nucleophilic and electrophilic attacks, catalysis by distortion, metal ion catalysis. Theories on mechanism of catalysis. Coenzymes - mechanism and action of TPP, coenzyme A, NAD, FAD.

UNIT – III KINETICS OF ENZYME ACTION   **15Hrs**

Definition and Importance, quantitative analysis of Single substrate - Michaelis-Menten equation. Determination & significance of Km & Vmax. Importance of Kcat/Km. Determination of Ki. Line – Weaver Burk Plot, Edie Hoftee and Hanes plot. Ping pong and random ordered mechanisms.

Inhibition- Competitive, non – competitive and uncompetitive and mixed inhibition, their kinetic differentiation. Determination of inhibition constant from MM equation.

UNIT - IV ENZYME REGULATION   **16 Hrs**

Enzyme Regulation–General mechanisms of enzyme regulation, Homologous interaction – Oxygen – haemoglobin interaction, Heterologous interaction – aspartate carbonyl transferase. Co-Operativity and Non- Cooperativity Significance of positive and negative kinetic Co-Operativity. Regulation of allosteric regulation – feedback regulation, sequential and concerned feedback, Enzyme induction and Repression. Enzyme multiplicity.

UNIT - V ENZYME TECHNOLOGY   **16 Hrs**

Isolation and fractionation of enzymes – classical methods of purification and crystallization - separation based on molecular size, electric charge, solubility difference and selective adsorption. Enzyme Immobilization- properties,method and its applications . Advantages and disadvantages of immobilized enzyme. Application of Immobilized enzyme. Enzyme engineering – artificial enzyme and its synthesis. Industrial, diagnostic and therapeutic

applications of enzymes. Biosensors - glucose oxidase, cholesterol oxidase, urease and antibodies as biosensors. Abzymes and ribozymes.

Text books
- Trevor Palmer, Philip Bonner *Enzymes: Biochemistry, Biotechnology, Clinical Chemistry* 2nd edition, Horwood Publishing Limited, 2007
- Dixon and Webb, *Enzymes*, 3rd edition, Academic Press, New York, 2000.

Reference books

- E.S. West, W.R. Todd, H.S. Mason and J.T. van Bruggen, *A Text Book of Biochemistry,* 4th edition*,* Oxford and IBH Publishing Co., New Delhi, 2000
- Nicholas C. Price, Lewis Stevens, and Lewis Stevens, *Fundamentals of Enzymology: the Cell and Molecular Biology of Catalytic Proteins*, 3rd edition, Oxford University Press, USA, 2000.
- David L. Nelson Michael M. Cox Lehninger *Principles of Biochemistry*, W. H. Freeman; 4th edition, 2004.

e-Resources
- https://storeiyta.firebaseapp.com/.../enzymes-biochemistry-biotechnology-clinical-che.
- https://quacktradition4ahz.files.wordpress.com/.../fundamentals-of-enzymology-the-ce.

PBCM303 IMMUNOLOGY

Semester	**: III**	**Credit**	**: 5**
Category	**: Core XI**	**Hours/ Week :**	**6**
Class & Major :	**II M.Sc. Biochemistry**	**Total Hours**	**: 78**

Objectives
To enable the students
- Understand the structure, functions and integration of immune system.
- Obtain knowledge about the antigen-antibody interactions.
- Illustrate the engineered antibodies used for treating most of the human diseases.

UNIT –I INTRODUCTION   15 Hrs
Introduction: Terminologies –History of Immunology –Immunohematology, Blood groups, Blood transfusion –Rh –incompatibilities –immunity –types of immunity –innate and acquired. Immune systems: Anatomy of lympho-recticular system –Primary lymphoid organ. Secondary lymphoid tissue –cells of the immune system –detailed aspects of T and B cells – receptors –activation and function.

UNIT –II ANTIGEN –ANTIBODY REACTIONS   16 Hrs
Antigens: Types, properties, haptens – adjuvants, toxoids antitoxins, Immunoglobulins – structure types and properties. Theories of antibody production. Antigen –antibody reactions – in vitro methods; Agglutination –Precipitation, Complement fixation, Immuno fluorescence, ELISA, RIA, in vivo methods.

UNIT –III IMMUNOLOGICAL DISORDERS   **16 Hrs**

Autoimmunity - Autoimmune diseases – pathogenesis - treatment. Immunodeficiency disorders-B cell deficiencies, T cell deficiencies, secondary immunodeficiency diseases-pathogenesis, diagnosis and treatment of AIDS. Immunization practices- active and passive immunization.

UNIT –IV HYPERSENSITIVITY REACTIONS   **15 Hrs**

Hypersensitivity reactions –antibody mediated, Type I anaphylaxis, Type II –Antibody dependent cell cytotoxicity, Type III – immune complex reactions –respective diseases and immunologic methods of diagnosis –cell mediated immune responses –Lymphokines, Cytokines. Type IV –Hypersensitivity reactions, MHC and transplantation.

UNIT –V HYBRIDOMA TECHNOLOGY   **16 Hrs**

Basic principles of Hybridoma technology. Monoclonal antibody (MoAb) production and application. Purification and characterization of of MoAbs. Characterization of MoAbs. Labeling of Antibodies. Complement system -components-classical and alternative pathway.

Text books
- Kuby, Richard A, Goldsby et al. *Immunology*, 4th ed., WH Freeman & Co. 2003.
- Abul Abbas, Andrew Lichtman, and Jordan Pober *Cellular and molecular immunology*, W. B. Saunders, fourth edition, 2000.
- Ivan Roitt, Jonathan Brostoff, and David Male *Immunology* Mosby, London. 6th edition, 2001.

Reference books
- Charles Janeway, Jr. and Paul Travers, *Immunobiology - the immune system in health and disease,* 5th edition, Garland Publishing, Inc. 2001.
- H. C. Gooi & Helen Chapel, *Clinical Immunology:* A PRACTICAL APPROACH. IRL Press at Oxford University, 1991.

e-Resources
- https://www.mh-hannover.de/.../manipulating_the_immune_system_for_therapeutic.p..
- sacema.org/uploads/Essential-Clinical-Immunology.pdf
- www2.nau.edu/~fpm/immunology/lectures/Chap.03-09.pdf

PBCM304 RESEARCH METHODOLOGY IN BIOCHEMISTRY

Semester	**: III**	**Credit**	**: 4**
Category	**: Core XII**	**Hours/Week**	**: 5**
Class & Major	**: II M.Sc. Biochemistry**	**Total Hours**	**: 65**

Objectives
To enable the students
- Understand about basic tools and techniques involved in research.
- Introduce the concept of statistical tools for data analysis in scientific research.

UNIT- I FUNDAMENTALS OF RESEARCH 13Hrs

Research-Meaning, Objectives & Motivation. Concept of theory, empiricism, deductive and inductive theory. Characteristics of scientific method –Understanding the language of research –Concept, Construct, Definition, Variable. Research Process. Problem Identification & Formulation –Research Question–Investigation Question –Measurement Issues –Hypothesis – Qualities of a good Hypothesis –Null Hypothesis & Alternative Hypothesis. Hypothesis Testing –Logic & Importance.

UNIT- II RESEARCH AND EXPERIMENTAL DESIGN 13 Hrs

Research Design: Concept and Importance of Research – Features of a good research. Types and concepts of research design – Exploratory, Descriptive, Qualitative and Quantitative.

UNIT- III MEASUREMENT SAMPLING AND DATA ANALYSIS 13 Hrs

Measurement: Concept & Problems in research –Validity and Reliability. Levels of measurement (Nominal, Ordinal, Interval, Ratio). Sampling – Types and statistics of Simple, Random, Systematic, Stratified Random & Multi-stage. Data Analysis: Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis – Cross tabulations and Chi-square test including testing hypothesis of association. **ANOVA and Duncan's multiple range tests*.**

UNIT- VI TOOLS / TECHNIQUES FOR RESEARCH 13 Hrs

Databases for Biological Science Discipline.FASTA, BLAST ,EMBL net, DDBJ and NCBI. Protein sequence databases; primary databases SWISS – PROT, TrEMBL, NRL-3D. Secondary Databases; PRO SITE, PROFILES, PRINTS, Pfam, BLOCKS and IDENTITY. Composite protein databases.

UNIT- V THESIS WRITING AND PAPER PUBLICATION 13 Hrs

Thesis writing-Introduction, Review of literature, materials and methods, Interpretation of results, Summary and Conclusion, Bibliography, Acknowledgement. Interpretation of Data and Paper Writing –Layout of a Research Paper, Journals in biological science, Impact factor of Journals, Ethical issues related to publishing, Plagiarism and Self-Plagiarism.

Text Books
- Panneerselvam, *Research Methodology*, 1st edition R, Prentice hall of India, New Delhi, 2004.
- Kothari CR, *Research Methodology – Methods and techniques*, 2nd edition, New Wiley Eastern ltd., Delhi, 2009.

Reference Books
- Donald Cooper & Pamela Schindler, *Business Research Methods*, TMGH, 9th edition, 2013
- Alan Bryman & Emma Bell, *Business Research Methods*, 4th edition, Oxford University Press, 2015.
- P.Saravanavel, *Research Methodology*, 14th edition, JBA publishers, 2003.

e-Resources
- gent.uab.cat/diego_prior/sites/.../02_e_01_introduction-to-research-methods.pdf

- https://www.heacademy.ac.uk/system/files/msor.3.1s.pdf
- 164.100.133.129:81/econtent/Uploads/Research_Methods.pdf

PBCR301 ENZYMOLOGY & CLINICAL DIAGNOSTICS

Semester   **: III**   **Credit**   **: 5**
Category   **: Core Practical III**   **Hours/Week : 6**
Class & Major : II M.Sc. Biochemistry   **Total Hours : 78**

Objectives
To enable the students
- Acquire knowledge on various biochemical tests involved in clinical diagnosis.
- Examine marker enzymes during pathological conditions.

ENZYMOLOGY

1. Assay of Salivary Amylase enzyme.
2. Effect of substrate concentration on enzyme activity (Salivary Amylase) and determination of Km value.
3. Effect of inhibitor on activity of Salivary Amylase.
4. Assay of lactate dehydrogenase (LDH).
5. Effect of pH on enzyme activity (Acid phosphatase/Alkaline phosphatase).
6. Effect of temperature on enzyme activity (ACP/ALP)

CLINICAL DIAGNOSTICS

Estimation of: (from blood/plasma/serum/urine)
1. Glucose by GOD-POD Method
2. Protein estimation by Biuret method
3. Triglycerides GPO/POD by kit method
4. Cholesterol by Zak and Zaltsky Method
5. HDL estimation
6. Calcium (Ca) by OCPC Method
7. Iron (Fe) by Dipyridyl Method
8. Copper (Cu) by Dithiocarbonate Method
9. Phosphorus (P) by Fiske- Subbaraow Method
10. ELISA

Text Books

- David T. Plummer, *An Introduction to practical Biochemistry,* 3rd edition, 1999.
- J.Jayaraman, *Laboratory Mannual in Biochemistry*, 4th edition, New Age international limited publication, 1992.
- Subodh, R, Saxena, *Medical Biochemistry*, 8th edition, Black printers, New Delhi, 2014.

- Shaun C A Anderson, Suncokayne S A, *Clinical Chemistry concepts and applications*, revised edition, CBS Publishers New Delhi, 2015.
- Ambika shanmugam, *Fundamentals of Biochemistry for Medical Students*, 8th edition, LWW India publishing house. 2012.

Reference Books
- Pattabiraman, Laboratory *Mannual in Biochemistry*, 2nd edition, 1994.
- Singh .S.P. *Practical Mannual of Biochemistry,* 6th edition, CBS Publication 2006.
- Harold Varley, *Practical Clinical Biochemistry*, 4th edition, CBS Publishers, New Delhi, 2005.

e-Resources
- https://www.worldcat.org/title/practicalenzymology/oclc/827358447/
- https://www.worldcat.org/title/practical-enzymology/oclc/1080648481/
- https:// Ferris-Clinical-Advisor-2020-Book ebook/dp/B07VM97C5X/
- https:// Ferris-Clinical-Advisor-2019-Solutions-ebook/dp/B07DL6VH6J/
- https:// Ferris-Clinical-Advisor-Elsevieron-VitalSource ebook/dp/B00Z5KE8T4/

PBCI301 PLANT BIOCHEMISTRY & PHARMACEUTICAL CHEMISTRY

Semester	: III	**Credit**	: 4
Category	: Core XIII	**Hours/Week**	: 5
Class & Major	: II M.Sc. Biochemistry	**Total Hours**	: 65

Objectives
To enable the students
- Identify the Biochemical pathways in plants.
- Analyze the emerging problems in the development on innovative practices
- Stimulate individual creativity and work in multidisciplinary teams

UNIT- I PLANT CELL AND PHOTOSYNTHESIS   **13 Hrs**

Structure of plant cell. Photosynthesis: Chloroplast- structure and function; Photosynthetic pigments and light harvesting complexes .Photo system I & II. Photosynthetic electron transport and photophosphorylation. Calvin cycle (C3 plants), Hatch slack pathway (C4 plants), Crassulacean acid metabolism.
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UNIT – II PLANT RESPIRATION AND METABOLISM   **13 Hrs**

Plant respiration: Cyanide sensitive and insensitive respiration., Nitrogen metabolism: Physical and biological nitrogen fixation, Ammonification, Nitrification, Denitrification Symbiotic nitrogen fixation and its regulation. nitrogenase system, nitrate reductase . Sulphur metabolism : Sulphate activation, Reduction of active sulphate, Oxidation of inorganic sulphur, incorporation of sulphur into amino acids.

UNIT- III PLANT TISSUE CULTURE AND HORMONES   **13 Hrs**

Plant tissue culture: Plant cell organs and embryo culture, anther culture, somaclonal variation, protoplast isolation, fusion and culture of protoplasts, Application of plant tissue

culture. Plant Hormones: Biosynthesis, Physiological effects and mechanism of action of Auxins, Gibberellic acids, Cytokinins, Abscisic acid, Ethylene, Brassinosteroids and Polyamines.

UNIT- IV PHARMACEUTICAL CHEMISTRY - I   13 Hrs

Introduction to Pharmaceuticals, Historical development, Classification and Nomenclature of drugs, Sources of drugs, Dosage forms and routes of administration, mechanism of action, Combined effect of drugs, Factors modifying drug action, tolerance and dependence, Pharmacogenetics. Absorption, Distribution, Metabolism and Excretion of drugs.

UNIT – V PHARMACEUTICAL CHEMISTRY - II   13 Hrs

Principles of Basic and Clinical pharmacokinetics, Adverse Drug Reactions and treatment of poisoning, ADME drug interactions, Bioassay of Drugs and Biological Standardization, Discovery and development of new drugs. Agonist & antagonists, Anesthetics, Narcotic and Synthetic non-narcotic drugs.

Text books
- Taiz & Ziger, *Plant physiology,* 5th edition, Sinauer associates, 2012.
- Donald J. Abraham, *Burger's Medicinal Chemistry*, John Wiley & Sons N.Y., 6th edition, 2010.
- Slater A, NW Scott, MR Fowler. *Plant biotechnology*, 2nd edition, Oxford University Press, 2008
- Wilson and Gisvold's *Text Book of Organic Medicinal and Pharmaceutical Chemistry*, 12th edition, EdBeale Jr., J.M., Block, J.H. 2012.

Reference books
- William Hopkins & Norman P. A. Huner, *Introduction of Plant Physiology*, Wiley 4th edition, 2008.
- Buchanan, *Biochemistry and molecular Biology of plant*, Wiley 2nd edition, 2015.
- Wilson and Griswold, *Text book of organic medicinal and pharmaceutical chemistry,* 12th edition, J.B. Lippincoff cam, 2010.

e-Resources
- www.routeetvies.fr/medias/.../1-plant-biotechprinciples-techniques-and-applications1.pd...
- https://faculty.psau.edu.sa/filedownload/doc-10-pdf-9e7f111f15db1aa3830cd806660.
- https://downloads.lww.com/wolterskluwer_vitalstream_com/.../frontmatter.pdf
- https://www.researchgate.net/publication/304284875_organic_medicinal_chemistry

PBCM401 GENETICS AND GENETIC ENGINEERING

Semester	**: IV**	**Credit**	**: 5**
Category	**: Core XIV**	**Hours/ Week :**	**6**
Class & Major	**: II M.Sc Biochemistry**	**Total Hours : 78**	

Objectives
To enable the students

- Understand the concept of Mendelian genetics and applications of genetic engineering.
- Acquire knowledge about all basic techniques of gene cloning right from DNA in plants and animals.
- Provide knowledge about intellectual property rights across the world

UNIT – I BASICS OF GENETICS   **16 Hrs**

History of Genetics Mendelian principles of inheritance – Dominance, codominance, incomplete dominance, segregation, Multiple alleles, Multiple genes.

UNIT – II GENE INHERITANCE   **15 Hrs**

Interaction of genes.Patterns of Inheritance – Autosomal inheritance, Sex-linked inheritance, Cytoplasmic inheritance.

UNIT – III VECTORS AND GENE CLONING   **16 Hrs**

Enzyme uses in genetic engineering – Restriction endonucleases, restriction digestion, mapping, ligation, Cloning vectors -- Desirable properties of vectors – Prokaryotic & Eukaryotic Expression Systems (Constitutive & Inducible). Plasmid Vectors - Phage Vectors - Cosmids -- Phagemids - BACs - Yeast Vectors - YACs - Lentiviral Vectors -- Adenoviral Vectors – Plant Vectors - Insect Vectors.

UNIT – IV GENE TRANSFER METHODS   **16 Hrs**

Methods of gene recombination - Bacterial Conjugation, Transformation, Transduction. Gene transfer methods - Microinjection, Electroporation, Microprojectile, Shot Gun method, Ultrasonication, Liposome fusion. Competence, identification of transformed colonies/clones – Blue white screening, DNA sequencing. cDNA Library

UNIT – V APPLICATIONS OF GENETIC ENGINEERING   **15 Hrs**

Genetic engineering in animals - Production of transgenic mice, Therapeutic products produced by genetic engineering- plasma proteins, human hormones, Genetic engineering in plants: Use of *Agrobacterium tumefaciens* and *A.rhizogenes*, Ti plasmids, Strategies for gene transfer to plant cells – Herbicide resistant, Drought tolerant, pest resistant, salt tolerant transgenic plants and related ethical issues.

Text books
- Satyanarayana U, *Biotechnology*, 2nd edition, Books & Allied (P) Ltd, 2008.
- Bernard R. Glick, Jack J. Pasternak, and Cheryl L. Patten, *Molecular biotechnology: Principles and applications of recombinant DNA,* 4th edition, By ASM press. 2010
- Singh. K., "*Intellectual property rights on Biotechnology*", Springer, 7th edition, 2015
- R.C.Dubey, *A text book of Biotechnology*, 5th revised edition, S.Chand Publications, 2014

Reference books
- J. Sambrook, E.F. Fritsch and T. Maniatis, *Molecular Cloning: a Laboratory Manual,* , 3rd edition, Cold Spring Harbor Laboratory Press, New York, 2000
- Brown, T.A, "*Gene Cloning and DNA Analysis*- An Introduction, 6th edition, John Wiley & Sons, 2010
- Strickberger. M.W., "*Genetics*", 3rd edition, Pearson India, 2015.

PBCM402 CLINICAL BIOCHEMISTRY

Semester	: IV	**Credit**	: 5
Category	: Core XV	**Hours/ Week**	: 6
Class & Major	: II M.Sc Biochemistry	**Total Hours**	: 78

Objectives
To enable the students
- Acquire in-depth knowledge on diseases and disorders.
- Interpret the causes to identify the diseases at early stage.
- Identify target oriented therapies.

UNIT- I GOOD CLINICAL LAB PRACTICES   15 Hrs

Importance of automation in clinical biochemistry. Good Clinical Practices: Basics and principles. Selection of Instruments, Quality assurance, maintenance of quality control programme.

UNIT- II ACID BASE BALANCES   16 Hrs

Acid base balance - coagulation of blood pH within normal range disturbances in acid base balance - acidosis, alkalosis, mixed disturbances - laboratory parameters - blood gas analysis. Fluid and electrolyte balance - regulation - disturbances of fluid and electrolyte balance - laboratory parameters in the diagnosis and management of fluid and electrolyte disorders - oral rehydration therapy.

UNIT - III METABOLIC DISORDERS   16 Hrs

Diabetes mellitus, Hypo & Hypercholesterolemia. Inborn errors of metabolism: a) Disorders of amino acid metabolism- Tyrosinemia, phenylketonuria, alkaptonuria b) Disorders of nucleic acid metabolism- Disorders in purine/ pyrimidine metabolism. Bone marrow disorders.

UNIT- IVEVALUATION OF ORGAN FUNCTION TESTS & PRENATAL DIAGNOSIS
**   15 Hrs**

Gastric function tests, Liver function tests, renal function test, lung, heart and pancreatic disorder.

UNIT - V CLINICALLY IMPORTANT HORMONES & MARKERS   16 Hrs

Thyroid diseases – hormones and markers, Menstrual disorders – hormones and markers, Tumor markers.

Text books
- C.A.Burtis & Ashwood Teitz, *Fundamentals of Clinical Chemistry,* 6th edition, W. B. Saunders company, 2005

- David Plummer, *Practical Biochemistry,* 3rd edition, Tata McGraw- Hill, 2000.
- Harrison T.R. Fauci, Braunwald, Isselbacher*, Principles of Internal Medicine*, 14th edition, MC-graw hill, Newyork. Volume I and II 2015

Reference books
- Thomas Devlin, Text book of *Biochemistry with clinical correlation,* 7th edition, John Wiley and Sons, 2000.
- William J. Marshall & Stephen K. Angert, *Clinical Biochemistry – Metabolic concepts and Clinical aspects,* 3rd edition, Churchill Livingstone, 2002.
- P. D. Mayne, A. Hodder, *Clinical chemistry in diagnosis and treatment,* Arnold publication, 6th revised edition, 1994.

e-Resources
- www.raftmaster.org/tietz_textbook_of_clinical_chemistry_and_molecular_diagnostics.
- https://www.academia.edu/35117679/_U_Satyanarayana_Biochemistry

III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
III	Core X	PBCM301	Enzymology & Enzyme Technology	Poster presentation	Seminar
	Core XI	PBCM303	Immunology	Poster presentation	Seminar
	Core XII	PBCM304	Research Methodology	Assignment	Seminar
	Core XIII	PBCI301	Plant Biochemistry & Pharmaceutical Chemistry	Assignment	Seminar
	Core Practical III	PBCR301	Enzymology & Clinical Diagnostics	DPA	Viva Voce
IV	Core XIV	PBCM401	Genetics And Genetic Engineering	Assignment	Seminar
	Core XV	PBCM402	Clinical Biochemistry	Case study	Seminar

DEPARTMENT OF CHEMISTRY

PREAMBLE

UG : Syllabi of programme offered in semester III and IV along with III and IV evaluation components (With effect from 2018 – 2021 batch onwards)

PG : Syllabi of programme offered in semester III and IV along with III and IV evaluation components (With effect from 2018 – 2020 batch onwards) are presented in this booklet.

PROGRAMME PROFILE B.Sc. (Chemistry)

PSO1: Development of the skills in handling various chemicals, apparatus and instruments.

PSO2: Application of the principles of thermodynamics and chemical kinetics in chemical reactions

PSO3: Acquiring the knowledge on heterocyclic compounds and natural products

PSO4: Ability to apply the basic principles of various spectroscopic, electro and thermo analytical methods to characterize the compounds

PSO5: Industrial insights on polymers, textile dyes, fibre and medicinal chemistry.

Semester	Part	Category	Course code	Course Title	Contact Hrs/ Week	Credits Min	Credits Max
I	I	Tamil/Hindi/French	UTAL105/ UTAL106/ UHIL101/ UFRL101	Basic Tamil-I/ Advanced Tamil-I/ Hindi-I/ French-I	4	2	3
	II	English	UENL107/ UENL108	General English-I/ Advanced English-I	5	3	4
	III	Core I	UCHM104	Fundamentals of Chemistry	2	1	1
		Core II	UCHM105	General Chemistry –I	4	4	4
		Core III	UCHM106/ UCHM107	Analytical Chemistry	4	4	4
		Core Practical I	UCHR204/ UCHR205	Volumetric Analysis	3	-	-
		Allied I	UPHA102	Allied Physics - I	3	3	3
		Allied Practical I	UPHR103	Allied Physics Practical-I	3	2	2
	IV	Value Education			2	1	1
				Total	**30**	**20**	**22**
II	I	Tamil/Hindi/French	UTAL205/ UTAL206/ UHIL201/ UFRL201	Basic Tamil-II/ Advanced Tamil-II/ Hindi-II/ French-II	4	2	3
	II	English	UENL207/ UENL208	General English-II/ Advanced English-II	5	3	4
	III	Core IV	UCHM202	General Chemistry –II	6	6	6
		Core Practical I	UCHR204/ UCHR205	Volumetric Analysis	3	4	4
		Allied II	UPHA201	Allied Physics II	3	3	3
		Allied Practical I	UPHR202	Allied Physics Practical-II	3	2	2
	IV	NME			4	2	2
		Soft skill			2	1	1

Sem	Part	Course	Code	Title			
	V	Extension Programme/ Physical Education/NCC			-	1	2
				Total	**30**	**24**	**27**
III	I	Tamil/Hindi/French	UTAL305/ UTAL306/ UHIL301/ UFRL301	Basic Tamil-III/ Advanced Tamil-III/ Hindi-III/ French-III	4	2	3
	II	English	UENL307/ UENL308	General English-III/ Advanced English-III	5	3	4
	III	Core V	UCHM305	General Chemistry –III	5	5	5
		Core Practical II	UCHR404/ UCHR405	Semi micro Qualitative Inorganic Analysis	3	-	-
		Core VI	UCHM306	Separation & Purification Techniques	3	3	3
		Core VII		Online Course (NPTEL/ST)	3	1	2
		Allied	UMAA304	Algebra, Differential Calculus and Trigonometry	5	5	5
	IV	Value Education			2	1	1
				Total	**30**	**20**	**23**
IV	I	Tamil/Hindi/French	UTAL405/ UTAL406/ UHIL401/ UFRL401	Basic Tamil-IV/Advanced Tamil-IV/ Hindi-IV/ French-IV	4	2	3
	II	English	UENL407/ UENL408	General English/ Advanced English	5	3	4
	III	Core VIII	UCHM405	General Chemistry –IV	5	5	5
		Core Practical II	UCHR404/ UCHR405	Semi micro Qualitative Inorganic Analysis	3	4	4
		Core IX	UCHM406	Instrumental Method of Analysis	4	4	4
		Allied	UMAA406	Integral Calculus, Laplace Transform & Ordinary Differential Equation	5	5	5
		Core X Project/ paper	UCHP501/ UCHM507	Project/Dairy and its products	2	-	-
	IV	Soft skill	USKS401		2	1	1
	V	Extension Programme/ Physical Education/NCC			-	-	2
				Total	**30**	**24**	**28**
V	III	Core XI	UCHM504	Inorganic Chemistry – I	5	4	4
		Core XII	UCHM505	Organic Chemistry –I	6	5	5
		Core XIII	UCHM506	Physical Chemistry –I	5	4	4
		Core Practical III	UCHR501	Gravimetric Analysis	4	4	4
		Core Practical IV	UCHR605	Physical Chemistry Practical	4	-	-
		Core X paper/ Project	UCHP501/ UCHM507	Project / Dairy and its products	4	4	5
	IV	Value education			2	1	1
				Total	**30**	**22**	**23**
VI	III	Core XIV	UCHM607	Inorganic Chemistry II	4	4	4
		Core XV	UCHM608	Organic Chemistry II	4	4	4

		Core XVI	UCHM609	Physical Chemistry II	4	4	4
		Core XVII	UCHM610	Physical Chemistry III	4	4	4
		Major elective	UCHO602 UCHO603 UCHO604 UCHO605	Polymer Chemistry Medicinal Chemistry Forensic Chemistry Chemistry of Dye	4	4	4
		Core Practical IV	UCHR605	Physical Chemistry Practical	4	4	4
		Core Practical IV	UCHR606	Organic Analysis and Preparation	4	4	4
		Viva –Voce	UCHM605	Comprehensive Viva-Voce	-	1	1
	IV	Soft Skill	USKS601		2	1	1
	V	Extension Programme/ Physical Education			-	-	2
				Total	**30**	**30**	**32**
				Grand Total	**180**	**140**	**155**

ALLIED COURSES OFFERED TO OTHER DEPARTMENTS

Semester	Part	Category	Course code	Course title	Contact hrs per week	Credits	
						Min	Max
I	III	Allied-I	UCHA102	Chemistry-I	5	4	4
IV	III	Allied-I	UCHA402/403	Chemistry for Physics	3	3	3
I/IV	III	Allied Practical	UCHR104/ UCHR404	Volumetric Analysis	3	2	2
V	III	Allied Optional	UCHA502 UCHA504 UCHA505 UCHA506	Industrial Chemistry Dairy Chemistry Agricultural Chemistry Environmental Chemistry	5	4	4

NON- MAJOR ELECTIVE COURSES

Semester	Part	Category	Course code	Course title	Contact Hrs/per week	Credits	
						Min	Max
II	IV	Non major elective	UCHE206 UCHE207 UCHE204 UCHE205 UCHE208	Cosmetics and Detergents Green Chemistry Food Chemistry Health and Hygiene Health Chemistry	4 4 4 4 4	2 2 2 2 2	2 2 2 2 2

EXTRA CREDIT EARNING PROVISION

Semester	Category	Course code	Course title	Hrs per week	Credits	
					Min	Max
II	Core	UCHI201	Internship	-	-	1
IV	Core	UCHI401	Internship	-	-	1
V	Core	UCHM507	Green Chemistry (Self Study Paper)	2 -	- -	1 1

UCHM305 GENERAL CHEMISTRY - III

Semester	: III	**Credit**	: 5
Category	: Core V	**Hours/ week**	: 5
Class & Major	: II B.Sc. Chemistry	**Total Hours**	: 65

Objectives

To enable the students
- Understand the characteristics of Boron and carbon family.
- Write the mechanism of electrophilic substitution reaction.
- Apply the principles of thermodynamics in chemical reactions.

UNIT- I CHEMISTRY OF P-BLOCK ELEMENTS   **13 Hrs**

Boron family: Group discussion, anomalous behavior of boron, electron deficiency & electron acceptor behavior of borontrihalides. Bonding in diborane.Preparation, properties, uses & structure of Borazole, boron nitride.

Carbon family: Group discussion, comparison of properties of C, Si - valency, oxides, halides, hydrides & oxyacids. Classification & preparation, properties & uses of carbides, silicates and silicones. Introduction to allotropes of carbon.

UNIT- II CHEMISTRY OF ALKYL, ARYL AND ARALKAYL HALIDES   **12 Hrs**

General method of preparation and properties of alkyl, aryl and aralkayl halides.

Organometallic compounds: Grignard reagent, preparation, physical and chemical properties. organolithium compounds, organocopper reagent, organozinc reagent and tetra methyl lead.

UNIT - III ALKENES, ALKYNES AND HYDROCARBONS   **12 Hrs**

Method of preparation and properties of alkenes like ethylene and propene. Dienes – preparation properties and uses of 1,3 butadienes. Methods of preparation and properties of alkynes with special reference to acetylene

Electrophilic substitution reactions in aromatic compounds: General mechanism - nitration, halogenation, sulphonation, Friedal Craft's acylation & alkylation. Directive influence - orientation - o/p ratio- of benzene derivatives.

UNIT - IV FIRST LAW OF THERMODYNAMICS   **13 Hrs**

First law of thermodynamics: statement, Calculation of W,Q, ΔE & ΔH for the expansion of ideal gases under reversible, isothermal and adiabatic conditions, molar heat capacities at constant volume and constant pressure and its relations.

Thermo Chemistry: Bond energy, bond dissociation energy. Calculation from thermo chemical data, Hess's law of heat of summation –statement, illustration, application -bond variation of heat of a reaction with temperature - Kirchoff's Equation.

UNIT - V SECOND LAW OF THERMODYNAMICS   **15 Hrs**

     Second law of Thermodynamics: Need for the II law, different statements of II law, Significance of Entropy.

     Gibb's free energy: Helmholtz free energy-their variation with temperature, pressure and volume. Maxwell's equations and thermodynamic equation of state - Gibbs Helmholtz equation-derivation and applications. Criteria for spontaneity-free energy, entropy.

Text Books
- Bahl. S and ArunBahl, *Advanced Organic Chemistry*, Revised Edition, S. Chand and Company Ltd, Ram Nagar,New Delhi, 2010.
- Madan .R.D, *Modern Inorganic Chemistry*, 3rd Edition, S.Chand& Company Limited, New Delhi, 2011.
- Puri.B.R, Sharma.L.R & Pathania.M.S, *Principles of Physical Chemistry,* Millennium Edition, Vishal publishing & Co, Jalandhar, 2004.

Reference Books
- Finar.I.L, *Organic Chemistry Volume I and II*, 6th Edition, England Addison Wesley Longman Ltd, New Delhi 2006.
- Puri.B.R, Sharma.L.R and Kallia K.C, *Inorganic Chemistry,* Milstone Publisher, New Delhi, 2003.
- Soni.P.L, *Text book of physical chemistry*, 22nd Revised Edition, Sultan Chand, New Delhi, 2001.

UCHR404/UCHR405 SEMIMICRO QUALITATIVE INORGANIC ANALYSIS

Semester **: III & IV**		**Credit** **: 4**
Category **: Core practical - II**		**Hours/Week : 3+3**
Class & Major : II B.Sc., Chemistry		**Total Hours : 78**

Objectives
To enable the students
- Identify the basic and acid radicals
- Develop analytical skills in qualitative inorganic analysis

INORGANIC ANALYSIS
1. Analysis of simple salt and binary salt containing cations and anions
2. Analysis of a mixture containing two cations and two anions, one of which will be an interfering ion by Semi-micro methods using the conventional scheme and identify simple acid radical, interfering radical and Elimination of Interfering acid radical for the following anions: carbonate, sulphide, sulphate, fluoride, chloride, bromide, nitrate, oxalate, phosphate, borate and chromate.
3. Separation of basic radicals into groups and analysis of groups for the following: cations, lead, copper, cadmium, bismuth, aluminium, iron, manganese, zinc, cobalt, nickel, calcium, strontium, barium, magnesium and ammonium.

Reference Books
- Dr.Ramanujam.V.V, *Inorganic Semi Micro Qualitative Analysis,* The National Publishing Company, 2009.
- Thomas.A.O, *Practical chemistry,* 2^nd^Edition, Scientific book center, Cannanore, 2006.
- Venkateswaran.V, Veerasawamy.R & Kulandaivelu.A.R, *Basic Principles of practical Chemistry,* 2nd edition, S. Chand & Sons Publications, New Delhi, 2005.

UCHM306 SEPARATION AND PURIFICATION TECHNIQUES

Semester	: III	**Credit**	: 3
Category	: Core VI	**Hours/Week**	: 3
Class &Major	: II B.Sc. chemistry	**Total Hours**	: 39

Objectives
To enable the Students
- Understand principles of Separation and Purification techniques.
- Use the Separation and Purification techniques through lab demonstration.

UNIT - I SEPARATION TECHNIQUES   6 Hrs

Principle – precipitation ,solvent extraction ,paper electroprocess and ultra centrifuge.

UNIT – II PURIFICATION TECHNIQUES   6 Hrs

Desicants , distillation- principle and types – fractional, steam azeotropic, recrystallisation and sublimation. test of purity – melting point and boiling point

UNIT- III CHROMATOGRAPHY   9 Hrs

Chromatography: principle, classification –partition, adsorption, mobile and stationary phases, types of adsorbents- choice of eluents

UNIT- IV PAPER, THIN LAYER AND COLUMN CHROMATOGRAPHY   9 Hrs

Principle- techniques-applications and limitations-Paper, Thin layer chromatography and Column. Superiority of TLC over PC.

UNIT- V ADVANCED TECHNIQUES IN CHROMATOGRAPHY   9 Hrs

Principle, techniques and applications of Gas Chromatography- High Performance Liquid Chromatography- Ion exchange Chromatography.

Text Books
- Gopalan .R, Subramanian P.S, Rangarajan. K, *Elements of Analytical Chemistry*, Sultan Chand and Sons, 2009.
- Srivastava .V.K., Srivastava .K.K, *Introduction to Chromatography: Theory and Practice*,S. Chand and company, New Delhi, 2006.

Reference Books
- Sharma B.K.,*Instrumental methods of Analysis*, Geol Publications, 2008.
- Skoog .D.A., West.D.M and Holler .F.J., *Analytical Chemistry: An Introduction*, 7th edition, Saunders college publishing, Philadelphia,2010.

- Kaur H, *Instrumental methods of Chemical Analysis*, Pragathi Prakasan Publications, Meerut, 2006.

UCHM405 GENERAL CHEMISTRY- IV

Semester	: IV	**Credit**	: 5
Category	: Core VIII	**Hours/Week**	: 5
Class & Major	: II B.Sc., Chemistry	**Total Hours**	: 65

Objectives
To enable the Students
- Understand the properties of Nitrogen, Oxygen, Halogen & Noble gas family.
- Apply the concepts of Second and Third Law of Thermodynamics.
- Find the mechanism of various organic chemical reactions.

UNIT - I CHEMISTRY OF NITROGEN AND OXYGEN FAMILY   **14 Hrs**

Nitrogen Family: General characteristics of nitrogen group elements – electronic configuration, similarities & gradation in physical & chemical properties, uses of N, P, As, Sb, & Bi. Preparation, properties & uses of hydrides, oxides, oxyacids. Structure of oxides and oxyacids. Structure & uses of hydrazine& hydroxylamine.

Oxygen family: General characteristics of oxygen group elements – electronic configuration, similarities & gradation in physical & chemical properties, uses of O, S, Se & Te. Preparation, properties & uses of hydrides, oxides, halides & oxyacids of sulphur, peroxyacids & thionic acids. Structure of oxides and oxyacids.

UNIT - II CHEMISTRY OF HALOGENS AND NOBLE GASES   **14 Hrs**

Halogens: General characteristics of halogen group elements – electronic configuration, similarities & gradation in physical & chemical properties, uses of F, Cl, Br, I & At. Preparation, properties & uses of hydracids, oxides & oxyacids. Interhalogen compounds, pseudohalogens & positive iodine. Flourides of oxygen. Exceptional properties of fluorine.

Noble gases: General characteristics of noble gas elements – electronic configuration - reason for placing in zero group - position in the periodic table - Applications - Clathrates - compounds of xenon - hybridization and geometries of XeF_2 , XeF_4, XeF_6 & $XeOF_4$.

UNIT – III AROMATICITY AND REACTION MECHANISM   **13 Hrs**

Aromaticity: Modern theory of aromaticity -non aromatic ,anti aromatic with simple examples.
Reaction Mechanism: general mechanism of S_N^1, S_N^2, S_N^i, E^1, E^2,SE^1 and SE^2 reactions.

UNIT - IV STEREOCHEMISTRY   **12 Hrs**

Fischer, flying wedge, sawhorse and Newmann projection formulae. Optical Activity in Compounds not containing asymmetric carbon atoms-biphenyl-allenes and spiranes. racemisation - methods of racemisation (by substitution and tautomerism) - resolution - methods of resolution(mechanical Seeding, biochemical and conversion to diastereoisomerism). Notation of

optical isomerism-Cahn-Ingold-Prelog rules-R-S-notations for optical isomers with one and two asymmetric carbon atom-erythro and threo representations.

UNIT-V CHEMICAL EQUILIBRIUM AND THIRD LAW OF THERMODYNAMICS 12Hrs
      Law of Mass Action: Various forms of equilibrium constants, Relationship between K_p and Kc.
      Thermodynamic derivation of the law of chemical equilibrium - reaction isotherm - standard free energy change and equilibrium constant - variation of equilibrium constant with temperature - Van't Hoff Isochore.
      Third Law of Thermodynamics: Nernst Heat theorem -statement of III law of thermodynamics-evaluation of entropy of heat capacity measurements - exceptions to III law-residual entropy.

Text Books
- Puri Sharma Pathania- *Principles of Physical Chemistry*- Shoban Lal Nagin Chand & Co,Jalandhar.(2006).
- Madan.R.D, – *Modern Inorganic Chemistry* – S.Chand & Company Limited, 2006.
- Bahl and Arun Bahl – "*Advanced Organic Chemistry*" – S. Chand, 2008.

Reference Books
- Huheey.J.E, Harper and Collins – "*Inorganic chemistry*" – NY IV edition, 2007.
- Morrison.R.T. and Boyd – "*Organic Chemistry*" – VI Edition – prentice Hall of India, New Delhi, 2006.
- Kundu and Jain – "*Physical Chemistry*" – S. Chand, 2010.

UCHR404/UCHR405 SEMIMICRO QUALITATIVE INORGANIC ANALYSIS

Semester : III & IV	**Credit** : 4
Category : Core practical - II	**Hours/Week** : 3+3
Class & Major : II B.Sc., Chemistry	**Total Hours** : 78

Objectives
To enable the students
- Identify the basic and acid radicals
- Develop analytical skills in qualitative inorganic analysis

INORGANIC ANALYSIS
1. Analysis of simple salt and binary salt containing cations and anions
2. Analysis of a mixture containing two cations and two anions, one of which will be an interfering ion by Semi-micro methods using the conventional scheme and identify simple acid radical, interfering radical and Elimination of Interfering acid radical for the following anions: carbonate, sulphide, sulphate, fluoride, chloride, bromide, nitrate, oxalate, phosphate, borate and chromate.

3. Separation of basic radicals into groups and analysis of groups for the following: cations, lead, copper, cadmium, bismuth, aluminium, iron, manganese, zinc, cobalt, nickel, calcium, strontium, barium, magnesium and ammonium.

Reference Books
- Dr.Ramanujam.V.V, *Inorganic Semi Micro Qualitative Analysis,* The National Publishing Company, 2009.
- Thomas.A.O, *Practical chemistry,* 2ndEdition, Scientific book center, Cannanore, 2006.
- Venkateswaran.V, Veerasawamy.R & Kulandaivelu.A.R, *Basic Principles of practical Chemistry,* 2nd edition, S. Chand & Sons Publications, New Delhi, 2005.

UCHM406 INSTRUMENTAL METHODS OF ANALYSIS

Semester	: IV	**Credit**	: 4
Category	: Core IX	**Hours/Week**	: 4
Class &Major	: II B.Sc Chemistry	**Total Hours**	: 52

Objectives
To enable the students
- Acquire the fundamentals and principles of spectroscopic techniques.
- Enhance the knowledge in thermo and electro analytical methods.

UNIT - I FUNDAMENTALS OF SPECTROSCOPY 9 Hrs

Electromagnetic spectrum: Electromagnetic radiation - properties, wave parameters - interaction of light with matter - types of spectroscopy: Atomic & Molecular spectroscopy - Absorption and Emission spectra.

UNIT - II UV AND IR SPECTROSCOPIC TECHNIQUES 10 Hrs

UV-Visible spectroscopy – Principle, instrumentation - photocolorimeter and spectrophotometer. Infrared spectroscopy - principle, instrumentation - source - monochromator – cell - sampling techniques - detector and recorders.

UNIT-III ATOMIC ABSORPTION AND EMISSION SPECTROSCOPIC TECHNIQUES
10 Hrs

Flame Spectroscopy, Atomic Absorption Spectroscopy (AAS): Principle, theory, instrumentation and application. Luminescence Spectroscopy, Fluorescence Spectroscopy: Principle, theory, instrumentation and application.

UNIT - IV ELECTRO ANALYTICAL METHODS 12 Hrs

Polarography - principle - concentration polarization- dropping mercury electrode-advantage and disadvantage - convection, migration and diffusion currents - illkovic equation(derivation not needed) and its significance - Amperometry - principle and uses.

UNIT - V THERMO ANALYTICAL METHODS 11 Hrs

Principles and instrumentation thermo gravimetric analysis and differential gravimetric analysis – characteristics and curves - factors affecting TGA and DTA curves- calcium oxalate monohydrate and silver nitrate- thermometric titrations-principle and applications

Text Books
- Gopalan .R, *Elements of analytical chemistry*, Sultan Chand, 2009.
- Kaur, *Instrumental methods of chemical analysis*.

Reference Books
- Khopkar S.M, *Analytical Chemistry*, New Age International, 2006.
- Skog.A and West .M, *Fundamentals of analytical chemistry*, Saunders College Publications, 2004.
- Sharma B.K, *Instrumental methods of chemical analysis* God Publications, 2007.
- Usharani. S, *Analytical Chemistry*, Macmillan, 2008.

UCHM507 DAIRY AND ITS PRODUCTS

Semester : IV & V	**Credit : 4**
Category : Core X	**Hours/Week : 2 + 4**
Class & Major: II & III B.Sc Chemistry	**Total Hours : 78**

Objectives
To enable the students
- Locate various bodies to recognize and unorganized marketing
- Analyze the various components present in the milk products
- Evaluate the various properties and processes incorporating with milk products

UNIT – I MARKET MILK INDUSTRY   **15Hrs**

Introduction to MMI - Market milk Industry. Organized, Unorganized marketing system. Study of major aided projects such as NDDB, OF, Technology mission in dairy development and National dairy plans - Milk Production, Utilization and consumption pattern, seasonal and regional variation - Dairy development policy in India.

UNIT – II PROCESSING OF MILK – I   **15Hrs**

Straining, filltration, clarification of market milk - Reception and preliminary testing of incoming milk - Methods of milk preservation – methods of cooling and chilling of milk, farm cooling, refrigeration, LP system. Bio-protective factors for raw milk preservation. Bio-Preservation of Milk-bactofugation - Homogenization of Milk

UNIT – III PROCESSING OF MILK – II   **16Hrs**

Processing of Milk-pasteurization of milk principle, methods, LTLT, HTST, in bottle pasteurization, UHT, Uperization, stassanization, vacration. Sterilization of milk - Manufacturing of special milks-Soya milk, Groundnut milk, irrediated milk, fortified milk-Milk distribution systems. Problems of return and unsold milk.

UNIT – IV TECHNOLOGY OF WESTERN DAIRY PRODUCTS   **16Hrs**

Classification of western dairy products - Cream-Definition, Composition, methods of cream separation, types of cream, factors affecting cream skimming efficiency and defects in

cream - Butter-History, definition, composition, types, churning theories, methods of manufacturing, overrun, defects and storage.

UNIT – V FROZEN DAIRY PRODUCTS   16Hrs

Ice-cream – History, development and status of ice-cream industry. Definition, Composition methods of manufacturing and nutritive value. Types and standards of Ice-cream. Role of milk constituents in manufacturing of Ice-cream. Study and role of dairy and non-dairy ingredients in Ice-cream.

Text Books
- B Srilakshmi "*Food Science*", New Age International Publishers, 2015.
- Swaminathan .M - "*Advanced text book on Food and Nutrition',* Vol II – Applied aspects, Bapcco Publishers, 2015
- Harish Sharma, Dairy Science and Technology and Food and Dairy Engineering, CBS Publishers & Distributors, 2005

Reference Books
- Awapapa.J - "*Introduction to biological chemistry"* – prentice hall,2013.
- N.P. Wong, R. Jenness, M.Keeney and E.H.Marth - "*Fundamentals of dairy chemistry*", CBS Publishers, 2001.

UCHP501 PROJECT

Semester : IV & V		**Credit : 4**	
Category : Core X		**Hours/Week : 2 + 4**	
Class & Major: II & III B.Sc., Chemistry		**Total Hours : 78**	

I. Guidelines
- This course offered as group project
- No of students is limited 5 to 6

II. Evaluation Pattern for the Project

S.No	Components	CIA	ESE
1	Deign the Research origin	10	
2	Review of Literature	10	
3	Experimentation	10	
4	Experimentation result	10	
5	Project Report	10	
6	Viva voce	10	
	Total	**60**	**40**

ALLIED COURSES OFFERED TO OTHER DEPARTMENTS

UCHA402/UCHA403 CHEMISTRY FOR PHYSICS

Semester : IV   **Credit** : 3
Category : Allied   **Hours |Week** : 3
Class &Major : II B.Sc., Physics   **Total Hours** : 39

Objectives
To enable the Students
- Understand the fundamentals atomic structure and nuclear chemistry.
- Analyse the conductance of solutions and electromotive forces using electro analytical techniques.
- Differentiate the types and properties of solids.

UNIT- I ATOMIC STRUCTURE   7 Hrs

Different of model atomic structure: Dalton, Thomson's model and Rutherford, Quantum numbers - n, l, m, s. Pauli exclusion Principle. Energy level diagram, Hunds rule of maximum multiplicity, Stability of half filled & completely filled orbitals. Shapes of s,p,d,f block elements. Electronic configuration of few elements.

UNIT - II NUCLEAR CHEMISTRY   7 Hrs

Fundamentals particles of the nucleus - nucleon terminology , nuclides, isotopes, isobars ,isotones, mirror nuclei-induced radio activity of radio isotopes - nuclear energy - fission - fusion - Nuclear reactors - accelerators (charged particles)

UNIT - III SOLID STATE AND PHOTOCHEMISTRY   10 Hrs

Solid State : Crystal latatice - laws of crystallography - elements of symmetry - crystal systems - unit cell- space lattice - Bravias lattice - structure of Nacl - structure of Cscl - Miller indices.

Photochemistry: Grothus - Drapers law, Stark Einsteins law - Quantum yield - photosythesis, phos phorescence - fluorescence - chemiluminescence - photosensitisation

UNIT- IV ELECTRO CHEMISTRY AND GALVONIC CELLS   8 Hrs

Electro Chemistry: Specific and equivalent conductivity - their determination, effect of dilution

Galvonic Cells: EMF and its origin, standard electrode potentials ,reference electrode (SHE& Calomel).Electrochemical series and its applications. Formation of standard cells, cell reaction and lead storage cell.

UNIT - V POLYMERS   7 Hrs

Introduction- classification of polymers: natural and synthetic-types of polymerization-Thermoplastic and Thermosetting polymers- uses of Nylon 6, 6 and Epoxy resins.

Text Books
- Madan. R.D, *Modern Inorganic Chemistry,* 2nd Edition, S.Chand& Company Limited, New Delhi, 2005.

- Puri.B.R, Sharma.L.R, & Pathania.M.S, *Principles of Physical Chemistry,* Millennium Edition, Vishal publishing & Co, Jalandhar, 2004.

Reference Books
- Soni.P.L, *Text Book of Physical Chemistry,* 25th Revised Edition, Sultan Chand, New Delhi, 2004.
- Puri.B.R, Sharma.L.R and Kallia.K.C, *Inorganic Chemistry,*Milstone Publisher, New Delhi, 2003.

UCHR104/ UCHR404 VOLUMETRIC ANALYSIS

Semester	: I/IV	**Credit**	: 2
Category	: Allied Practical	**Hours/ week**	: 3
Class &Major	: I B.Sc Biochemistry/ II B.Sc Physics	**Total Hours**	: 39

Objectives
To enable the students
- Estimate the chemical substance using Quantitative Analysis.
- Acquire the Skills in Quantitative Analysis.

Volumetric Analysis
1. Estimation of sodium hydroxide using standard sodium carbonate
2. Estimation of HCl using standard oxalic acid
3. Estimation of oxalic acid by $KMnO_4$ using standard oxalic acid
4. Estimation of borax using standard sodium carbonate
5. Estimation of Ferrous sulphate using standard Mohrs salt
6. Estimation of zinc using EDTA

Reference Books
- Thomas.A.O, *Practical chemistry,* 2nd edition, Scientific Book Center, Cannanore, 2006.
- Venkateswaran.V, Veerasawamy.R & Kulandaivelu.A.R, *Basic Principles of practical Chemistry,* 2nd edition, S. Chand & Sons Publications, New Delhi, 2008.

III and IV Evaluation Component of CIA

Semester	Course Code	Course Title	Component-III	Component-IV
III	UCHM305	General Chemistry –III	Assignment	Seminar
	UCHM306	Separation & Purification Techniques	Poster Presentation	Seminar
IV	UCHM405	General Chemistry –IV	Assignment	Seminar
	UCHM406	Instrumental Methods of Analysis	Poster Presentation	Seminar
	UCHM507	Dairy and its products	Assignment	Preparation of milk product
	UCHA402/UCHA403	Chemistry for Physics	Assignment	Seminar
	UCHR404/UCHR405	Semi micro Qualitative Inorganic Analysis	DPA	Viva Voce
	UCHR104/ UCHR404	Volumetric Analysis	DPA	Viva Voce

PROGRAMME PROFILE M.Sc. (Chemistry)

PSO1: Development of the skills in handling various chemicals, apparatus and instruments.

PSO2: Application of the principles of thermodynamics and chemical kinetics in chemical reactions

PSO3: Acquiring the knowledge on heterocyclic compounds and natural products

PSO4: Ability to apply the basic principles of various spectroscopic, electro and thermo analytical methods to characterize the compounds

PSO5: Industrial insights on polymers, textile dyes, fibre and medicinal chemistry.

Semester	Category	Course Code	Course Title	Contact Hrs/Week	Credits	
					Min	Max
I	Core-I	PCHM107/PCHM111	Organic Chemistry-I	5	4	4
	Core-II	PCHM108/PCHM112	Inorganic Chemistry-I	5	4	4
	Core-III	PCHM109	Physical Chemistry-I	5	4	4
	Core-IV	PCHM110	Nano Science and Nano Materials	5	4	4
	Core Practical-I	PCHR203	Organic Practical	5	-	-
	Core Practical-1I	PCHR204	Inorganic Practical	5	-	-
			Total	**30**	**16**	**16**
II	Core-V	PCHM204	Organic Chemistry-II	5	4	4
	Core-VI	PCHM205	Inorganic Chemistry-II	5	4	4
	Core-VII	PCHM206	Physical Chemistry-II	5	4	4
	Core Practical-I	PCHR203	Organic Practical	5	5	5
	Core Practical-II	PCHR204	Inorganic Practical	5	5	5
	Non-Major Elective			5	4	4
	Service Learning	PCHX201	Vermicomposting	-	1	1
			Total	**30**	**27**	**27**
III	Core-VIII	PCHM306	Organic Chemistry-III	6	5	5
	Core-IX	PCHM307	Inorganic Chemistry-III	6	4	4
	Core –X	PCHM308	Physical Chemistry-III	6	4	4
	Core-XI	PPHI301/PCHI301	Sustainable Materials and Technologies	5	5	5
	Core Practical – III	PCHR401	Physical Chemistry Practical	5	-	-
	Core XVI	PCHP401	Project	2	-	-
			Total	**30**	**18**	**18**
IV	Core-XII	PCHM404	Organic Chemistry-IV	6	5	5
	Core-XIII	PCHM408	Inorganic Chemistry-IV	5	4	4
	Core-XIV	PCHM409	Physical Chemistry-IV	5	4	4
	Core-XV	PCHM410	Research Methodology	5	4	4
	Core Practical – III	PCHR401	Physical Chemistry Practical	5	6	6
	Core XVI	PCHP401	Project	4	6	6
			Total	**30**	**29**	**29**
			Total	**120**	**90**	**90**

PCHM306 ORGANIC CHEMISTRY- III

Semester	: III	**Credit**	: 5
Category	: Core VIII	**Hours/Week**	: 6
Class &Major	: II M.Sc. chemistry	**Total Hours**	: 78

Objectives

To enable the students
- Understand the various spectroscopic methods to interpret the structure of the compounds
- Apply the gained knowledge from Alkaloids to extract it from natural products.

UNIT–I HETEROCYCLIC COMPOUNDS   **18 Hrs**

Nomenclature of heterocyclic compounds. Preparation, Properties and uses - Pyrazole, Oxazole, Pyridazine, Pyrimidine, Pyrazines and Thiozole.

Alkaloids: Classification and isolation of alkaloids - General methods of Structural elucidation. Structural elucidation of Papaverine, Cocaine.

UNIT-II UV AND IR SPECTROSCOPY   **15 Hrs**

UV–Visible spectroscopy: Frank-condon principle, Types of electronic transitions, Chromophores & Auxochromes, absorption and intensity shifts, Factors influencing positions & intensity of absorption bands, Absorption spectra of dienes, polyenes & unsaturated carbonyl compounds, Woodward – Fieser rules.

IR spectroscopy – Principle, vibrational frequencies & factors affecting them, identification of functional groups, Finger Print Region, Significance of Far IR region.

UNIT-III MASS SPECTROMETRY   **15 Hrs**

Principle - EI, CI & FAB – Base peak, isotopic peaks, metastable peak, parent peak, Fragmentation–Nitrogen, even electron rule and pattern, McLafferty rearrangement, Retro - Diel's Alder reaction fragmentation pattern of hydrocarbons, alcohols, aldehydes and ketones.

UNIT-IV NMR SPECTROSCOPY   **18 Hrs**

Basic principles of NMR experiments – CW & FT NMR – ^{1}H NMR – Chemical Shift & Coupling constant – Factors influencing Proton Chemical Shift & Proton – Proton Coupling constant, AX & AB spin system – Spin decoupling – Nuclear Overhaust effect – Chemical exchange. ^{13}C NMR chemical shift & factor affecting ^{13}C Chemical shift.

UNIT-V IDENTIFICATION OF ORGANIC COMPOUNDS: **12 Hrs**

Identification of organic molecules using UV, IR, NMR and Mass spectroscopic techniques.

Text Books

- Finar .I.L, *Organic Chemistry*, Vol-I&II, Fifth Edition, ELBS Publication, 2006.
- Sharma. Y.R, *Elementary Organic Spectroscopy*, Fifth Edition, S. Chand Publication, 2013.
- Jag mohan, *Organic Spectroscopy: Principles and Applications*, Second Edition, Alpha Science International Ltd., Harrow, U.K.

Reference Books

- Dyer.J, *Applications of Organic Spectroscopy*, Prentice & Hall of IndiaPvt Ltd., NewDelhi,1980.
- Mukerjee.S.M & Singh.S.P, *Organic Reaction Mechanism*, McMillan India Ltd.,Chennai, 1990.
- Gurdeep R. Chatwal, *Organic chemistry of Natural products*, Volume I & II Himalaya Publishing House , New Delhi, 2009.
- Kemp. W, *Organic Spectroscopy*, Mcmillan Lid., 2001.
- Silverstein.R.M, G.D.Bassler & Monsu*, Spectrometric Indentification of OrganicCompounds,* John Wiley & Sons, NewYork , 2004.

e- Books

- https://www.k-state.edu/bmb/labs/jc/teaching/bioch590/bioch590-6-NMR.pdf
- https://www.weizmann.ac.il/plants/aharoni/sites/plants.aharoni/files/uploads/june19 2007.pdf
- http://chemistry.syr.edu/totah/che575/support/3a1/3-1.MS.pdf

PCHM307 INORGANIC CHEMISTRY- III

Semester	**: III**	**Credit**	**: 4**
Category	**: Core IX**	**Hours/Week**	**: 6**
Class &Major	**: II M.Sc. chemistry**	**Total Hours**	**: 78**

Objectives
To enable the students
- Know about the application of Nuclear Chemistry in various fields
- Understand the properties & applications of f-block elements.
- Interpret the spectra for Inorganic compounds.

UNIT-I   CHEMISTRY OF LANTHANIDES AND ACTINIDES   15 Hrs

Lanthanides and actinides - Occurrence, isolation Position in the periodic table, lanthanide contraction, oxidation state, color, spectral, magnetic characteristics, coordination numbers, stereochemistry, nuclear and non-nuclear applications.

UNIT-II NUCLEAR CHEMISTRY-I   16 Hrs

Subatomic particle,   isotope, isotone, isobar, nuclear forces, meason theory of nuclear forces, stability of the nucleons-N/P ratio and stability belt, liquid drop model, shell and combined model of the nucleus. Mass defects and Binding energy. Natural and artificial radioactivity. Radioactivity disintegration, Group displacement law, radioactive series, Trans uranium element.

UNIT-III NUCLEAR CHEMISTRY-II   16 Hrs

Nuclear transmutation, classification of nuclear reactions- elastic, inelastic, spallation, capture, fission and fusion reaction, Q-value of nuclear fission, mechanism and fission bomb. Nuclear fusion-Mechanism, stellar energy and Hydrogen bomb. Modes of radioactive decay –

detection and determination of activity by Cloud Chamber and Geiger Muller Counter. Nuclear reactors – Fast Breder reactors, particle accelerators, Cyclotron and Synchrotron. Neutron Activation Analysis, isotopic dilution analysis, Dosimetry.

UNIT– IV ORGANO METALLIC CHEMISTRY -I   15 Hrs

Carbon donors: Alkyls and aryls metallation, Chain and cyclic donors, olefines, acetylene, and allyl system.

Reactions: Association, substitution, addition and elimination reactions, ligand protonation, electrophilic and nucleophilic attack on ligands. Carbonylation, decarboxylation, oxidative addition and fluxionality.

UNIT- V ORGANO METALLIC CHEMISTRY -II   16 Hrs

Catalysis: Hydrogenation of olefins(Wilkinson's catalyst), hydroformylation of olefins using cobalt or rhodium catalysts (Oxo process), oxidation of olefins to aldehydes and ketones (Wacker process) polymerization (Zeigler-Natta catalyst): cyclo oligomerisation of acetylene using Nickel catalyst(Reppe's catalyst), polymer bound catalysts.

Text Books
- Arniker .H.J, *Nuclear chemistry*, wiley Eastern Co, II Edition , 2000.
- Wahid U.Malik, G.D.Tuli & R.D.Madan, *Selected Topics in Inorganic Chemistry*, S.Chand & Company Ltd., New Delhi, 2010.

Reference Books
- Maheshwar Sharma & Madhuri Sharma, *Nuclear chemistry*, Ane Books Pvt. Ltd, 2009.
- Singh. G, *Chemistry of Lanthanides and Actinides*, Discovery publishing, 2008.
- J.E.Huheey, E.A. Keiter and R.L. Keiter , *Inorganic Chemistry*; 4th ed.; Harper and Row: NewYork, 1983.

e-Books
- https://www.alchemyst.co.uk/pdf/Inorganic/lanthanides_and_actinides.pdf
- http://chemistry.bd.psu.edu/jircitano/Wilkinsons13.pdf
- https://nptel.ac.in/courses/104101006/downloads/lecture-notes/mod3/lec4.pdf

PCHM308 PHYSICAL CHEMISTRY-III

Semester   : III   **Credit   : 4**
Category   : Core X   **Hours/Week : 6**
Class & Major   : II M.Sc Chemistry   **Total Hours : 78**

Objectives
To enable the students
- Acquire the fundamental knowledge in the colloidal system
- Know about the function of the catalysts and its surface action and apply it for research work.

UNIT – I COLLOIDAL STATE   15 Hrs

Colloidal system-classification, Preparation of lyophobic colloidal solutions-Dispersion methods and Condensation methods-Purification of colloidal solutions-general properties of colloidal systems. properties of hydrophobic colloidal systems-Electrical properties and electro kinetics properties. Determination of size of colloidal particles

UNIT-II SURFACE CHEMISTRY   16 Hrs

Kinetics of surface reactions: Physical and chemical adsorption–adsorption isotherms–types of adsorption isotherms–Langmuir adsorption isotherm. B.E.T theory for multilayer adsorption – measurement of surface area – Mechanism of heterogeneous catalytic unimolecular and bimolecular reactions. Adsorption coefficient and its significance.

UNIT-III CATALYSIS   16 Hrs

Acid Base catalysis – mechanism of Langmuir - Hinshelwood and Eley Rideal – Bronsted catalytic law - Catalysis by enzymes – effects of substrate concentration, pH and temperature on enzyme catalyzed reactions – reversible and irreversible enzyme inhibition mechanism.

UNIT–IV KINETICS OF REACTIONS IN SOLUTION AND FAST REACTION   15 Hrs

Kinetics of reaction in solution – Diffusion controlled reactions in solutions- influence of ionic strength on rates of reactions – primary and secondary salt effect, dielectric constant.

Kinetics of fast reaction – relaxation method - temperature and pressure jump methods-flash photolysis.

UNIT–V CORROSION   16 Hrs

Corrosion – definition – costs of corrosion – economic losses –human life and safety – types of corrosion- dry corrosion – wet corrosion –mechanisms - galvanic corrosion – concentration cell corrosion – atmospheric corrosion – soil corrosion – pitting corrosion - inter-granular corrosion-water line corrosion – stress corrosion – microbial corrosion.

Overvoltage and evolution of oxygen and hydrogen at different pH. Symmetry factors vs transfer coefficients. Corrosion and passivation of metals - Pourbiax and Evan's diagrams. Corrosion control methods. Inhibitor – types and theory

Text Books
- D. R. Crow, *Principles and applications of electrochemistry*, 4thedition, Chapman & Hall/CRC, 2014.
- Atkins .P and J. de Paula, *Physical Chemistry*, 7th ed., Oxford University Press, Oxford, 2002.

Reference Books
- Gabor A. Somorjai Yimin Li, *Introduction to Surface chemistry and Catalysis*, 2nd ed., John Wiley & Sons, 2010
- Puri , Sharma and Pathania, *Principle of Physical chemistry*, 46th Edition, Vishal publication, 2013.
- K.J. Laidler, *Chemical Kinetics*, Third Edition, Pearson Education India, 2008.

e-Books
- https://nptel.ac.in/courses/113108051/module1/lecture1.pdf
- http://www.uobabylon.edu.iq/eprints/publication_12_18276_228.pdf

PPHI301/PCHI301 SUSTAINABLE MATERIALS AND TECHNOLOGIES

Semester	**: III**	**Credit**	**: 5**
Category	**: Core XI**	**Hours/week**	**: 5**
Class & Major: II - M.Sc Chemistry & Physics		**Total Hours**	**: 65**

Objectives
To enable the students
- Understand the concept of sustainable materials
- Learn about green chemistry strategies for designing the chemical synthesis.
- Explore the theoretical understanding of various physical and chemical properties of nanomaterials.

UNIT– I INTRODUCTION TO MATERIALS　　　　　　　　　13 Hrs

Concept of Sustainable materials, Classification of materials: Crystalline & amorphous materials, high Tc superconductors, alloys & composites, semiconductors, solar energy materials, luminescent and optoelectronic materials, Polymer, Liquid crystals and quasi crystals, Ceramics.

UNIT– II GREEN CHEMISTRY　　　　　　　　　　　　　14 Hrs

Introduction: Prospects and future of Green Chemistry - Twelve guiding principles of green chemistry - Concept of atom economy - Green starting materials, Green reagents, Green solvents and reaction conditions, Green synthesis - Real world cases (Traditional Vs. Green processes) Synthesis of Ibuprofen, Adipic acid - Biomimetic, multifunctional reagents; Combinatorial green chemistry; Non-covalent derivatization.

UNIT– III GREEN TECHNOLOGIES　　　　　　　　　　　13Hrs

Green Solvents: Enhancement of selectivity, efficiency, and industrial applicability - Ionic liquids-Supercritical fluids - Solvent free neat reactions in liquid phase - Flourous phase reactions Green Catalysis: Heterogeneous catalysis: Use of zeolites, silica, alumina, clay, polymers, cyclodextrins, and biocatalysts.

UNIT– IV CHARACTERIZATION TECHNIQUES RELATED TO NANOMATERIALS
　　　　　　　　　　　　　　　　　　　　　　　　　13 Hrs

Electron Microscopy techniques: Scanning Electron Microscope, Transmission Electron Microscope, Field emission scanning electron microscopy, Atomic Force Microscopy, X-ray photoelectron spectroscopy, (XPS), Energy Dispersive X-Ray Analysis (EDX).

UNIT– V APPLICATION OF NANOMATERIALS   **12 Hrs**

      Overview of nanomaterials properties and their applications, Molecular Electronics and Nanoelectronics – Nanobots- Biological Applications – Quantum Devices – Nanomechanics – Photovoltaic cells- Nano structures as single electron transistor.

Reference Books
- K. Barriham, D.D. Vvedensky, *Low Dimensional Semiconductor Structures: Fundamental and Device Applications*, Cambridge University Press, 2001.
- V.K. Ahluwalia, *Methods and Reagents of Green Chemistry: An Introduction by Green Chemistry*, Ane Books India, 2006.
- Bontempi, Elza, *Raw Materials Substitution Sustainability*, Springer International Publishing, 2017.
- G. Cao, *Nanostructures & Nanomaterials: Synthesis, Properties & Applications,* Imperial College Press, 2004.

Text Books
- J.George, Marcel Dekker, *Preparation of Thin Films*, Inc., New York. 2005.
- Rashmi Sanghi & M. M. Srivastava, *Green Chemistry – Environment Friendly Alternatives*, Narora Publishing House, 2003.
- Elson Longo, Felipe de Almeida La Porta*, Recent Advances in Complex Functional Materials,* Springer, 2017.

e-Books
- https://asdlib.org/onlineArticles/ecourseware/Bullen/SPMModule_BasicTheoryAFM.pdf
- http://etsf.ehu.es/files/nanorobots_work.pdf
- http://www.me.nchu.edu.tw/lab/CIM/www/courses/Manufacturing%20Processes/Ch07-Ceramics-Wiley.pdf

PCHR401 PHYSICAL CHEMISTRY PRACTICAL-I

Semester   **: III & IV**   **Credit**   **: 6**
Category   **:Core Practical -III**   **Hours/Week : 5+5**
Class & Major: II M.Sc Chemistry   **Total Hours : 130**

Objectives
To enable the students
- Understand some theoretical concepts by experimental methods
- Interpret the results in accurate manner

Phase rule
- Binary system of Naphthalene & Biphenyl
- Binary system of Naphthalene & M-dinitrobenzene
- Three component System(CH_3COOH, H_2O & $CHCl_3$)

Kinetics
   - Hydrlolysis of Ester
   -KI Vs $K_2S_2O_8$
   -I_2 Vs CH_3COCH_3 (By Calorimetric method)
   -Comparision of Strength of two Acids.

Partition Co-efficient
- Instability constant ($KI_3 = KI + I_2$)
- Strength of KI

Potentiometry
- Mixture of acids Vs Strong base
- FAS Vs $K_2Cr_2O_7$
- Determination of dissociation constant of week acid
- Sparingly soluble salts $BaSO_4$ (concentration cell)

Conductometric
- Mixture of acids Vs NaOH
- Verification of Onsager's theory
- Degree of dissociation & dissociation constant of a week electrolyte
- Determination of solubility of a sparingly soluble salts

Polarimeter
- Inversion of Sucrose

Text book
- Alexander Findlay and Kitcher. J.A, "Practical physical chemistry", Longmans, Green, 2010.

Reference book
- Shoemaker .D.P and Garland .C.W, "Experiment physical chemistry", 8th ed., Mc Graw- Hill, New York, 2009.

PCHM404 ORGANIC CHEMISTRY- IV

Semester	: IV	**Credits**	: 5
Category	: Core XI	**Hours/Week**	: 6
Class & Major	: II-M. Sc., Chemistry	**Total Hours**	: 78

Objectives
To enable the students
- Understand the principles to differentiate the Photochemical and Pericyclic reactions.
- Apply the chemistry concepts to categorize the different reagents and rearrangements in organic synthesis.
- Expose the mechanism of writing skill in Retro synthesis reactions.

UNIT - I PHOTOCHEMISTRY   **18 Hrs**

Absorption of Electromagnetic Radiation-Excited state,Types - Quantum yield - jablonski diagram : Phosphorescence & Fluorescence - Energy transfer and Photo sensitization- Inter system crossing - photochemical reactions - photoreduction, photo enolisation, cis - trans isomerisation, photo oxidation, photo addition, photoreactions of ketones - Norrish type I & II reactions and Di-Pi methane rearrangement.

UNIT - II PERICYCLIC CHEMISTRY   **15 Hrs**

Introduction of pericyclic reactions - Conservation of molecular orbital Symmetry - Methods to explain Pericyclic reactions - Electrocyclic reactions (FMO Approach) -

Cycloaddition - Cheleotropic reactions - Sigmatropic Rearrangement - Correlation Diagram method

UNIT - III MOLECULAR REARRANGEMENT 15 Hrs

Introductory concept of rearrangements, migrating aptitude, memory effect. Pinacol - Pinacolone, Wager- Meerwein, , Favorski, Baeyer - Villiger, Wolf, Stevens (in cyclic systems) Von Richter rearrangements, Hoffman, Curtius, Lossen, Schmidt, Beckman,Benzil-Benzilic, Benzidine , Fries and cope rearrangement.

UNIT - IV MORDERN REAGENTS FOR ORGANIC SYNTHESIS 12 Hrs

CrO_3, peracids, Osmiumtetroxide, DDQ, Seleniumdioxide, DCC, DMSO, aluminium triisopropoxide, Diazomethane, LAH, $NaBH_4$, organoboranes, , NBS, LTA, Wittig reagent. Pd compounds- heck & Suzuki coupling.

UNIT - V RETROSYNTHESIS 18Hrs

An introduction to retero synthesis - Synthon, Synthetic equivalent, Umpolung-Target molecule, Functional group interconversion, Disconnection approach - One group disconnection - Disconnection of alcohols, olefins and ketones - Logical and illogical disconnection, Two group disconnection- 1,2 - 1,3 - 1,4 - 1,5 and - Deoxygenated skeletons and dicarbonyls. Retero Diels Alder reaction, Reterosynthesis .

Text books
- Jonathanclayden, Nick Greeves and Warrner Stuart, Organic Chemistry, Oxford University Press, Oxford, UK, 2012.
- Jerry March, *Advanced Organic Chemistry,* 6th edition, John Wiley & Sons.NewYork, 2007.
- Ahluwalia .V.K, *Organic Reaction Mechanism*, 4th edition, Narosa Publishers,2011.

Reference books
- Coyle .J.D, *Organic Photo Chemistry*-Wiley,2004
- Aggarwal. O.P, " *Reaction and Reagents in organic chemistry*", 4th edition, Goyle publications, 2004.
- Gaikwad .N.J, Chaudari R.Y, Patil V.R., *Retrosynthetic analysis and synthesis of drugs*, Nirali prakashan Publication, 2006.

e-Books
- https://www.massey.ac.nz/~gjrowlan/chem312/lct1.pdf
- http://diposit.ub.edu/dspace/bitstream/2445/61063/25/5.%20Organic%20Synthesis.%20Introduction%20to%20Retrosynthetic%20Analysis.pdf
- https://www.massey.ac.nz/~gjrowlan/chem312/tutorial.pdf

PCHM408 INORGANIC CHEMISTRY – IV

Semester	**: IV**	**Credit**	**: 4**
Category	**: Core XIII**	**Hours/Week**	**: 5**
Class &Major	**: II M.Sc. chemistry**	**Total Hours**	**: 65**

Objectives
To enable the students
- Understand the basic concept of supramolecular and green chemistry
- Acquire skill to interpret the spectra of NMR,EPR and NQR for inorganic compounds.

UNIT – I INORGANIC CHAINS, RINGS, CAGES AND CLUSTERS **15 Hrs**

Silicate minerals – ortho-, pyro-, and meta-silicates – pyroxene, amphiboles– two-dimensional silicates – talc, mica and three dimensional aluminosilicates, feldspar, ultramarine – Polymeric sulphur nitride, phosphonitrilic compounds-trimers and tetramers - homocyclic inorganicring systems – Concept of multi-centered bond – structure of B_2H_6, B_4H_{10}, $[B_{12}H_{12}]^{2-}$, B_6H_{10}, B_8H_{12}, $B_{10}H_{14}$ – Wade's rules, closo, nido, arachno boranes and carboranes – The "styx" code.

UNIT – II EPR SPECTROSCOPY **12 Hrs**

Electron spin resonance: theory, g value– factors affecting the magnitude of g- values , hyperfine structure, ESR of organic free radicals, ESR of inorganic ions, ESR of simple free radicals in solutions, zero field splitting and Krammer's degeneracy.

UNIT-III APPLICATIONS OF NQR AND MOSSBAUER SPECTROSCOPY **14 Hrs**

NQR Spectra of transition metal complexes, metal hyperfine anisotropic spectra. Zero-field splitting, applications. Massbauer-Principles, isomer shift, quadrapole effect of magnetic field, Magnetic hyperfine interactions, Applications of the technique to the studies of (i) bonding and structures of Fe^{2+} and Fe^{3+} compounds including those of intermediate spin, (ii) Sn+2 and Sn+4 compounds, nature of M-L bond, coordination number, structure and (iii) detection of oxidation state.

UNIT-IV SUPRAMOLECULAR CHEMISTRY **12Hrs**

Metallocenes- Electronic structure and bonding in ferrocene- synthesis – physical and spectroscopic properties of metallocenes- reactions and applications of metallocenes- multiple decker sandwich complexes- application of metallocenes in polymers- non-linear optics- medicine- molecular recognition– catalysis.

UINT-V GREEN CHEMISTRY **12 Hrs**

The Twelve principles, atom economy for addition, elimination, substitution reactions and its calculation, green starting materials, green reagents, green catalysts, green solvents and green reactions.

Text Books
- Parish. R. V, *NMR, NQR, EPR and Mossbauer Spectroscopy in Inorganic Chemistry*, EllisHorwood, New York, 1990.
- Ahluwalia .V.K and Varma, *Text book of Green Chemistry* ,3rd ed., Ane Books Pvt. Ltd, 2013

Reference Books
- Gokel. W, "*Advances in Supramolecular Chemistry*", Vol.7, Jai press INC, 2000.
- J.E.Huheey, E.A. Keiter and R.L. Keiter , *Inorganic Chemistry*; 4th ed.; Harper and Row: NewYork, 1983.

e-Books
- https://www.rsc.org/Education/Teachers/Resources/Inspirational/resources/6.4.4.pdf
- https://nptel.ac.in/courses/104108062/module6.pdf
- http://www.anilmishra.name/notes/nqr1.pdf

PCHM409 PHYSICAL CHEMISTRY-IV

Semester	**: IV**	**Credit**	**: 4**
Category	**: Core XIV**	**Hours/Week**	**: 5**
Class &Major	**: II M.Sc. chemistry**	**Total Hours**	**: 65**

Objectives
To enable the students
- Understand the principles of Magnetic, Quadruple and Electron resonance spectroscopy.
- Analyse the samples using different analytical techniques like SEM, TEM, AFM, STM, Polarography and cyclic voltammetry.
- Differentiate cells by using photo analytical techniques.

UNIT– I ROTATIONAL AND VIBRATIONAL SPECTROSCOPY   15 Hrs

The rotation of molecules, rotational spectra-rigid diatomic molecule, intensity of spectral lines, selection rules, effect of isotopic substitution. Diatomic molecules as non-rigid rotors. Polyatomic molecules-linear, symmetric and asymmetric top molecule. Stark effect.

Vibrating diatomic molecule: energy of diatomic molecules as simple harmonic oscillator-energy levels, vibrational transitions, selection rules; anharmonic oscillator-energy levels, selection rules, vibrational transitions. - Diatomic vibrating rotator: Born-Oppenheimer approximation, vibration of polyatomic molecules-fundamental vibrations, linear molecules, symmetric top and asymmetric top molecules.

UNIT - II MICROSCOPY TECHNIQUES   12 Hrs

Principle, theory, Instrumentation and Application of Optical microscopy - Scanning electron microscope (SEM) - Transmission electron microscope (TEM)- Atomic force microscope(AFM) - Surface Tunneling microscope (STM) - Energy dispersive X-ray spectroscopy (EDX).

UNIT – III MACROMOLECULES   13 Hrs

Polymerization in homogeneous and heterogeneous phases - Kinetics of polymerization (Ionic and Addition)-kinetics of copolymerization - Mechanism of Polymerization - Chain Initiation- Propagation - Termination-Transfer -Inhibition and Retardation. Properties of polymers : Molecular weight of polymers - Mw, Mn determination - Light Scattering, Ultra centrifuge - Gel Permeation Chromatography.

UNIT- IV PHOTO and Radiation Chemistry   10 Hrs

Photovoltaic and photogalvanic cells, photoelectrochemical cells, photo assisted electrolytes of water, aspects of solar energy conversion. Radiation chemistry-Interaction of high energy radiation with matter-primary and secondary processes-G value- radialysis of water-hydrated electron.

UNIT - V ELECTRO ANALYTICAL TECHNIQUES   15 Hrs

Polarography – theory, DME, diffusion, Kinetic and catalytic currents, current-voltage curves for reversible and irreversible systems, Qualitative and quantitative application to

inorganic systems. Amperometric titrations- theory, types of titration curves, Cyclic Voltammetry - theory, instrumentation, differential pulse Voltammetry - principle and instrumentation.

Text Books
- Banwell .C. N and McCash .E. M, *Fundamentals of Molecular Spectroscopy*, 4th ed., Tata McGraw Hill, New Delhi, 2007.
- Drago. R. S, *PhysicaI Methods in Chemistry; Saunders*: Philadelphia, 2008.
- Allen J. Bard and Israel Rubinstein, *Electroanalytical chemistry*, vol.22, Marcel Dekker, 2004.

Reference Books
- Atkins. P and J. de Paula, *Physical Chemistry*, 7th ed., Oxford University Press, Oxford, 2002.
- Raman .K. V, Gopalan .R and Raghavan .P. S, *Molecular Spectroscopy*, Thomson and Vijay Nicole, Singapore, 2004.
- Weil .J. A, Bolton .J. R and Wertz .J. E, *Electron Paramagnetic Resonance*; Wiley Interscience, 2005.

e-Books
- https://pubweb.eng.utah.edu/~lzang/images/Lecture_6_STM.pdf
- https://gcep.stanford.edu/pdfs/assessments/solar_assessment.pdf
- https://shodhganga.inflibnet.ac.in/bitstream/10603/88264/10/10_chapter%201.pdf

PCHM410 RESEARCH METHODOLOGY

Semester	: IV	**Credits**	: 4
Category	: Core XV	**Hours/Week**	: 5
Class & Major	: II M.Sc. Chemistry	**Total hours**	: 65

Objectives
To enable the students
- Identify the research problems
- Analysis of data using software.
- Draft research reports efficiently

UNIT - I LITERATURE SURVEY **13 Hrs**

Nature and importance of research - aims, objective, principles and problems - selection of research problem - survey of scientific literature - primary and secondary sources -citation index for scientific papers and journals - patents.

UNIT - II PROCESSING OF DATA **13 Hrs**

Editing ,Coding, Tabulation-Problems-use of computers in social research-Analysis of data-statistical analysis- Diagramatic and graphic representation-interpretation of research.

UNIT - III STATISTICAL TREATMENT OF ANALYTICAL DATA **13 Hrs**

Sampling –Definition, need and types-Sampling errors - Statistical treatment of finite samples - the students test and F test Criteria for rejection of an observation - the Q test, significant figures and computation rules - data plotting - least square analysis.

UNIT-IV SCIENTIFIC WRITING   15 Hrs

Internet source- e Books, e- Journals, Thesis writing, Website- Information and retrieving Chemical compound search - Conventions of writing - the general format - page and chapter format - Revising editing and evaluating the final product - proof reading - Meanings and examples of commonly used abbreviations.

UNIT – V PROPOSAL WRITING AND PLAGIARISM   11 Hrs

Patent and project proposal – writing – knowledge of various funding agencies. Plagiarism – definition, classification and their limitations

Text Books

- Kothari. C.R, *Research Methadology- Methods and techniques*, New Wiley Eastern Ltd., New Delhi, 2009.
- Paneerselvam, *Research Methadology*, R. Prentice hall of India, New Delhi, 2004.

Reference Books

- Anderson. J, Durston .H.M and Poole. M, "*Thesis and assignment writing*":, Wiley Eastern Ltd., 2007.
- Suresh Chandra, Mohit kr. Sharma, "*Research Methodology*", Alpha science, Oxford, 2013.

e-Books

- http://www.library.auckland.ac.nz/docs/helpsheets/Bibliometrics.pdf
- https://www.researchgate.net/...plagiarism...plagiarizing.../The-Effect-of-Anti- plagiaris...

III and IV Evaluation Component of CIA

Semester	Course Code	Course Title	Component-III	Component-IV
III	PCHM306	Organic Chemistry-III	Mechanism writing	Seminar
	PCHM307	Inorganic Chemistry-III	Assignment	Seminar
	PCHM308	Physical Chemistry-III	Assignment	Seminar
	PCHI301	Sustainable Materials and Technologies	Poster Presentation	Seminar
IV	PCHM404	Organic Chemistry- IV	Mechanism writing	Seminar
	PCHM408	Inorganic Chemistry – IV	Assignment	Seminar
	PCHM409	Physical Chemistry-IV	Problem Solving	Seminar
	PCHM410	Research Methodology	Assignment	Seminar
	PCHR401	Physical Chemistry Practical-I	DPA	Viva Voce

DEPARTMENT OF MATHEMATICS

PREAMBLE

UG : Programme profile and the syllabi of courses offered in the III and IV semesters along with evaluation components III and IV (With effect from 2018-2021 batch onwards) and

PG : Programme profile and the syllabi of courses offered in the III and IV semesters along with evaluation components III and IV (With effect from 2018-2020 batch onwards) are presented in this booklet.

PROGRAMME PROFILE B.Sc. (Mathematics)

PSO 1: Interpretation of effective use of mathematical skills to solve quantitative problems from a wide array of authentic contexts.

PSO 2: Ability to apply rigorous mathematical arguments in axiomatic and non-axiomatic systems.

PSO 3: Demonstration of effective written communication of mathematical concepts.

PSO 4: Capacity to formulate and develop mathematical arguments in a logical manner

Semester	Part	Category	Course code	Course Title	Contact Hrs/ week	Credit Min	Credit Max
I	I	Language	UTAL105/ UTAL106/ UHIL101/ UFRL101	Basic Tamil-I/Advanced Tamil-I/Hindi-I / French-I	4	2	3
	II	English	UENL107/ UENL108	General English-I/ Advanced English-I	5	3	4
	III	Core I	UMAM103/ UMAM107	Fundamentals of Mathematics	2	1	1
	III	Core II	UMAM104	Differential calculus	5	4	4
	III	Core III	UMAM106	Analytical Solid Geometry	6	5	5
	III	Allied	UMAA111	Mathematical Statistics	6	5	5
	IV	Value Education			2	1	1
				TOTAL	**30**	**21**	**23**
II	I	Language	UTAL205/ UTAL206/ UHIL201/ UFRL201	Basic Tamil II/ Advanced Tamil-II/ Hindi-II /French-II	4	2	3
	II	English	UENL207/ UENL208	General English II/ Advanced English II	5	3	4
	III	Core IV	UMAM204	Integral Calculus	5	5	5
	III	Core V	UMAM402 /	Graph Theory	5	4	4
	III	Core VI	UMAM606/ UMAM206	Discrete Mathematics	5	4	4

	IV	Non Major Elective			4	2	2
	IV	Soft Skill			2	1	1
	V	Extension Programme/ Physical Education			-	1	2
				TOTAL	**30**	**22**	**25**
III	I	Language	UTAL305/ UTAL306/ UHIL301/ UFRL301	Basic Tamil III/ Advanced Tamil-III/ Hindi-III /French-III	4	2	3
	II	English	UENL307/ UENL308	Basic English III/ Advanced English III	5	3	4
	III	Core VII	UMAM306	Differential Equations	5	4	4
	III	Core VIII	UMAM307	Introduction to Probability Theory	5	5	5
	III	Allied	UCSA303	Mathematical Programming in C	3	3	3
	III	Allied Practical	UCSR305	Mathematical Programming in C Practical	3	2	2
	IV	Online Course (NPTEL/ SP)	UMAV301		3	1	2
	IV	Value Education			2	1	1
				TOTAL	**30**	**21**	**24**
IV	I	Language	UTAL405/ UTAL406/ UHIL401/ UFRL401	Basic Tamil IV/ Advanced Tamil-IV/ Hindi-IV/French-IV	4	2	3
	II	English	UENL407/ UENL408	Basic English IV/ Advanced English IV	5	3	4
	III	Core IX	UMAM405	Applications of Transforms	4	3	3
	III	Core X	UMAM406	Mechanics	4	4	4
	III	Core XI	UMAM404	Mathematical modeling	4	4	4
	III	Core XVIII	UMAP501/ UMAR511	Project / R Programming	2	--	-
	III	Allied	UPHA402	Electronics for Mathematics	3	3	3
		Allied Practical	UPHR404	Electronics for Mathematics Practical	2	2	2
	IV	Soft Skill			2	1	1
	V	Extension program me/ Physical Education			-	-	2
				TOTAL	30	22	26
V	III	Core XIII	UMAM501	Modern Algebra	6	6	5
	III	Core XIV	UMAM505	Real Analysis I	6	5	5
	III	Core XV	UMAM510	Number Theory	6	5	5
	III	Core XVI	UMAM510	Numerical Methods	3	3	3
		Core XVII	UMAR501	Numerical Methods Using R Programming	3	2	2
	III	Core XVIII	UMAP501/	Project/ R Programming	4	4	5

			UMAR511				
	IV	Value Education			2	1	1
				TOTAL	**30**	**25**	**26**
	III	Core XIX	UMAM610	Linear Algebra	5	5	5
	III	Core XX	UMAM611	Real Analysis II	6	6	6
	III	Core XXI	UMAM602/ UMAM507	Complex Analysis	6	6	6
	III	Core XXII	UMAM613	Operations Research	6	6	6
VI	III	Major Elective	UMAM614	Mathematics in Space Science	5	4	4
			UMAO606	Mathematics for construction craft	5	4	4
	III	Comprehensive Viva	UMAC601				
	IV	Soft Skill					
	V	Extension programme/ Physical Education			-	-	2
				TOTAL	**30**	**29**	**31**
				GRAND TOTAL	**180**	**140**	**156**

ALLIED COURSES OFFERED TO OTHER DEPARTMENTS

Class & Major	Semester	Category	Course Code	Course Title	Contact Hrs/ week	Credit Min	Max
I B Com & I B Com (CA)	I	Allied	UMAA112	Business Mathematics	5	4	4
I B.SC PHY			UMAA104/ UMAA304	Mathematics for Physics-I/ Algebra, Differential Calculus and Trigonometry	5	5	5
I BCA			UMAA110	Mathematical Methods I	5	4	4
I B.Sc (CS) & I B.Sc ISM			UMAA113	Statistical Methods	6	4	4
I B.Sc (CS)	II		UMAA218	Mathematics for computer Science	6	4	4
II BCA			UMAA216	Mathematical Methods II	5	4	4
I B.SC PHY			UMAA212	Mathematics for Physics-II	5	5	5
II B.Sc Chem	III		UMAA304/ UMAA104	Algebra, Differential Calculus and Trigonometry/ Mathematics for Physics-I	5	5	5
II B.Sc BIO			UMAA305	Bio-Statistics	5	4	4
II BBA/ II B.COM/ II B.COM CA			UMAA211/ UMAA403/ UMAA107/ UMAA301	Business Statistics	5	4	4

II B.Sc Chem	IV		UMAA406	Integral Calculus, Laplace Transform And Ordinary Differential Equations	5	5	5
II BBA			UMAA505/ UMAA410	Quantitative techniques for Business	5	4	4

NON-MAJOR ELECTIVE

Semester	Part	Category	Course Code	Course Title	Contact Hrs/ week	Credit
II	IV	Non Major Elective	UMAE204	Basic Mathematics for Science	4	2
			UMAE202	Mathematics for Business and Decision Making	4	2
			UIDE302/ UMAE302/ UMAE206	Numerical Methods using C++	4	2
			UMAE402/ UMAE306	Operations Research for Managers	4	2
			UMAA501/ UMAE305 UMAE207	Statistical Data Analysis through SPSS	4	2
			UMAE309/ UMAE208	Applied Mathematics	4	4

EXTRA CREDIT EARNING PROVISION

Semester	Part	Category	Course code	Course Title	Contact Hrs/ week	Credit Min	Credit 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 UMAS601 UMAS602 UMAS603	Project Fourier Transforms Simulation Number Theory	2	-	2

UMAM306 DIFFERENTIAL EQUATIONS

Semester	**: III**	**Credits**	**: 4**
Category	**: Core VII**	**Hours/Week**	**: 5**
Class & Major	**: II B.Sc. Mathematics**	**Total Hours**	**: 65**

Objectives
To enable the students

- Understand linear, non- linear ordinary and partial differential equations.
- Classify the Differential Equations.
- Formulate differential equations in geometrical and physical problems.

UNIT – I FIRST ORDER DIFFERENTIAL EQUATIONS   **13 Hrs**

Linear equations with variable coefficients – separable Equations – Differences between Linear and non-linear Equations – Exact Equations and Integrating factors.

UNIT – II SECOND ORDER DIFFERENTIAL EQUATIONS   **12 Hrs**

Homogeneous Equations with constant co-efficient – Fundamental solutions of linear homogeneous equations – linear Independence and the Wronskian.

UNIT – III   SECOND ORDER DIFFERENTIAL EQUATIONS [CONTD]   **13 Hrs**

Complex roots of the characteristic Equation – Repeated roots; Reduction of Order – Non-Homogeneous Equations; Method of undetermined Co-efficient – Variation of Parameters.

UNIT – IV LINEAR PARTIAL DIFFERENTIAL EQUATIONS   **15 Hrs**

Introduction – Origin of partial differential equations – Lagrange's method – Working rule for solving Pp+Qq=R by Lagrange's method.

UNIT – V NON-LINEAR PARTIAL DIFFERENTIAL EQUATIONS   **12 Hrs**

Complete integral, particular integral, singular integral and general integral – Special methods of solution applicable to certain standard forms-Standard form I: only p and q present Standard form II – z = px+qy+f(p,q) – Standard form III only p, q and z present – Standard form IV Equations of the form $f_1(x,p) = f_2(y,p)$

Text Books
- Boyce-Diprima, "*Elementary Differential Equations*", John Wiley & sons, Inc, Newyork 2008.
- Raisinghania.M.D, *"Ordinary and Partial Differential Equations"*, New Delhi.S.Chand and Co 2008.

Reference Books
- Grewal.B.S, *"Higher Engineering Mathematics"*, New Delhi. Khanna Publishers, 2002.
- Narayanan.S & Manickavachagom Pillay, T.K "*Differential Equations and its Applications*"**,** Vishwanathan.S Printers & Publishers pvt ltd., Chennai, 2006.
- Venkatraman.M.K *"Engineering Mathematics"*, Chennai, Part B National Publishing Company 1999.

UMAM307 INTRODUCTION TO PROBABILITY THEORY

Semester	**: III**	**Credit**	**: 5**
Category	**: Core VIII**	**Hours/Week**	**: 5**
Class &Major	**: II B.Sc. Mathematics**	**Total Hours**	**: 65**

Objectives

To enable the students

- Understand basic ideas and concepts of probability theory.
- Compute conditional probability and conditional expectations.
- Apply Markov chain for solving real life problems.

UNIT – I INTRODUCTION TO PROBABILITY THEORY   12 Hrs

Introduction – Sample space and Events – Probabilities defined on events – Conditional Probabilities – Independent events – Bayer's Formula.

UNIT – II RANDOM VARIABLES   12 Hrs

Joint Probability distributed random Variable – Distribution of the number of the number of events that occur – Limit theorem.

UNIT – III CONDITIONAL PROBABILITY   13 Hrs

Introduction – Discrete Case – Continuous Case – Computing Expectations by Conditions.

UNIT – IV CONDITIONAL EXPECTATION   14 Hrs

Computing Probability by Condition – A List Model – A Random Graph – Uniform Priors, Polya's Urn Model, and Bose – Einstein Statistics – Mean Time for Patterns – The k-Record Values of Discrete Random Variables – Left Skip Free Random Walks – An identity for Compound random variables

UNIT – V MARKOV CHAINS   14 Hrs

Introduction – Chapman Kolmogorov equation – Classification of States – Limiting Probability

Text Book

- Sheldon M. Ross,"*Introduction to probability models"*, Elsevier Publication,10th Edition, 2010.

Reference Books

- Breiman.L, *" Probability "* Addision – Wesley , Reading , Massachusettu , 1968.
- Feller.W , " *An Introduction to Probability Theory and its Application*" Volume 1 , John Wiley, New York, 1957.

UMAM405 APPLICATIONS OF TRANSFORMS

Semester	: IV	**Credits**	: 3
Category	: Core IX	**Hours/Week**	: 4
Class & Major	: II B.Sc. Mathematics	**Total Hours**	: 52

Objectives

To enable the students

- Acquire knowledge of Transformation techniques.
- Analyse various Transformations.
- Solve difference equations and differential equations using transforms.

UNIT- I FOURIER SERIES   11Hrs
Periodic Functions – Bounds of a Function –Continuity of a function – Fourier series – Dirichlet's conditions – Bernoulli's generalized formula of integration by parts – Even and odd functions – Half- range series – Change of interval

UNIT- II FOURIER TRANSFORMS   11Hrs
Definition – Fourier Integral theorem – Complex Fourier transform – Inversion theorem for complex Fourier transform – Properties of Fourier Transforms – Convolution theorem – parseval's identity – Infinite Fourier Sine and Cosine transforms (without proof) – Properties of Fourier Transforms – Fourier transform derivatives – Applications of to boundary value problems.

UNIT - III LAPLACE TRANSFORMS   10Hrs
Laplace transforms – Inverse Laplace transforms – Laplace transforms of derivatives of integrals – Applications to solution of differential equations.

UNIT-IV Z-TRANSFORMS   10Hrs
Definition, example and Properties of Z-transform – The Inverse Z-transform – Convolution theorem – Z- transform of rational functions.

UNIT-V SOLUTIONS OF DIFFERENCE EQUATIONS BY USING Z-TRANSFORM
                                                                     10Hrs
Power series method, partial fraction method, the inverse integral method – Volterra difference equation of convolution type – Volterra systems

Text Books
- Saber N. Elaydi*, "An introduction to Difference Equations"*, Springer Verlag New Youk, 2005.
- Kandasamy.P & Thilagavathy.K ," *Mathematics*" Volume II, IV, S.Chand Publications, 2005

Reference Books
- Narayanan.S & Manicavachagom Pillay, "*Calculus*" Volume-I, Viswanathan.S Printers & Publishers Pvt, Ltd.,Chennai,2005

UMAM406 MECHANICS

Semester	: IV	**Credits**	: 4
Category	: Core X	**Hours/Week**	: 4
Class &Major	: II B.Sc. Mathematics	**Total Hours**	: 52

Objectives
To enable the students
- Understand forces acting on a particle.
- Examine a mechanical system.
- Evaluate the trajectory of a projectile, Circular Motion.

PART – I STATICS

UNIT-I FORCES   10 Hrs

Introduction – Forces acting at a point – Parallelogram of forces – Triangle of forces – Lami's theorem, Simple Problems.

UNIT-II FORCES ON A RIGID BODY   10Hrs

Moment of a force – Moment of a force about a line – Scalar moment, General motion of a rigid body – Equations of motions of a rigid body Kinetic energy of a rigid body.

UNIT-III FORCES ON A RIGID BODY (CONTINUATION)   11 Hrs

Parallel Forces – Point of application of resultant of many parallel forces – Varignon's Theorem – Parallel forces at the vertices of a triangle – Couples-Arm and axis of a couple – Resultant of several coplanar forces.

PART – II DYNAMICS

UNIT –IV   PROJECTILES   11 Hrs

Motion of Projectile, Nature of trajectory, Results Pertaining to the motion of the Projectile, Simple Problems, Impulse force, Newton's experimental Law, Direct and oblique Impact of two smooth spheres, Impact of a smooth sphere on a fixed smooth plane Simple Problems.

UNIT - V CENTRAL ORBITS   10 Hrs

Motion under action of Central forces and Central Orbit, equation of a central orbit, Finding law force and speed of a given orbit the law of force, Simple problems

Text Book
- Duraipandian.P, Laxmi Duraipandian and Muthamizh Jayapragasam, "*Mechanics*", S.Chand& Co Pvt.Ltd, New Delhi,2006.

Reference Books
- Chatterji.P.N, "*Statics*", Rajhans Publications, Meerut,1996.
- Loney.S.L, "*Elements of Statics*", Macmilan India, New Delhi, 1982.
- Joseph F. Shelley. "*Vector Mechanics for Engineers*" Volume - I: Dynamics, Tata MC Graw Hill edition, New Delhi.2005.

UMAM404 MATHEMATICAL MODELING

Semester	: IV	**Credit**	: 4
Category	: Core XI	**Hours/Week**	: 4
Class & Major	: II B.Sc. Mathematics	**Total hours**	: 52

Objectives
 To enable the students

- Classify mathematical models involving differential equations, difference equation, dynamics and graph theory.
- Analyze the mathematical models in real life problems.
- Apply the mathematical models in real life problems.

UNIT – I GROWTH AND DECAY MODELS USING ODE   **10 Hrs**

Ordinary differential equation – Linear growth model – Growth of science and scientists – Non- linear growth and decay models – Diffusion of glucose or a medicine in the bloodstream.

UNIT – II MODELING IN POPULATION DYNAMICS   **10 Hrs**

Modeling in population dynamics – Prey-predator models – Competition models – Multi-species models – Modeling of epidemics – Simple epidemic models – A model for diabetic-mellitus

UNIT – III MODELING OF PLANETARY MOTION USING SECOND ORDER ODE
     10 Hrs

Modeling in second order O.D.E – Modeling of planetary motion – Motion under central force – Circular motion – Elliptic motion of a satellites – Rectilinear motion.

UNIT – IV MODELING THROUGH DIFFERENCE EQUATIONS   **11 Hrs**

Modeling through difference equations – Linear difference equation – Obtaining complementary function by use of matrices – Harrod model – Cob-web model – Applications of Actuarial science.

UNIT – V MODELING THROUGH GRAPHS   **11 Hrs**

Modeling through graphs – Seven bridge problem – Representing results of tournament – Genetic graph – Food web – Communication network – Matrices associated with a directed graph – Detection of clique – Terms of signed graph.

Text Book
- Kapur J. N, "*Mathematical Modeling*", Wiley Eastern Limited, New Age International Pvt. Ltd., Reprint 2013.

Reference Books
- Kapur J. N, "*Mathematical Models in Biology and Medicine*", Oscar Publications, New Delhi, 1985.
- Olink R, "*Mathematical Models in Social and Life Sciences*", Wiley Publications 2014.

UMAR511 R PROGRAMMING

Semester	: IV & V	**Credits**	: 4
Category	: Core XVIII	**Hours/Week**	: 2+4
Class & Major	: II & III B. Sc. Mathematics	**Total Hours**	: 78

Objectives
To enable the students

- Develop the basic knowledge of the R language.
- Understand the concept of R programming.
- Develop a new programme.

UNIT -I INTRODUCTION TO R   13Hrs

Introduction to R Programming- Download, Install and Setup R & R Studio - Working with Data in R - Creating Vectors, Matrices, Lists, Data Frames and performing some simple operations on them

UNIT- II DATA IN R   13Hrs

Flow control – Looping – Conditional Statements and Branching - Essentials of R Programming - R Operators - Input and Output in R - Implementation of Program Flow in R - Working with Variables and Data in R.

UNIT- III MEASURE OF CENTRAL TENDENCY   17Hrs

Summary Statistics – Measuring Central Tendency – Mean, Median and other Quantiles, Mode – Measuring Location via Standard Scores

UNIT- IV STANDARD DEVIATION   17Hrs

Measuring Variability – Variance and Standard Deviation, Range, Median and Mean Absolute Deviation, Interquartile Range, Coefficient of Variation – Measuring Symmetry

UNIT -V GRAPHS   18Hrs

Bar Charts and Pie Charts in R - Boxplots and Boxplots With Groups in R - Histograms in R - Stem and Leaf Plots in R - Line Graphs in R - Stacked Bar Charts, Clustered Bar Charts and Mosaic Plots in R – Scatter plots in R - Modifying Plots in R - Adding Text to Plots in R - Adding Legends to Plots in R

Text Books
- Mark Gardener, "*Beginning R -The Statistical Programming Language*", Wiley Publications, 2015
- Larry Pace, *Beginning R – An Introduction to Statistical Programming*, Apress, 2012 (www.it-ebooks.info)

References Books
- W. John Braun and Duncan J. Murdoch, "*A First Course in Statistical Programming with R*", Cambridge University Press, 2007

Lab Exercise

1. Creating a Vector, Performing Vector Arithmetic, Adding Elements to a Vector

2. Creating a Matrix, Referring to Matrix Rows and Columns, Matrix Manipulation

3. Creating a List, Creating a Data Frame from Vectors, Reading a Table into a Data

   Frame, Dealing with Missing Data in R

4. Finding Pythagorean Triples, Solving Quadratic Equations

5. Measuring Central Tendency

6. Measuring Variability

7. Covariance and Correlation, Measuring Symmetry

8. Creating Frequency Distributions and Tables.

9. Creating Pie Charts and Bar Charts, Box plots, Histograms.

10. Creating Line Graphs, Scatter plots, Saving and Using Graphics

ALLIED COURSES OFFERED TO OTHER DEPARTMENTS

UMAA304 ALGEBRA, DIFFERENTIAL CALCULUS & TRIGONOMETRY

Semester : III	**Credit : 5**
Category : Allied	**Hours/Week : 5**
Class & Major : II B.Sc. Chemistry	**Total Hours :65**

Objectives
To enable the students
- Acquire in-depth knowledge about Binomial, Exponential and Logarithmic Series.
- Understand the fundamentals of differentiation.
- Apply the techniques in their respective major subjects.

UNIT-I ALGEBRA   **15 Hrs**
      Binomial theorem for rational index – Exponential and Logarithmic series – summation and simple approximations related to Binomial, Exponential and Logarithmic series.

UNIT-II MATRICES   **13 Hrs**
      Cayley Hamilton theorem – verification – finding inverse of a matrix using Cayley Hamilton theorem – Eigen values and Eigen vectors.(simple problems only for matrices of order upto 3×3).

UNIT-III DIFFERENTIAL CALCULUS   **10 Hrs**
      Successive differentiation – Leibenitz theorem and its applications – Jacobian- Concept of polar coordinates radius of curvature in Cartesian coordinates

UNIT-IV TRIGONOMETRIC SERIES   **12 Hrs**
      Complex numbers-Applications of De-Moivre's theorem-Expansions of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$,- Expansions of $\sin^n\theta$, $\cos^n\theta$-Expansion of $\sin\theta$, $\cos\theta$, $\tan\theta$ in powers of θ.

UNIT-V HYPERBOLIC FUNCTIONS   **15 Hrs**
      Hyperbolic Functions-Inverse Hyperbolic Functions –relation between circular and hyperbolic functions, logarithm of complex numbers.

Text Books

- Narayanan and Manicavachagom Pillay, "*Algebra Volume I*", Viswanathan.S Publishers & Printers Pvt. Ltd., Chennai,1996.
- Narayanan and Manicavachagom Pillay, "*Calculus Volume I*", Viswanathan.S Publishers & Printers Pvt. Ltd., Chennai, 1994.
- Narayanan.S & Manicavachagom Pillay.T.K, "*Trigonometry*", Vishwanathan.S Printers & Publishers Pvt,Lltd., Chennai, 1994.

UMAA305 BIO-STATISTICS

Semester : IV	**Credit : 4**
Category : Allied	**Hours/week : 4T+1P=5**
Class & Major: II B.Sc. Bio-Chemistry	**Total Hours : 65**

Objectives
To enable the students
- Understand and Practice Statistical Methods
- Apply Statistical techniques for Bio-Sciences.
- Gain analyzing skill in the Field of Experimentation in Biology and Genetics.

UNIT–I STAGES OF STATISTICAL SURVEY AND AVERAGES   (12+5) Hrs

Nature and scope of Statistical Methods and their limitations – Collection, Classification and Tabulation of Statistical data – Diagrammatic and Graphical representation of statistical data Measures of Central tendency – Mean, Median, Mode, Geometric Mean, Harmonic mean.

UNIT – II DISPERSION, SKEWNESS AND MOMENTS   (10+4) Hrs

Measures of dispersion – Range, Quartile deviation, Mean deviation, Standard deviation - co-efficient of variation – Lorenz curve - Skewness – Karl Pearson's, Bowley's and Kelly's co-efficient of skewness – Skewness and Kurtosis based on moments.

UNIT – III CORRELATION AND REGRESSION ANALYSIS   (10+4) Hrs

Correlation Analysis – Scatter diagram – Karl Pearson's co-efficient of Correlation – Spearman's Rank correlation coefficient – Co-efficient of Concurrent Deviation- Fitting of straight line of the form $Y = ax + b$ by the method of least squares - Regression Analysis – Regression Lines – Regression Equations

UNIT – IV PROBABILITY, RANDOM VARIABLES AND EXPECTATIONS   10 Hrs

Concept of Probability – Addition and Multiplication theorem of probability – Baye's Theorem- concept of random variable Distribution function – Definition of probability function for discrete and continuous random variable- mathematical expectation – Chebychev's inequality-simple problems.

UNIT – V THEORETICAL DISTRIBUTIONS   10 Hrs

Standard distribution – Binomial, Poisson, normal and exponential distributions- Derivation of mean, Variance-properties- Fittings of Distributions.

Lab Exercises

1. Presentation of data – Diagrams &Graphs
2. Calculation of Measures of central tendency – Mean, Median, Mode, Geometric mean, Harmonic mean
3. Calculation of Measures of Dispersion – Range, Quartile deviation, Mean deviation , standard deviation and its relative measures and Skewness
4. Karl Pearson's correlation coefficient
5. Regression equation of X on Y & Y on X

Text Books
- Gupta S.P., "*Statistical Methods*", Sultan Chand, 2011.
- Gupta.S.C. and Kapoor.V.K, "*Elements of Mathematical Statistics*", Sultan Chand & sons, 2008.

Reference Books
- Gupta.S.C. and Kapoor.V.K, "*Fundamentals of Mathematical Statistics*", Sultan and Sons, 2007.
- Snedecor G.W and Cochran W.G., "*Statistical Methods*", Oxford Press and IBH. 2006.
- Wayne W. Daniel, *"Bio statistics"*, Sareen printing press, Delhi, 2009.

UMAA211/UMAA403 /UMAA107/UMAA301 BUSINESS STATISTICS

Semester : III	**Credit : 4**
Category : Allied	**Hours/week : 5**
Class & Major: II BBA/ II B.Com / II B.Com- CA	**Total Hours : 65**

Objectives
To enable the students
- Describe data with descriptive statistics
- Gain knowledge of the Statistical tools related to business problems.
- Analyze the concepts for business problems.

UNIT- I STAGES OF STATISTICAL SURVEY AND AVERAGES   13Hrs
        Introduction- Nature, Scope and limitations of Statistics in Business – Collection of data - Classification and tabulation of data - diagrammatic and graphical representation of data- Measures of Central tendency – Mean, median, mode, Geometric mean, Harmonic mean, quartiles, deciles, percentiles

UNIT- II DISPERSION, SKEWNESS AND MOMENTS   14Hrs
        Measures of Dispersion – range, quartile deviation, mean deviation, standard deviation, coefficient of variation, Lorenz curve-Skewness – Definition - Types of skeweness – Absolute and Relative measure of skewness - Karl Pearson's coefficient of skewness, Bowley's coefficient of skewness & Kelly's coefficient of skewness - Moments – measures of Skewness and Kurtosis based on moments

UNIT- III CORRELATION AND REGRESSION ANALYSIS   **12Hrs**

Correlation Analysis - Types of Corrleation-Methods of Measuring correlation- Karl Pearson's Coefficient of correlation – Spearman's rank correlation coefficient – Regression Analysis- regression lines - regression equations

UNIT- IV INDEX NUMBERS   **13Hrs**

Index numbers – unweighted index numbers – simple aggregate method – simple average of price relatives method- Weighted index numbers – weighted aggregate method – weighted average of price relatives method – Time reversal and factor reversal test - cost of living index number.

UNIT- V ANALYSIS OF TIME SERIES   **13Hrs**

Time series – Components of Time series – Trend, seasonal variation, cyclical variation , irregular variation – methods of measuring trend – graphical method, semi average method, moving average method, method of least squares- methods of measuring seasonal variation- simple average method, ratio to moving average method.

Text Book
- Gupta S.P., "*Statistical Methods"*, Sultan Chand & Sons, 2006

Reference Books
- Agarwal B.L., "*Basic Statistics"*,New Age International Publishers, fourth edition 2006.
- Elhance D.N and Veena Elhance and Agarwal B.M. , "*Fundamental of statistics Kitab Mahal"* , 1999.
- Pillai R.S.N and Bagavathi., "*Statistics"*, S.Chand & Company 2006.

UMAA406 INTEGRAL CALCULUS, LAPLACE TRANSFORM & ORDINARY DIFFERENTIAL EQUATIONS

Semester	**:IV**	**Credits**	**:5**
Category	**:Allied**	**Hours/Week :5**	
Class & Major	**: II B.Sc. Chemistry**	**Total Hours :65**	

Objectives
To enable the students
- Learn certain techniques in Laplace transform.
- Understand the differentiation and integration.
- Solve the applied problems.

UNIT-I INTEGRALS   **15 Hrs**

Integration by Substitution, Integration of rational and irrational function of the form - Properties of definite Integrals.

UNIT-II INTEGRALS (CNTD)   **15 Hrs**

Integration by parts-Double integrals-Applications of double integrals - areas.

UNIT-III FOURIER SERIES   **10 Hrs**

Fourier series for functions in $[0,2\pi]$ and $[-\pi,\pi]$

UNIT-IV LAPLACE TRANSFORM   **12 Hrs**

Laplace transform of functions-Inverse Laplace transforms-Application of Laplace
Transforms in solving differential equations.

UNIT-V DIFFERENTIAL EQUATIONS   **13 Hrs**

Formation of partial Differential Equation-Second order differential equations with
Constant co-efficient-Homogeneous linear differential equations of the second order with variable
co-efficients.

Text Books

- Manicakavachagam pillai,*T.K, "Ancillary Mathematics Integral Calculus"*,
  S.viswanathan Publishers & Printers. 2001

Reference Books

- Narayanan and Manichavaschagam Pillay, "*Ancillary Mathematics"*, S.Viswanathan
  (Publishers & Printers) Pvt,Ltd.,2000.
- Grewal.B.S, "*Higher Engineering Mathematics"*, New Delhi, Khanna Publishers,2002.

UMAA505/UMAA410 QUANTITATIVE TECHNIQUES FOR BUSINESS

Semester	**: IV**	**Credits**	**: 4**
Category	**:Allied**	**Hours/Week**	**: 5**
Class & Major: II BBA		**Total Hours**	**: 65**

Objectives
To enable the students

- Understand the various techniques of research.
- Solve real life problems in business and management.
- Enlighten on applications in management techniques.

UNIT-I   LINEAR PROGRAMMING PROBLEM   **15 HRS**

Mathematical Formulation of the Problem- Graphical Solution Method- Some
Exceptional Cases- General Linear Programming Problem- The Computational Procedure- Use
of Artificial Variable Techniques- Big- M Method. Simple problems.

UNIT-II   TRANSPORTATION PROBLEM   15HRS
General Transportation Problem-The Transportation Table-Loops in Transportation
Tables-Solution of a Transportation Problem-Finding an Initial Basic Feasible Solution-Test
for Optimality-Degeneracy in Transportation Problem-Transportation Algorithm (MODI
Method). Simple problems.

UNIT-III ASSIGNMENT PROBLEM   12 HRS
Mathematical Formulation of the problem- the Assignment method- Special Cases in
Assignment Problem. Simple problems.

UNIT-IV GAME THEORY   10 HRS
Two-person Zero-sum Games- Some Basic Terms- The Maximin-Minimax Principle-
Games Without Saddle Points-Mixed Strategies- Graphic Solution of 2xn and mx2 Games-
Dominance PropertySimple problems.

UNIT-V   NETWORK SCHEDULING BY PERT/CPM   13 Hrs
  Network and Basic Components- Logical Sequencing- Rules of Network Construction-
Critical Path Analysis- Probability Considerations in PERT- Distinction between PERT and
CPM. Simple problems.

Text Book
- Kanti Swaroop, Gupta P.K. and Manmohan, "*Operation Research*", Sultan Chand &
  Sons,Delhi, 2003.

Reference Books
- Kapoor.V.K, "*Introduction to Operation Research*" Sulthan Chand & Sons 1996.
- Sharma S.D, "*Operation Research*" Kedar Nath Ram Nath & Co 1995
- Taha.A Hamdy, "*Operation Research-An Introduction*", Prentice hallof India pvt
  ltd,New Delhi, 6th edition, 2000.

III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course code	Course Title	Component III	Component IV
III	Core VII	UMAM306	Differential Equation	Assignment	Problem Solving
	Core VIII	UMAM307	Introduction to probability theory	Assignment	Problem Solving
IV	Core IX	UMAM405	Applications of Transforms	Model Building	Assignment
	Core X	UMAM406	Mechanics	Model Building	Problem Solving
	Core XI	UMAM404	Mathematical Modeling	Assignment	Poster Presentation
IV & V	Core XII	UMAP501/ UMAR511	Project / R Programming	DPA (Daily Practical assessment)	Viva-Voce

III & IV EVALUATION COMPONENTS OF CIA-Allied

Semester	Category	Course code	Course Title	Component III	Component IV
III	Allied	UMAA304/ UMAA104	Algebra, Differential Calculus and Trigonometry/ Mathematics for Physics-I	Assignment	Problem Solving
		UMAA305	Bio-Statistics	Assignment	Problem Solving
		UMAA211/ UMAA403/ UMAA107/ UMAA301	Business Statistics	Assignment	Problem Solving
IV		UMAA406	Integral Calculus, Laplace Transform And Ordinary Differential Equations	Assignment	Problem Solving
		UMAA505/ UMAA410	Quantitative techniques for Business	Assignment	Problem Solving

PROGRAMME PROFILE M.Sc. (Mathematics)

PSO 1: Understanding of advanced concepts, principles and techniques from Pure & Applied topics in mathematics and application of problem-solving skills.

PSO 2: Development of abstract mathematical thinking and mathematical intuition.

PSO 3: Assimilation and communication of detailed technical arguments

PSO 4: Proficiently to construct and formulate logical arguments, conjectures and construction of rigorous proof by abstracting principles.

PSO 5: Ability to carry out extended investigation of mathematical work as various projects independently.

Semester	Category	Course Code	Course Title	Contact Hrs/ Week	Credit Mini	Credit Max
I	Core I	PMAM107	Abstract Algebra	6	4	4
	Core II	PMAM102	Real Analysis	6	4	4
	Core III	PMAM103	Ordinary Differential Equations	6	4	4
	Core IV	PMAM105	Calculus Of Variations And Integral Equations	6	4	4
	Core V	PMAM106/ PMAM407	Fuzzy Analysis	6	4	4
			TOTAL	**30**	**20**	**20**
II	Core VI	PMAM209	Linear Algebra	5	4	4
	Core VII	PMAM202	Measure and Integration	5	4	4
	Core VII	PMAM206	Partial Differential	5	4	4

			Equations			
	Core IX	PMAM204	Classical Mechanics	5	4	4
	Core X	PMAM208	Operations Research	5	4	4
	Non Major Elective			5	4	4
	Service Learning	PMAX201/ PMAX202	Mathematics for High School Students \Elementary Mathematics for Higher Secondary Students	-	1	1
			TOTAL	**30**	**25**	**25**
III	Core XI	PMAM305	Complex Analysis	5	4	4
	Core XII	PMAM310	Fluid Dynamics	6	4	4
	Core XIII	PMAM311	Topology	6	4	4
	Core XIIV	PMAM406 / PMAM313	Mathematical Statistics	6	5	5
	Core XV	PMAI312	Number Theory and Cryptography	5	4	4
	Core XX	PMAP401	Project	2	-	-
			TOTAL	**30**	**20**	**20**
IV	Core XVI	PMAM405	Functional Analysis	6	5	5
	Core XVII	PMAM309/ PMAM408	Stochastic process	6	4	4
	Core XVIII	PMAM407	Numerical Analysis	7	5	5
	Core XIX	PMAM403	Differential Geometry	6	5	5
	Core XX	PMAP401	Project	4	5	5
	Library			1	-	-
			TOTAL	**30**	**25**	**25**
			GRAND TOTAL	**120**	**90**	**90**

PROGRAMME OFFERED TO OTHER DEPARTMENTS

Semester	Category	Course Code	Course Title	Contact Hrs/ Week	Credit	
					Mini	Max
I	Core III	PCAM103	Mathematical Foundation	4	4	4
		PCSM108	Theoretical foundations for computers	6	4	4
		PCAM504	Operations Research	4	4	4
	Non Major Elective	PMAE101	LaTeX and MaTLab	3	4	4
	Practical		LaTeX and MaTLab	2		
	Non Major Elective	PMAE102	Operations Research	5	4	4
II	Core VI	PCAM206	Applied Statistics	5	4	5
	Non Major Elective	PMAE202	NET/SET/ Competitive Exam	5	5	5
		PMAE203	Discrete mathematics	5	4	4

EXTRA CREDIT EARNING PROVISION

Semester	Category	Course code	Course Title	Hrs/ week	Credit	
					Min	Max
III	Self study paper	PMAS301/ PMAS302	Difference Equation Combinatorial Analysis	2	-	1

PMAM305 COMPLEX ANALYSIS

Semester   : III   **Credit : 4**
Category   : Core XI   **Hours/Week : 5**
Class &Major : II M.Sc Mathematics   **Total Hours : 65**

Objectives
To enable the students
- Lay the foundation for topics in Advanced Complex Analysis.
- Develop clear thinking and analyzing capacity for research.
- Introduce the fascinating world of complex variable theory which is markedly different from analyzing of real variable.

UNIT-I THE GENERAL FORM OF CAUCHY THEOREM   15 Hrs
        Chains and cycles – Simple continuity – Homology – The General statement of Cauchy's Theorem – Proof of Cauchy's Theorem – Local exact differential – Multiply connected regions – Residue Theorem – The argument principle.

**UNIT-II EVALUATION OF DEFINITE INTEGRALS AND HARMONIC FUNCTIONS
        AND POWER SERIES EXPANSIONS   10 Hrs**
        Evaluation of definite integrals – Schwarz theorem – Weierstras-ps theorem – Taylor's series –Laurent series.

UNIT-III PARTIAL FRACTION AND ENTIRE FUNCTIONS   15Hrs
        Gamma Function_ Equicontinuity-Normality and compactness-Arzela's theorem-Families of analytic function-The Classical definition.

UNIT-VI   RIEMANN MAPPING THEOREM   15Hrs
        Statement and Proof- Behavior at an angle Schwarz-Christoffel formula – Mapping on a rectangle - Functions with mean value property – Harnack;s principle.

UNIT-V ELLIPTIC FUNCTIONS   10 Hrs
        Simply periodic functions-Doubly periodic functions.

Text Book
- Lars V. Ahlfors, "*Complex Analysis*", 3rd Edition, New York, McGraw Hill 1979.

Reference Books
- Conway J.B, "*Functions of one complex variables*", Springer – Verlag, International student Edition, Naroser Publishing Co. 1978.
- Hille E, "*Analytic Function Theory*", 2 vols, Gonm & Co, 1959
- Heins M, "*Complex Function Theory*", New York ,Acamedic Press,1968.
- Presfly H.A, "*Introduction to Complex Analysis*", Clarendon Press, Oxford, 1990.

PMAM310 FLUID DYNAMICS

Semester	: III	**Credit**	: 4
Category	: Core XII	**Hours/Week**	: 6
Class &Major	: II M.Sc Mathematics	**Total Hours**	: 78

Objectives
To enable the students
- Understand incompressible and compressible fluid flows.
- Analyse fluid motion.
- Grasp the basic ideas of turbulence.

UNIT – I KINEMATICS OF FLUIDS IN MOTION **16 Hrs**

Real Fluids and ideal fluids – Velocity of a fluid at a point –Streamlines and pathlines – Steady and unsteady Flows – The velocity potential, the vorticity vector – Local and particle rates of change – The equations of continuity – Conditions at a rigid boundary – General analysis of fluid motion

UNIT- II EQUATIONS OF MOTION OF A FLUID **14 Hrs**

Pressure at a point in a fluid at rest – pressure at appoint in a moving fluid – condtions at a boundary of two inviscid immiscible fluids- Eluer's equations of motion – bernoulli's equation

UNIT- III THREE DIMENSIONAL FLOWS **14Hrs**

Introduction- Sources sinks and doublets – Images in a rigid infinite plane – images in solid spheres – Axi- symmetric flows – strokes stream function – symmetric irrotational motions

UNIT- IV TWO DIMENSIONAL FLOWS **18 Hrs**

Meaning of two dimensional flow – Use of cylindrical polar coordinates – The stream function – The complex potential for two – Dimensional , irrotational , incompressible flow – Complex velocity potentials for standards two dimensional flows- uniform stream – Line sources and line sinks – Line doublets – Line votices, Mline Thomson circle theorem –The theorem of blasius

UNIT-V VISCOUS FLOW **16 Hrs**

Stress components in real fluid – relations between Cartesian components of stress – translational motion of fluid element – the rate of strain quadric and principal stresses – some

further properties of rate of strain quadric – stress analysis in fluid motion – the coefficient of viscosity and laminar flow – the navier – strokes equations of motion of a viscous fluid

Text Book
- Chorlton .F,*"Text book of Fluid Dynamics" ,* CBS Publishers & Distributors, New Delhi, 2004.

Reference Books
- Batcherlor, C.K., "*An Introduction to fluid Mechanics*" , Cambridge University Press, 2000
- Miline and Thomson L.M., "*Theoretical Hydrodynamics*", 1962.

PMAM311 TOPOLOGY

Semester : III	**Credits** : 4
Category : Core XIII	**Hours/Week** : 6
Class &Major: II M.Sc Mathematics	**Total Hours** :78

Objectives
To enable the students
- Introduce the main ideas and problems of topology.
- Understand topological spaces, continuous function, connectedness, countability and separation axioms.
- Apply the concept of topology in research fields.

UNIT-I METRIC SPACES   **16 Hrs**

Partially ordered sets & lattices, metric spaces, definitions and examples, open sets and closed sets convergence, completeness and Baires theorem, continuous mappings, spaces of continuous function Euclidean and Unitary spaces.

UNIT-II TOPOLOGICAL SPACES & COMPACTNESS   **16Hrs**

Definitions and examples, elementary concepts, open base and open sub base, weak topologies and the function algebras. Compactness, Compact spaces, product spaces, tychonoff's theorem and locally compact spaces and compactness for metric spaces, Ascolis theorem.

UNIT-III SEPARATION   **16 Hrs**

T_1 spaces Hausdroff's spaces, completely regular spaces and normal spaces,Urysohn's lemma, the Tietae Extension theorem, Uryshon's embedding theorem, the stone-Cech compactification.

UNIT-IV CONNECTEDNESS   **14 Hrs**

Connected spaces, the components of a space ,totally disconnected spaces and locally connected spaces.

UNIT-V APPROXIMATION   **16 Hrs**

The Weierstrass approximation theorem, the Stone-Weierstrass theorem, locally compact Hausdorff, the extended Stone-Weierstrass theorem.

Text Book
- George F. Simmons, "*Introduction to Topology and Modern Analysis"*, McGraw Hill, New Delhi,1999.

Reference Books
- Dugunji.J., "*Topology",* Prentice Hall of India, New Delhi, 1975.
- Munkers R James, "*A first course in Topology"*, Pearson Education, Pvt.Ltd., New Delhi, 2002.

PMAM313 MATHEMATICAL STATISTICS

Semester	: IV	**Credit**	: 5
Category	: Core XVII	**Hours/Week**	: 6
Class &Major	: II M.Sc Mathematics	**Total Hours**	: 78

Objectives
To enable the students

- Understand axiomatic approach to probability theory to study some statistical characteristics, discrete and continuous functions and their properties.
- Discuss sampling theory significance tests, estimation and testing of hypothesis.
- Express the computational skill.

UNIT-I CHARACTERISTIC FUNCTIONS   **16 Hrs**

Properties of characteristic functions- characteristic functions and moments-semi-invariants- characteristic function of the sum of the independent random variables-Determination of distribution function by the characteristic function- characteristic function of multidimensional random vectors-Probability generating function.

UNIT- II SOME PROBABILITY DISTRIBUTIONS   **16 Hrs**

One point, two point, Binomial-Polya-Hypergeometric- Poisson(discrete) distributions-Uniform-normal gamma-Beta-Cauchy and Laplace (continuous) distribution.

UNIT-III LIMIT THEOREM   **15 Hrs**

Stochastic convergence-Bernoulli law of large numbers-Convergence of sequence of distribution functions-Levy-Cramer theorem-de-Moivre Lapalace theorem-Poisson, Chebyshev, Khintchine weak law of large numbers-Lindberg Theorem-Lyapunov Theorem-Borel-Cantelli Lemma-Kolmogorov Inequality and Kolmogorov Strong law of large numbers.

UNIT-IV SAMPLE MOMENTS AND THEIR FUNCTIONS   **15 Hrs**

Notion of a a sample and a statistic-Distribution functions of $\overline{X}$,S^2 and [$\overline{X}$,S^2]- χ^2 distribution-Student t-Distribution-Fisher's Z=-Distribution-Snedecor's F-distribution of sample mean from non-normal populations.

UNIT-V SIGNIFICANT TEST   **15 Hrs**

Concept of statistical test-Parametric tests for small and large samples- χ^2 test. Estimation: Preliminary notion-Consistency estimation-Unbiased estimates-Sufficiency-Efficiency-Asymptotically most efficient estimates-methods of finding intervals.

Text Book
- M.Fisz, "*Probability Theory and Mathematical Statistics*", John Wilry and sons, New York,1963.

Reference Books
- K.L.Chun, "*A Course in Probability Academic Press*", New York, 1974
- R.B.Ash, "*Real Analysis and Probability*", Academic Press, New York, 1972
- R.Durrett, "*Probability Theory and Examples*", (2nd Edition) Duxbury press.
- V.K.Rohatgi, " *An Introduction to Probability Theory And Mathematical Statistics*", (3rd Edition) Wiley Eastern LTd., New Delhi, 1983.

PMAI312 NUMBER THEORY AND CRYPTOGRAPHY

Semester	**: III**	**Credit**	**: 4**
Category	**: Core XV**	**Hours/Week**	**: 5**
Class &Major	**: II M.Sc Mathematics**	**Total Hours**	**:65**

Objectives
To enable the students
- Learn about the Applications of the Theory of Numbers.
- Understand the security concepts.
- Describe the principles of public key cryptosystems, hash functions and digital signature.

UNIT - I DIVISIBILITY   **13Hrs**

Introduction – Divisibility – Primes – The Binomial Theorem – Congruences – Euler's totient - Fermat's, Euler's and Wilson's Theorems – Solutions of congruences – The Chinese Remainder theorem.

UNIT- II CONGRUENCES   **13Hrs**

Techniques of numerical calculations – Prime power Moduli – Primitive roots and Power Residues –Congruences of degree two - Number theory from an Algebraic Viewpoint

UNIT - III SECURITY CONCEPTS   **13Hrs**

Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms. Cryptography Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition

techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT - IV SYMMETRIC KEY CIPHERS   13Hrs

Block Cipher principles, DES, AES, Blowfish, Block cipher operation, Stream ciphers, Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Diffie-Hellman Key Exchange.

UNIT – V CRYPTOGRAPHIC HASH FUNCTIONS   13Hrs

Message Authentication, Secure Hash Algorithm, Digital signatures, Elgamal Digital Signature Scheme. Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys.

Text Books

- Ivan Niven, Herbert S, Zuckerman and Hugh L, Montgomery, "*An Introduction to the Theory of Numbers"*, Fifth edn., John Wiley & Sons Inc, 2004.
- William Stallings, "*Cryptography and Network Security – Principles and Practice"*, Pearson Education, 6th Edition, 2017.

Reference Books

- David M. Burton W.M.C.,"*Elementary Number Theory"*, Brown Publishers, Dubuque, Lawa, 1989.
- George Andrews, "*Number Theory"*, Courier Dover Publications,1994.
- William J. Leveque , "*Fundamentals of Number Theory"*, Addison-Wesley Publishing Company, Phillipines, 1977.
- C K Shyamala, N Harini, Dr T R Padmanabhan, "*Cryptography and Network Security"*, Wiley India, 1st Edition, 2011
- Forouzan Mukhopadhyay , "*Cryptography and Network Security"* , Mc Graw Hill, 3rd Edition, 2011
- Atul Kahate, "*Cryptography and Network Security"*, Mc Graw Hill, 3rd Edition, 2017

PMAM405 FUNCTIONAL ANALYSIS

Semester : IV	**Credit** : 5	
Category : Core XVI	**Hours/Week** : 6	
Class &Major : II M.Sc Mathematics	**Total Hours** :78	

Objectives
To enable the students
- Understand Banach and Hilbert Spaces.
- Understand Operator theory leading to the spectral theory of Operators on a Hilbert space.
- Analyze the operator theory on a Hilbert space.

UNIT-I BANACH SPACES 16 Hrs

Definition – Some examples - Continous Linear Transformation – the Hahn - banach theorem-The natural embedding of N in N^{**}.

UNIT-II BANACH SPACES AND HILBERT SPACES 16 Hrs

Open Mapping Theorem-Conjucate of an operator-Definition and some simple properties-Orthogonal sets.

UNIT-III HILBERT SPACES 16 Hrs

Conjucate space H^*-Adjoint of operator-Self-adjoint operator-Normal and Unitary Operators-Projections.

UNIT-IV PRELIMINARIES ON BANACH ALGEBRAS 15 Hrs

Definition and some examples-Regular and single elements-Topological divisors of zero-Spectrum-The formula for the spectral radius-The radical and semi-simplicity.

UNIT-V STRUCTURE OF COMMUTATIVE BANACH ALGEBRAS 15 Hrs

Gelfand Mappping-Application of the formula $r[x]=\lim \| x^n \|^{1/n}$-Involutions on Banach Algebras-Gelfand-Neumark Theorem.

Text Book
- G.F.Simmons, "*Introduction to topology aand Modern Analysis*", McGraw Hill international Book Company,New York,1963.

Reference Books
- Bachman & L.Narici, "*Functional Analysis*", Academic Press, New york, 1966.
- E.Kreyszig "*Introduction of Functionan Analysis with Applications*", Johu Wiley & Sons, New York, 1978.
- Goffman. H.C., Fredrick, G., "*First course in Functional Analysis*", Prentice Hall of India, New Delhi, 1987.
- W.Rudin, "*Functional Analysis*", Tata McGraw Hill Book Company , New Delhi 1963.

PMAM408 STOCHASTIC PROCESS

Semester	: III	**Credit**	: 4
Category	: Core XIV	**Hours/Week**	: 6
Class &Major	: II M.Sc Mathematics	**Total Hours**	:78

Objectives
To enable the students
- Understand the concepts of Stochastic process.
- Learn about Markov Chain
- Analyse and apply the stochastic models for real life probabilistic situations

UNIT - I MARKOV AND STATIONARY PROCESSES   **15Hrs**

   Specification of Stochastic Processes – Stationary Processes – Poisson Process – Generalizations – Birth and Death Processes – Markov Chain – Erlang Process

UNIT - II RENEWAL PROCESSES   **15Hrs**

   Renewal processes in discrete and continuous time – Renewal equation – Stopping time – Wald's equation – Renewal theorems

UNIT - III MARKOV RENEWAL AND SEMI – MARKOV PROCESSES   **16Hrs**

   Definition and preliminary results – Markov renewal equation – Limiting behavior – First passage time.

UNIT- IV BRANCHING PROCESSES   **16Hrs**

   Generating functions of branching processes – Probability of extinction – Distribution of total number of progeny – Generalization of classical Galton – Watson process – Continuous time Markov branching process – Age dependent branching process – Bellman – Harris process

UNIT - V MARKOV PROCESSES WITH CONTINUOUS STATE SPACE   **16Hrs**

Brownian motion – Weiner process – Kolmogorov equations – First passage time distribution for Weiner process – Ornstein : Uhlenbeck process

Text Book

- Medhi. J, "*Stochastic Processes*", New Age International (P) Ltd., New Delhi, 2nd Edition, 2001.

Reference Book

- Bhat. U.N, "*Elements of Applied Stochastic Processes*", John Wiley and Sons Limited, 2nd Edition, 1984.
- Cox .D.R and Miller H.D,"*The theory of Stochastic Processes*", Methuen, London,1965.
- Ross .S. M ,"*Stochastic Processes*", Wiley, New York, 2nd Edition,1996.
- Karlin .S and Taylor.H.M, "*A First Course in Stochastic Processes*", 2nd Edition, Academic press, New York, 1975.

PMAM407 NUMERICAL ANALYSIS

Semester : IV	**Credit** : 5
Category : Core XVIII	**Hours/Week** : 7
Class &Major: II M.Sc Mathematics	**Total Hours** :91

Objectives
To enable the students

- Introduce the exciting world of programming to the students through numerical methods.
- Describe the several errors and approximation in numerical methods.
- Apply these methods to solve mathematical problems numerically.

UNIT – I TRANSCENDENTAL AND POLYNOMIAL EQUATIONS   18Hrs
Rate of convergence – Secant Method, Regula Falsi Method, Muller Method and Chebyshev Method. Polynomial equations: Descartes' Rule of Signs - Iterative Methods: Birge-Vieta method, Bairstow's method Direct Method: Graeffe's root squaring method.
Chapter:2, Section:2.5 &2.9.

**UNIT – II SYSTEM OF LINEAR ALGEBRAIC EQUATIONS AND EIGEN VALUE
          PROBLEMS   19Hrs**
Error Analysis of Direct methods – Operational count of Gauss elimination, Vector norm, Matrix norm, Error Estimate. Iteration methods - Jacobi iteration method, Gauss Seidel Iteration method, Successive Over Relaxation method , Convergence analysis of iterative methods, Optimal Relaxation parameter for the SOR method. Eigen values and Eigen vectors – Jacobi method for symmetric matrices and Power methods only.
Chapter:3, Section:3.3 to 3.5

UNIT - III INTERPOLATION AND APPROXIMATION   18Hrs
Hermite Interpolations- Piecewise and Spline Interpolation – piecewise linear interpolation, piecewise quadratic interpolation, piecewise cubic interpolation, Spline interpolation- Quadratics Spline interpolation ,cubic Spline interpolation. Bivariate Interpolation-Lagrange Bivariate interpolation. Least square approximation.
Chapter:4, Section:4.5 to 4.7

UNIT - IV DIFFERENTIATION AND INTEGRATION   18Hrs
Numerical Differentiation – Optimum choice of Step length – Extrapolation methods – Partial Differentiation. Numerical Integration -Methods based on undetermined coefficients : Gauss Legendre Integration method and Lobatto Integration Methods only.
Chapter:5, Section:5.2 to 5.6,5.8

UNIT - V ORDINARY DIFFERENTIAL EQUATIONS   18Hrs
Singlestep Methods: Local truncation error or Discretization Error, Order of a method, Runge-Kutta methods: Explicit Runge–Kutta methods, Minimization of Local Truncation Error, System of Equations, Implicit Runge-Kutta methods. Stability analysis of single step methods (RK methods only).
Chapter:6, Section:6.4,6.5
Text Book
- M.K. Jain, S.R.K. Iyengar and R.K. Jain, "*Numerical Methods for Scientific and Engineering Computation"*, New Age International (p) Limited Publishers, New Delhi, Sixth Edition 2012.

Reference Books
- Kendall E. Atkinson, "*An Introduction to Numerical Analysis*", II Edn., John Wiley & Sons, 1988.
- M.K. Jain, "*Numerical Solution of Differential Equations*", II Edn., New Age International Pvt Ltd., 1983.
- Samuel. D. Conte, Carl. De Boor, "*Elementary Numerical Analysis*", Mc Graw-Hill International Edn., 1983.

PMAM403 DIFFERENTIAL GEOMETRY

Semester : IV   **Credit** : 5
Category : CoreXIX   **Hours/Week : 6**
Class &Major: II M.Sc Mathematics   **Total Hours :78**

Objectives
To enable the students
- Understand space curves and their intrinsic properties of a surface and geodesics further the non-intrinsic properties of surface and the differential geometry of surfaces are explored.
- Develop arguments in the geometric description of curves and surfaces.
- Apply abstract algebra and analysis to geometrical problems and facts.

UNIT I SPACE CURVES   **16 Hrs**
       Definition of a space curve- Arc length – tangent – normal and binormal – curvature and torsion – contact between curves and surfaces – tangent surface – involutes and evolutes – Intrinsic equations – Fundamental Existence theorem for space curves – Helices.

UNIT II INTRINSIC PROPERTIES OF A SURFACE   **16 Hrs**
       Definition of a surface – curves on a surface – Surface of revolution – Helicoids – Metric – Direction coefficients – families of curves – Isometric correspondence – Intrinsic properties.

UNIT III GEODESICS   **16 Hrs**
       Geodesics – Canonical geodesic equations – Normal property of geodesics – Existence theorems – Geodesic parallels – Geodesics curvature – Gauss Bonnet theorem – Gaussian curvature – surface of constant curvature.

UNIT IV NON INTRINSIC PROPERTIES OF A SURFACE   **15 Hrs**
       The second fundamental form – Principal curvature – Lines of curvature – Developable – Developable associated with space curves and with curves on surface – Minimal surfaces – Ruled surfaces.

UNIT V DIFFERENTIAL GEOMETRY OF SURFACES   **15 Hrs**
       Fundamental Equations of Surface theory – Fundamental Existence theorem for surfaces- Compact surfaces whose points are umblics – Hilbert's lemma – Compact surface of constant curvature – Complete surfaces.

Text Book

- T.J. Willmore,"*An Introuduction to Differential Geometry*", Oxford University Press, (17th impression) **N**ew Delhi 2002

Reference Books

- J.A. Thorpe "*Elementary topics in Differential Geometry,*" Under graduate Texts in Mathematics, Springer – Verlag 1979.
- Kobayashi.S.and Nomizu.K. "*Foundations of Differential Geometry*", Interscience Publishers, 1963
- Struik, D.T. "*Lectures on Classical Differential Geometry*", Addison – Wesley, Mass.1950
- Wilhelm Klingenberg, "*A course in Differential Geometry*", Graduate Texts in Mathematics , Springer – Verlag 1978.

PMAP401 PROJECT

Semester	:III	**Credits**	: 5
Category	: Core XX	**Hours/Week**	: 2(LaTex)+4(Project)
Class & Major	:PMAP401	**Total Hours**	: 26 hours

Objectives

To enable the students

- Understand the mathematical latex application tools
- Develop a designing skills in LaTeX
- Apply the designing skills in LaTeX

Lab Excercise

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.

Text Book

- David F Griffiths and Desmond J. Higham, "*Learning LaTex*", SIAM (Society for Industrial and Applied Mathematics) Publishers, Phidel Phia, 1996.

Reference Books

- Martin J. Erickson and Donald Bindner, *"A Student's Guide to the Study, Practice, and Tools of Modern Mathematics"*, CRC Press, Boca Raton, FL, 2011.
- L. Lamport., *"LATEX: A Document Preparation System"*, User's Guide and Reference Manual. AddisonWesley, New York, second edition, 1994.

III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course code	Course Title	Component III	Component IV
III	CoreXI	PMAM305	Complex Analysis	Term Paper	Seminar
	Core XII	PMAM310	Fluid Dynamics	Poster Presentation	Seminar
	Core XIII	PMAM311	Topology	Term Paper	Seminar
	CoreXIIV	PMAM406/ PMAM313	Mathematical Statistics	Assignment	Seminar
	Core XV	PMAI312	Number Theory and Cryptography	Term Paper	Seminar
IV	CoreXVI	PMAM405	Functional Analysis	Poster Presentation	Seminar
	CoreXVII	PMAM309/ PMAM408	Stochastic Process	Assignment	Seminar
	Core XVIII	PMAM407	Numerical Analysis	Poster Presentation	Seminar
	CoreXIX	PMAM403	Differential Geometry	Term Paper	Seminar

DEPARTMENT OF PHYSICS

PREAMBLE

UG: Course profile and syllabi of courses offered in the III and IV semesters along with evaluation components III & IV (With effect from 2018-2021 batch onwards)

PG: Course profile and syllabi of courses offered in III and IV semesters along with evaluation components III & IV (With effect from 2018-2020 batch onwards) are presented in this booklet.

PROGRAMME PROFILE: B.Sc. (Physics)

PSO1: Application of the knowledge in the principles of nature and ability to solve and apply the concepts of physics in various fields including Material Science, Mechanics, Thermal Physics and Electricity.

PSO2: Learning of laboratory skills, enabling measurements in basic physics and analysis of measurements to draw valid conclusions.

PSO3: Development of the skills for problem solving and scientific reasoning for the prospective physicists and logical reasoning.

PSO4: Analysis of the behavior of materials from atomic level to macroscopic level.

Semester	Part	Category	Course code	Course Title	Contact Hrs/week	Credit Min	Credit Max
I	I	Language	UTAL105/UTAL106/ UHIL101/UFRL101	Basic Tamil-I/Advanced Tamil I/Hindi/French	4	2	3
	II	English	UENL107/UENL108	General English-I/Advanced English-I	5	3	4
	III	Core I	UPHM103	Mechanics	5	5	5
	III	Core II	UPHM105/UPHM202	Properties of Matter	6	5	5
	III	Core Practical-I	UPHR102/UPHR202	Major Practical I	3	2	2
	III	Allied	UMAA104	Algebra, Differential Calculus and Trigonometry	5	5	5
	IV	Value Education			2	1	1
				TOTAL	**30**	**23**	**25**
II	I	Language	UTAL205/UTAL206 UHIL201/UFRL201	Basic Tamil-II/Advanced Tamil-II/Hindi/French	4	2	3
	II	English	UENL207/UENL208	General English-II/Advanced English-II	5	3	4
	III	Core III	UPHM104/UPHM203	Thermal and Statistical Physics	7	6	6
	III	Core Practical-II	UPHR203/UPHR101	Major Practical II	3	2	2
	III	Allied	UMAA212	Integral Calculus, Laplace Transform and Ordinary Differential equation	5	5	5
	IV	NME	-	-	4	2	2
	IV	Soft Skill			2	1	1

	V	Extension Programme/ Physical Education/NCC	-	-	-	1	2
				TOTAL	**30**	**22**	**25**
III	I	Language	UTAL305/UTAL306/ UHIL301/UFRL301	Basic Tamil-III/Advanced Tamil-III/Hindi/ French	4	2	3
	II	English	UENL307/UENL308	General English-III/Advanced English-III	5	3	4
	III	Core IV	UPHM303/UPHM402	Electricity and Magnetism	6	5	5
		Core V	UPHM304/UPHM509	Mathematical Physics	4	3	3
	III	Core Practical-III	UPHR303	Major Practical III	3	2	2
	III	Allied	UCSA306	Computational Physics with Python	3	3	3
	III	Allied Practical	UCSR310	Computational Physics with Python Lab	3	2	2
	IV	Value Education	-	-	2	1	1
				TOTAL	**30**	**21**	**23**
IV	I	Language	UTAL405/UTAL406/ UHIL401/UFRL401	Basic Tamil-IV/Advanced Tamil-IV/Hindi/ French	4	2	3
	II	English	UENL407/UENL408	General English-IV/Advanced English-IV	5	3	4
	III	Core VI	UPHM406/UPHM302	Optics and Laser Physics	4	4	4
	III	Core VII	UPHM407	Atomic Physics	4	4	4
	III	Core Practical-IV	UPHR405	Major Practical IV	3	3	3
	III	Allied	UCHA401/UCHA402/ UCHA403	Chemistry for Physics	3	3	3
	III	Allied Practical	UCHA402/UCHR403	Volumetric and Organic Analysis-I	3	2	2
	III	Core XI	UPHP501/UPHP502	Project / Instrumentation Techniques	2	-	-
	IV	Soft Skill			2	1	1
	V	Extension Programme/ Physical Education/NCC			-	-	2
				TOTAL	**30**	**22**	**26**
V	III	Core VIII	UPHM501	Quantum Mechanics and Relativity	6	5	5
	III	Core IX	UPHM505	Basic Electronics	6	5	5
	III	Core X	UPHM506/UPHM608	Solid State Physics	6	5	5
	III	Core Practical-V	UPHR502	Major Practical V	3	3	3
	III	Core XI	UPHP501/UPHP502	Project / Instrumentation Techniques	**4**	**4**	**5**

	III	Online Course		NPTEL/Spoken Tutorial	3	1	2
	IV	Value Education			2	1	1
				TOTAL	**30**	**24**	**26**
VI	III	Core XII	UPHM609	Numerical methods and Basic Computational Physics	5	5	5
	III	Core XIII	UPHM611	Nuclear and Radiation Physics	5	5	5
	III	Core XIV	UPHM612	Material Science	5	5	5
	III	Core XV	UPHM613	Digital Electronics	5	4	4
	III	Core Practical VI	UPHR605	Major Practical VI	3	3	3
	III	Major Elective	UPHO601/ UPHO602/ UPHO603	Nanophysics/ Astrophysics/Functional Materials	5	4	4
	III	Viva Voce	UPHM610	Comprehensive Viva Voce	-	1	1
	IV	Soft Skill			2	1	1
	V	Extension Programme/ Physical Education/NCC			-	-	2
				TOTAL	**30**	**28**	**30**
				GRAND TOTAL	**180**	**140**	**155**

UPHM303/UPHM402 ELECTRICITY & MAGNETISM

Semester: III   **Credit   : 5**
Category: Core IV   **Hours/week : 6**
Class &Major: II B.Sc. Physics   **Total Hours : 78**

Objectives
To enable the students

- Understand basic laws & definition of Electricity and Magnetism.
- Analyze inter-relationship between Electricity and Magnetism.
- Apply the basic ideas to various concepts of Electricity and Magnetism.

UNIT-I: Electrostatics   15 Hrs
        Electrostatic potential- Electric potential as line integral of electric field - Relation between electric potential and electric field in vector form - Poisson's and Laplace's equations –Capacitance - Spherical and cylindrical capacitor- Energy of a charged capacitor - Energy density - Loss of energy due to sharing of charges. Electrometers - Kelvin's attracted disc electrometer.

UNIT-II: Current Electricity And Thermo Electricity   16 Hrs
        Carey Foster bridge - Theory - Determination of temperature coefficient of resistance. Calibration of ammeter and voltmeter using a potentiometer - Seebeck, Peltier and Thomson effects- Laws of thermoelectric circuits - Peltier coefficient- Thomson coefficient- Application of thermodynamics to a thermocouple and expressions for Peltier and Thomson coefficients - Thermoelectric diagrams and uses.

UNIT- III: Chemical Effects And Magnetic Effects Of Electric Current   15 Hrs

Electrical conductivity of an electrolyte - Faraday's laws of electrolysis - Determination of specific conductivity of an electrolyte (Kohlraush bridge) – Gibbs-Helmholtz equation for the emf of a reversible cell- Calculation of emf of a Daniel cell- Helmholtz Galvanometer - Theory of moving coil Ballistic Galvanometer- Damping correction- Absolute capacitance of a capacitor.

UNIT-IV: Electromagnetic Induction And Transient Currents   16 Hrs

Faraday's laws of electromagnetic induction in vector form- Determination of self-inductance by Anderson's bridge method and absolute mutual inductance by BG - Growth and decay of current in a circuit containing resistance and inductance. Growth and decay of charge in a circuit containing resistance and capacitor - Measurement of high resistance by leakage - Growth and decay of charge in a LCR circuit - Condition for the discharge to be oscillatory- Frequency of oscillation**.**AC generator two phase and three phase.

UNIT-V: Magnetic Properties of Materials and Maxwell's Equations   16 Hrs

Susceptibility – Permeability - Intensity of magnetization and their relationship - Properties of dia, para and ferro magnetic materials- Langevin's theory of diamagnetism and paramagnetism- Weiss theory of ferromagnetism - Antiferrimagnetism and ferrimagnetism.

Text Books
- R Murugeshan , *Electricity and magnetism*, 8th edition, S Chand & Co, New Delhi, 2006.
- M Narayanamurthy & N Nagarathnam, *Electricity & Magnetism,* 6th edition, National Publishing Co, Meerut, 2009.
- Brijlal N Subramanyan and Jivan Seshan, *Mechanics and Electrodynamics*, Eurasia Publishing House (Pvt.) Ltd, New Delhi, 2005.

Reference Books
- Sehgal D L, Chopra K L, Sehgal N K , *Electricity and magnetism,* Sultan Chand & Sons, New Delhi, 2007.
- David J Griffiths, *Introduction to Electrodynamics*, 3nd edition, Prentice Hall of India Pvt Ltd, New Delhi, 2007.
     K K Tewari, *Electricity & Magnetism*, S Chand & Co, 4th edition, 2005.

UPHM304/UPHM509 - MATHEMATICAL PHYSICS

Semester : III		**Credit : 3**
Category : Core V		**Hours/Weeks : 4**
Class & Major: II B.Sc. Physics		**Total Hours : 52**

Objectives
To enable the students
- Important mathematical knowledge for the description of physical phenomenon.
- Enhance basic skills of learning and appreciating Physics through Mathematics.

UNIT I APPLICATION OF VECTOR   16 Hrs

Vector Algebra - Divergence, Gradient and Curl and their physical significances - Simple Problems – Gauss' Divergence Theorem, Green's Theorem and Stokes Theorem (statement and proof only). Particle motion in a potential field using gradient, Faraday law based on the Stokes theorem, Conservation of Electrical Charges using divergence.

UNIT II DIFFERENTIAL EQUATION AND APPLICATIONS   16Hrs

Linear Ordinary Differential Equations - First order – solution by Separable Equations. Initial Value Problem - Theorem for Initial value problems. Boundary Conditions - Applications of Differential Equations: General Solution of Wave Equation in one dimension, Newton law of Cooling, Rate of Decay of Radioactive materials.

UNIT III COMPLEX ANALYSIS   16Hrs

Brief Review of Complex Numbers and their Graphical Representation. De Moivre's theorem - Roots of Complex Numbers. Functions of Complex Variables. Analyticity and Cauchy-Riemann Conditions- Examples of analytic functions. Application of analytic function to Flow Problems.

UNIT IV FOURIER SERIES AND ITS APPLICATIONS   16 Hrs

Periodic functions. Expansion of periodic functions in a series of sine and cosine functions and determination of Fourier coefficients. Even and odd functions and their Fourier expansions. Simple applications of Fourier series: Half and full wave rectifiers.

.UNIT V BASIC MATHEMATICAL STATISTICS   14 Hrs

Importance of statistics, concepts of statistical population and a sample - quantitative and qualitative data - collection of primary and secondary data. Univariate Statistics – Mean, Median, Mode, Standard deviation, Dispersion, Skewness and Kurtosis – Frequency Distribution-Graphical representation of frequency distribution – Normal Distribution-Characteristics and Applications.

Text Books
- Sathyaprakash, *Mathematical Physics*,S-Chand Publishers, New Delhi, 2010
- R. Murugesan,*Mechanics and Mathematical Methods –*. S-Chand Publishers, New Delhi, 2010
- P.R. Vittal, *Allied Mathematics –*. Margham Publishers, Chennai -2010.
- Vitaly Bychkov, *Examples on use of vector analysis in physics* - www.umu.se/digitalAssets/141/141566_vector-analysis-in-physics-vbyv.pdf

Reference Books
- B.S. Grewal, *Higher Engineering Mathematics*, 43rd Edition, Khanna Publishers, New Delhi, 2014
- M. D. Greenberg, *Advanced Engineering Mathematics,* Pearson Education Publishers (Singapore), 2nd Edition, 2010
- Tail.Chow, *Mathematical Methods for Physicist: A concise Introduction*, Cambridge University Press, 2003.

UPHR303 MAJOR PRACTICAL III

Semester	: III	**Credit**	: 3
Category	: Core Practical III	**Hours/Week**	: 3
Class & Major:	II B.Sc. Physics	**Total Hours**	: 39

Objectives
To enable the Students

- Apply the concepts of Electricity and Magnetism through direct experiment
- Analyze the experimental errors on various techniques of electricity and magnetism
- Operate these techniques to make error free measurements.

Lab Exercise
1. Calibration of Low range Voltmeter – Potentiometer
2. Calibration of High range Ammeter – Potentiometer
3. Field along axis of the coil – Vibration Magnetometer
4. Figure of a merit – Ballistic Galvanometer
5. Determination of m and B_H – TAN C position
6. Carey Foster's Bridge – Resistance and Specific resistance
7. Deflection Magnetometer Using TAN A
8. Deflection Magnetometer Using TAN B

Optional
1. Calibration of High range Voltmeter – Potentiometer
2. Calibration of Low range Ammeter – Potentiometer
3. Absolute Determination of Mutual inductance – B.G
4. Carey Foster's Bridge – Temperature Co-efficient
5. Absolute capacitance of a capacitor using Ballistic Galvanometer.
6. Comparison of mutual inductance – BG.
7. Self – inductance of a coil – Anderson's Method

Text Book
- N.Srinivasan, S.Balasubramaniam & R.Ranganathan, *The text book of practical Physics*, Sultan Chand & Sons, 2006.

Reference Books
- A.Ponnusamy & B. Amalanathan, *Practical Physics,* Bright Publishers, 2000.
- C.C.Ouseph,G.Rangarajan, A text book of Practical physics Viswanatha Publishers, 2000.
- C.S. Barrett & T. B. Massalski, *Structure of metals*, McGraw-Hill Book Company, 2012.

E – Books
- https://www.worldcat.org/title/electromagnetic-radiation/oclc/1083096643
- https://www.Structure-Analysis-Electron-Diffraction-Vainshtein-ebook/dp/B01DRXHOA0
- https://www.Electronic-Instrumentation-Measurement-Rohit-Khurana-ebook/dp/B01HI93MGY

UPHM406/UPHM302 OPTICS AND LASER PHYSICS

Semester: III   **Credit   : 4**
Category: Core VI   **Hrs/Week   : 4**
Class: II B.sc. physics   **Total Hours : 52**

Objectives
To enable the students
- To understand the concepts of dispersion of light, interference, diffraction and polarization of light waves and their applications in day-to-day life
- To study the working principle of laser and to apply the knowledge to industry, engineering, medicine
- To study fibre optic communication and its applications in different fields

UNIT-I GEOMETRICAL OPTICS   10 Hrs

Fermat's principle - dispersion of light - dispersive power - Cauchy's formula - deviation without dispersion - dispersion without deviation - cardinal points of an optical system and their relationships, thick lens and combinations- aberrations - spherical aberration - methods of minimizing spherical aberrations - chromatic aberrations in lens - condition for achromatism of two thin lenses in contact and without contact – eyepieces – Huygen's and Ramsden's eyepieces with comparison.s

UNIT-II INTERFERENCE   11 Hrs

Introduction - condition for sustained interference of light - Young's experiment – theory of interference fringes - Fresnel's biprism - experimental determination of 'λ' of monochromatic light and thickness of sheet - colour of thin films – airwedge - experiment to measure the diameter of the wire - Newton's rings - determination of wavelength of sodium light by Newton's rings - determination of 'μ' of liquid –Michelson's interferometer - theory – applications.

UNIT-III DIFFRACTION   10 Hrs

Introduction - Fresnel and Fraunhoffer diffraction - construction of half-period zones - zone plate - principle – theory - diffraction at a circular aperture - Fraunhoffer diffraction at a single slit - plane transmission diffraction grating - dispersive power of a grating - determination of wavelength of light using transmission grating (normal incidence).

UNIT-IV POLARISATION   11 Hrs

Polarisation of light - Brewster's law - double refraction - Nicol prism - quarter wave plate - half wave plate - production and detection of plane, circularly and elliptically polarized light - optical activity -specific rotation - Laurent's half-shade polarimeter.

UNIT-V LASER,OPTICALFIBREANDHOLOGRAPHY   10 Hrs

Laser: Introduction - characteristics of laser light- spontaneous and stimulated emission- population inversion-pumping - lasing action - Ruby laser - He-Ne laser –

applications. **Optical Fibre:** Introduction - modes of propagation of a light - acceptance angle - numerical aperture - types of optical fibres - optical sources and detectors - optical communication - optical fibre sensors - medical applications. **Holography**: Introduction - principle – important properties of hologram – recent advances - applications.

Text Books
- Optics and Spectroscopy, R. Murugeshan , Kiruthiga Sivaprasath, S. Chand & Company Ltd, New Delhi ,7th revised edition 2010(Unit I,II,III, IV)
- A Text Book of Optics , Brijlal ,N. Subramaniam, S. Chand & Company Ltd, New Delhi ,2008

Reference Books

- Halliday D. Resnick , Walker,*Fundamentals of Physics ,* J 6th Edition, NY , Wiley 2006
- Ajoy Ghatak , *Optics* , Tata Mc Graw ,Hill Publishing Company , New Delhi 1993
- S.L.Kakani , K.C. Bhandari, *A Text Book of Optics* S. Chand & Company Ltd, New Delhi ,2002
- B.B. Laud, *Lasers and Non-Linear Optics,*, New Age InternationalPublishers,2009
- A.K.Ghatak and K. Thyagarajan, *Lasers - Principles and Applications*, Tata- Mc-Graw Hill
- Subir Kumar Sarkar, *Optical Fibers and Fibre Optic Communication Systems,* S. Chand & Company Ltd, New Delhi,2004
- R. P. Feynman, R B Leighton and M Sands, *The Feynman Lectures on Physics,* Vols. I, II, and IIINarosa, New Delhi, 1998.

UPHM407 ATOMIC PHYSICS

Semester	: IV	**Credit**	: 4
Category	: Core VII	**Hours/week**	: 4
Class and major: II-B.Sc Physics		**Total Hours**	: 52

Objectives
To enable the students
- Understand the fundamental properties of atom and atomic models.
- Solve the problems related to physics of materials on the atomic and molecular scales.
- Compare the spectrum of different atoms and their transitions.

UNIT -I BASIC PROPERTIES OF ATOMS   11 Hrs
Positive rays – Discovery – Properties – Positive ray analysis - Thompson parabola method – Determination of e/m - Determination of mass – Discovery of stable isotopes – Limitations –Dempster's mass spectrograph - Aston's mass spectrograph – Mass defect and packing fraction. Critical potentials - Methods of excitations of atoms – Experimental determination of critical potentials - Frank and Hertz's experiment- Davis and Goucher's method

UNIT-II THE PHOTOELECTRIC EFFECT   10 Hrs

Photoelectric emission – Laws - Lenard's experiment - Richardson and Compton experiment-Einstein's photoelectric equation - Experimental verification by Millikan's experiment - photo electric cell.

UNIT-III ATOMIC MODELS   11 Hrs

The Bohr atom Sommerfelds relativistic model – Vector atom model – Quantum numbers associated with vector atom model - Coupling schemes (LS, JJ coupling) Pauli's exclusionprinciple – Periodic classification of elements. Magnetic dipole moment due to orbital motion of electron - Magnetic dipole moment due to spin- Stern and Gerlach experiment.

UNIT-IV ATOMIC STRUCTURE   10 Hrs

Optical spectra - Spectral terms and their notations - Fine structure of sodium D-lines –Alkali spectra-Spectrum of Helium- Zeeman effect-Experiment - Expression for the Zeeman shift -Larmor's theorem - Quantum mechanical explanation for the normal Zeeman effect - Anomalous Zeeman effect - Paschen Back effect - Stark effect.

UNIT-V ATOMS AND ELECTROMAGNETIC RADIATION   10 Hrs

X- Rays – Production and detection of X-rays - Continuous and characteristic X-ray spectra - Moseley's law- Absorption of X- rays by matter – Bragg's law – The Bragg X-ray spectrometer - Compton effect – Change of wavelength – Experimental determination - Industrial and Medical application of X-rays.

Text Books
- R. Murugesan, *Modern physics* S.Chand & Co, 2008.
- J.B.Rajam*, Atomic Physics*, S. Chand & Co, 1986.
- Arthur Beiser*, Concept of Modern Physics*, Tata McGraw-Hill edition, 2006.

References Books
- N.Subramaniam and Brij Lal, *Atomic and Nuclear physics*, S.Chand, 2003.
- Gupta. A. B. and Dipak , *Atomic Physics*, Ghosh-Books & Allied publisher.
- Sehgal and Chopra, *Modern physics*, McGraw Hill Publication, 1996.

UPHR405 MAJOR PRACTICAL IV

Semester : IV	**Credit** : 3
Category : Core practical-IV	**Hours/Week** : 3
Class &major: II B.Sc. Physics	**Total hours** : 39

Objectives
To enable the students
- Gain the practical knowledge of optics
- Understand the concepts of optical devices and principles.

Lab Exercise
1. Focal length of lens –uv method, auxiliary method,μ of a lens.
2. Air wedge – thickness of a wire.
3. Newton's ring – radius of curvature of convex lens.
4. Spectrometer –angle and 'μ' of a prism.

5. Spectrometer- Dispersive power of a prism.
6. Spectrometer-grating –λ of mercury light-normal incidence.
7. Spectrometer-Cauchy's constant.
8. Spectrometer – i-d curve.

 Optional
1. Spectrometer- i-i' curve.
2. Spectrometer-grating –'λ' of LASER light(gas)
3. Spectrometer – grating -'λ' of LASER light (solid state)
4. Planck's constant- using LASER Light.
5. Laser Light –Numerical aperture (NA) of optical fiber.
6. Spectrometer-Auto collimated lens using LASER Light.

Text Books
- Srinivasan M. N.,Balasubramanian S., Ranganathan R., *The Text book of practical physics,*Sultan chand &sons, new delhi,2006
- Ouseph C.C.,Rangarajan G., *A text book of practical physics* Part-I,S.Viswanathan publisher,1990.

Reference Books
- S.LGupta and V. Kumar, *Practical Physics*, Pragathi Prakashan, 25th edition, 2002

UPHP501 PROJECT

Semester   : IV&V   **Credit   : 4**
Category   : Core XI   **Hours/Weeks: 2 + 4**
Class &Major: II & III B.Sc Physics   **Total Hours   : 78**

Guidelines
- This course is offered as group project
- No. of students is limited from 5 to 6

Project Evaluation

S.No.	Criteria		CIA (Valuation by Faculty Guide)	ESE (Average of Internal &External marks)
			Evaluation	
1	Choice of the problem & Defining the problem		10	-
2	Review of literature		10	-
3	Research proposal		10	-
4	Collection of Data / Experimentation		10	-
5	Analysis of Data / Experimentation result		10	-
6	Preparation of report	I Draft II Draft III Draft Final Draft	10	-
7	Project report		-	30
8	Viva voce		-	10
Total			**60**	**40**

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UPHP502 INSTRUMENTATION TECHNIQUES

Semester	: IV&V	**Credit**	: 4
Category	: Core XI	**Hours/Weeks**	: 6
Class &Major	: II & III B.Sc. Physics	**Total Hours**	: 78

Objectives
To enable the students
- Understand the concepts of electromagnetic radiation.
- Apply the knowledge in different techniques.

UNIT- I ELECTROMAGNETIC RADIATION   **16 Hrs**

Electromagnetic radiation–Different regions, their wavelengths, frequencies and energies–interaction of EM radiations with matter – atomic, molecular, electronic interaction–Basic principles of spectroscopy –emission and absorption of radiations–radiation sources – dispersing and resolving techniques – detectors – typical atomic emission and absorption spectrographs in the UV and visible region.

UNIT- II MOLECULAR SPECTRA   **14 Hrs**

IR absorption – spectroscopy –RAMAN spectroscopy – Instrumentation techniques for analyzing solid, liquid and gaseous samples – sample handling techniques.

UNIT- III DIFFRACTION TECHNIQUES   **16 Hrs**

Microstructure characterization Diffraction techniques: interpretation of single crystal and powder crystal X-RAY diffraction patterns, Identification & quantitative estimation of unknown samples by X-ray powder diffraction technique and fluorescent analysis – Theory and method of particle size analysis.

UNIT-IV ELECTRON MICROSCOPY TECHNIQUES AND ELCTRONIC INSTRUMENTS   **16 Hrs**

Electron Microscopy techniques related to nanomaterials SEM, TEM& AFM (instrumentation and working only).

Digital voltmeters and multimeters–electronic counters–AC millivoltmeter–wave analyzers and spectrum analyzers–frequency synthesizers –lock in amplifier–frequency response analyzer phase meter.

UNIT- V ELECTRONIC RECORDERS AND DISPLAYS   **16 Hrs**

Standard lab Equipments–signal generator–pulse generator–CRO–VTVM–wave analysis recorders–analog recorders–XY – recorders–stripe chart recorder–oscilloscope recorder–digital recorder– digital readout CRO.

Text Books
- H.H. Willard, L.L.Jr. Merritt, J.A. Dean, F.A.Jr. Settle*, Instrumental methods of analysis,* 7th edition, Wadsworth Publishing Company, *1989.*

- G. Aruldas, *Molecular structure and spectroscopy*, Print *book*. English. 2nd ed. New Delhi, 2007.
- B. E. Warren, *X-ray diffraction*, Addison-Wesley Publishing Co.2012.
- R. W. James, *The optical principles of the diffraction of X-rays*, G. Bell & Sons Ltd. 2005.
- D. Patranabis, *Principles of Industrial Instrumentation*, TMH, 2001.

Reference Books

- D.A. Skoog and D.M. West, *Principles of instrumental analysis*, 2nd edition, Holt-Saunders, 2000.
- Sir A. Cottrell, *An introduction to metallurgy*, University Press, 2000.
- J.H. Brophy, R. M. Rose and J. Wulff, *The structure & properties of materials* (Volume II), Wiley Eastern Ltd.2007.

III and IV Evaluation components of CIA

Semester	Category	Course Code	Course Title	Component-III	Component-IV
III	Core IV	UPHM303/UPHM402	Electricity and Magnetism	Working model (Generation of electricity)	Usage of magnetic materials in day today life (Poster presentation)
	Core V	UPHM304/UPHM509	Mathematical Physics	Problem solving	Seminar
IV	Core VI	UPHM406/UPHM302	Optics and Laser Physics	Simple optics experiment-Model display	Seminar-Recent trends in laser
	Core VII	UPHM407	Atomic physics	Non working model(atomic structure)	PPT(various spectroscopic techniques)
	Core XI	UPHP502	Instrumentation techniques	Seminar	Working Model

PROGRAMME PROFILE: M.Sc. Physics

PSO 1: Proficiency in various mathematical concepts for the proper understanding of application in all physical systems especially in electronics, electromagnetism, material science, classical and quantum mechanics.

PSO 2: Learning of laboratory skills, enabling measurements in a physics and electronics laboratory and analysis of the measurements to draw valid conclusions.

PSO 3: Operation of the different electronic and physical devices such as microprocessor, microcontroller, laser, linear and nonlinear optical instruments in atomic scale.

PSO 4: Ability to synthesis crystals and nanomaterials for various technological applications.

Semester	Category	Course Code	Course Title	Contact Hrs/week	Credit Min	Credit Max
I	Core I	PPHM101	Mathematical Physics I	5	4	4
	Core II	PPHM102	Classical Mechanics	5	4	4
	Core III	PPHM105	Electronics	5	4	4
	Core IV	PPHM104	Electromagnetic Theory	5	4	4
	Core V	PPHM106/ PPHM203	Molecular Spectroscopy	5	4	4
	Core Practical I	PPHR202	General practical –I	5	3	3
			TOTAL	**30**	**23**	**23**
II	Core VI	PPHM205/ PPHM401	Mathematical Physics II	5	4	4
	Core VII	PPHM201	Quantum Mechanics I	5	5	5
	Core VIII	PPHM202	Statistical Mechanics	5	4	4
	Core IX	PPHM207/ PPHM302	Solid State Physics I	5	3	3
	Core Practical I	PPHR202	General practical –I	5	3	3
	NME			5	4	4
	Service Learning	PPHX201	Energy Audit	-	1	1
			TOTAL	**30**	**24**	**24**
III	Core X	PPHM301	Quantum Mechanics II	6	5	5
	Core XI	PPHM303	Microprocessor and Microcontroller	6	4	4
	Core XII	PPHM305	Material Science	**6**	**4**	**4**
	Project	PPHP401	Project	2	-	-
	Core Practical- II	PPHR402	General practical –II	5	3	3
	Core XIII	PIDM301	Sustainable Materials And Technologies	**5**	**5**	**5**
			TOTAL	**30**	**21**	**21**
IV	Core XIV	PPHM406/ PPHM304	Laser and nonlinear optics	5	3	3
	Core XV	PPHM402	Nuclear and Particle Physics	6	4	4
	Core XVI	PPHM403	Solid State Physics-II	5	4	4
	Core XVII	PPHM405	Crystal growth and Thin Films	**5**	**4**	**4**
	Core Practical-II	PPHR402	General Practical-II	5	3	3
	Project	PPHP401	Project	4	4	4
			TOTAL	**30**	**22**	**22**
			GRAND TOTAL	**120**	**90**	**90**

PPHM301 QUANTUM MECHANICS II

Semester : III   **Credit** : 5
Category : Core X   **Hours/Weeks** : 6
Class & Major: II M.Sc. Physics   **Total Hours** : 78

Objectives
To enable the students
- Understand the time perturbation effects in quantum mechanics.
- Examine the scattering and semi classical theory of quantum particles.
- Understand about Quantum field theory.

UNIT- I TIME DEPENDENT PERTURBATION THEORY   **15Hrs**

Time Dependent Perturbation Theory-First and Second Order Transitions-Transition to Continuum of States-Fermi Golden Rule-Constant and Harmonic Perturbation- Collision-Adiabatic and Sudden Approximation- A Charged Particle in an Electromagnetic Field.

UNIT -II SCATTERING THEORY   **16Hrs**

Scattering theory- Scattering of a particle by a fixed centre of force. Scattering amplitude differential and total cross sections. Method of partial waves. Phase shifts. Optical theorem. Scattering by a hard sphere and potential well. Integral equation for potential scattering. Green's function. Born approximation. Yukawa and Coulomb potential.

UNIT- III SEMI-CLASSICAL THEORY OF RADIATION   **16Hrs**

Application of the time dependent perturbation theory to semi-classical theory of radiation –Einstein's coefficients –absorption -induced emission-spontaneous emission - Einstein's transition probabilities-dipole transition -selection rules –forbidden transitions.

UNIT-IV QUANTUM FIELD THEORY   **16Hrs**

Quantization of Wave Fields- Classical Lagrangian Equation-Classical Hamiltonian Equation - Field Quantization of the Non-Relativistic Schrodinger Equation-Creation-Quantization of Electromagnetic Field Energy and Momentum.

UNIT- V GENERALISED ANGULAR MOMENTUM   **15Hrs**

Infinitesimal rotation, Generator of rotation, Commutation rules, Matrix representation of angular momentum operators, Spin, Pauli spin matrices, Rotation of spin states, Coupling of two angular momentum operators, Clebsch Gordon co-efficients-Applications.

Text Books
- P.M.Mathew & K.Venkatesan,*Text Book of Quantum Mechanics* Tata McGraw Hill 2010.
- G Aruldhas, *Quantum Mechanics*,Prentice Hall of India, 2006.
- David J.Griffith, *Introduction to Quantum Mechanics*, Pearson Prentice Hall, 2006.

Reference Books
- A Devanathan , *Quantum Mechanics*, Narosa Publishing-New Delhi, 2006.
- L.I Schiff , *Quantum Mechanics*, McGraw Hill, 1968.
- A.K. Ghatak and S. Loganathan , *Quantum Mechanics,* McMillan India, 2006.
- R.Shankar, *Principles of Quantum Mechanics*, Springer, 2005.

PPHM303 MICROPROCESSOR AND MICROCONTROLLER

Semester	**: III**	**Credit**	**: 4**
Category	**: Core XI**	**Hours/week**	**: 6**
Class &Major : II M.Sc Physics		**Total Hours**	**:78**

Objectives
To enable the students
- Plan the internal organization of microprocessor and microcontroller.
- Design the microprocessor and microcontroller based systems.
- Apply the interfacing system in applications.

UNIT- I MICROPROCESSOR 8085   **16 Hrs**

Internal Architecture of 8085- Addressing Modes-Direct-Indirect-register addressing-register indirect addressing-Immediate addressing-Instruction Set-Programming techniques-interrupts of 8085.

UNIT- II PROGRAMMING WITH 8085   **14 Hrs**

Addition-Subtraction and Multiplication-square and square root-BCD to Binary Conversion-Binary to BCD conversion-Bubble Sort Method-largest and smallest-Ascending and Descending Order-Sum of Series-Time delay subroutine-Clock Program.

UNIT -III INTERFACING MEMORY AND PERIPHERALS   **16 Hrs**

Basic interfacing concepts-Peripheral I/O instructions-Device select and data transfer-I/O mapped I/O-Memory mapped I/O-Interfacing of ROM, RAM and EPROM Chips-Interfacing of 8255.

UNIT-IV INTERFACING APPLICATIONS   **16 Hrs**

Seven Segment Display Interface-Keyboard Interface-Interfacing to Digital to Analog Converter(DAC)-Analog to Digital Converter(DAC)-Stepper Motor Interface-Hardware Controlled Serial I/O using programmable chip 8251(USART).

UNIT- V MICROCONTROLLER 8051 ARCHITECTURE AND PROGRAMMING
                                   13Hrs

Architecture of 8051-Key features of 8051-Memory Organization-Program Memory (internal and external ROM)data memory-Internal RAM organization-special function registers-addressing modes-instruction set-data instructions-arithmetic instructions-logical instructions-Rotate and Swap operations-simple programs.

Text Books
- Ramesh Goankar-*Microprocessor Architecture programming and applications with the 8080A/8085*, Pen ram International Ltd, 2000.

- Doughlas V.Hall-*Microprocessor Interfacing Programming and Hardware* 2nd edition Tata McGraw Hill Publishing Co.Ltd, 1991.

Reference Books
- Mohammed Rafiquzzaman-*Microprocessor and Microcomputer based system*, Universe Verlag Biefield, 2002.
- Kenneth J. Ayala *The 8051 Microcontroller Architecture, Programming and Applications*, edition 2 Penram International Ltd, 2000.

PPHM305 MATERIAL SCIENCE

Semester	: III	**Credit**	: 4
Category	: Core XII	**Hours/Weeks**	: 6
Class & Major	: II M.Sc Physics	**Total Hours**	: 78

Objectives
To enable the students
- Understand the theoretical concepts of Materials.
- Apply the knowledge on different properties of materials with examples.
- Analyze the different methods available for characterizing the materials.

UNIT– I IONIC CONDUCTIVITY AND SOLID ELECTROLYTES   16Hrs

Types of ionic crystals-alkali halides-silver chloride- alkaline earth fluorides -simple stoichiometric oxides. Types of ionic conductors-halide ion conductors-oxide ion conductors-solid electrolytes-applications of solid electrolytes. Electrochemical cell-principles-Batteries, sensors and fuel cells-crystal defects. Electronic properties and band theory; metal, semiconductors-Inorganic solids-colour, magnetic and optical properties.

UNIT– II MAGNETIC MATERIALS   15Hrs

Introduction-types of magnetic materials-diamagnetism-paramagnetism, ferromagnetism. Ferrites: Preparation and their applications in micro wave-floppy disk-magnetic bubble memory and applications. Insulating materials: classification on the basis of temperature –Polymer insulating materials and ceramic insulating materials. ferrro electric materials: examples-applications of ferro electrics.

UNIT–III NANOPHASE MATERIALS   16Hrs

Introduction-techniques for synthesis of nanophase materials-sol-gel synthesis-electro deposition-inert gas condensation-mechanical alloying (Ball milling method)-properties of nanophase materials-applications of nanophase materials, Basics of composite materials.

Metallic glasses: composition, properties and applications. Shape memory alloys: application of SMA-Advantages and Disadvantages. Biomaterials: metals and alloys in biomaterials-ceramic biomaterials, composite biomaterials.

UNIT– IV OPTICAL AND DIELECTRIC PROPERTIES OF MATERIALS
                                                                          15 Hrs

Theory of electronic polarization and optical absorption, ionic polarization, orientational polarization. Optical phonon model in an ionic crystal; Interaction of

electromagnetic waves with optical modes, polarization, Dispersion curves of transverse optical (TO) phonon and optical photon in a diatomic ionic crystal, LST relation; Metal-insulator transition. Optical properties of metals & nonmetals- Luminescence, photoconductivity.

UNIT– V THERMAL PROPERTIES OF METALS & ALLOYS　　　　　　**16 Hrs**

Temperature effects on the intensities of Bragg reflections. Influence of temperature on diffraction of X-rays: Normal coordinates of lattice vibration and X-ray scattering from a vibrating lattice and origin of thermal diffuse spots. First order TDS. Debye-Waller factor' Debye's method of calculating isotropic temperature factor for a cubic crystal. DTA, TGA, DSC (Outline only).

Annealing processes, Heat treatment of steels, mechanism of hardening-Quenching, thermal stresses.

Text Books
- V.R. Raghavan, *Material science and engineering*, Printice Hall India Ltd., 2001.
- V. Rajendran, *Materials science*, Tata Mcgraw-Hill Education, 2011.

Reference Books
- *E. J. Mittemeijere and P. Scardi*, *Diffraction analysis of the microstructure of materials*, Springer, 2004.
- W.D. Callister, *Materials science & engineering*, John Wiley & Sons, Inc. 2014.
- *D. P. Woodruff & T. A. Delchar*, *Modern techniques of surface science*, Cambridge University Press, 2016.
- T. Pradeep, *Nano*: *The essentials in understanding nanoscience and nanotechnology*, Tata McGraw Hill, New Delhi, 2007.

E – Books
- https://www.pdfdrive.com/materials-science-and-engineering-an-introduction-e7853330.html
- https://www.pdfdrive.com/fundamentals-of-materials-science-and-engineering-e29579234.html
- https://www.pdfdrive.com/an-introduction-to-materials-engineering-and-science-for-chemical-and-materials-engineers-e185424520.html

PIDM301 SUSTAINABLE MATERIALS AND TECHNOLOGIES

Semester	**: III**	**Credit**	**: 5**
Category	**: Core XIII**	**Hours/week**	**: 5**
Class & Major: II - M.Sc Physics & Chemistry		**Total Hours**	**: 65**

Objectives
To enable the students
- Learn the concept of sustainable materials.
- Understand about green chemistry strategies for designing the chemical synthesis.
- Explore the theoretical knowledge of physical and chemical properties.

UNIT– I INTRODUCTION TO MATERIALS   **13 Hrs**

Concept of Sustainable materials, Classification of materials: Crystalline & amorphous materials, high Tc superconductors, alloys & composites, semiconductors, solar energy materials, luminescent and optoelectronic materials, Polymer, Liquid crystals and quasi crystals, Ceramics.

UNIT– II GREEN CHEMISTRY   **14 Hrs**

Introduction: Prospects and future of Green Chemistry - Twelve guiding principles of green chemistry - Concept of atom economy - Green starting materials, Green reagents, Green solvents and reaction conditions, Green synthesis - Real world cases (Traditional Vs. Green processes) Synthesis of Ibuprofen, Adipic acid - Biomimetic, multifunctional reagents; Combinatorial green chemistry; Non-covalent derivatization.

UNIT– III GREEN TECHNOLOGIES   **13Hrs**

Green Solvents: Enhancement of selectivity, efficiency, and industrial applicability - Ionic liquids-Supercritical fluids - Solvent free neat reactions in liquid phase - Flourous phase reactions Green Catalysis: Heterogeneous catalysis: Use of zeolites, silica, alumina, clay, polymers, cyclodextrins, and biocatalysts.

UNIT– IV CHARACTERIZATION TECHNIQUES RELATED TO NANOMATERIALS   **13 Hrs**

Electron Microscopy techniques: Scanning Electron Microscope, Transmission Electron Microscope, Field emission scanning electron microscopy, Atomic Force Microscopy, X-ray photoelectron spectroscopy (XPS), Energy Dispersive X-Ray Analysis (EDX).

UNIT– V APPLICATION OF NANOMATERIALS   **12 Hrs**

Overview of nanomaterials properties and their applications, Molecular Electronics and Nanoelectronics – Nanobots- Biological Applications – Quantum Devices – Nanomechanics – Photovoltaic cells- Nano structures as single electron transistor.

Text Books
- J.George, Marcel Dekker, *Preparation of thin films*, Inc., New York. 2005.
- Rashmi Sanghi & M. M. Srivastava, *Green chemistry – Environment friendly alternatives*, Narora Publishing House, 2003.
- Elson Longo, Felipe de Almeida La Porta, *Recent advances in complex functional materials,* Springer, 2017.

Reference Books
- K. Barriham, D.D. Vvedensky, *Low dimensional semiconductor structures: fundamental and device applications*, Cambridge University Press, 2001.
- V.K. Ahluwalia, *Methods and reagents of green chemistry: An introduction by green chemistry*, Ane Books India, 2006.
- Bontempi, Elza, *Raw materials substitution sustainability*, Springer International Publishing, 2017.
- Xiaobo Chen, Samuel S. Mao, *Titanium dioxide nanomaterials: Synthesis, properties, modifications, and applications,* Chem. Rev. 2007, 107, 2891-2959.
- G. Cao, *Nanostructures & nanomaterials: Synthesis, properties & applications,* Imperial College Press, 2004.

- https://www.elsevier.com/books/introduction-to-materials-science/mercier/978-2-84299-286-6
- https://onlinelibrary.wiley.com/doi/book/10.1002/9780470988305
- http://www.mrforum.com/product/9781945291739/
- https://doi.org/10.1016/j.aca.2015.11.008
- https://www.taylorfrancis.com/books/9781315153285

PPHM304 LASER AND NONLINEAR OPTICS

Semester	: III	**Credit**	: 3
Category	: Core XIV	**Hours/Weeks**	: 5
Class & Major	: II M.Sc Physics	**Total Hours**	: 65

Objectives
To enable the students
- Compare the different types of laser.
- Define the field of non linear optics.
- Study the working function of fiber optics.

UNIT -I LASERS   **13 Hrs**

Gas lasers – He-Ne, Ar^+ ion lasers – Solid state lasers – Ruby – Nd: YAG, Ti Sapphire –Organic dye laser – Rhodamine – Semiconductor lasers – Diode laser, p-n-junction laser, GaAs Laser.

UNIT- II INTRODUCTION TO NONLINEAR OPTICS   **13 Hrs**

Refractive index – frequency dependent and intensity dependent refractive index - Wave propagation in an anisotropic crystal – Polarization response of materials to light – Second harmonic generation – Sum and difference frequency generation – Phase matching – four wave mixing - Third harmonic generation – self focusing – Parametric amplification - bistability

UNIT- III MULTIPHOTON PROCESSES   **13 Hrs**

Two photon process – Theory and experiment – Three photon process parametric generation of light – Oscillator – Amplifier – Stimulated Raman scattering – Intensity dependent refractive index optical Kerr effect – photorefractive, electron optic effects

UNIT- IV NONLINEAR OPTICAL MATERIALS   **13 Hrs**

Basic requirements – Inorganics – Borates(Sodium and potassium penta borates) – Organics – Urea, Nitro aniline – Semi organics – Thiourea complex – X-ray diffraction, FTIR and FT-NMR qualitative study – Kurtz test – Laser induced surface damage threshold

UNIT -V FIBER OPTICS   **13 Hrs**

Step – Graded index fibers – wave propagation – Fiber modes – Single and multimode fibres – Numerical aperture – Dispersion – Fiber bandwidth – Fiber loss – Attenuation coefficient – Material absorption

Text Books

- B.B. Laud *Lasers and Nonlinear Optics* 4th edition. New Age International (P) Ltd New Delhi 2010.
- Robert W. Boyd, *Nonlinear Optics*, 3rd edition Academic Press, New York, 2012.

Reference Books

- Govind P. Agarwal, Fiber-Optics Communication Systems, 3rd edition John Wile & Sons, Singapore 2003.
- William T. Silvast, Laser Fundamentals, Cambridge University Press, Cambridge, 2013.
- D.L. Mills, *Nonlinear Optics – Basic Concepts*, Springer, Berlin, 2005.

PPHM402 NUCLEAR AND PARTICLE PHYSICS

Semester : IV	**Credit : 4**
Category : Core XV	**Hours/week : 6**
Class & Major : II M.Sc Physics	**Total Hours : 78**

Objectives

To enable the students

- Understand the nuclei model and its associated particles.
- Acquire the working process of nuclear reactor and detectors.
- Compare the different elementary particles

UNIT- I STATIC PROPERTIES OF NUCLEI AND NUCLEAR MODEL   15 Hrs

Nuclear size-determination from electron scattering-nuclear form factors-angular momentum-spin and moments of nuclei-nuclear model reactions-shall model-Nilsson model-physical concept of the unified model.

UNIT-II TWO NUCLEAN SYSTEM AND NUCLEAR FORCES   16 Hrs

Dipole and quadruple moments of the deuteron- central and tensor forces-ecridenced for saturation property-neutron-proton scattering-exchange character-spin dependence (ortho anpara-hydragen) –charge independence and charge symmetry. Iso spin formalism-general form of the nucleon-nucleon force-S-wave effective range theory-proton-proton scattering-evidence for hard core potential.

UNIT-III NUCLEAR DECAYS AND REACTIONS   15 Hrs

Electromagnetic decays: selection rules-Fermi theory of beta decay-kurie plot-Fermi and Gamow – teller transitions-parity violation in beta decay-introduction to nuclear reactions.

UNIT-IV NUCLEAR DETECTORS   16 Hrs

Interactions of radiations with matter-Ge and Si solid state detectors-colorimeter and the use for measuring get energies-syndication and Cerenkov counters-quantization ideas-hybrid detectors.

UNIT-V ELEMENTARY PARTICLES   16 Hrs

Relativistic kinemetics-classification spin and parity determination of pions and strange particles –Gelmann nishijima scheme-properties of quark and their classification-elementary ideas of Su(2) and Su(3)-symmetric groups and hadron classification-introduction to the standard model-electro weak interactions-W and Z Bosons.

Text Books
- Krane. K.S *Introducing nuclear physics*, Wiley India, 2008.
- Roy R Rand Nigam B.P *Nuclearphysics Theory and experiment* New Age International 2005.
- Tayal. D.C*Nuclear physics* Himalaya Publication 1997.
- Sathiya prakash Nuclear Physics Pragati Prakashan Publication 2011.

Reference Books
- D.Griffith, *Introduction to elementary particles* Academic press 2 nd edition 2008.
- A. Nutshell by C.A.Bertulani *Nuclear physics* 1st edition Princeton University press 2007.
- B.L.Cohen, *Concept of Nuclear physics*, McGraw-Hill, 2003.

PPHM403 SOLID STATE PHYSICS -II

Semester   : IV   **Credit   : 4**
Category   : Core XVI   **Hours/week : 5**
Class & Major: II - M.Sc Physics   **Total Hours : 65**

Objectives
To enable the students
- Understand the concept of modern solid state physics.
- Develop the basic frameworks of solid state physics.
- Explore the theoretical understanding of various physical properties of condensed matter.

UNIT- I SEMI CONDUCTING PROPERTIES   14Hrs

Carrier concentration in semiconductors-Fermi level-mobility of charge carriers-effect of temperature on mobility-electrical conductivity of semi conductors-Hall effect in semi conductors-junction properties: metal-metal junction, metal-semiconductor junction, semiconductor-semiconductor junction.

UNIT- II DIELECTRIC PROPERTIES   13Hrs

Dipole moment-polarisation-electric field of a dipole-polarisability-classical theory of electronic polarisation-polarisability, Dielectric constant and polarisability – Clausius Mossotti equation- piezo, pyro and ferroelectric properties of crystals-anti Ferro electricity and ferric electricity

UNIT- III OPTICAL PROPERTIES   12Hrs

Classical model drude model- optical refractive index and relative dielectric constant -colour centres (types and generation) – Luminescence-Photoconductivity

UNIT -IV MAGNETIC PROPERTIES   13Hrs

classification of magnetic materials-atomic theory of magnetism-Langevin's classical theory of diamagnetism and para magnetism-quantum theory of magnetism ferromagnetism-Weiss molecular field theory-ferromagnetic domains-domain theory-anti ferromagnetism, ferrimagnetisms.

UNIT -V SUPERCONDUCTING PROPERTIES   13Hrs

Sources of superconductivity-Meissner effect-thermodynamics of superconducting transition-isotope effect-London penetration depth-coherence length-band gapelements of BCS theory-flux quantisation-Josephson effect-High Tc superconductivity.

Text Books
- M.A.Wahab, *Solid state physics, Structure and properties of materials*,2nd edition, Narosa publishing house, 2005.
- Micea S.Rogalski and Stuart.B.Palmer, *Solid state physic,* Gordon and Breach science publishing, 2001.
- R.K.Puri and V.K.Babbar, *Solid state physics*, third edition, S.Chand and company Ltd, 2005.
- P.K.Palanisamy, *Solid state physics*, Scitech publications (India). Ltd ,2003.

Reference Books
- Charles Kittel, *Introduction to solid state physics,* Wiley eastern limited, 7th edition 2000.
- Ajay Kumar Saxena, *Solid state physics*, MacMillan Publishers, 2006.
- J.S.Blackmore *Solid state physics*, second edition-Cambridge university press, 1974.
- N.W.Ashcroft and N.D.Mermin, *Solid state physics,* CBS publishing Asia Ltd, 1988.

PPHM405 CRYSTAL GROWTH AND THIN FILMS

Semester : IV	**Credit** : 4
Category : Core XVII	**Hours/week** : 5
Class and Major: II M.Sc Physics	**Total hours** : 65

Objectives
To enable the students
- Interpret different techniques of crystal growth.
- Apply the characterization in the single crystals.
- Analyze the different methods in thin film growth process.

UNIT–I NUCLEATION   11Hrs

Nucleation concept – Kinds of nucleation – Classical theory of nucleation - Induction period – Measurement – Homogeneous Nucleation – Energy of formation of a critical spherical nucleus – critical radius – Nucleation rate.

UNIT-II CRYSTAL GROWTH FROM SOLUTION   15Hrs

Low temperature solution growth – Solution and Solubility – Preparation of solution - Principle of low temperature solution growth - Mier's solubility diagram – Measurement of solubility – Achievement of super saturation**.**

Crystal Growth methods – Slow cooling method – Holden's rotary crystallizer - Slow evaporation method – Johnson's rotating crystal method - Temperature gradient method – Kruger and Fink U tube method.

UNIT- III MELT GROWTH, GEL GROWTH AND FLUX GROWTH   13Hrs

Growth of crystal from melt – Bridgman method – Czochralski method – LEC growth of III – V materials - Verneuil method. Gel growth – Different gel medium – Specific gravity – Silica gel – Agar gel – Basic growth procedure – Single diffusion technique – Double diffusion technique – Reaction method – Chemical reduction method.

Principle of flux growth – Slow cooling method – Slow evaporation method – Top seeded solution.

UNIT– IV PREPARATION AND DEPOSITION TECHNIQUES OF THIN FILM
13Hrs

Nature of Thin Film-Deposition Technology-Distribution of Deposit-Resistance Heating-Thermal Evaporation-Flash Evaporation.

Electron Beam Method-Cathodic Sputtering-Glow Discharge Sputtering-Low Pressure Sputtering-Reactive Sputtering-RF Sputtering-Chemical Vapour Deposition-Chemical Deposition.

UNIT - V THIN FILM GROWTH PROCESS   13 Hrs

Epitaxy-Thin Film Structure-Substrate Effect-Epitaxial Deposit-Twinning and Multi twinning-Phase Transition-Dissociations-Film Thickness Effect-Crystal Growth Process

Text Books

- P. Santhana Raghavan and P. Ramasamy *Crystal growth processes and methods*, KRU Publications, 2000.
- K.L. Chopra, *Thin film phenomena,* McGraw-Hill, 1969.
- K.L. Chopra, *Thin film device applications*, Springer Science & Business Media, 2012.
- L.T. Meissel & R. Glang-McGraw Hill - *Handbook of thin film technology*, 2006.

Reference Books

- A. Goswami, *Thin film fundamentals*, New Age International – New Delhi, 2008.
- H. Komatsu, *Studies and concepts in crystal growth*, Pergamon Press, Oxford, 1993.
- K.L. Chopra, S.R. Das, *Thin film solar cells*, Springer Science & Business Media, 1983.
- J. Hans Scheel, *Crystal growth technology book*, Originally published,2003.

e– Books

- https://www.Handbook-Crystal-Growth-Films-Epitaxy-ebook/dp/B00PC556NE
- https://www.springer.com/gp/book/9781468491470
- https://www.elsevier.com/books/handbook-of-crystal-growth/kuech/978-0-444-63304-0

PPHR402 PHYSICS PRACTICAL - II

Semester	: III&IV	**Credit**	: 3
Category	: Core practical-II	**Hours/Week**	: 5
Class and Major: II M.Sc. Physics		**Total Hours**	:65

Objectives

To enable the students
- Program a microcontroller to perform various tasks.
- Design and implement microprocessor based embedded system.

MICROPROCESSORAND MICROCONTROLLER

1. Selection of largest element of an array.
2. Selection of smallest element of an array.
3. Square of a single byte Hex number.
4. Square root.
5. Ascending order.
6. Descending order.
7. Arithmetic progression.
8. Clock program.
9. Code conversion.
10. ADC interface.
11. Interfacing of 8255.
12. Digital to Analog conversion.
13. Continuous Anticlockwise Rot-Stepper Motor.
14. Rotation through required angle.
15. Keyboard Interface.
16. Study of seven segment display.
17. Timer interface
18. Parallel interface
19. Microprocessor 8085 – solving equation.
20. Microprocessor 8085 – waveform generation

Optional

1. Temperature conversion- 8085.
2. Traffic control system using microprocessor.
3. Microprocessor 8085- Interface (A/D counter).

Text Books
- Ghosh P. K.Sridhar P. R., "*Introduction to Microprocessors for Engineers and Scientists"*, Prentice- Hall of India, New Delhi,2nd edition, 2001.
- Yu-Cheng Liu,Glenn A.Gibson, "*Microcomputer Systems*:8086/8088 Family, Prentice-Hall of India, New Delhi,2nd edition, 1994.
- Barry B.Brey, "*The Intel Microprocessors 8086/8088, 80186, 80286, 80386 and 80486, Prentice-Hall of India*, New' Delhi, 3rd edition, 1995.
- Brian W. Kernighan, Dennis M. Ritchie, "*The C Programming Language*", Prentice-Hall of India, New Delhi, 2nd edition,1993.

III and IV Evaluation Components of CIA

Semester	Category	Course Code	Course Title	Component-III	Component-IV
III	Core X	PPHM301	Quantum Mechanics II	Problem solving	PPT
	Core XI	PPHM303	Microprocessor and Microcontroller	Assignment	Seminar
	Core XII	PPHM305	Material Science	Poster Presentation	Seminar
	Core XIII	PIDM301	Sustainable Materials and Technologies	Poster Presentation	Seminar
IV	Core XIV	PPHM406/ PPHM304	Laser and nonlinear optics	Seminar	Working model of laser
	Core XV	PPHM402	Nuclear and particle physics	Assignment	PPT
	Core XVI	PPHM403	Solid state physics -II	Journal review	Poster presentation
	Core XVII	PPHM405	Crystal Growth and Thin Films	Characterization Techniques analysis	Seminar

DEPARTMENT OF COMPUTER SCIENCE

PREAMBLE

UG **:** Course Profile and Syllabi of courses offered in III & IV semesters along with evaluation components III & IV (With effect from 2018-2021 batch onwards) and

PG **:** Course Profile and Syllabi of courses offered in III & IV semesters along with evaluation components III & IV (With effect from 2018-2020 batch onwards) are presented in this booklet.

PROGRAMME PROFILE B.Sc. (Computer Science)

PSO1: Ability to understand, analyze, design, develop and optimize solutions related to computer programming languages.

PSO2: Application of concepts in core areas related to computer programming for efficient design of computer-based systems of varying complexity.

PSO3: Ability to test the technical issues in Software Engineering and deliver a quality product for business success.

PSO4: Ability to innovate and develop new technologies.

Semester	Part	Category	Course Code	Course Title	Contact Hrs/Week	Credit Min	Credit Max
I	I	Language	UTAL105/ UTAL106/ UHIL101/ UFRL101	Basic Tamil-I/ Advanced Tamil-I/ Hindi-I/ French-I	4	2	3
	II	English	UENL107/ UENL108	General English-I/ Advanced English-I	5	3	4
	III	Core I	UCSM106/ UCAM107	Programming in C	6	5	5
	III	Core II	UCSM107/ UCAM108	Fundamental of Computer Science	5	4	4
	III	Core II	UCSM108/ UCAM109	Advanced Computer Science			
	III	Core III	UCSR109/ UCAR105	Programming in C - Practical	3	2	2
	III	Allied I	UMAA113	Statistical Methods	5	4	4
	IV	Value Education			2	1	1
Total					**30**	**21**	**23**
II	I	Language	UTAL205/ UTAL206/ UHIL201/ UFRL201	Basic Tamil-II/ Advanced Tamil-II/ Hindi-II/ French-II	4	2	3

	II	English	UENL207/ UENL208	General English-II/ Advanced English-II	5	3	4
	III	Core IV	UCSM206/ UCAM205	Data Structures	6	6	6
	III	Core V	UCSR206/ UCAR204	Data Structures - Practical	4	3	3
	III	Allied II	UMAA210	Mathematics for Computer Science	5	4	4
	IV	Non Major Elective			4	2	2
	IV	Soft Skill			2	1	1
	V	Extension Programme / Physical Education/NCC			-	1	2
	Total				**30**	**22**	**25**
III	I	Language	UTAL305/ UTAL306	Basic Tamil-III / Advanced Tamil–III	4	2	3
			UHIL301/ UFRL301	Hindi-III / French-III			
	II	English	UENL307/ UENL308	General English-III/ Advanced English-III	5	3	4
	III	Core VI	UCSM305/ UCAM310	Java Programming	5	5	5
	III	Core VII	UCSM306	Microprocessor and its Applications	4	4	4
	III	Core VIII	UCSR308/ UCAR304	Java Programming – Practical	4	3	3
	III	Allied III	UPHA304	Digital Electronics	3	3	3
	III	Allied IV	UPHR304	Digital Electronics – Practical	3	2	2
	IV	Value Education			2	1	1
	Total				**30**	**23**	**25**
IV	I	Language	UTAL405/ UTAL406/	Basic Tamil-IV / Advanced Tamil–IV	4	2	3
			UHIL401/ UFRL401	Hindi-IV / French-IV			
	II	English	UENL407/ UENL408	General English-IV / Advanced English-IV	5	3	4
	III	Core IX	UCSM408	Graphics & Multimedia	6	6	6
	III	Core X	UCSM409/ UCSM609	Operating System	5	5	5
	III	Core XI	UCSR411	Operating System & Graphics Lab	5	3	3
	IV	Online courses		NPTEL/SPOKEN TUTORIAL/SWAYAM	3	1	2
		Soft skill			2	1	1
	V	Extension Programme / Physical Education			-	-	2
	Total				**30**	**21**	**26**

	III	Core XII	UCSM506	Middleware Technologies	5	5	5
	III	Core XIII	UCSM509	Database Management System	5	4	4
	III	Core XIV	UCSM510	Computer Networks	5	5	5
V	III	Core XV	UCSM511	Software Engineering	5	4	4
	III	Core XVI	UCSR509	Middleware Technologies – Practical	4	3	3
	III	Core XVII	UCSR511	Database Management System-Practical	4	3	3
	IV	Value Education			2	1	1
Total					**30**	**25**	**25**
	III	Core XVIII	UCSM612	Cloud Computing	5	5	5
	III	Core XIX	UCSM613	Open Source Technology	5	5	5
	III	Core XX	UCSM610	Big Data Tools	4	4	4
	III	Core XXI	UCSR607	Open Source Technology-Practical	4	3	3
	III	Core XXII	UCSP601	Project	5	5	5
VI	III	Major-Elective	UCSO606/ UCSO607/ (UCSO608/U CSM507)	Network Security / Mobile Computing / System Analysis and Design	5	4	4
	III	Viva – Voce	UCSM611	Comprehensive Viva Voce	-	1	1
	IV	Soft skill			2	1	1
	V	Extension Programme / Physical Education/N CC			-	-	2
Total					**30**	**28**	**30**
Grand Total					**180**	**140**	**154**

ALLIED COURSES OFFERED TO OTHER DEPARTMENTS

Class & Major	Semester	Category	Course Code	New Course Title	Contact Hrs/ Week	Credit
	I	Allied	UCSA104	C Programming	3	3
	I	Allied Practical	UCSR110	C Programming Lab	3	2
	II	Allied	UCSA204	Object Oriented Programming	3	3
	II	Allied Practical	UCSR207	Object Oriented Programming – Lab	3	2
	III	Allied	UCSA305	Fundamentals of Blockchain Technology	3	3
B.Com with Computer Applications	III	Allied Practical	UCSR309	Blockchain Technology Using Solidity – Lab	3	2
	IV	Allied	UCSA406	Digital Marketing Analytics	3	3
	IV	Allied Practical	UCSR412	Web Design - Lab	3	2
	V	Allied	UCSA509	Business Analytics and Intelligence.	3	3

	V	Allied Practical	UCSR512	Business Analytics and Intelligence using SAS - Lab	3	2
BBA, B.Com and Economics	IV	Allied	UCSA407	Cyber Security in Finance	3	3
	IV	Allied Practical	UCSR413	Cyber Security Lab	3	2
Tamil	V	Allied	UCSA505	Tamil Kanini	3T + 2P	5
Maths	III	Allied	UCSA304	Mathematical Programming using C	3	3
	III	Allied Practical	UCSR307	Mathematical Programming using C – Lab	3	2
	V	Allied	UCSA507	Object Oriented Programming using Java	3	3
	V	Allied Practical	UCSR508	Object Oriented Programming using Java - Lab	3	2
Physics	III	Allied	UCSA306	Computational Physics with Python	3	3
	III	Allied Practical	UCSR310	Computational Physics with Python – Lab	3	3

NON-MAJOR ELECTIVE

Semester	Part	Category	Course Code	Course Title	Contact Hrs/week	Credit
II	IV	Non Major Elective	UCSE206	Tableau Programming	2T+2P	2
			UCSE207	Python Programming	4P	2
			UCSE208	R Programming	4P	2
			UCSE209	Arduino Programming	4P	2

EXTRA CREDIT EARNING PROVISION

Semester	Part	Category	Course Code	Course Title	Contact Hrs/week	Credit Min	Credit Max
II	III	Core	UCSI201	Summer Internship / Working Model	-	-	1
IV	III	Core	UCSI401	Summer Internship	-	-	1
V	III	Self Study Paper	UCSS501	Python Programming	2	-	2
V	III	Self Study Paper	UCSS502/ UCAS502	Android Applications	2	-	2
VI	III	Self Study Paper	UCSS601/ UCAS601	Angular JS	2	-	2
VI	III	Self Study Paper	UCSS602/ UCAS602	Green Computing	2	-	2

UCSM305/ UCAM310 JAVA PROGRAMMING

Semester : III
Category : Core VI
Class & Major : II B.Sc. CS

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

Objectives
To enable the students
- Understand the OOP Concepts, Exception and String Handling in Java
- Construct programs using Applets and JDBC concepts
- Execute Java and Applet Programs in various applications

UNIT -I INTRODUCTION **10 Hrs**

Fundamentals of Object Oriented Programming: Java Evolution – Overview of Java Language – Data Types, variables, arrays – Operators – Control statements.

UNIT –II CLASSES AND METHODS **15 Hrs**

Introduction to classes – class fundamentals – Declaring objects – Constructors – Methods and Classes – Overloading methods – static - final - Nested and Inner classes – Inheritance – Method Overriding – Abstract Classes – Packages – Interfaces.

UNIT – III EXCEPTION HANDLING AND FILES **15 Hrs**

Exception handling – Types of Exception – try and catch – nested try – throw and throws – Multithreading Programming –I/O Streams – Reading and Writing files – Reading and writing Console I/O.

UNIT – IV STRING HANDLING AND APPLETS **15 Hrs**

String Handling- String Operations: Comparison – Modifying String – String Buffer - Applet Class – Applet Architecture – The HTML Applet Tag – Passing parameters in Applets – Applet Context – Improving the Banner Applet – get() Method - JDBC Concepts.

UNIT – V AWT **10 Hrs**

AWT classes – Window fundamentals – Working with Frame windows, Graphics – Controls – Layout Managers - Java Swing.

Text Books
- Herbert Schildt, *Java - The Complete Reference*, Tata McGraw Hill, 10th Edition, Nov 2017.

Reference Books
- E. Balagurusamy , *Programmingwith Java A Primer*, Tata McGraw Hill, Fourth Edition, 2010.

- Cay S. Horst Mann & Gary Cornell, *Core java*, Volume II (9th ed.), Sun Microsystems Press Java Series, 2012.

e-Resources
- http://www.w3schools.com/html/
- https://www.youtube.com/watch?v=oqJy4e6Aa0M
- https://www.youtube.com/watch?v=7r3Vln4bGLk

UCSM306 MICROPROCESSOR AND ITS APPLICATIONS

Semester : III	**Credit** : 4	
Category : Core VII	**Hours/Week** : 4	
Class & Major : II B.Sc CS	**Total Hours** : 52	

Objectives
To Enable the Students
- Understand the Architecture and Instruction set
- Develop simple programming Skills
- Gain hands-on experience in Interfacing Peripherals

UNIT - I INTRODUCTION TO 8085 MICROPROCESSOR   12 Hrs

Evolution of the Microprocessor – Intel 8085: Introduction – Register Architecture – 8085 Pins and Signals – Memory Addressing – 8085 Addressing Modes – 8085 Instruction Set – The 8085 Programming Model.

UNIT - II 8085 MICROPROCESSOR   10 Hrs

8085 Instruction Timing and Execution – Serial Port – Interfacing Input/Output Devices – 8085 Interrupts – Interrupt Controller – Direct Memory Access Transfer – Direct Memory Access Controller.

UNIT - III 8086 MICROPROCESSOR   10 Hrs

Introduction – 8086 Architecture – 8086 Addressing Modes – Accessing Immediate and Register Data – Accessing Data in Memory.

UNIT – IV 8086 INSTRUCTION SET   10 Hrs

8086 Instruction Set – Data Movement Instructions – Arithmetic and Logic Instructions – Program Control Instructions.

UNIT - V PERIPHERAL INTERFACING   10 Hrs

Keyboard Display Interface controller (8279) – Hex Key and Display Interface to 8085, 8279 Keyboard Display Controller Chip – Printer Interface – LR 7040 Printer Interface Using 8295 Printer Controller.

Text Books

- Mohamed Rafiquzzaman, *Introduction to Microprocessors and Microcomputer – Based System Design,* CRC Press, New York, 2010.
- S. Ramesh Gaonkar, *Microprocessor Architecture, Programming and Applications with the 8085*, Penram International Publishing, New Delhi, 2011.

References Books

- B. Barry Brey, *the INTEL Microprocessors 8086/8088, 80186, 80286, 80386 and 80486 Architecture -Programming and Interfacing*, Prentice Hall, New Delhi, 2011.
- Gilmore, *Microprocessors principles and applications*, Tata McGraw Hill, New Delhi, 2010.

e- Resource

- http://www.nptel.ac.in/courses/106108100

UCAR304/UCSR308 JAVA PROGRAMMING – PRACTICAL

Semester : III	**Credit** : 3
Category : Core XIII	**Hours/Week** : 4
Class & Major : II B.Sc CS	**Total Hours** : 52

Objectives

To enable the students

- Create programs using Inheritance, Exception and String Handling
- Build programs using Threads, Packages and Interfaces
- Design simple applet programs using Swing and JDBC

Lab Exercises

1. Classes and Objects
2. Constructors
3. Method Overloading
4. Implementing Single and Multiple Inheritance concepts.
5. Method Overriding
6. Implementing Package Concepts.
7. Implementing Interfaces Concepts.
8. Implementing Exception Handling.
9. Implementing Thread Synchronization
10. Implementing String manipulation using string and string buffer classes
11. Implementing Graphics using Applet.
12. Implementing Swing Concepts.
13. JDBC Connectivity

UCSM408GRAPHICS & MULTIMEDIA

Semester : IV   **Credit** : 6

Category : Core IX   **Hours/Week** : 6

Class & Major : II B.Sc CS   **Total Hours** : 78

Objectives

To enable the students

- To inculcate knowledge on Graphics & Multimedia concepts
- To deals with Graphics Concepts and Multimedia methodologies
- Mathematical Knowledge on Graphics and Technical background of Multimedia

UNIT-I GRAPHICS   15 Hrs

Output Primitives: Points and Lines – Line-Drawing algorithms – Loading frame Buffer – Line function – Circle-Generating algorithms – Ellipse-generating algorithms. Attributes of Output Primitives: Line Attributes – Curve attributes – Color and Grayscale Levels – Area-fill attributes – Character Attributes.

UNIT-II2D GEOMETRIC TRANSFORMATIONS   15 Hrs

2D Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations. 2D Viewing: The Viewing Pipeline – Viewing Co-ordinate Reference Frame – Window-to-Viewport Co-ordinate Transformation- 2D Viewing Functions – Clipping Operations.

UNIT-III MULTIMEDIA   16 Hrs

Text: Types of Text – Unicode Standard – Font – Insertion of Text – Text compression – File formats. Image: Image Types – Seeing Color – Color Models –Basic Steps for Image Processing – Scanner – Digital Camera – Interface Standards –Specification of Digital Images – CMS – Device Independent Color Models – ImageProcessing software – File Formats – Image Output on Monitor and Printer.

UNIT-IV AUDIO   16 Hrs

Audio: Introduction – Acoustics – Nature of Sound Waves – FundamentalCharacteristics of Sound – Microphone – Amplifier – Loudspeaker – Audio Mixer – DigitalAudio – Synthesizers – MIDI – Basics of Staff Notation – Sound Card – AudioTransmission– Audio File formats and CODECs – Audio Recording Systems – Audio and Multimedia–Voice Recognition and Response - Audio ProcessingSoftware.

UNIT-V VIDEO   16 Hrs

Video: Analog Video Camera – Transmission of Video Signals – Video SignalFormats – Television Broadcasting Standards – PC Video – Video File Formats andCODECs – Video Editing – Video Editing Software. Animation: Types of Animation –Computer Assisted Animation – Creating Movement – Principles of Animation – SomeTechniques of Animation – Animation on the Web – Special Effects – RenderingAlgorithms. Compression: MPEG-1 Audio – MPEG-1 Video - MPEG-2Audio – MPEG-2Video.

Text Books
- Donald Hearn, M.Pauline Baker, *Computer Graphics,2nd Edition, PHI.*
- Ranjan Parekh,*Principles Of Multimedia, 2007, TMH.*

Reference Books
- Amarendra N Sinha, Arun D Udai,*Computer Graphics*, TMH.
- Making it Work – Tay Vaughan, *Multimedia,*7th edition, TMH.

UCSM409/UCSM609 OPERATING SYSTEM

Semester	**: IV**	**Credit**	**:5**
Category	**: Core X**	**Hours/week**	**:5**
Class & Major	**: III B.Sc. CS**	**Total Hours**	**:65**

Objectives
To enable the students
- Acquire knowledge on basics of operating systems
- Analyze the various scheduling algorithms in process and memory management
- Exposure to LINUX Operating System

UNIT – I OVERVIEW OF OPERATING SYSTEM   **13 Hrs**

Operating system – Types of Computer Systems Computer-system operation – I/O structure – System components – System calls – System programs – Process concept – Process scheduling – Operations on processes –Interprocess communication – Multithreading models – Threading issues.

UNIT – II PROCESS MANAGEMENT   **13 Hrs**

Scheduling criteria – Scheduling algorithms – Multiple-processor scheduling – Real time scheduling – Algorithm Evaluation – Process Scheduling Models - Synchronization hardware – Semaphores – Classic problems of synchronization – Deadlock characterization – Methods for handling deadlocks – Recovery from deadlock

UNIT – III MEMORY MANAGEMENT   **13 Hrs**

Swapping – Contiguous memory allocation – Paging – Segmentation – Segmentation with paging. Virtual Memory: Background – Demand paging – Process creation – Page replacement – Allocation of frames – Thrashing.

UNIT – IV FILE CONCEPT   **13 Hrs**

Access methods – Directory structure – File-System Mounting – Protection – Directory implementation – Allocation methods – Free-space management – Disk scheduling – Disk management – Swap-space management.

UNIT – V LINUX SYSTEM   **13 Hrs**

History – Design Principles – Kernel Modules – Process Management – Scheduling – Memory management – File systems – Input and Output – Inter-process Communication – Security

Text Books
- Silberschatz, Galvin and Gagne, *Operating System Concepts*, Sixth Edition, John Wiley & Sons Inc, New Delhi, 2012.
- Richard Fox, *Linux with Operating System Concepts*, Second Edition, Pearson Education, 2014.

Reference Books
- Andrew S. Tanenbaum , *Operating system Design and Implementation,* Fourth Edition, PHI, New Delhi, 2010.
- H M Deital, P J Deital and D R Choffnes, *Operating Systems*, Pearson Education, New Delhi, 2013.

e-Resources
- http://www.w3schools.com
- http://www.youtube.com

UCSR411OPERATING SYSTEM & GRAPHICS LAB

Semester	**: IV**	**Credit**	**: 3**
Category	**: Core XI**	**Hours/Week**	**: 5**
Class & Major : III B.Sc. CS		**Total Hours**	**: 65**

Operating System
1. Simulation of FCFS process scheduling
2. Simulation of SJF process scheduling
3. Demonstration of process synchronization using signals
4. Deadlock avoidance using banker's algorithm
5. Implement Page replacement algorithm

Graphics
1. Write a program to rotate an image
2. Write a program to drop each word of a sentence one by one from the top
3. Write a program to drop a line using DDA Algorithm
4. Write a program to move a car with sound effect
5. Write a program to bounce a ball a move it with sound effect
6. Write a program to test whether a given pixel is inside or outside or on a polygon

Multimedia
1. Create Sun Flower using Photoshop
2. Animate Plane flying in the Clouds using Photoshop
3. Create Plastic Surgery for the Nose using Photoshop
4. Create See-through text using Photoshop
5. Create a Web Page using Photoshop
6. Convert Black and White Photo to Color Photo using Photoshop

ALLIED COURSES OFFERED TO OTHER DEPARTMENTS

UCSA305 FUNDAMENTALS OF BLOCKCHAIN TECHNOLOGY

Semester   : III   **Credit   : 3**
Category   : Allied   **Hours/Week   : 3**
Class &Major : II B.Com(CA)   **Total Hours : 39**

Objectives
To enable the students
- Understand the concepts of Blockchain
- Prepare and take on new roles evolving in the market across various verticals
- Acquire knowledge on Bitcoin, Multichain, Hyperledger Fabric

UNIT – I Introduction to Blockchain – I (Basics)   8 Hrs
    Blockchain – History of Blockchain 2.0 - Architecture : Block in a Block chain Transactions – How to create and connect to a Blockchain - Concepts and benefits of blockchain - Components in Blockchain design.

UNIT – II Blockchain – II (Basics)   8 Hrs
    Conceptualization - Cryptographic Hash Function - Properties of a Hash Function - Wallets - Digital Signature - Public Key Cryptography - Blockchain-as-a-Service (BaaS) – Decentralized Autonomous Organization (DAO) - DAO Structure – Smart Contract.

UNIT – III Bitcoin Basics   7 Hrs
    Creation of Coins - Bitcoin scripting - Bitcoin P2P Network - Transaction in Bitcoin Network - Block Mining -   Block propagation and block relay.

UNIT – IV Multichain   8 Hrs
    Multichain - Compatibility & Differences with Bitcoin Core - Working with Multichain Streams - Multichain Explorer - Checking PoE in using Multichain.

UNIT – V Hyperledger Fabric   8 Hrs
    Hyperledger Fabric - Comparison between Fabric & Other Technologies - Fabric Architecture - Components - Advantages - Goals of Hyperledger - Hyperledger Fabric Network Setup.

Case Study: Blockchain Applications
    Blockchain in Healthcare ,Blockchain in Energy Markets,Blockchain in Media

Text Books
- AndreasAntonopoulos,*"Mastering   Bitcoin: Unlocking   Digital Cryptocurrencies",*Published December 27th 2014 by O'Reilly Media (first published July 1st 2014)
- Melanie Swan, *"Blockchain"*, O'Reilly media, February- 2015

Reference Books

- Andreas M. Antonopoulos, "*Mastering Bitcoin: Programming the Open Blockchain*", 2nd Edition, June, 2017.
- Alan T.Norman , "*Blockchain Technology Explained: The Ultimate Beginner's Guide*", Dec 12, 2017

E-Recourses

- https://www.amazon.com/Hands-Blockchain-Hyperledger-decentralized-applications/dp/1788994523
- https://github.com/HyperledgerHandsOn/trade-finance-logistics
- The Basics of Blockchain
- Hyperledger Fabric - https://www.hyperledger.org/projects/fabric

UCSR309 BLOCKCHAIN TECHNOLOGY USING SOLIDITY LAB

Semester	**: III**	**Credit**	**: 2**
Category	**: Allied**	**Hours/Week**	**: 3**
Class &Major	**: II B.Com(CA)**	**Total Hours**	**: 39**

Objectives
To enable the students

- Understand primary principles of Blockchain technology
- Apply the Blockchain concepts in real time
- Working with Ethereum Blockchain

Lab Exercises

1. Smart Contracts in Ethereum
2. Importing other Source Files
3. Value or Data Types
4. Strings & Operators
5. Arrays
6. Data Structures
7. Mappings
8. Control Structures
9. Functions
10. Inheritance

UCSA406 DIGITAL MARKETING ANALYTICS

Semester	**: IV**	**Credit**	**: 3**
Category	**: Allied**	**Hours/Week**	**: 3**
Class &Major	**: II B.Com(CA)**	**Total Hours**	**: 39**

Objectives
To enable the students

- Provide students with the knowledge about business advantages of the digital marketing and its importance for marketing success; and developing a digital marketing plan
- Integrate different digital media and create marketing content
- Optimizing a Website and SEO optimization; and to create Google AdWords campaigns; social media planning
- Acquire knowledge of Google Analytics for measuring effects of digital marketing and getting insight of future trends that will affect the future development of the digital marketing

UNIT – I Introduction to Digital Media   **7 Hrs**

Digital Marketing - Digital marketing vs traditional marketing - Digital Media Types - Paid Media -Owned Media - Determining Your Owned and Earned Social Metrics - Demystifying Web Data - Searching for the Right Metrics - The main steps of building your website - Choosing your domain name - Hosting – your website's home on the internet - How to choose a web designer/developer

UNIT – II Search Analytics   **8 Hrs**

SEO Optimization -Writing the SEO content - Google AdWords- creating accounts - Google AdWords- types. Introduction to CRM - CRM platform - CRM models. Web design: - Optimization of Web sites - MS Expression Web

UNIT – III Web Analytics   **8 Hrs**

Introduction to Web analytics - Web analytics – levels. Introduction of Social Media Marketing - Creating a Facebook page - Visual identity of a Facebook page - Facebook Ads - Creating Facebook Ads - Types of publications

UNIT – IV Web Analytics   **8 Hrs**

Business tools on LinkedIn - Creating campaigns on LinkedIn - Analyzing visitation on LinkedIn. Creating business accounts on YouTube - YouTube Advertising - YouTube Analytics. E-mail marketing: E-mail marketing plan - E-mail marketing campaign analysis - Keeping up with conversions. Digital Marketing Budgeting- resource planning- cost estimating- cost budgeting- cost control

UNIT – VDigital Marketing in IoT   **8 Hrs**

Levers of digital marketing- The digital advertising, a continuous disruption- The Personalization of Media- Data in Advertising- Predictive Models- Programmatic Advertising- IoT- IoT needs to work: Artificial Intelligence- Security in IoT- IoT shaping digital Marketing

Reference Books
- Ryan, D.,*Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation*, Kogan Page Limited 2014.
- The Beginner's Guide to Digital Marketing-Digital Marketer.2015
- Pulizzi,J.,*Epic Content Marketing*, Mcgraw Hill Education,2014

e-Resources
- https://www.pdfdrive.com/digital-marketing-how-internet-of-things-is-impacting-digital-market-e58837676.html

- https://www.webmarketingacademy.in/beginners-guide-to-digital-marketing-with-resources/

UCSR412 WEB DESIGN LAB

Semester	**: IV**	**Credit**	**: 2**
Category	**: Allied**	**Hours/Week**	**: 3**
Class &Major	**: II B.Com(CA)**	**Total Hours**	**: 39**

Objectives
To enable the students
- Develop skills in analyzing the usability of a web site
- Learn the language of the web: Ms Expression, HTML and CSS
- Develop skills in digital imaging and embed social media content into web pages

Lab Exercises

Ms Expression
1. Create a website for the web developer.
2. Create a Web design for Summer Beach
   a. Create Custom Interactive Buttons
   b. Using Behaviors to Change Content
   c. Centering the Webpage
3. Create a Web design for Car Show room
   a. Creating Borders and a Background
   b. Creating Page Layouts with Layers
   c. Styling Your Web Site Using CSS
   d. Adding Navigation Controls to Your Site
4. Creating an Advertisement for your online courses in the website
5. Create a website for online shopping – samples flipkart, amazon etc.,
6. Create a College Website
7. Creating an advertisement in social media in the website

e-Resources
- http://docplayer.net/28135492-Expression-web-4-advanced-lab-exercises.html

UCSA407 CYBER SECURITY IN FINANCE

Semester	**: IV**	**Credit**	**: 3**
Category	**: Allied**	**Hours/Week**	**: 3**
Class &Major	**: BBA/B.Com and Economics**	**Total Hours**	**: 39**

Objectives
To enable the students
- To plan and prepare for all stages of an investigation – Detection, initial response and management interaction

- To investigate web server attacks and router attacks and also can learn the importance of evidence handling and storage
- To understand the system level security

UNIT-IIIntroduction to Cyber Security   **7 Hrs**

Introduction to Cyber Security - Implementing Hardware Based Security - Software BasedFirewalls - Security Standards - Operating System Attacks - Application Attacks.

UNIT-IICyber Security Vulnerabilities   **8 Hrs**

Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness.

UNIT – III Cyber Security Safeguards   **8 Hrs**

Cyber Security Safeguards- Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management.

UNIT-IV Cyber Security in Finance   **8 Hrs**

Characterization of cyber-incidents – Types of cyber attacks in financial services – Need for convergence in incident reporting schemes – Optimizing information sharing – Different models of information sharing – Sharing of relevant information with different types of stakeholders – Complementary policies to strengthen responses in case of cyber attacks

UNIT- VIntrusion Detection and Prevention   **8 Hrs**

Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems,

Text Books
- James Graham, Richard Howard, Ryan Olson, *Cyber Security Essentials*, CRC Press, Auerbach Publications, 2011.
- William Stallings *Cryptography and Network Security*, Sixth edition Prentice Hall 2013.

e- Resources
- http://ptgmedia.pearsoncmg.com/images/9780789748904/samplepages/0789748908.pdf
- https://www.ceps.eu/system/files/TFRCybersecurityFinance.pdf

UCSR413 CYBER SECURITY LAB

Semester : IV	**Credit** : 2
Category : Allied	**Hours/Week** : 3
Class &Major : BBA/B.Com/Economics	**Total Hours** : 39

Objectives

The student should be made to

- Understand the security and privacy features and operation of browsers.
- Know the security vulnerabilities of browsers.
- Explore, how browsers hacks are used for better security.

Lab Exercises

1. Study of different wireless network components and features of any one of the Mobile Security Apps.
2. Study of the features of firewall in providing network security and to set Firewall Security in windows.
3. Steps to ensure Security of any one web browser (Mozilla Firefox/Google Chrome)
4. Study of different types of vulnerabilities for hacking a websites / Web Applications.
5. Analysis of Security Vulnerabilities of E-commerce services.
6. Analysis of security vulnerabilities of E-Mail Application

UCSA304   MATHEMATICAL PROGRAMMING USING C

Semester : III	**Credit** : 3
Category : Allied	**Hours/Week** : 3
Class & Major : II B.Sc. Maths	**Total Hours** : 39

Objectives
To enable the students

- Understand the concept of Structured Programming Language.
- Apply Control Statements in the C Program.
- Write C Programs using functions, pointers, structure and union for the real time problem.

UNIT - I   INTRODUCTION **7 Hrs**

Basic Structure of C programs - Executing C program -C fundamentals: character set – Identifiers and keywords – data types – constants – variables – declaration – expression – statements.

UNIT - II   OPERATORS AND EXPRESSION **8 Hrs**

Operators and Expression: arithmetic operators – unary operators – relational and logical operators – assignment operators – conditional operators. Data input and Output statements: getchar and putchar functions – scanf and printf function – more about scanf and printf functions.

UNIT - III CONTROL STATEMENTS & ARRAY   **8 Hrs**

Control statements: if-else, while, do-while, for-nested control structure – switch – break – continue- comma operator – goto statement. Arrays: definition of array – processing array- passing array to function – multidimensional arrays – arrays and strings.

UNIT - IV FUNCTIONS & POINTERS   **8 Hrs**

Functions: definition – accessing and function – function prototype –passing argument to a function – recursion. Pointers: Fundamentals – pointer declaration – passing pointer to a function – array of pointers.

UNIT - V STRUCTURE AND UNIONS   **8 Hrs**

Structure and Unions: Definition of structure – processing structure – user defined data types- Structure and pointers - passing structure to function – self referential structure- Unions - Bit wise operations. Data files: opening and Closing a data file – creating data file – processing a data file – unformatted data file.

Text Books
- Balagurusamy E., *Programming in ANSI C*, 6th Edition, TMH Publishers, New Delhi, 2004.
- Ashok N. Kamthane, *Programing in ANSI C and Turbo C, 3*rd Edition, Pearson Education, New Delhi, 2006.

Reference books
- Byron S. Gottfried, *Theory and Problems of Programming with C*, 2nd Edition, Tata Mcgraw-Hill Ltd, New Delhi, 2008
- Pradip Dey and Ghosh Manas, *Programming in C,* Oxford University Press USA, 2009.

e-Resources
- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-087-practical-programming-in-c-january-iap-2010/lecture-notes/
- http://freevideolectures.com/Course/2519/C-Programming-and-Data-Structures/2
- http://www.powershow.com/view/d7c5Y2Y2N/OBJECT_ORIENTED_PROGRAMMING_powerpoint_ppt_presentation

UCSR307 MATHEMATICAL PROGRAMMING USING C - LAB

Semester	**: III**	**Credit**	**: 2**
Category	**: Allied Practical**	**Hours/Week**	**: 3**
Class & Major	**: II B.Sc Maths**	**Total Hours**	**: 39**

Objectives
To enable the students
- Acquire knowledge on Structured Programming Language.
- Choose appropriate programming techniques to develop a program.
- Solve the real time problems using c programming.

I Arithmetic and Trigonometric Operations   **9 Hrs**
  1. Solve Quadratic Equations.
  2. Solve Taylor' Series for sin, cos and tan.

II String Manipulation   **6 Hrs**
   1. Counting the no. of vowels, consonants, words, white spaces in a line of text and array of lines.
   2. Reverse a string & check for palindrome.

III Recursion   **9 Hrs**
   1. ${}^nP_r, {}^nC_r$
   2. GCD of two numbers
   3. Fibonacci series

IV Matrix Manipulation   **9 Hrs**
   1. Addition & Subtraction
   2. Multiplication
   3. Transpose, of a matrix

V Sorting and Searching   **6 Hrs**
   1. Bubble Sort
   2. Linear Search

UCSA306 COMPUTATIONAL PHYSICS WITH PYTHON

Semester : III	**Credit** : 3	
Category : Allied	**Hours/Week** : 3	
Class & Major : II B.Sc(Physics)	**Total Hours** : 39	

Objectives
To enable the students
- Know the basics of algorithmic problem solving
- Develop Python programs with conditionals and loops
- Use Python data structures –- lists, tuples, dictionaries

UNIT- I ALGORITHMIC PROBLEM SOLVING   **7 Hrs**
    Algorithms - Building blocks of algorithms(Statements, State, Control Flow, Functions). - Notation (pseudo code, Flow chart) - Algorithmic problem solving- Iteration, Recursion(Towers of Hanoi).

UNIT- II DATA,EXPRESSIONS,STATEMENTS   **9 Hrs**
    Python interpreter and interactive mode: values and types: - int, float, Boolean, string, and list - variables - expressions - statements - tuple assignment - precedence of operators comments; modules and functions - function definition and use - flow of execution

UNIT- III CONTROL , FUNCTIONS   **8 Hrs**
    Conditionals: Boolean values and operators - conditional (if) - alternative (if-else - chained conditional (if-elif-else) - Iteration: state, while, for, break, continue, pass.
    Functions: return values - parameters - local and global scope - function composition

UNIT- IV-LEAST-SQUARES FITTING   **8 Hrs**
       Least-Squares Fitting -Derivation --Non-linear fitting .- Python curve-fitting libraries-Euler's Method -Standard Method for Solving ODE's -Problems with Euler's Method -Euler-Cromer Method -Visual Python- VPython Coordinates -VPython Controls and Parameters

UNIT- VPARTIAL DIFFERENTIAL EQUATIONS   **7 Hrs**
       Partial Differential Equations -Laplace's Equation -Wave Equation -Schrodinger's Equation-Monte Carlo Techniques - Random Numbers -Integration-Chaos - The Real Pendulum -Phase Space- Poincar´e Plots

Text Books
- Allen B. Downey, "*Think Python: How to Think Like a Computer Scientist*'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016
- Guido van Rossum and Fred L. Drake Jr, *An Introduction to Python – Revised and updated for Python 3.2*, Network Theory Ltd., 2011.

Reference Books
- John V Guttag, *Introduction to Computation and Programming Using Python*'', Revised and expanded Edition, MIT Press , 2013
- Robert Sedgewick, Kevin Wayne, Robert Dondero, *Introduction to Programming in Python,* 2013

e-References
- http://greenteapress.com/wp/think- python
- http://www.fizika.unios.hr/rf/wp-content/uploads/sites

UCSR310 COMPUTATIONALPHYSICS WITH PYTHON LAB

Semester	**: III**	**Credit**	**: 2**
Category	**: Allied**	**Hours/Week**	**: 3**
Class & Major	**: II B.Sc(Physics)**	**Total Hours**	**: 39**

Objectives
- Designand conduct experiments as well as to analyze and interpret data
- Develop creative software applications
- Understand a complex real world problem and develop an efficient practical solution

Lab Exercises

1. Compute the Towers of Hanoi.

2. Find the square root of a number (Newton's method)

3. To define an integer, floating point number, Strings are defined either with a single quote or double quotes and Assignments can be done on more than one variable "simultaneously".

4. Find the maximum of a list of numbers.

5. Find the semester marks using Elif condition.
6. Find the Global and Local variable program using function.
7. Programs that take command line arguments (word count).
8. Find the most frequent words in a text read from a file.
9. Selection sort, Merge sort.
10. Simulate bouncing ball using TRINKET.

III and IV Evaluation Components of CIA

Semester	Part	Category	Course Code	Course Title	Component III	Component IV
III	III	Core VI	UCSM305/ UCAM310	Java Programming	Assignment	Problem Solving
	III	Core VII	UCSM306	Microprocessor and its Applications	Assignment	Simple Program Writing
	III	Core VIII	UCSR308/ UCAR304	Java Programming - Practical	DPA	Viva-voce
IV	III	Core IX	UCSM408	Graphics & Multimedia	Assignment	Seminar
	III	Core X	UCSM409 /UCSM609	Operating System	Assignment	Seminar
	III	Core XI	UCSR411	Operating System & Graphics lab	DPA	Viva-voce

ALLIED COURSES OFFERED TO OTHER DEPARTMENTS

Semester	Part	Category	Course Code	Course Title	Component III	Component IV
III	III	Allied	UCSA305	Fundamentals of Blockchain Technology	Assignment	Problem Solving
	III	Allied Practical	UCSR309	Blockchain Technology Using Solidity – Lab	DPA	Viva-voce
	III	Allied	UCSA304	Mathematical Programming using C	Assignment	Problem Solving
	III	Allied Practical	UCSR307	Mathematical Programming using C – Lab	DPA	Viva Voce
	III	Allied	UCSA306	Computational Physics with Python	Assignment	Problem Solving

	III	Allied Practical	UCSR310	Computational Physics with Python – Lab (Vpython)	DPA	Viva Voce
IV	IV	Allied	UCSA406	Digital Marketing Analytics	Assignment	Seminar
	IV	Allied Practical	UCSR412	Web Design Lab	DPA	Viva Voce
	IV	Allied	UCSA407	Cyber Security in Finance	Assignment	Seminar
	IV	Allied Practical	UCSR413	Cyber Security Lab	DPA	Viva-voce

PROGRAMME PROFILE M.Sc. (Computer Science)

PSO1: Demonstration of the knowledge of advanced programming skills and distributed environmental need for sustainable development.

PSO2: Ability to design and develop hardware and software in emerging technology environments.

PSO3: Ability to solve problems using the techniques of data analytics like pattern recognition and knowledge discovery.

PSO4: Ability to work out effective and efficient real time solutions using acquired knowledge in various domains.

Semester	Category	Course Code	Course Title	Contact Hrs/ Week	Credit Min	Credit Max
I	Core I	PCSM111/ PCSM403	Internet of Things	5	4	4
	Core II	PCSM112	Object Oriented Software Engineering	4	4	4
	Core III	PCSM113	Data Mining	5	4	4
	Core IV	PCSM114/ PCSM210	Design and Analysis of Algorithm	4	3	3
	Core V	PCSM115	Virtual Reality	4	4	4
	Core VI	PCSR106	UML - Practical	3	2	2
	Core VII	PCSR107	Data Mining using WekaTool -Practical	4	3	3
			Library	1	-	-
Total				**30**	**24**	**24**
II	Core VIII	PCSM212	Multimedia and its Applications	4	3	3
	Core IX	PCSM211	Software Testing	4	3	3
	Core X	PCSM213/ PCSM309	TCP / IP Networks	4	3	3
	Core XI	PCSM214	Biometrics	4	4	4
	Core XII	PCSR206/ PCSM304	Networking – Practical	4	3	3

	Core XIII	PCSR207	Biometrics Using Mat lab- Practical	4	3	3
	Non Major Elective	PALE201/ PALE301		5	4	4
	Service Learning	PCSX201		-	1	1
			Library	1	-	-
			Total	**30**	**24**	**24**
III	Core XIV	PCSM311	Cloud Computing	4	4	4
	Core XV	PCSM315	Big Data Analytics	5	4	4
	Core XVI	PCSM313	Research Methodology	4	4	4
	Core XVII	PCSM314	Cyber Security	5	4	4
	Core XVIII	PCSI301	Fuzzy Set and Systems	5	4	4
	Core XIX	PCSR306	Big Data Analytics - Practical	4	3	3
	Core XXI	PCSR302	Mini Project	2	2	2
			Library	1	-	-
Total				**30**	**25**	**25**
IV	Core XXII	PCSM404	Digital Image Processing	5	4	4
	Core XXIII	PCSM406	Artificial Intelligence and Robotics	5	4	4
	Core XIV	PCSP402	Major Project	19	9	9
			Library	1	-	-
Total				**30**	**17**	**17**
Grand Total				**120**	**90**	**90**

NON-MAJOR ELECTIVE

Semester	Category	Course Code	Course Title	Contact Hrs/week	Credit
I	Non Major Elective	PCSE205	Programming in J2EE	3T+2P	4
		PCSE206	Mobile Computing Lab	5P	4

PCSM311 CLOUD COMPUTING

Semester   **: III**   **Credit**   **:**   **4**
Category   **: Core XI**   **Hours/Week**   **:**   **5**
Class &Major   **: II M.Sc Computer Science**   **Total Hours**   **: 65**

Objectives
To enable the students
- Understand the Cloud computing concepts
- Gain substantial knowledge in application of cloud computing
- Identify the cloud services

UNIT - I INTRODUCTION 13 Hrs

Introduction – Cloud computing basics – overview – Applications – Intranets and the cloud – First Movers in the Cloud- Organization and cloud computing- Benefits – Limitations – Security Concerns.

UNIT - II BUSINESS CASE FOR CLOUD COMPUTING 13 Hrs

Business case for going to the cloud. – Cloud Computing Services – applications in Business – Deleting your datacenter – Hardware and Infrastructure – Clients –Security – Network –services – Standards.

UNIT -III ACCESSING THE CLOUD 13 Hrs

Accessing the Cloud-Platforms – Web Applications –web APIs – web Browers - Cloud Storage – overview – Cloud storage providers-standards– Software as a service - software plus Services – Developing application.

UNIT - IV CLOUD COMPUTING AT WORK 13 Hrs

Cloud computing at work : Driving forces – Company offerings –Industries -software plus Services – overview - Developing application – Google – Microsoft –Development – troubleshooting – Application Management.

UNIT -V   BEST PRACTICES FOR CLOUD COMPUTING 13 Hrs

Local clouds and Thin Clients –Server Solution – Thin Clients –Migrating to the cloud – Cloud Services for Individuals-Enterprise class cloud offerings –Migration –Cloud Computing evaluation.

Text Book
- Anthony T.Velte, Toby J.Velte Robert elsenpeter, *Cloud Computing –A Practical approach,*Tata McGraw Hill Publications, 2010.

Reference Books
- Barrie sosinsky, *Cloud Computing Bible*, Wiley publishing Inc., 2011.
- BorkoFurht, Armando Escalante, *Handbook of Cloud Computing*, Springer, 2010.

PCSM315 BIG DATA ANALYTICS

Semester : III	**Credit** : 4
Category : Core XV	**Hours / Week** : 5
Class & Major: II M. Sc Computer Science	**Total Hours** : 65

Objectives
To enable the students

- Understand the concepts in Big Data and apply Hadoop ecosystem components.
- Get introduced to tools like Pig, Hive, HBase, Elastic MapReduce etc.
- Realize the Hadoop architecture and implementation of MapReduce Application.
- Acquire knowledge on variety of NoSQL databases

UNIT – I BIG DATA & HDFS   **13Hrs**

Big Data Definition and Taxonomy – Challenges for processing big data - Technologies support big data - Big Data value for the enterprise – Setting up the environment – First step with the Hadoop ecosystem. HDFS Architecture – HDFS Concepts – Blocks – NameNode – Secondary NameNode – DataNode – HDFS Federation – Basic File System Operations – Data Flow – Anatomy of File Read – Anatomy of File Write.

UNIT – II HADOOP   **13Hrs**

Introduction to Hadoop – History of Hadoop – Hadoop Architecture Concepts-Components of Hadoop – Applications of Hadoop – Advantages/Disadvantages of Hadoop - Compression – Security – Enterprise integration in hadoop. Use cases of Hadoop – RDBMS vs Hadoop – Ecosystem tour – Vendor comparison.

UNIT – III PIG   **13Hrs**

Introduction to Apache Pig – Map Reduce Vs. Apache Pig – SQL vs. Apache Pig – Different data types in Pig – Modes of Execution in Pig – Execution Mechanism- Local Mode-Map Reduce or Distributed Mode   – Grunt shell – Loading data – Exploring Pig – Latin commands - Embedded - Transformations in Pig - How to write a simple pig script - How to develop the Complex Pig Script - Bags, Tuples and fields in PIG - UDFs in Pig - Need of using UDFs in PIG.

UNIT – IV HIVE AND HBASE   **13 Hrs**

Hive introduction – Hive architecture – Hive vs RDBMS – HiveQL and the shell - Managing tables (external vs managed) – Data types and schemas – Partitions and buckets.
HBASE: Architecture and schema design - HBase vs. RDBMS- HMaster and Region Servers-Column Families and Regions- Write pipeline- Read pipeline- HBase commands.

UNIT – V FRAMEWORKS AND APPLICATIONS   **13Hrs**

IBM for Big Data – Map Reduce Framework – Algorithms using map reduce - Map Reduce Types and Formats- Map Reduce Features-   Sharding – NoSQL Databases - S3– Hbase – Impala – Analyzing big data with twitter – Big data for E-Commerce – Big data for blogs.

Text Books
- Michael Berthold, David J. Hand, *Intelligent Data Analysis*, Springer, 2007.
- AnandRajaraman and Jeffrey David Ullman, *Mining of Massive Datasets*, Cambridge University Press, 2012.
- Paul Zikopoulos, Chris Eaton, Paul Zikopoulos, *Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data*, McGraw Hill, 2012.

Reference Books
- Jay Liebowitz, *Big DAata and Business Analytics,* Auerbach Publications, CRC press (2013).
- EMC Education Services, *Data Science and Big Data Analytics: Discovering, Analyzing,*

Visualizing and Presenting Data, I edition, 2015.

- ArvindSathi, *BigDataAnalytics: Disruptive Technologies for Changing the Game*, MC Press, 2012.

e-Resources
- http://postscapes.com
- http://www.bigdataanalysis.eu/what-is-bigdata

PCSM313 RESEARCH METHODOLOGY

Semester	**: III**	**Credit**	**: 4**
Category	**: Core XVI**	**Hours/Week**	**: 4**
Class & Major	**: II M.Sc Computer Science**	**Total Hours**	**: 52**

Objectives
To enable the students
- Understand the concepts of Research Methodology
- Acquired knowledge on Report Writing, and LaTeX
- Gain Practical Knowledge in Python, and R Programming

UNIT –I INTRODUCTION TO RESEARCH   **10 Hrs**

Meaning of Research - Objectives of Research - Motivation of Research - Types of Research - Research Approaches - Significance of Research - Research Methods versus Methodology - Research and Scientific Methods - Research Process - Criteria of Good Research - Problems encountered by Researchers in India. Defining the Research Problem Methodology: What is a Research Problem? Selecting the problem-Necessary of defining the Problem-Techniques involved in defining a problem-an Illustration conclusion.

UNIT - II REPORT WRITING   **10 Hrs**

Scientific Writing: Significance of report writing - Structure and Components of Research Report. Types of Report: research papers - thesis - Research Project Reports - Precautions for writing research reports - Pictures and Graphs - Citation Styles - Oral presentation - Creating reports and articles.

UNIT –III LaTeX   **11 Hrs**

Introduction to LaTeX- Text - Text environment - Inline Formulas and Displayed Formulas - Documents -Customizing LaTeX - Presentation.

UNIT - IV PYTHON   **10 Hrs**

Introduction to python - Installing python - Basic Python Syntax: String operations - The format method - String Slices - String operators - Numeric Data types - Conversions -

Simple Input and Output - Functions - Control flow and syntax - Loops - Collections - Lists - Tuples - Sets - Dictionaries – Class & Objects – Regular Expressions.

UNIT –V R Programming   11 Hrs

Overview of R programming - Evolution of R - Applications of R programming - Basic syntax Basic Concepts of R: Reserved Words - Variables & Constants. Data structures in R: Vectors – Matrix. Control flow: If...else - If else() Function. Functions: R Functions - Function Return Value. Strings: String construction rules. R Data Reshaping: Joining Columns and Rows in a Data Frame. Working with files: Read and writing into different types of files. Data visualization in R and Data Management: Bar Chart - Dot Plot

Text Books
- Kothari. C.R - Gaurav Garg - *Research methodology -Methods & Techniques* - 3rd Edition - New Age International Publishers - 2014.
- Misra R.P - Research Methodology – A Hand Book - Concept publishing Company - New Delhi
- George Gratzer - *Practical LaTeX* - Springer International Publishing Switzerland 2014.
- Kindle Edition -   Python Programming -Publisher: Guru99 (19 July 2016)
- Norman Matloff   - *The Art of R Programming-a tour of statistical software design* - 2011.

Reference Books
- Ryhan Ebad - *Research Methodology In Computer Science Hardcover* - Centrum Press 2014.
- Paul Teetor - *R Cookbook: Proven Recipes for Data Analysis - Statistics - and Graphics* (O'Reilly Cookbooks) - 2011
- Rob Kabacoff - *R in Action : Data Analysis and Graphics with R* – 2011
- Nina Zumel - John Mount - Jim Porzak, *Practical Data Science with R* - 2014
- Richard Cotton, *Learning R: A Step-by-Step Function Guide to Data Analysis*, 2013

e-Resources
- http://extras.springer.com

PCSM314 CYBER SECURITY

Semester : III	**Credits : 4**	
Category : Core XVII	**Hours/weeks : 5**	
Class & Major: II M.Sc Computer Science	**Total Hours : 65**	

Objectives
- Understand the difference between threat, risk, attack, and vulnerability
- Find information about threats, vulnerabilities, and attacks
- Understand threats, attacks and exploits and the motivations behind them

UNIT - I INTRODUCTION TO CYBER SECURITY   **13 Hrs**

      Introduction -Computer Security - Threats -Harm - Vulnerabilities – Controls.Authentication - Access Control - Cryptography. Web - User Side: Browser Attacks - Web Attacks Targeting Users - Obtaining User or Website Data - Email Attacks.

UNIT - II SECURITY IN OPERATING SYSTEM & NETWORKS   **13 Hrs**

      Security in Operating Systems - Security in the Design of Operating Systems –Rootkit. Network security attack: Threats to Network Communications - Wireless Network Security - Denial of Service - Distributed Denial-of-Service.

UNIT - III DEFENCES: SECURITY COUNTERMEASURES   **13 Hrs**

      Cryptography in Network Security - Firewalls - Intrusion Detection and Prevention Systems - Network Management - Databases - Security Requirements of Databases - Reliability and Integrity - Database Disclosure - Data Mining and Big Data.

UNIT - IV PRIVACY IN CYBERSPACE   **13 Hrs**

      Privacy Concepts -Privacy Principles and Policies -Authentication and Privacy - Data Mining -Privacy on the Web - Email Security - Privacy Impacts of Emerging Technologies.

UNIT - V MANAGEMENT AND INCIDENTS   **13 Hrs**

      Security Planning - Business Continuity Planning - Handling Incidents - Risk Analysis - Dealing with Disaster.Emerging Technologies: The Internet of Things - Economics - Electronic Voting - Cyber Warfare.

Text Book
- Charles P. Pfleeger, Shari Lawrence Pfleeger, Jonathan Margulies - *Security in Computing* - 5th Edition - Pearson Education - 2015.

Reference Books
- George K.Kostopoulous - Cyber Space and Cyber Security - CRC Press - 2013.
- Martti Lehto - Pekka Neittaanmäki - Cyber Security: Analytics - Technology and Automation edited - Springer International Publishing Switzerland 2015.
- Nelson Phillips and Enfinger Steuart - Computer Forensics and Investigations - Cengage Learning - New Delhi - 2009.

PCSI301 FUZZY SET AND SYSTEMS

Semester	**: III**	**Credit**	**: 4**
Category	**: Core XVIII**	**Hours/Week**	**: 5**
Class &Major : II M.Sc Computer Science		**Total Hours**	**: 65**

Objectives
To enable the students
- Understand the concepts of fuzzy set theory and fuzzy logic;

- Construct fuzzy rules and perform fuzzy reasoning on them.
- Illustrate the organization, design and operation of some common fuzzy systems

UNIT –I INTRODUCTION   13 Hrs

Introduction – Background – Uncertainty and Imprecision – Statistics and Random Processes – Uncertainly and Information – Fuzzy Sets and Membership – Chance versus Ambiguity - Sets as Points in Hypercubes – Classical Sets and Fuzzy Sets: Classical Sets – Fuzzy Sets.

UNIT -II CLASSICAL RELATIONS AND FUZZY RELATIONS   13 Hrs

Cartesian product – Crisp Relations – Fuzzy Relations – Tolerance and Equivalence Relations – Fuzzy Tolerance and Equivalence Relations – Value Assignments.

UNIT -III MEMBERSHIP FUNCTIONS   13 Hrs

Features of the Membership Functions – Standard Forms and Boundaries – Fuzzification – Lambda(λ) Cut for Fuzzy Relations – Defuzzification to scalars - Membership Value Assignments – Fuzzy to Crisp Conversions.

UNIT- IV FUZZY ARITHMETIC AND EXTENSION PRINCIPLE   13 Hrs

Fuzzy Arithmetic - Numbers - Vectors and the Extension Principle – Extension Principle – Fuzzy Numbers – Interval Analysis in Arithmetic – Approximate Methods of Extension.Classical Logic and Fuzzy logic: Fuzzy Tautologies - contradictions - Equivalence - and Logical Proofs - Classical Predicate Logic – Fuzzy Logic – Approximate Reasoning — other Forms of the Implication Operation – Other Forms of the Composition Operation.

UNIT V FUZZY SYSTEMS AND CLASSIFICATION   13 Hrs

Fuzzy Rule Based systems: Natural Language – Linguistic Hedges – Rules Based Systems – Graphical Techniques of Inference. Fuzzy Classification: Classification by Equivalence Relations – Cluster Analysis – cluster Validity – c-Means Clustering – Classification Metric – Hardening the Fuzzy c-Partition – Similarity Relations from Clustering.

Text Books
- Timothy J Ross - "*Fuzzy Logic with Engineering Applications*" - McGraw – Hill - Inc - 4th Edition - 2016.
- Timothy J. Ross, *Fuzzy Logic with Engineering Applications*, Wiley India, II Edition, 2010 reprint. Chapters 1,2,3,4,5,6,Chapter 11 (Part I only), 12

Reference Books
- John Yen, Reza Langari, *Fuzzy Logic- Intelligence, Control, and information*, Pearson Education, 2004.
- George J.Klir , Bo Yuan, *Fuzzy Sets and Fuzzy Logic-Theory and Applications*, Prentice Hall of India, 2000.

PCSR306 BIG DATA ANALYTICS – PRACTICAL

Semester	: **III**	**Credits**	: **3**
Category	: **Core XIX**	**Hours/Week**	: **4**
Class & Major	: **II M.Sc Computer Science**	**Total/Hours**	: **52**

Objectives
To enable the students
- Understand Analytical concepts using PIG
- Gain knowledge on higher level of abstraction
- Develop programming skills using HIVE commands.

Lab Exercise
1. I/O operations
2. Split and union
3. Filters
4. Joins
5. Flattening
6. Sample and Parallel
7. Advanced Relational Operations
8. Perform Basic DDL - DML Operations using Hive Commands.
9. Perform Group by Operations using Hive Command.
10. Perform Order by vs. Sort by Operations using Hive Commands.
11. Demonstrate Join Operations using Hive Commands.
    (i) Left Outer Join (ii) Right Outer Join (iii) Full Outer Join
12. Calling out external program to perform Map and Reduce operations.

PCSM404   DIGITAL IMAGE PROCESSING

Semester	**: IV**	**Credits**	**: 3**
Category	**: Core XIII**	**Hours/week**	**: 5**
Class & Major	**: II M. Sc Computer Science**	**Total Hours**	**: 65**

Objectives
To enable the students
- To study the image enhancement techniques
- To study image restoration procedures
- To study the image compression procedures
- To study the image segmentation and representation techniques

UNIT - I   DIGITAL IMAGE FUNDAMENTALS   11 Hrs
Elements of digital image processing systems, Vidicon and DigitalCamera working princ iple,Elements of visual perception, brightness,contrast, hue, saturation, mach band effect, Color i mage fundamentals -RGB, HSI models, Image sampling, Quantization, dither.

UNIT - II   IMAGE ENHANCEMENT   15 Hrs
Histogram equalization and specification techniques, Noise distributions,Spatial averagin g, Directional Smoothing, Median, Geometric mean,Harmonic mean, Contraharmonic mean filte rs, Homomorphic filtering,Color image enhancement.

UNIT - III   IMAGE RESTORATION   **13 Hrs**

Image Restoration - degradation model, Unconstrained restoration –
Lagrangemultiplierand Constrained restoration, Inverse filtering-
removalof blurcaused byuniform linear motion, Wiener filtering, Geometric transformations.

UNIT - IV   IMAGE SEGMENTATION   **13 Hrs**

Edge detection, Edge linking via Hough transform – Thresholding -Region based
segmentation – Region growing   – Region splitting and   merging –Segmentation   by morpho
logical watershed – basic concepts –   Dam   construction algorithm.

UNIT - V   IMAGE COMPRESSION   **13 Hrs**

Need for data compression, Huffman, Run Length Encoding, Shiftcodes, Arithmetic
coding, Vector Quantization, Transform coding, JPEGstandard, MPEG.

Textbooks
- Rafael C. Gonzalez, Richard E. Woods, *Digital Image   Processing*,Pearson, 2nd Edition, 2004.
- Anil K. Jain, Fundamentals *of Digital Image Processing*, Pearson 2002.

References
- Kenneth R. Castle man, *Digital Image Processing*, Pearson, 2006.
- Rafael C. Gonzalez, Richard E. Woods, Steven Eddins,*DigitalImage Processing using MA TLAB*,
  Pearson Education, Inc., 2004.
- D,. Dudgeon and RM. Mersereau, *Multidimensional DigitalSignal Processing*, Prentice H all   Professional   Technical Reference, 1990.
- William K. Pratt, *Digital Image Processing* , John Wiley,New York, 2002
- Milan Sonka et aI, *Image Processing, Analysis Andmachine Vision*, Brookes/Cole, Vikas Publishing House, 2nd edition, 1999.

PCSM406 ARTIFICIAL INTELLIGENCE & ROBOTICS

Semester	: IV	**Credits**	: 4
Category	: CoreXXII	**Hours/weeks**	: 5
Class & Major:	II M.Sc Computer Science	**Total Hours**	: 65

Objectives
To enable the students
- Understand the Basics of Artificial Intelligence
- Analyze and develop AI Algorithms
- Develop simple robots

UNIT I INTRODUCTION TO ARTIFICIAL INTELLIGENCE   **13 Hrs**

Introduction: Intelligent Agents-Search Strategies-Solving Problems by Searching –
Breadth - First Depth-First- Depth-Limited -Iterative Deepening –Bidirectional- Informed Search
Methods -A* -AO* -Games as Search Problems -Alpha-Beta Pruning.

UNIT II REPRESENTATION   **13Hrs**
   Representation: Propositional Logic – First - Order Logic - Frame Systems and Semantic Networks.

UNIT III REASONING   **13Hrs**
   Reasoning: Inference in First-Order Logic - Forward and Backward Chaining - Resolution Unification-Logical Reasoning Systems.

UNIT IV PLANNING   **13Hrs**
   Planning: Simple Planning Agent - From Problem Solving to Planning - Basic Representations for Planning - Practical Planners - Hierarchical Decomposition - Resource Constraints - Uncertainty - Probabilistic Reasoning Systems.

UNIT V LEARNING & ROBOTICS   **13Hrs**
   Learning: General Model of Learning Agents - Inductive Learning - Computational Learning Theory - Learning in Neural and Belief Networks - Reinforcement Learning - Types of Communicating Agents - Robotics: Tasks - Parts - Configurations Spaces - Navigation and Motion Planning.

Text Book

- StuartJ.Russell and Peter Norvig - *Artificial Intelligence* - Tata Mc Graw Hill Publisher 3rd Edition 2017.

Reference Books

- Elaine Rich and Kevin Knight - *Artificial Intelligence* - Tata Mc Graw Hill Publisher - 3rdEdition 2017.
- Dan W.Patterson - *Introduction to Artificial Intelligence and Expert Systems* - Prentice Hall of India -2009.

III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
III	Core XIV	PCSM311	Cloud Computing	Assignment	Seminar
	Core XV	PCSM315	Big Data Analytics	Assignment	Seminar
	Core XVI	PCSM313	Research Methodology	Case study	Seminar
	Core XVII	PCSM314	Cyber Security	Assignment	Seminar
	Core XVIII	PCSI301	Fuzzy Set and Systems	Assignment	Seminar
	Core XIX	PCSR306	Big Data Analytics - Practical	DPA	Viva Voce
IV	Core XXII	PCSM404	Digital Image Processing	Problem Solving	Seminar
	Core XXIII	PCSM406	Artificial Intelligence and Robotics	Assignment	Seminar

DEPARTMENT OF COMPUTER APPLICATIONS

PREAMBLE

UG : Programme profile and the syllabi of courses in the III & IV semesters along with evaluation components III & IV (with effect from 2018-2021 batch onwards)

PROGRAMME PROFILE: BCA

PSO1 : Understanding of the key concepts and principles of programming languages.

PSO2 : Capacity to analyze a problem, identify the computing requirements and using procedures find a solution.

PSO3 : Development of practical skills to solve problems and provide solutions using current trends in the discipline of Computer Applications.

PSO4 : Ability to apply the algorithmic principles, mathematical foundations and computer science theory for designing computer-based systems.

Semester	Part	Category	Course Code	Course Title	Contact/ Week	Credit Min	Credit Max
I	I	Language	UTAL105/ UTAL106/ UHIL101/ UFRL101	Basic Tamil-I/ Advanced Tamil-I/ Hindi-I/ French-I	4	2	3
	II	English	UENL107/ UENL108	General English-I/ Advanced English-I	5	3	4
	III	Core I	UCAM107/ UCSM106	Programming in C	6	5	5
	III	Core II	UCAM108/ UCSM108 UCAM109/ UCSM109	Fundamental of Computer Science/ Advanced Computer Science	5	4	4
	III	Core Practical I	UCAR105/ UCSR108	Programming in C- Practical	3	2	2
	III	Allied I	UMAA110	Mathematical Methods-I	5	4	4
	IV	Value Education			2	1	1
Total					**30**	**21**	**23**
II	I	Language	UTAL205/ UTAL206/ UHIL201/ UFRL201	Basic Tamil-II/ Advanced Tamil-II/ Hindi-II/ French-II	4	2	3
	II	English	UENL207/ UENL208	General English-II/ Advanced English-II	5	3	4
	III	Core III	UCAM205/ UCSM206	Data Structures	6	6	6

	III	Core Practical II	UCAR204/ UCSR205	Data Structures - Practical	4	3	3
	III	Allied II	UMAA216	Mathematical Methods-II	5	4	4
	IV	Non - Major Elective			4	2	2
	IV	Soft Skill			2	1	1
	V	Extension Programme/ Physical Education/NCC			-	1	2
Total					**30**	**22**	**25**
III	III	Core IV	UCAM310/ UCSM305	Java Programming	5	5	5
	III	Core V	UCAM308	MIS and ERP	5	4	4
	III	Core VI	UCAM311	Data Communication Networks	6	5	5
	III	Core Practical III	UCAR304/ UCSR308	Java Programming - Practical	4	3	3
	III	Allied III	UCOA303	Financial Accounting	5	5	5
	IV	Online course		NPTEL/Spoken Tutorial/Swayam	3	1	2
	IV	Value Education			2	1	1
Total					**30**	**24**	**25**
IV	III	Core VII	UCAM404	Database Management System	6	5	5
	III	Core VIII	UCAM403	Object Oriented Analysis and Design	5	4	4
	III	Core IX	UCAM406	Python Programming	6	5	5
	III	Core Practical IV	UCAR402	Database Management System - Practical	3	2	2
	III	Core Practical V	UCAR404	Python Programming- Practical	3	2	2
	III	Allied IV	UCOA403/ UCOR403	Accounting Package	5	5	5
	IV	Soft skill			2	1	1
	V	Extension Programme/ Physical Education			-	-	2
Total					**30**	**24**	**26**
V	III	Core X	UCAM507	Operating System	5	5	5
	III	Core XI	UCAM504	Software Engineering	5	4	4
	III	Core XII	UCAM505	Web Programming	6	5	5
	III	Core XIII	UCAM508	Open Source Technology	6	5	5
	III	Core Practical VI	UCAR506	Open Source Technology - Practical	3	2	2
	III	Core Practical VII	UCAR505	Web Programming - Practical	3	2	2
	IV	Value Education			2	1	1
Total					**30**	**24**	**24**
VI	III	Core XIV	UCAM609	Data Mining	5	4	4
	III	Core XV	UCAM610	Software Testing	5	4	4

	III	Core XVI	UCAM611	Internet of Things	4	3	3
	III	Core Practical VIII	UCAR602	Data Mining - Practical	4	3	3
	III	Core Project	UCAP601	Project Work	5	5	5
	III	Major-Elective	UCAO606/ UCAO604	Network Security/ Cloud Computing	5	4	4
	III	Viva-Voce	UCAM601	Comprehensive Viva Voce	-	1	1
	IV	Soft Skill			2	1	1
	V	Extension Programme/ Physical Education/NCC			-	-	2
				Total	**30**	**25**	**27**
				Grand Total	**180**	**140**	**150**

NON-MAJOR ELECTIVES-UG

Semester	Part	Category	Course Code	Course Title	Contact/ Week	Credit
II	IV	NME	UCAE208	R Programming	4	2
			UCAE209	Cyber Forensics	4	2
			UCAE210	PyMOL	4	2

EXTRA CREDIT EARNING PROVISION

Semester	Part	Category	Course Code	Course Title	Contact/ Week	Credit Min	Credit Max
II	III	Summer Internship	UCAI201	Summer Internship	-	-	1
IV	III	Summer Internship	UCAI401	Summer Internship	-	-	1
V	III	Self Study	UCSS501/ UCAS501	R-Programming	2	-	2
V	III	Self Study	UCSS502/ UCAS502	Android Applications	2	-	2
VI	III	Self Study	UCSS601/ UCAS601	Angular JS	2	-	2
VI	III	Self Study	UCSS602/ UCAS602	Green Computing	2	-	2

UCSM305/ UCAM310 JAVA PROGRAMMING

Semester : III
Category : Core IV
Class & Major : II BCA

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

Objectives
To enable the students
- Understand the OOP Concepts, Exception and String Handling in Java.
- Construct programs using Applets and JDBC concepts.
- Execute Java and Applet Programs in various applications.

UNIT - I INTRODUCTION 10 Hrs

Fundamentals of Object Oriented Programming: Java Evolution – Overview of Java Language – Data Types, variables, arrays – Operators – Control statements.

UNIT – II CLASSES AND METHODS 15 Hrs

Introduction to classes – class fundamentals – Declaring objects – Constructors – Methods and Classes – Overloading methods – static - final - Nested and Inner classes – Inheritance – Method Overriding – Abstract Classes – Packages – Interfaces.

UNIT – III EXCEPTION HANDLING AND FILES 15 Hrs

Exception handling – Types of Exception – try and catch – nested try – throw and throws – Multithreading Programming –I/O Streams – Reading and Writing files – Reading and writing Console I/O.

UNIT – IV STRING HANDLING AND APPLETS 15 Hrs

String Handling- String Operations: Comparison – Modifying String – String Buffer - Applet Class – Applet Architecture – The HTML Applet Tag – Passing parameters in Applets – Applet Context – Improving the Banner Applet – get() Method - JDBC Concepts.

UNIT – V AWT 10 Hrs

AWT classes – Window fundamentals – Working with Frame windows, Graphics – Controls – Layout Managers - Java Swing.

Text Books
- Herbert Schildt, *Java - The Complete Reference*, Tata McGraw Hill, 10th Edition, Nov 2017.

Reference Books
- E. Balagurusamy , *Programming with Java A Primer*, Tata McGraw Hill, Fourth Edition, 2010.

- Cay S. Horst Mann & Gary Cornell, *Core java*, Volume II (9th ed.), Sun Microsystems Press Java Series, 2012.

e-Resources
- http://www.w3schools.com/html/
- https://www.youtube.com/watch?v=oqJy4e6Aa0M
- https://www.youtube.com/watch?v=7r3Vln4bGLk

UCAM308 MIS AND ERP

Semester : III	**Credit** : 4
Category : Core V	**Hours/Week** : 5
Class & Major: II BCA	**Total Hours** : 65

Objectives
To enable the students
- Define transaction and decision making process.
- Analyse the risks and benefits of MIS and ERP in enterprises.
- Evaluate the production, marketing and accounting information in ERP.

UNIT - I OVERVIEW OF MIS   **13 Hrs**

Definition of MIS-MIS as an evolving concept-MIS and other academic disciplines-Structure of a MIS: Operating elements of an information system-Management activity-organizational function-Hardware, software AND communications technology for information system: A computer system-Data representation for computers-instructing a computer-communication facilities-communication networks-distributed systems.

UNIT - II STORAGE AND RETRIEVAL OF DATA   **12 Hrs**

Physical versus logical models of data-logical data concepts and definitions-physical storage devices-file organizations-Database organizations-Transaction processing systems, office automation and information processing control functions: transaction processing- document preparation-message and document communication-information processes control.

UNIT - III DECISION MAKING PROCESS   **15 Hrs**

Intelligence and design phases-concepts of decision making-behavioral models of the decision maker-behavioral model of organizational decision making-decision making under psychological stress-methods for deciding among alternatives-documenting and communicating decision rules-Relevance of decision-making concepts for information system design. Concepts of information: definition-information in the mathematical theory of communication-quality of information-value of information in decision making.

UNIT - IV ERP AND FUNCTIONAL MODULES   **13 Hrs**

Overview of enterprise systems – Evolution - Risks and benefits - Fundamental technology - Issues to be consider in planning design and implementation of cross functional

integrated ERP systems- Overview of ERP software solutions- Small medium and large enterprise vendor solutions, BPR, Business Engineering and best Business practices - Business process Management.

UNIT - V CRM **12 Hrs**

Marketing information system and sales order process in ERP: Sales and distribution in ERP- Pre sales activities- Sales order processing- inventory sourcing- Delivery- Billing- Payment- Customer relationship management- benefits of CRM.

Text Books
- Gordon B. Davis AND Margrathe H.Olson , *Management Information System*,
   Mc Graw Hill, Third edition, 2010.
      Unit-I   : Chapter 1,2,3,4
      Unit-II   : Chapter 5,7,8,9
      Unit-III   : Chapter 10,11,12
- Alexis Leon, "*ERP demystified"*, Third Edition, Tata McGraw-Hill, 2014
      Unit IV   : Chapter 3,4,5,6
      Unit V   : Chapter 7,8,9

Reference Books
- *Enterprise Resource Planning – A Managerial Perspective*, Tata McGraw Hill, First Edition, 2011.
- O'Brein & Marakas, *Management information System*, Mc Graw- Hill, Tenth Edition, 2010.

E- Resources
- https://www.cs.utah.edu/~swalton/Documents/Computer-Fundamentals.pdf
- http://www.w3schools.com/erp.html/

UCAM311 DATA COMMUNICATION NETWORKS

Semester	**: III**	**Credit**	**: 5**
Category	**: Core VI**	**Hours/Week**	**: 6**
Class & Major	**: II BCA**	**Total Hours**	**: 78**

Objectives
 To enable the students
- Identify the different types of network model.
- Apply Multiplexing techniques in the Telecommunication.
- Select appropriate routing algorithm.

UNIT - I INTRODUCTION **15 Hrs**

Introduction to Data Communication, Network. Protocols & standards and standards organizations - Line Configuration - Topology - Transmission node - Classification of Network OSI Model - Layers of OSI Model.

UNIT - II   TRANSMISSIONS   16 Hrs

Parallel and Serial Transmission - Modems - Guided Media Unguided Media - Performance - Types of Error - Error Detection - Error Corrections.

UNIT – III MULTIPLEXING APPLICATIONS   16 Hrs

Multiplexing - Types of Multiplexing - Multiplexing Application - Telephone systems project 802 - Ethernet - Token Bus - Token Ring FDD IEEE 802.6 - SMDS - Circuit Switching - Packet switching.

UNIT – IV LAYERS   16 Hrs

History of Analog and Digital Network - Access to ISDN - ISDN Layers - Broadband ISDN X.25 Layers - Packet Layer Protocol - ATM - ATM Architecture - ATM Applications.

UNIT – V NETWORKS   15 Hrs

Repeaters –Bridges- Routers - Gateway - Routing algorithms - TCP/IP Network, Transport and Application Layers of TCP/IP- SMTP - SNMP - World Wide Web- Frame relay- ATM- ATM LANs –X.25 - relay.

Text Books

- B. Forouzan, *Introduction to Data Communications in Networking*, Fourth Edition, TataMcGraw-Hill, New Delhi, 2017
    - Unit I   : Chapter 1,2,3
    - Unit II   : Chapter 6,7,9
    - Unit III   : Chapter 8,12,14
    - Unit IV   : Chapter 16,19
    - Unit V   : Chapter 21,24,25
- William Stallings, *Data and Computer Communication*, Tenth Edition, Prentice Hall of India, Sep 2013

Reference Books

- A. S.Tanenbaum, *Computer Networks*, Fourth Edition, Pearson Education, (Prentice hall of India Ltd), New Delhi, 2011.

E-Resources

- http://www.w3schools.com/dcn.html/
- http://freevideolectures.com/Course/2278/Data-Communication

UCAR304/UCSR308 JAVA PROGRAMMING – PRACTICAL

Semester	**: III**	**Credit**	**: 3**
Category	**: Core Practical III**	**Hours/Week**	**: 4**
Class & Major : II BCA		**Total Hours**	**: 52**

Objectives

To enable the students
- Create programs using Inheritance, Exception and String Handling.
- Build programs using Threads, Packages and Interfaces.
- Design simple applet programs using Swing and JDBC.

Lab Exercise
1. Classes and Objects
2. Constructors
3. Method Overloading
4. Implementing Single and Multiple Inheritance concepts.
5. Method Overriding
6. Implementing Package Concepts.
7. Implementing Interfaces Concepts.
8. Implementing Exception Handling.
9. Implementing Multithreading.
10. Implementing String manipulation using string and string buffer classes
11. Implementing Graphics using Applet.
12. Implementing Swing Concepts.
13. JDBC Connectivity

UCAM404 DATABASE MANAGEMENT SYSTEM

Semester	: IV	**Credit**	: 5
Category	: Core VII	**Hours/Week**	: 6
Class & Major	: II BCA	**Total Hours**	: 78

Objectives

To enable the students
- Understand the data models and represent the database system using ER diagram.
- Create a database using SQL queries and access database using normal forms.
- Query the database using PL/SQL commands.

UNIT – I DATABASES AND DATABASE USERS   **16 Hrs**

Introduction –Characteristics of the database approach –Database Actors – Advantages of using DBMS approach - Database Applications - Database System Concepts and Architecture: Data models, schemas and Instances- three schema architecture and data independence - Data Base Languages and interfaces – Database architecture.

UNIT – II DATA MODELING USING ENTITY RELATIONSHIP MODEL   **16 Hrs**

Conceptual data models – Entity types, Entity sets, Attributes and key – Relationship types, Relationship sets, Roles & Structural constraints – ER diagrams. Relational model: Relational model concepts – Relational model constraints & Relational database schemas –

Update operations & Dealing with constraint violations. Relational Algebra & Calculus: Unary Relational operations – Relational Algebra operations from set theory – Binary relation operations.

UNIT – III RELATIONAL DATABASE DESIGN & TRANSACTION PROCESSING CONCEPTS   16 Hrs
Informal Design guidelines for relational schemas – Functional Dependencies – Normal forms based on primary keys – second & third Normal forms – Boyce-Codd Normal Form.Introduction – Transaction & System concepts – Characterizing schedules – Concurrency control techniques – Database Recovery concepts. Database Security & Authorization: Introduction to Database security issues – Discretionary Access control based on Granting & Revoking privileges.

UNIT – IV SCHEMA DEFINITION, BASIC CONSTRAINTS & QUERIES   15 Hrs
SQL Data Definition – specifying Basic Constraints in SQL – Schema change statements in SQL – Basic queries in SQL – More complex SQL queries – insert, delete and update statements in SQL – Views in SQL – Embedded SQL, Dynamic SQL.

UNIT – V PL/SQL   15 Hrs
Introduction to PL/SQL- Creating and running PL/SQL Code- Navigating the Database- Creating and Editing the source code- SQL* Plus- Running a SQL statement- Running a PL/SQL- Running a script

Text Books
- Shamkant B.Navathe, Ramez Elmasri, *Fundamentals of Database Systems*, Sixth Edition, Pearson Education, New Delhi, 2011.
    - Unit I   : Chapter 1 to Chapter 2
    - Unit II   : Chapter 3,4,5
    - Unit III   : Chapter 8,11,12
    - Unit IV   : Chapter 7
- Steven Feuerstein & Bill Pribyl*, Oracle PL/SQL programming,* Sixth Edition, O'Reilly Media, 2014.
    - Unit V   : Chapter 1 & 2

Reference Books
- Silberschatz, Korth and Sudarshan, *Database System Concepts,* Sixth Edition, McGraw Hill, New Delhi, 2010.
- Raghu Ramakrishnan, *Database Management System*, Third Edition, Tata McGraw-Hill Publishing Company, New Delhi, 2012.

E-Resources
- http://www.w3schools.com/dbms.html/
- https://www.youtube.com/watch?v=aR44FbeeFH8
- https://www.youtube.com/watch?v=1057YmExs

UCAM403 OBJECT ORIENTED ANALYSIS AND DESIGN

Semester : IV   **Credit** : 4
Category : Core VIII   **Hours/Week** : 5
Class & Major : II BCA   **Total Hours** : 65

Objectives
To enable the students

- Understand the concepts of object oriented and designing process.
- Analyze and compare various designing patterns.
- Choose appropriate testing strategies and debugging principles.

UNIT- I INTRODUCTION   **13 Hrs**

An overview – Object basics – Object state and properties – Behavior – Methods - Messages – Information hiding – Class hierarchy – Relationships – Associations – Aggregations- Identity – Dynamic binding – Persistence – Meta classes – Object oriented system development life cycle.

UNIT - II UML   **13 Hrs**

Introduction – Survey – Rambough, Booch, Jacobson methods – Patterns – Frameworks - Unified approach – Unified modeling language – Static and Dynamic models – UML diagrams – Class diagram – Use case diagrams – Dynamic modeling – Model organization – Extensibility.

UNIT - III USE CASE APPROACH   **13 Hrs**

Identifying Use case – Business object analysis – Use case driven object oriented analysis – Use case model – Documentation – Classification – Identifying object, relationships, attributes, methods – Super-sub class – A part of relationships Identifying attributes and methods – Object responsibility.
Case Study: Library Management System, Mark Analysis System, Ticket Reservation System, Banking Transaction.

UNIT - IV UML DESIGN PROCESS   **13 Hrs**

Design process – Axioms – Corollaries – Designing classes – Class visibility – Refining attributes – Methods and protocols – Object storage and object interoperability – Databases – Object relational systems – Designing interface objects – Macro and Micro level processes – The purpose of a view layer interface.

UNIT - V TESTING STRATEGIES   **13 Hrs**

Quality assurance – Testing strategies – Object Orientation Testing – Test cases – Test Plan – Debugging principles – Usability – Satisfaction – Usability testing – Satisfaction Testing.

Text Book

- Ali Bahrami, *Object Oriented System Development*, McGraw Hill International Edition, 2008

Reference Book

- Grady Booch, Robert Maksimchuk, *Object Oriented Analysis and Design*, Pearson Education, 2007.

UCAM406 PYTHON PROGRAMMING

Semester	: IV	**Credit**	: 5
Category	: Core IX	**Hours/Week**	: 6
Class & Major	: II BCA	**Total Hours**	: 78

Objectives

To enable the students

- Understand the basics of algorithmic problem solving
- Develop Python programs with conditionals and loops.
- Design Python data structures - lists, tuples, dictionaries.

UNIT I   ALGORITHMIC PROBLEM SOLVING   **16 Hrs**

Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion).

UNIT II DATA,EXPRESSIONS,STATEMENTS   **16 Hrs**

Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments.

UNIT III CONTROLFLOW,FUNCTIONS   **16 Hrs**

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays.

UNIT IV LISTS,TUPLES,DICTIONARIES   **15 Hrs**

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing – list comprehension.

UNIT V FILES,MODULES,PACKAGES   **15 Hrs**

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages.

Text Books

- Allen B. Downey, *Think Python: How to Think Like a Computer Scientist*, Shroff Publishers & Distributors Pvt. Ltd,2nd edition, 2016.
- Guido van Rossum and Fred L. Drake Jr, *An Introduction to Python, Revised and updated for Python 3.2*, Network Theory Ltd., Mar 2011.

Reference Book

- Charles Dierbach, *Introduction to Computer Science using Python: A Computational Problem-Solving Focus*, Wiley India Edition, 2013.
- John V Guttag, *Introduction to Computation and Programming Using Python*, Revised and expanded Edition, MIT Press , 2013
- Robert Sedgewick, Kevin Wayne, Robert Dondero, "*Introduction to Programming in Python: An Inter-disciplinary Approach*, Pearson India Education Services Pvt. Ltd., 2016.

E-Resources

- http://www.w3schools.com/dbms.html/
- http://greenteapress.com/wp/think- python/

UCAR402 DATABASE MANAGEMENT SYSTEM – PRACTICAL

Semester	: IV	**Credit**	: 2
Category	: Core Practical IV	**Hours/Week**	: 3
Class & Major	: II BCA	**Total Hours**	: 39

Objectives

To enable the students

- Develop practical skills on various queries, views, indexes, triggers in SQL.
- Design the database for different applications using Oracle.
- Implement the Procedures and functions in PL/SQL to access the database.

Lab Exercises

1. Create a Student_Information and Mark _Details data bases using DDL, DML, TCL and DCL.
2. Create a Library data base and perform the Aggregate Function & SET Operations.
3. Create a Hospital data base and perform the Inner and Outer Joins Operations.
4. Create Bank database and query it using group by having and order by.
5. Create Employee database and query it using sub queries.
6. Create Views and indexes for the Phone Directory database.
7. Create PL/SQL Block for Mark sheet processing.
8. Create PL/SQL for Cursor.
9. Create the Procedures for Stock management data base.
10. Create the Functions for Real estate data base.
11. Create different types of triggers for Event Management database.

Note: All the tables should be created with Constraints.

UCAR404 PYTHON PROGRAMMING –PRACTICAL

Semester	**: IV**	**Credit**	**: 2**
Category	**: Core Practical V**	**Hours/Week**	**: 3**
Class & Major	**: II BCA**	**Total Hours**	**: 39**

Objectives

To enable the students
- Design Python programs with conditionals statements, loop and functions.
- Discover how to work with lists and sequence data
- Use Python to read and write files

Lab Exercise

1. Compute the GCD of two numbers.

2. Find the square root of a number (Newton's method)

3. Exponentiation (power of a number)

4. Find the maximum of a list of numbers

5. Linear search and Binary search

6. Selection sort, Insertion sort

7. Merge sort

8. First n prime numbers

9. Multiply matrices

10. Programs that take command line arguments (word count)

11. Find the most frequent words in a text read from a file

12. Simulate elliptical orbits in Pygame

13. Simulate bouncing ball using TRINKET.

III and IV Evaluation Components of CIA

Semester	Part	Category	Course Code	Course Title	Component III	Component IV
III	III	Core IV	UCAM310/ UCSM305	Java Programming	Assignment	Presentation using ICT Technique
	III	Core V	UCAM308	MIS and ERP	Assignment	Presentation using ICT Technique
	III	Core VI	UCAM311	Data Communication Networks	Assignment	Presentation using ICT Technique
	III	Core Practical III	UCAR304/ UCSR306	Java Programming - Practical	DPA	Viva-voce
IV	III	Core VII	UCAM404	Database Management System	Assignment	Presentation using ICT Technique
	III	Core VIII	UCAM403	Object Oriented Analysis and Design	Assignment	Presentation using ICT Technique
	III	Core IX	UCAM406	Python Programming	Assignment	Presentation using ICT Technique
	III	Core Practical IV	UCAR402	Database Management System-Practical	DPA	Viva-voce
	III	Core Practical V	UCAR404	Python Programming- Practical	DPA	Viva-voce

DEPARTMENT OF PSYCHOLOGY

PREAMBLE

UG: Course Profile and the syllabi of courses offered in the III and IV semesters along with evaluation components III & IV (with effect from 2018 - 2021 batch onwards) are presented in this booklet.

PROGRAMME PROFILE B.Sc. (Psychology)

PSO 1 : Ability to understand the concept of Therios and principles in psychology.
PSO 2 : Acquiring the knowledge of laboratory skills in various concept in psychology.
PSO 3 : Understanding of the applications of psychology in different fields.
PSO 4 : Applying the knowledge of psychology in various fields.

Semester	Part	Category	Course code	Course Title	Hours per week	Credit Min	Credit Max
I	I	Language	UTAL105/ UTAL106/ UHIL101/ UFRL101	Basic Tamil I/ Advanced Tamil I/ Hindi I / French I	4	2	3
	II	English I	UENL107/ UENL108	General English I/ Advanced English I	5	3	4
	III	Core I	UPSM101	General Psychology I	6	5	5
		Core II	UPSM102	Developmental Psychology I	7	5	5
		Core III	UPSM103	Social Psychology I	6	5	5
	IV	Value Education			2	1	1
				TOTAL	**30**	**21**	**23**
II	I	Language	UTAL205/ UTAL206/ UHIL201/ UFRL201	Basic Tamil II/ Advanced Tamil II/ Hindi II/ French II	4	2	3
	II	English II	UENL207/ UENL208	General English II/ Advanced English II	5	3	4
	III	Core IV	UPSM201	General Psychology II	5	5	5
		Core V	UPSM202	Developmental Psychology II	5	5	5
		Core VI	UPSM201	Social Psychology II	5	5	5
	IV	Non Major Elective	UPSE201	Psychology for Effective Living	4	2	2
		Soft skill			2	1	1
	V	Extension activity/ Physical Education/NCC			-	1	2
				TOTAL	**30**	**24**	**27**

III	I	Language	UTAL307/ UTAL308/ UHIL301/ UFRL301	Basic Tamil III/ Advanced Tamil III/ Hindi III/ French III	4	2	3
	II	English III	UENL305/ UENL306	General English III/ Advanced English III	5	3	4
	III	Core VII	UPSR301	Experimental Psychology I	6	5	5
		Core VIII	UPSM301	Psychological Statistics	5	5	5
		Core IX	UPSM302	Theories of Personality	5	5	5
	IV	Online Course		NPTEL/ Spoken Tutorial	3	1	2
		Value Education			2	1	1
				TOTAL	**30**	**22**	**25**
IV	I	Language	UTAL405/ UTAL406/ UHIL401/ UFRL401	Basic Tamil IV/ Advanced Tamil IV/ Hindi IV/ French IV	4	2	3
	II	English IV	UENL407/ UENL408	General English IV/ Advanced English IV	5	3	4
	III	Core X	UPSR401	Experimental Psychology II	6	5	5
		Core XI	UPSM401	Physiological Psychology	7	5	5
		Core XII	UPSM402	Research Methodology	6	5	5
	IV	Soft skill			2	1	1
	V	Extension activity/ Physical Education/NCC			-	-	2
				TOTAL	**30**	**21**	**25**
V	III	Core XIII	UPSM501	Abnormal Psychology	6	5	5
		Core XIV	UPSM502	Educational Psychology	6	5	5
		Core XV	UPSM 503	Positive Psychology	5	5	5
		Core XVI	UPSM 504	Organizational Psychology	6	5	5
		Core XVII	UPSM 505	Psychological Testing	5	5	5
		Value education			2	1	1
				TOTAL	**30**	**26**	**26**
VI	III	Core XVIII	UPSM 601	Clinical Psychology	6	5	5
		Core XIX	UPSM 602	Counselling Psychology	6	5	5
		Core XX	UPSM 603	Human Resource Development	5	5	5
		Core XXI	UPSM 604	Health Psychology	6	5	5
		Core XXII	UPSP 601	Project	5	5	5
	IV	Soft skill			2	1	1
	V	Extension activity/ Physical Education/NCC			-	-	2
				TOTAL	**30**	**26**	**28**
				GRAND TOTAL	**180**	**140**	**154**

Semester	Part	Category	Course Code	Course Title	Contact Hour/Week	Credit	
						Min	Max
II	IV	Non Major Elective	UPSE201	Psychology for Effective Living	4	2	2

EXTRA CREDIT EARNING PROVISIONS

Semester	Category	Course Code	Course Title	Contact/ Week	Credit	
					Min	Max
II	Core	UPSI201	Summer Internship	-	-	1
IV	Core	UPSI401	Summer Internship	-	-	1

UPSR301 EXPERIMENTAL PSYCHOLOGY I

Semester   : **III**   **Credit**   : **5**
Category   : **Core VII**   **Hours / Week : 6**
Class & Major : II B.Sc. Psychology   **Total Hours : 78**

Objectives
To enable the students
- Acquire knowledge of psychological instruments and techniques.
- Provide basic training in planning and conducting experiments.
- Facilitate the skills of observation and reporting through experiments.

UNIT- I SENSATION AND ATTENTION
      Two Point Threshold – Kinaesthetic Sensitivity – Span of Attention – Division of Attention

UNIT- II PERCEPTION
      Muller – yer Illusion – Size – weight Illuson – Depth Perception – Reaction time

UNIT- III LEARNING
      Trial and Error Learning –Concept formation –Habit Interference – Paired Associate learning

UNIT- IV MEMORY

Immediate Memory Span –Wechsler Memory Scale –PGI Memory Scale –2 Experiments using Memory Drum

UNIT-V INTELLIGENCE

Seguin Form Board –Koh's Block Design Test –Alexander Pass –along Test –Raven's Progressive Matrices Test

Note
- Each student have to complete a minimum of 12 experiments.
- Atleast two experiments from each unit.
- Duration of the end semester examination is 3 hours

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.

UPSM301 PSYCHOLOGICAL STATISTICS

Semester	**: III**	**Credit**	**: 5**
Category	**: Core VIII**	**Hours / Week**	**: 5**
Class & Major	**: II B.Sc. Psychology**	**Total Hours**	**: 65**

Objectives
To enable the students
- Understand various statistical techniques in terms of their assumptions, application, and limitations.
- Acquire competencies to organize data for manual and computer analysis.
- Applying elementary competencies in using computer packages of statistical analyses.

UNIT- I INTRODUCTION   **12 Hrs**

Meaning and Definition of Statistics – Nature and Scope of Statistics – Uses and Limitations of Statistics – Application of Statistics in Psychology Meaning and Definition of variable – Dependent variable – Independent variable – Descriptive Statistics – Inferential Statistics

UNIT- II ORGANIZATION OF DATA INTRODUCTION   13 Hrs

Meaning of Enquiry – Planning and Designing of Enquiry – Primary Data – Secondary Data – Framing a schedule – Classification and Tabulation of Data – Frequency Distribution. Diagrammatic and Graphical Representation of Data

UNIT- III MEASURES OF CENTRAL TENDENCY   13 Hrs

Meaning and Purpose of Measures of Central Tendency – Characteristics and Types of Measures – Characteristics and Uses of Mean, Median and Mode – Computation of Mean – Median and Mode Meaning – Purpose and Uses of Percentiles and Percentile Ranks

UNIT- IV TEST OF MEAN DIFFERENCES   13 Hrs

Measurements of Variability – Range Quartile Deviations – Mean Deviation – Standard Deviation.

UNIT- V TEST OF ASSOCIATION   14 Hrs

Meaning, purpose and assumptions of Analysis of variance – One way ANOVA –Chi square – Meaning and Characteristics of Correlation – Types of Correlation – Person's Product Moment Correlation – Spearman's Rank order Correlation.

Text Books
- Garrett, H. E, *Statistics in Psychology and Education*, 6th ed. New Delhi: Paragon International Publishers, 2004.
- Mangal, S. K. *Statistics in Psychology and Education*. 2nd ed. New Delhi: Prentice Hall, 2004.

Reference Books
- Arthur Aron, Elliot J. Coups, Elaine N. Aron. *Psychological Statistics* 6th Edition. Pearson Publication, 2013. .
- Guilford, J. P., & Fruchter. *Fundamental Statistics in Psychology and Education*. 6th ed. Singapore: McGraw Hill, 1987.
- Girija, M., Sasikala, L., & Girija. *Introduction to Statistics.*1 st ed. New Delhi: Vrinda Publications, 2004.
- Bhandarkar, K. M, *Statistics in Education*. 1st ed. Hyderabad: Neelkamal 2006.
- Kumar, P, *Psychological Statistics*. 1st ed. Jaipur: Aavishkar Publishers, 2006.

UPSM302 THEORIES OF PERSONALITY

Semester   : III   **Credit   : 5**
Category   : Core IX   **Hours / Week : 5**
Class & Major : II B.Sc. Psychology   **Total Hours   : 65**

Objectives
To enable the students
- Understand the various concept in personality.
- Know the theories of personality.
- Facilitate knowledge on the personality.

UNIT- I INTRODUCTION TO THEORIES OF PERSONALITY   13 Hrs
Meaning of personality – Define of personality – Theory and Its Relatives – Definition of theory – research in personality theory.

UNIT- II PSYCHODYNAMIC THEORIES   13 Hrs
Freud:Psychoanalysis – Adler:Individual Psychology – Jung:Analytical Psychology – Horny: Psychoanalytical Social Theory – Fromm:Humanistic Psychoanalysis.

UNIT- III HUMANISTIC & EXISTENTIAL THEORIES   13 Hrs
Maslow: Holistic Dynamic theory – Maslow's view of motivation – Self – Actualization Rogers: Person – Centered theories – May: Existential Psychology.

UNIT- IV TRAIT & FACTOR THEORIES   13 Hrs
Allport – Eysenck – Cattle – McCrae & Costa's theories

UNIT - V LEARNING THEORIES   13 Hrs
Behavioral Analysis – Skinner – Social Cognitive Theory – Bandura. – Rotter &Kelly

Text Book
- Jess Feist Gregory J. Feist, *Theories of Personality* 7ed McGraw-Hill Education – Europe, 2008.

Reference Books
- Duane P. Schultz, Sydney Ellen Schultz. *Theories of Personality* 9th ed**.** Wadsworth, Cengage Learning, 2008.
- Calvin S. Hall Gardner Lindzey John B. *Theories of Personality* 4th Edition Campbell Wiley india Pvt. Ltd, 2008.
- Richard M. Ryckman. Theories of Personality, 10e   Cengage Learning, Inc, 2013.

UPSR401 EXPERIMENTAL PSYCHOLOGY II

Semester	**: IV**	**Credit**	**: 5**
Category	**: Core IX**	**Hours / Week:**	**6**
Class & Major : II B.Sc. Psychology		**Total Hours**	**: 78**

Objectives
To enable the students
- Understand the various psychological concepts of testing
- Knowing tests to measure psychological concepts
- Learn the skill of administering psychological tests

UNIT- I MOTIVATION & EMOTION
Level of Aspiration – Picture frustration – Emotional intelligence test – Locus of control

UNIT- II INTERST & APTITUDE TEST
Thurstone interest schedule – Differential aptitude test – Test of personal values – Test of Verbal & Non verbal reasoning

UNIT- III PERSONALITY
Neo-PI-16 PF-Jung's word Association Test – Projective test (TAT or Rorschach Ink Bottle Test)

UNIT- IV STRESS / ADJUSTMENT / MENTAL HEALTH
Stress Coping Test – Stress – Trait Anxiety - Mental Health – Adjustment Inventory for College Students

UNIT- V CREATIVITY & LEADERSHIP
Passi Test of Creativity – Non-Verbal Test of Creative Thinking – Leadership Preference Scale – Decision Making Scale

Note
- Each student have to complete a minimum of 12 experiments.
- Atleast two experiments from each unit.
- Duration of the end semester examination is 3 hours

Reference Books
- Anne Anastasi, Susana Urbina, *Psychological Testing* 7th Edition pearson Publication, 2016.
- Rajamani.M, *Experimental Psychology with Advanced Experiments*, New Delhi. Concept Publishing Company 2005.
- Woodworth.R.S& Schlosberg. H, Experimental Biology. NewYorkMethenand Co. Ltd, 1965.

UPSM401 PHYSIOLOGICAL PSYCHOLOGY

Semester : IV	**Credit** : 5
Category : Core XI	**Hours / Week** : 7
Class & Major : II B.Sc. Psychology	**Total Hours** : 91

Objectives
To enable the students
- Understand about the biological basis of behavior..
- Gain basic knowledge about physiology nervous system, endocrine system, sensory processes and muscles
- Promote the understanding of the physiology of learning, memory, motivation emotion, etc.

UNIT- I INTRODUCTION TO BIOPSYCHOLOGY   16 Hrs

Biopsychology – Definition – Meaning – Human Consciousness –Biological Roots of Behavioral Neuroscience – Functionalism and the Inheritance of Traits – Nervous – Neural Communication – Structure of Synapses – Release of Neurotransmitter

UNIT- II BRAIN AND NERVOUS SYSTEM   20 Hrs

Basic Features of the Nervous System – The Central Nervous System: Development of the Central Nervous System – The Forebrain – The Midbrain –The Hindbrain – The Spinal Cord – The Peripheral Nervous System: Spinal Nerves – Cranial Nerves – The Autonomic Nervous System.

UNIT- III VISION AND AUDITION, BODY OF SENSES, AND THE CHEMICAL SENSES   17 Hrs

Anatomy of the Visual System – Anatomy of the Visual System – Analysis of Visual Information: Role of the Striate Cortex – Analysis of Visual Information: Role of the Visual Association Cortex. Audition – Vestibular System – Somatosenses – Gustation – Olfaction

UNIT- IV SLEEP AND BIOLOGICAL CIRCADIAN RHYTHMS   20 Hrs

A Physiological and Behavioral Description of Sleep: Disorders of Sleep – Physiological Mechanisms of Sleep and Waking – Biological Clocks.

UNIT- V LEARNING, MEMORY AND EMOTION   18 Hrs

The Nature of Learning – Synaptic Plasticity – Long – Term Potentiation and Long – Term Depression – Perceptual Learning – Classical Conditioning – Instrumental Conditioning – Relational Learning – Emotion as Response Patterns – Communication of Emotion – Feelings of Emotion

Text Book
- Carlson, N.R. *Physiology of behavior*, 11th edition London: Allen and Bacon, 2012.

Reference Books
- Carlson, N. R. *Foundations of Physiological Psychology*, 6th Edition. Pearson Education, New Delhi, 2009.

- Schneider, A. M. & Tarshis, *Physiological Psychology*. New York: Random House, 1975.
- Levinthal, C. F. *Introduction to Physiological Psychology*. New Delhi: PHI, 1983.

UPSM402 RESEARCH METHODOLOGY

Semester	**: IV**	**Credit**	**:5**
Category	**: Core XII**	**Hours / Week**	**:6**
Class & Major	**: II B.Sc. Psychology**	**Total Hours**	**:78**

Objectives

To enable the students

- Understand the different stages of research
- Develop insight into the various research methods
- Apply appropriate research tools to acquire the skill of reporting the research

UNIT- I INTRODUCTION OF RESEARCH   12 Hrs

Definition–Principles – Meaning & Importance – Type of Research – Research Methods versus Methodology – Variables – Meaning of Types.

UNIT- II RESEARCH PROBLEM AND RESEARCH DESIGN   17 Hrs

Research Problem – Selecting of Problem – Defining the Problem – Technique Involved in Defining a Problem.

Meaning – Need for Research Design – Features of a Good Design – Important Concepts Relating to Research Design – Different Research Design – Basic Principles of Experimental Designs – Important Experimental Design.

UNIT- III SAMPLING AND DATA COLLECTION   17 Hrs

Sample Design – Sampling and Non-Sampling Error – Sample Survey Vs. Census Survey – Types of Sampling Design – Non-Probability Sampling – Probability Sampling – Complex Random Sampling Designs.

Collection of Primary Data – Collection of Secondary Data – Selection of Appropriate Method for Data Collection – Case study Method.

UNIT- IV TESTING OF HYPOTHESIS   17 Hrs

Definition – Meaning – Concepts – Testing of Hypothesis – Type-I & II Error – Limitation.

UNIT- V INTERPRETATION AND REPORT WRITING   15 Hrs

Meaning of Interpretation – Techniques of Interpretation – Precautions in Interpretation – Significance of Report Writing –– Writing a Research Report

Text Book

- Kothari, C.R.. *Research Methodology – Methods and Techniques*. New Delhi: Wiley Eastern Ltd, 2008.

Reference Books

- Kundu. *Research Methodology*. New Delhi: Pearson Publishing 2010.
- Myers, J. *Methods in Psychological Research*. New Delhi: Sage Publication, 2008.
- Coaley, K, *An Introduction to Psychological Assessment and Psychometrics*. New Delhi: Sage Publications, 2009.
- Coolican, H. *Research Methods in Statistics in Psychology*. New Delhi: Rawat Publications, 2009.
- Ranjith Kumar. *Research Methodology* 3rd Ed, Sage publication 2009.

III and IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
III	Core VIII	UPSM 301	Psychological Statistics	Assignment	Seminar
	Core IX	UPSM 302	Theories of Personality	Assignment	Seminar
IV	Core XI	UPSM401	Physiological Psychology	Assignment	Seminar
	Core XII	UPSM402	Research Methodology	Assignment	Seminar

UPSR301- EXPERIMENTAL PSYCHOLOGY I / UPSR401- EXPERIMENTAL PSYCHOLOGY II

Semester   : III/IV   **Credit   : 5**
Category   : Core VII/IX   **Hours / Week : 5**
Class & Major : II B.Sc. Psychology   **Total Hours   : 65**

Criteria	Evaluation		Total
	CIA (60 marks)	ESE (40 marks)	CIA + ESE (100 marks)
CIA I	10	-	60
CIA II	10	-	
Daily Practical Assessment (DPA)	30	-	
Viva Voce	10	-	
Record	-	20	40
Result	-	10	
Viva Voce	-	10	

INTERNAL QUALITY ASSURANCE CELL (IQAC)

I. Ph.D. ADMISSION GUIDELINES

Ph.D. Admission Procedure as per Thiruvalluvar University Regulations July 2017

(a) Admission Procedure

- Departmental Research Committee (DRC) incharge of admission as per TVU norms.
- Selection on merit based on PG marks 50%, Entrance 40%, research outline 10% for FT, PT.
- NET /SET passed candidates need not write entrance and will be assessed for 60%.
- PT candidates must have continuous teaching experience for min. 2yrs and produce No Objection certificate from employer along with experience certificate at the time of admission.
- DRC comprises of guide and two senior TVU approved guides from the same Department/ College/neighboring College.
- Admission can be made four sessions in a year January, April, July, October.
- Selected list along with applications to be submitted to TVU before the last day of the previous month for approval. (31st Dec., 31st March, 30th June, 30th Sep. every year.)
- Assistant Professors can guide 4 students, Associate Professors 6 students.
- Only 2 candidates per session can be admitted under a supervisor.

(b) Course Duration

From the date of commencement (officially notified by the university) of the Ph.D., programme, the minimum and the maximum periods prescribed for completion of Ph.D., programme are as follows:

S.No	Faculty	Type	Minimum	Maximum
1	Arts and Science with M.Phil degree	Full time	2years	5years
2	Arts and Science without M.Phil degree	Full time	3 years	5 years
3	Arts and Science with M.Phil degree	Part time	3 years	6 years
4	Arts and Science without M.Phil degree	Part time	4 years	6 years

(c) Doctoral Committee (DC)

- For every candidate a doctoral committee not less than 3 members to be formed with TVU approval.

- DC comprises of research Supervisor as the chair person along with 2 senior approved guides from the same Department or from neighbouring college.

- DC approves the course work syllabi prepared by the research supervisor and monitors the research progress.

- Course work evaluation is done by DC and report sent to TVU on successful completion.

- DC to meet at least twice in a year for each scholar till the submission of her thesis and reports to be sent to TVU.

(d) Course Work

- Every candidate provisionally registered for the Ph.D. programme shall undergo   course work in the first year.

- The course work consists of the following

S.No.	Category	Course Code	Course Title	Credits Without M.phil	Credit With M.Phil
1	Paper I	DTAM101	Research Methodology	6	-
2	Paper II	DTAM102	Advanced core	6	6
3	Paper III	DTAM 103	Background Core	6	6
	TOTAL CREDITS			18	12

(e) Evaluation

- The three papers are self study papers.

- Final Examination will be conducted at the end of first year for 100 marks.

- Research Supervisor with the approval of the DC Committee will conduct the written examinations for the courses prescribed through CoE office.

- Results will be communicated by the Supervisor to the University with the answer scripts and questions along with the Minutes of the Meeting of the DC Committee.

- On the basis of these examinations, provisional registration of the candidate will be confirmed by the University.

- Researchers shall be permitted to proceed with her research work and submit the thesis at the expiry of minimum total period of research prescribed after provisional registration.
- The board of examiners will evaluate the thesis and report on the merit of candidate.
- After due correction the same will be permitted for Viva Voce examination.

(f) Attendance Requirements

- Attendance to be eligible to submit the thesis.
- The Part Time research scholars should have a minimum of 60 contact days per year for the discussion with the guide.
- Attendance and onduty letters to be maintained by the concerned research supervisor and monitored by R & D cell.
- A maximum of 6 days at a stretch will be provided as On duty for reference / work.

(g) Class Teaching

- All Full Time scholars are expected to handle a subject for minimum of 2hrs / week.
- Research Supervisors concerned shall allot these hours to the scholars and ensure that timetable and classes are handled effectively by scholars.

(h) Presentation / Participation

- Every research scholar shall publish a minimum of 2 research article in peer reviewed journal
- with impact factor in SCI indexed journal / UGC listed journal.
- A plagiarism report of the Research article shall be submitted to the R&D Cell.
- A minimum of 2 presentation/ participation should be done by the scholars in International/
- National Conference / Seminar

(i) Monitoring progress

- The Doctoral Committee would review the progress and give suggestion.
- A brief report of work done by scholar in the prescribed proforma to be forwarded by the research supervisor to TVU once in every 6 months.
- The report should clearly indicate the progress achieved and cover the following points
    (i) Thesis proposal status
    (ii) Course work completion status
    (iii) Schedule of the research work

(iv) Progress made during period of the report

(v) Publications / reports if any

(vi) Problems / difficulty if any

(vii) Plans for future work

- Failing any one of the above, the candidate will not be permitted to submit the thesis.

(j) Plagiarism Check

Certificate of Plagiarism Check to be produced by the scholar before submission.

1. Name of the Research Scholar

2. Course of Study M.Phil.,/Ph.D.,

3. Title of the Thesis/Dissertation

4. Name of the Supervisor

5. Department

6. Acceptable maximum limit   20%

7. % of similarity of content identified

8. Software used - URKUND

9. Date of verification

(k) Fees Payment

S.No	Nature of Fee	Payment
1	Research Fees to be paid till submission of thesis July session October session January session April session	 on or before July 31st on or before October 31st on or before January 31st on or before April 30th
2	University fees	As per TVU norms
3	Doctoral Committee expenses	To be borne by the respective scholar
4	Examination fee (course Work)	College norms
5	Synopsis evaluation	-do-
6	Thesis evaluation	-do-
7	VIVA Voce	-do-
8	Change of Title	-do-

9	Re-registration	-do-

(l) Thesis Submission

- Draft copy of Synopsis to be approved by the DC

- Panel of examiners to be formed by the DC (As per TVU norms)

- After one month and before 6 months from the date of submission of the synopsis scholars can submit their thesis as per TVU norms.

- No Candidate is permitted to submit her thesis after maximum period.

Ph.D. Admission Procedure as per Thiruvalluvar University Regulations July 2019.

(a) Admission Procedure

- Selection on merit based on PG marks 50%, Common Entrance Test 40%, research outline 10% for FT ,PT.

- NET /SET passed candidates need not write entrance and will be assessed for 60%.

- PT candidates must have continuous teaching experience for min. 2yrs and produce No Objection certificate from employer along with experience certificate at the time of admission.

- DRC comprises of guide and two senior TVU approved guides from the same Department/ College/neighbouring College.

- The Admission into Ph.D., Programme will be through an Common Entrance Test (CET) conducted by the University for all the colleges in the in the month of November and June (Twice a Year).

- The candidate is eligible for interview only after scoring a minimum of 50% marks and above in the entrance examination. A certificate of qualification for Ph.D., admission will be issued to the eligible candidates that will be valid for a period of ONE year only

- Application forms will be available online from 1st to 20th of the months mentioned above. Before 30th of the month, the written test will be conducted.

- Assistant Professors can guide 4 students, Associate Professors 6 students.

- Only 2 candidates per session can be admitted under a supervisor.

- Ph.D., registration can be done in two sessions January – June and July - December.

(b) Doctoral Committee (DC)

- For every candidate a doctoral committee not less than 3 members to be formed with TVU approval.

- Supervisor-Convener

- Head of the department concerned

- External subject expert (Outside Thiruvalluvar University with 500 citations).

- The DC will meet to review the progress of a candidate once in a year.

- DC approves the course work syllabi prepared by the research supervisor and monitors the research progress.

- Course work evaluation is done by DC and report sent to TVU on successful completion.

(c) Course Work

- PG (without M.Phil) - FOUR course work papers and 2 MOOC courses

- With M.Phil - Two courses / Two MOOC Courses.

- The course work consists of the following

S.No	Category	Course Code	Course Title	Credits Without M.phil	Credit With M.Phil
1	Paper I	DTAM101	Research Methodology	6	-
2	PaperII	DTAM102	Advanced core	6	6
3	Paper III	DTAM 103	Background Core	6	6
4	Paper IV	DTAM 104	Guide Paper	5	
	TOTAL CREDITS			23	12

(d) Evaluation

- Three tests to be conducted. Internal 25 and External 75 marks

- Final Examination will be conducted at the end of first year for 100 marks.

- Research Supervisor with the approval of the DC Committee will conduct the written examinations for the courses prescribed through CoE office.

- Results will be communicated by the CoE office through the Supervisor to the University with the answer scripts and questions along with the Minutes of the Meeting of the DC Committee.

- On the basis of these examinations, provisional registration of the candidate will be confirmed by the University.

- Researchers shall be permitted to proceed with her research work and submit the thesis at the expiry of minimum total period of research prescribed after provisional registration.

- The board of examiners will evaluate the thesis and report on the merit of candidate.

- After due correction the same will be permitted for Viva Voce examination.

II. Examination Reforms – Publication of CIA Result before ESE

- Continuous Internal Assessment (CIA) marks can be published after 80th instructional day

III. Publication of PG Project

- The Teacher Incharge for the PG and M.Phil project has to publish their research work in the UGC approved journals.