THEIVANAI AMMAL COLLEGE FOR WOMEN (AUTONOMOUS)
VILLUPURAM
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(A UNIT OF E.S.S.K. EDUCATIONAL CHARITIES)

ACADEMIC COUNCIL BOOKLET – IX

Arts, Science and IQAC (Master Copy)

1st July 2017

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தமிழாய்வுத்துறை

முகவுரை

இளங்கலைத்தமிழ் : ஐந்தாம், ஆறாம் பருவங்களுக்குரிய முதன்மைப்பாடம், துறைசாரா விருப்பாடம் ஆகிய பாடத்திட்டங்கள் இடம்பெற்றுள்ளன. முதன்மைப்பாடத்தில் சில புதிய பாடத்திட்டங்கள் அறிமுகப்படுத்தப்பட்டுள்ளன. அகமதிப்பீட்டுக்கூறுகள் V & VI ஆகிய இரண்டு பருவங்களுக்கு இடம்பெற்றுள்ளன. (2015- 2018).

பருவம்	பிரிவு	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	வாரம் மணி நேரம்	தரம்	
						Min	Max
I	I	தமிழ்	UTAL105/ UTAL106	பொதுத்தமிழ்-I/ சிறப்புத்தமிழ்-I	4	2	3
	II	ஆங்கிலம்	UENL107/ UENL108	Basic English-I/ Advanced English-I	5	3	4
	III	முதன்மைப்பாடம்-I	UTAM102	நன்னூல்- எழுத்ததிகாரம்	6	4	5
		முதன்மைப்பாடம்-II	UTAM105	நவீன இலக்கியங்கள்	5	4	4
		முதன்மைப்பாடம்-III	UTAM106	தமிழக வரலாறும் பண்பாடும்	6	4	4
		முதன்மைப்பாடம்-IV	UTAM107	மொழித்திறன்	2	1	1
	IV	மதிப்பீட்டுக் கல்வி			2	1	1
				மொத்தம்	**30**	**19**	**22**
II	I	தமிழ்	UTAL205/ UTAL 206	பொதுத்தமிழ்- II/ சிறப்புத்தமிழ்-II	4	2	3
	II	ஆங்கிலம்	UENL207/ UENL208	Basic English-II/ Advanced English-II	5	3	4
	III	முதன்மைப்பாடம்-V	UTAM202	நன்னூல்- சொல்லதிகாரம்	5	5	5
		முதன்மைப்பாடம்-VI	UTAM204	சிற்றிலக்கியங்கள்	4	4	4
		முதன்மைப்பாடம்-VII	UTAM205	மொழி வரலாறு	4	4	4
		முதன்மைப்பாடம்-VIII	UTAM201	பயிற்சி பட்டறை-I	2	1	1
	IV	துறை சாரா விருப்பப்பாடம்-I			4	2	2
		திறன்சார்கல்வி			2	1	1
	V	கூடுதல் செயல்பாடு			-	1	2
				மொத்தம்	**30**	**23**	**26**
III	I	தமிழ்	UTAL 305/ UTAL306	பொதுத்தமிழ் - III/ சிறப்புத்தமிழ் -III	4	2	3
	II	ஆங்கிலம்	UENL 307/ UENL 308	Basic English-III/ Advanced English-III	5	3	4
	III	முதன்மைப்பாடம்-IX	UTAM303	யாப்பருங்கலக்காரிகை	5	5	5
		முதன்மைப்பாடம்-X	UTAM304	காப்பியங்கள்	5	4	4
		முதன்மைப்பாடம்-XI	UTAM305	மொழியியல்	5	4	4
	IV	துறைசாரா விருப்பப்பாடம்-II			4	2	2
		மதிப்பீட்டுக்கல்வி			2	1	1
				மொத்தம்	**30**	**21**	**23**
IV	I	தமிழ்	UTAL405/ UTAL406	பொதுத்தமிழ் - IV/ சிறப்புத்தமிழ்-IV	4	2	3
	II	ஆங்கிலம்	UENL407/ UENL 408	Basic English-IV/ Advanced English-IV	5	3	4
	III	முதன்மைப்பாடம்-XII	UTAM401	புறப்பொருள் வெண்பாமாலை	5	5	5
		முதன்மைப்பாடம்-XIII	UTAM403	நம்பியகப்பொருள்	4	4	4
		முதன்மைப்பாடம்-XIV	UTAM404	தமிழ் இலக்கண நூல்கள்	4	4	4
		முதன்மைப்பாடம்-XV	UTAM405	அற இலக்கியங்கள்	4	4	4

		முதன்மைப்பாடம்-XVI	UTAM401	பயிற்சி பட்டறை –II	2	1	1
	IV	திறன்சார்கல்வி			2	1	1
	V	கூடுதல் செயல்பாடு				-	2
				மொத்தம்	**30**	**24**	**28**
V	III	முதன்மைப்பாடம்-XVII	**UTAM506**	**சமய இலக்கியம்**	5	5	5
		முதன்மைப்பாடம்-XVIII	UTAM505	இதழியல்	5	5	5
		முதன்மைப்பாடம்-XIX	**UTAM508**	**பெண்ணியம்**	6	6	6
		சார்புப் பாடம்-I	UCSA505	தமிழ்க்கணினி	5	5	5
		சார்பு விருப்பப்பாடம்-I	UTAA506 UTAA507 **UTAA508**	மொழிப்பெயர்ப்புக்கலை அற இலக்கியங்கள் **செவ்வியல் நூல்கள்**	5	4	4
	IV	மதிப்பீட்டுக்கல்வி			2	1	1
				மொத்தம்	**30**	**26**	**27**
VI	III	முதன்மைப்பாடம்-XX	UTAM603	இலக்கியத் திறனாய்வியல்	4	4	4
		முதன்மைப்பாடம் -XXI	UTAM604	சொற்பொழிவுக்கலை	4	4	4
		முதன்மைப்பாடம் -XXII	UTAM606	நாட்டுப்புறவியல்	4	4	4
		முதன்மைப்பாடம் -XXIII	UTAM607	தண்டியலங்காரம்	5	5	5
		முதன்மைப்பாடம்-XXIV	**UTAM609**	**சங்க இலக்கியம்**	5	4	4
		முதன்மைப்பாடம்-XXV	**UTAM610**	**ஊடகத்தமிழ்**	4	3	3
		முதன்மைப்பாடம்-XXVI	**UTAM601**	**பயிற்சி பட்டறை – III**	2	1	1
	III	புறவாய்மொழித்தேர்வு	UTAC606	புற வாய்மொழித்தேர்வு		1	1
	VI	திறன்சார்கல்வி			2	1	1
				மொத்தம்	**30**	**27**	**27**
				கூட்டு எண்ணிக்கை	**180**	**140**	**153**

(EXTRA CREDIT)

கோடைக்கால பயிற்சி (விருப்பம் உள்ள மாணவியருக்குரியது)

பருவம்	பிரிவு	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	வாரம் மணி நேரம்	தரம்	
						Min	Max
IV	**III**	முதன்மைப்பாடம்	**UTAI401**	கோடைக்கால பயிற்சி வகுப்பு	-	-	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**			

Experiential Learning (விருப்பம் உள்ள மாணவியருக்குரியது)

தாளின் பெயர்	பணி அனுபவம்			ஒருங்கிணைந்த நிறுவனம்	மதிப்பீட்டுமறை
	நிறுவனம்	கால அளவு	கால வரையறை		
UTAM505 இதழியல்	பிரசாத் ஸ்கூல் ஆப் மீடியா			பிரசாத் ஸ்கூல் ஆப் மீடியா	செய்தி சேகரித்தல்
UTAM606 நாட்டுப்புறவியல்	மணல் மகுடி அமைப்பு			மணல் மகுடி நிலம்	செய்முறைத்தேர்வு

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 UTAE203	படைப்புக்கலை தமிழ்மொழிஅறிமுகம் -1	4	2	2
III	IV	துறை சாரா விருப்பப்பாடம்- II	UTAE305 UTAE306 UTAE307 UTAE308 UTAE309	தமிழ்மொழி அறிமுகம்-2 தமிழ்ப் பெண்படைப்பாளர்களின் படைப்புகள் போட்டித் தேர்வு இந்திய ஆட்சிப்பணித் தேர்வு தமிழ்ப் பண்பாட்டு வரலாறு	4	2	2
V	IV	துறை சாரா விருப்பப்பாடம்- III	UTAE501	சித்த மருத்துவம்	4	2	2

சார்பு விருப்பப்பாடம் (பிறதுறை மாணவியர்க்கு மட்டும்)

பருவம்	பிரிவு	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	வாரம் மணி நேரம்	தரம்	
						Min	**Max**
V	III	சார்பு விருப்பப்பாடம்- I	UTAA506 UTAA507 **UTAA508**	மொழிபெயர்ப்புக்கலை அற இலக்கியங்கள் **செவ்வியல் நூல்கள்**	**5**	**4**	**4**

UTAM505 இதழியல்

பருவம் : ஐந்தாம் பருவம் **தரம் : 04**
பிரிவு : முதன்மைப்பாடம் -XVIII **மணிநேரம்/வாரம் : 05**
வகுப்பு : III B.A. தமிழ் **மொத்த மணிநேரம் : 65**

நோக்கம்:

மாணவியர்

- இதழ்களைப்பற்றிய தகவல்களை அறிந்துகொள்ளல்.
- இதழ்களுக்குப் படைப்புகளை அனுப்புவதற்கான முறைகளைக் கண்டறிதல்.
- இதழாசிரியராக உருவாகுவதற்குரிய திறனை வளர்த்துக்கொள்ளுதல்.

அலகு - I இதழியல் **12 மணிகள்**

இதழியல் விளக்கம் - இதழ்களின் வகைகள், இதழ்கள் சுதந்திரம் - நடத்தை அறக்கோட்பாடுகள் - இதழியல் தொழில் வாய்ப்புகள்.

அலகு - II இதழியல் வளர்ச்சி நிலைகள் **14 மணிகள்**

இதழியல் வளர்ச்சி வரலாறு - தமிழகத்தில் இதழியல் வளர்ச்சி - பத்திரிகைச் சட்டங்கள் - பத்திரிகை மன்றம் - இதழ்கள் தொடங்குவதற்குரிய வழிமுறை - செய்தித்தாள் நிர்வாக அமைப்பு.

அலகு - III செய்திகள் **15 மணிகள்**

செய்தியாளர் - செய்தி - செய்தியின் உள்ளடக்கங்கள் - செய்தித்திரட்டுதல் - இந்திய நாட்டில் இதழியல் உரிமைகள் - சட்டம் - செய்தித்தணிக்கை, இந்திய இதழியல் வரலாறும் போக்குகளும், ஓர் இதழைக் தொடங்கி நடத்தும் முறை, மாணவர்கள் இதழ்கள் தயாரித்தல் பயிற்சி.

அலகு - IV விளம்பரம் **12 மணிகள்**

விளம்பரக் கலையின் தோற்றமும் வளர்ச்சியும் - வகைகள்.

அலகு - V இதழ்கள் **12 மணிகள்**

சிற்றிதழ்கள் - இன்றைய நாளிதழ்கள், பருவ இதழ்கள், ஆய்விதழ்கள்.

பாடநூல்கள்

- குருசாமி.மா. பா., *இதழியல் கலை*, ஆதித்தனார் கல்லூரி, திருச்செந்தூர், 2005.
- இராசா, கி, *மக்கள் தகவல் தொடர்பியல்,* பாவை பப்ளிகேஷன்ஸ், சென்னை,2010.

பார்வை நூல்கள்

- சுரேஷ்பால், *மீடியா உலகம்*, தீபிகா பதிப்பகம், சென்னை, 2012.
- செல்வம்.கோ, *உங்கள் வானொலி*, புவனம் பதிப்பகம், சென்னை,2010.

UTAM506 சமய இலக்கியம்

பருவம் : ஐந்தாம் பருவம் **தரம் : 05**
பிரிவு : முதன்மைப்பாடம் - XVII **மணிநேரம்/வாரம் : 05**
வகுப்பு : III B.A. தமிழ் **மொத்த மணிநேரம் : 65**

நோக்கம்:

மாணவியர்

- சமய இலக்கியங்களின் வழி சமயக்கருத்துக்களை அறிதல்.
- சமய இலக்கிய நெறிகளை உணர்தல்

- இறை வழிபாட்டின் வழி மனிதத்தை உணர வைத்தல்.

அலகு - I சைவ இலக்கியங்கள் 13 மணிகள்

திருஞானசம்பந்தர் தேவாரம் (இடர்களையும் பதிகம் - மறையுடையார் எனத் தொடங்கும் பாடல்) - திருநாவுக்கரசர் தேவாரம் (நமச்சிவாய திருப்பதிகம் - சொற்றுணை வேதியன்) - மாணிக்கவாசகர் திருவாசகம் (நீத்தல் விண்ணப்பம் முதல் பத்து பாடல்கள்) - சுந்தரர் (மற்றுப்பற்றெனக்கின்றி எனத்தொடங்கும் பத்து பாடல்கள்).

அலகு - II வைணவ இலக்கியங்கள் 13 மணிகள்

குலசேகராழ்வார் (திருமலை தொடர்பு வேண்டல் - ஊனேறு சங்கத்து உடற்பிறவி என்று தொடங்கும் முதல் பத்து பாடல்கள்) - பெரியாழ்வார் திருப்பல்லாண்டு ஆண்டாள் திருமொழி (முதல் பத்து பாடல்கள்) - தொண்டரடிப் பொடியாழ்வார் திருப்பள்ளி எழுச்சி (முதல் பத்துப் பாடல்கள்).

அலகு - III சித்தர் இலக்கியங்கள் 13 மணிகள்

திருமூலரின் திருமந்திரம் (யாக்கை நிலையாமை முதல் பத்து பாடல்கள்) - சிவவாக்கியர் - ஈணெருமை எனத் தொடங்கும் பாடல் (151- 160 பாடல்கள்) - பட்டினத்தார் பாடல்கள் நெஞ்சொடு புலம்பல் முதல் பத்து பாடல்கள்.

அலகு - IV சமண, பௌத்த இலக்கியங்கள் 13 மணிகள்

சிறுபஞ்சமூலம் பொருளுடையான் எனத் தொடங்கும் பாடல்கள் (முதல் பத்துப் பாடல்கள்) - நாலடியார் - கல்வி (131 - 140 பாடல்கள்) - ஆசியஜோதி முழுவதும்.

அலகு - V கிறித்துவ, இசுலாமிய இலக்கியங்கள் 13 மணிகள்

தேம்பாவணி - ஐயம் நீங்கு படலம் (முதல் பத்துப்பாடல்கள்) - சீறாப்புராணம் - மழைப்பிழத்த படலம் (முதல் 20 பாடல்கள்).

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- நாராயணசாமி.க,*சித்தர்தத்துவம்*,தமிழ்ப்புத்தகாலயம்,திருவல்லிக்கேணி, சென்னை,2010

UTAM508 பெண்ணியம்

பருவம் : ஐந்தாம் பருவம் **தரம் : 06**
பிரிவு : முதன்மைப்பாடம் - XIX **மணிநேரம்/வாரம் : 06**
வகுப்பு : III B.A. தமிழ் **மொத்த மணிநேரம் : 78**

நோக்கம்:
மாணவியர்

- பெண்ணிய வரலாற்றினை அறிதல்.
- பெண்ணியப் படைப்பாளர்களை தெரிந்துகொள்ளல்.
- பெண்ணியப் படைப்புக்களை உருவாக்குதல்.

அலகு - I பெண்ணியம் தோற்றமும் வளர்ச்சியும் 15 மணிகள்

பெண்ணியம் - விளக்கம் - தோற்றம், வளர்ச்சி நிலைகள் - மேலைநாடுகளில் பெண்ணியம் - இந்தியாவில் பெண்ணியத்தின் தோற்றம், வளர்ச்சி நிலைகள் - இந்திய பெண்ணியத்தின் சிறப்புத்தன்மைகள் - பெண்ணியக் கோட்பாடுகள் - பெண்ணடிமைத்தனத்திற்கான காரணங்கள் - பெண்கள் முன்னேற்றத்திற்கான வழிகள்.

அலகு - II பெண்ணியக் கவிதைகள் **16 மணிகள்**

மாலதி மைத்ரி - நீரின்றி அமையாது உலகு, வெண்ணிலா - ஆதியில் சொற்கள் இருந்தன, குட்டி ரேவதி - பூனையைப்போல் அலையும் வெளிச்சம், சல்மா - பச்சை தேவதை.

அலகு - III பெண்ணிய சிறுகதைகள் **16 மணிகள்**

அம்பை - காட்டில் ஒரு மான் (முழுவதும்)

அலகு - IV பெண்ணிய நாவல்கள் **16 மணிகள்**

இமயம் - செடல் (முழுவதும்)

அலகு - V பெண்ணிய திறனாய்வு கட்டுரைகள் **15 மணிகள்**

பெண்ணின் ஆளுமையில் முடிவு எடுக்கும் திறன், நான் ஒண்ணும் நளாயினி இல்லை, தாய் உரிமை ஆட்சியும், வீழ்ச்சியும், சங்கப் பெண்பாற் புலவர்களும் பெண் அடையாளப் பதிவுகளும், பெண்மொழியும் பெண் வாசிப்பும்.

பாட நூல்கள்

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பார்வை நூல்கள்

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UTAA506 மொழிபெயர்ப்புக்கலை

பருவம் : ஐந்தாம் பருவம் **தரம் : 04**
பிரிவு : சார்பு விருப்பப் பாடம் - I **மணிநேரம்/வாரம் : 05**
வகுப்பு : பிற துறை மாணவியர்கள் **மொத்த மணிநேரம் : 65**

நோக்கம்:

மாணவியர்

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

அலகு - I மொழியின் பயன்பாடு **12 மணிகள்**

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

அலகு - II மொழிபெயர்ப்பு வகைகள் **14 மணிகள்**

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

அலகு - III மொழிபெயர்ப்பு உத்திமுறைகள் 15 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 ஒலிபெயர்ப்பு வகைகள் 12 மணிகள்

ஒலிபெயர்ப்பு - என்றால் என்ன? ஒலிபெயர்ப்பின் வகைகள் - ஒலிபெயர்ப்பின் இன்றியமையாமை - ஒலிக்குறியீடு - மொழிபெயர்ப்பும் ஒலிபெயர்ப்பும் - ஒலிபெயர்ப்பில் ஒருமைத் தன்மை - இக்காலத்தில் கையாளாப்டும் ஒலிபெயர்ப்பு முறைகள்.

அலகு - V பயிற்சி 12 மணிகள்

கட்டுரை - சிறுபத்தி - விளம்பரம் - மரபுத்தொடர்கள் - பழமொழிகள் முதலானவற்றை மொழிபெயர்க்கச் செய்தல்.

பாடநூல்கள்

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பார்வை நூல்கள்

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UTAA507 அற இலக்கியங்கள்

பருவம் : ஐந்தாம் பருவம் **தரம் : 04**
பிரிவு : சார்பு விருப்பப் பாடம் - I **மணிநேரம்/வாரம் : 05**
வகுப்பு : பிற துறை மாணவியர்கள் **மொத்த மணிநேரம் : 65**

நோக்கம்:

மாணவியர்

- அற இலக்கியங்களை அறிந்துகொள்ளல்.
- அற இலக்கியங்களை பிற மொழி இலக்கியத்தோடு ஒப்பிடுதல்
- அற இலக்கியங்களின் வாயிலாக மாணவர்களை நல்வழிப்படுத்தல்.

அலகு – I திருக்குறள் 12 மணிகள்

திருக்குறள் - அறம், பொருள் : 60 குறள்கள்.

இல்வாழ்க்கை, விருந்தோம்பல், கல்வி, நட்பு ஆராய்தல், ஆள்வினை உடைமை, வினைத்திட்பம்.

அலகு - II அறவுரை நூல்கள் 12 மணிகள்

பழமொழி – 10 பாடல்கள்

(1. அறிதவித்து… 2. ஆற்றும் 3.சொற்றொறும் 4. விளக்கு 5. ஆற்றவும் 6. உணற்(கு) 7. உரைமுடிவு காணான் 8. புலமிக்கவரை 9. நல்லார் நலத்தை 10. கற்று அறிந்தார்.)

நாலடியார் - 10 பாடல்கள் செல்வம் நிலையாமை (1-5 பாடல்கள்), ஈகை (1-5 பாடல்கள்)

அலகு - III அறவுரை நூல்கள் 13 மணிகள்

முதுமொழிக்காஞ்சி (1-10 பாடல்கள்), இன்னா நாற்பது (1-10 பாடல்கள்)

அலகு - IV மருந்து நூல்கள் 13 மணிகள்

சிறுபஞ்சமூலம் (1-10 பாடல்கள்) , ஏலாதி (1-10 பாடல்கள்), திரிகடுகம் (1-10 பாடல்கள்).

அலகு - V பிற்கால நீதி நூல்கள் 15 மணிகள்

நல்வழி - (1முதல் 20 வரை உள்ள பாடல்கள்), வெற்றி வேற்கை - (1முதல் 20 வரை உள்ள பாடல்கள்).

பாடநூல்கள்

- அறவாணன்.க.ப, *திருக்குறள், நாலடியார், பழமொழி நானூறு, திரிகடுகம். இன்னா நாற்பது, முதுமொழிக்காஞ்சி, சிறுபஞ்சமூலம், ஏலாதி,* தமிழ்க் கோட்டம், சென்னை, 2010.
- *வெற்றி வேற்கை, நல்வழி,* அரசு(தொ.ஆ) கங்கை புத்தக நிலையம். சென்னை,2011.

பார்வை நூல்கள்

- அறவாணன். க.ப *அற இலக்கியக் களஞ்சியம்*, தமிழ்க்கோட்டம், சென்னை, 2010.
- தனிநாயக அடிகள், *திருவள்ளுவர்*, அண்ணாமலைப் பல்கலைக்கழகம், 2011.

UTAA508 செவ்வியல் நூல்கள்

பருவம் : ஐந்தாம் பருவம் **தரம் : 04**
பிரிவு : சார்பு விருப்பப் பாடம் - I **மணிநேரம்/வாரம் : 05**
வகுப்பு : பிறதுறை மாணவியர்கள் **மொத்த மணிநேரம் : 65**

நோக்கம்:
மாணவியர்

- செவ்வியல் நூல்களின் வரலாற்றினை அறிதல்.
- செவ்வியல் படைப்பாளர்களைத் தெரிந்துக்கொள்ளல்.
- செவ்வியல் படைப்புகளை பிற மொழி இலக்கியத்தோடு ஒப்பிட்டு பார்த்தல்.

அலகு - I செம்மொழியின் வரலாறு 14 மணிகள்

தமிழ் மொழியின் தொன்மை - சிறப்புக்கள் - மொழிக்குடும்பங்கள் - திராவிட மொழிகள் - திராவிட மொழிகளின் வகைகள் - உலகச் செம்மொழிகள் வரலாறு (கிரேக்கம், இலத்தின், தமிழ், ஈபுரு, அரேபியம், சீனம், சமஸ்கிருதம்).

அலகு - II தமிழ் இலக்கண நூல்கள் 12 மணிகள்

தமிழ் இலக்கண வரலாறு - எழுத்து - எண்கள் - ஐந்திலக்கணம் - மறைந்து போன, வழக்கில் உள்ள தமிழ் இலக்கண நூல்கள்.

அலகு - III தமிழ் இலக்கிய நூல்கள் 12 மணிகள்

எட்டுத்தொகை - பத்துப்பாட்டு - பதினெண்கீழ்க்கணக்கு நூல்கள் - இறையனார்களவியல் - சிலப்பதிகாரம் - மணிமேகலை - முத்தொள்ளாயிரம்.

அலகு - IV செவ்வியல் மொழி **14 மணிகள்**

உலகச் செம்மொழி இலக்கியப் பாடுபொருள்கள் - கிரேக்கம், இலத்தின் (கையறுநிலை, காதல், வீரம், இசைப்பாடல்) - தமிழ் (அகம், புறம், அறநெறிகள், தத்துவம்) - சமஸ்கிருதம் (இயற்கை, வழிபாடு, பக்தி, நீதி).

அலகு - V ஒப்பீட்டு நோக்கில் உலகச் செம்மொழிகள் **13 மணிகள்**

வாய்மொழி மரபு, பாணர் மரபு, வீரயுகப் பண்புகள், கையறுநிலை (கிரேக்கம், தமிழ் - இலத்தீன் - ஒப்பீடு) - தொல்காப்பியப் பொருளதிகாரமும் அரிஸ்டாலின் கவிதையியலும் (தமிழ் - கிரேக்கம் - ஒப்பீடு) - கதை மரபுகள் - இதிகாசம், காப்பியம், (ஹோமரின் இலியட், ஒடிசி, சிலப்பதிகாரம், மணிமேகலை) (தமிழ், சமஸ்கிருதம், கிரேக்கம்).

பாட நூல்கள்

- பாலசுப்பிரமணியம்,கு.வே, *தமிழ் செம்மொழி,* காவ்யா பதிப்பகம், சென்னை, 2013.
- இளங்குமரனார், *தமிழ் இலக்கண வரலாறு*, மணிவாசகர் பதிப்பகம், சென்னை, 2011.

பார்வை நூல்கள்

- கைலாசபதி.க, *தமிழ் வீரயுகப் பாடல்கள்*, குமரன் பதிப்பகம், சென்னை, 2010.
- தமிழ்ப் பல்கலைக்கழக *வாழ்வியல் களஞ்சிய கட்டுரைகள்* தொகுதி 4,7,8,9.
- மு.வ. *மொழி வரலாறு*, பாரி நிலையம், சென்னை, 2012.

UTAM603 இலக்கியத் திறனாய்வியல்

பருவம் : ஆறாம் பருவம் **தரம் : 04**
பிரிவு : முதன்மைப்பாடம் -XX **மணிநேரம்/வாரம் : 04**
வகுப்பு : III B.A. தமிழ் **மொத்த மணிநேரம் : 52**

நோக்கம்:

மாணவியர்

- இலக்கியங்களைத் திறனாய்வின் அடிப்படையில் அறிந்து கொள்ளுதல்
- சமூகவியல் நோக்கில் இலக்கியத்தை ஒப்பு நோக்குதல்.
- திறனாய்வுக்கோட்பாடுகளை வளர்த்துக்கொள்ளல்.

அலகு - I திறனாய்வு அறிமுகம் **13 மணிகள்**

இலக்கியத் திறனாய்வு - தரமான திறனாய்வாளர் - திறனாய்வு வகைகள் - திறனாய்வால் ஏற்படும் சிக்கல்கள் - உரையாசிரியர்கள் திறனாய்வார்கள்.

அலகு - II இலக்கியப்பாகுபாடுகள் **12 மணிகள்**

இலக்கியமும் வாழ்க்கையும் - இலக்கியப்பாகுபாடுகள் - இலக்கிய உணர்ச்சி - கற்பனை - இலக்கியத்தில் கருத்து - உண்மையியல் - குறிக்கோள்நிலை - நடை - இலக்கியத்தில் இயற்கை.

அலகு - III கவிதை **15 மணிகள்**

கவிதையின் விளக்கம் - கவிதையின் கூறுகள் - தொடைகள் - கவிதையும் யாப்பு வடிவமும் - சொல்லாட்சி - அணிகள் - உள்ளுறை உவமம் - கவிதை வகைகள் - புதுக்கவிதை விளக்கம் - புதுக்கவிதை போக்குகள் - புதுக்கவிதைக்குரிய பொருள்.

அலகு - IV நாவல் **15 மணிகள்**

நாவல் விளக்கம் - நாவலுக்குரிய கதையும், கதைகோப்பும், கதைக்குரிய பொருள் - கதைமாந்தர் - உரையாடல் - கதையமைப்பு - சிறுகதை விளக்கம் - சிறுகதையின் அமைப்பு - புதினம், சிறுகதை வேறுபாடுகள்.

அலகு - V நாடகம் **10 மணிகள்**

நாடகம் விளக்கம் - நாடகத்தின் கதைக்கோப்பு பாத்திரங்கள் - நாடக அமைப்புகளும் அவற்றின் இயல்புகளும் - காட்சிகள் அமைப்பு - நாடகத்திற்குரிய இடமும், காலமும் - நாடகத்திற்கும் புதினத்திற்கும் உள்ள வேறுபாடுகள்.

பாடநூல்கள்

- பாலச்சந்திரன்.சு , *இலக்கியத் திறனாய்வு*, நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை,2011.

பார்வை நூல்கள்

- ஞானசம்பந்தன்.அ.ச, *இலக்கியக் கலை*, சைவசித்தாந்தம், சென்னை, 2010
- ஞானமூர்த்தி.தா.ஏ, *இலக்கியத் திறனாய்வியல்*, ஐந்திணைப் பதிப்பகம், சென்னை,2011.

UTAM604 சொற்பொழிவுக்கலை

பருவம் : ஆறாம் பருவம் **தரம் : 04**
பிரிவு : முதன்மைப்பாடம் -XXI **மணிநேரம்/வாரம் : 04**
வகுப்பு : III B.A. தமிழ் **மொத்த மணிநேரம் : 52**

நோக்கம்:

மாணவியர்

- பேச்சாளராக மாணவர்களைத் தகுதி பெறச் செய்தல்.
- தன்னம்பிக்கையுடன் நேர்காணல் எதிர்கொள்வதற்குப் பயிற்சி அளித்தல்.
- பேச்சாளர்க்குரிய தகுதிகளை வளர்த்துக் கொண்டு சிறந்த பேச்சாளர் ஆகுதல்.

அலகு - I பேச்சாளர்குரிய தகுதிகள் **12 மணிகள்**

பேச்சாளன் தகுதிகள் - முன்னோடிகள் - இலக்கிய அடிப்படை – அனுபவம் - தனித்தன்மை - முயற்சிகள்.

அலகு - II பல்வகை உரைகள் **13 மணிகள்**

பல்வகை உரைகள்- நாட்டுப்புறவியல் - செய்திகள் - மன்றங்கள் - இலக்கியநடை - அவையறிதல் - வருணனைகள் - இணைப்புரைகள்

அலகு - III பேச்சுகளின் வகைகள் **15 மணிகள்**

சிந்தனை பேச்சு - நன்மைகள் - சிலேடைகள் - நெகிழ்வுப்பேச்சு ஆற்றல்கள் சங்கங்கள்.

அலகு - IV பயிற்சி அளித்தல் **15 மணிகள்**

பயிற்சி அளித்தல் - பேச்சுப்பயிலரங்கங்கள் - மொழிபெயர்ப்பு பயிற்சி அளித்தல்

அலகு - V பயிற்சி அளித்தல் **10 மணிகள்**

கலந்துரையாடல் - நேர்காணல் - பேச்சுக்கலையில் கடைபிடிக்க வேண்டியவை

பாடநூல்கள்

- ஞானசம்பந்தன். கு , *பேசும் கலை*, நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை,2011.

பார்வை நூல்கள்

- பரமனாந்தம்.அ.மு பேச்சாளராக, வானதி பதிப்பகம் சென்னை,2010

- குமரி ஆனந்தன். *நீங்களும் பேச்சாளராகலாம்,* பாவை பதிப்பகம், சென்னை,2011.

UTAM606 நாட்டுப்புறவியல்

பருவம் : ஆறாம் பருவம் **தரம் : 04**
பிரிவு : முதன்மைப்பாடம் -XXII **மணிநேரம்/வாரம் : 04**
வகுப்பு : III B.A. தமிழ் **மொத்த மணிநேரம் : 52**

நோக்கம்:

மாணவியர்

- நாட்டுப்புறக்கலைகள் வாயிலாக பண்பாட்டுனை அறிந்து கொள்ளல்.
- நாட்டுப்புறப் பாடல்களை தொகுப்பதற்கு பயிற்சி பெற்று தொகுத்து வெளியிடுதல்.
- நாட்டுப்புறத் துறையில் வேலை வாய்ப்பு பெறுதல்.

அலகு - I நாட்டுப்புறவியல் அறிமுகம் **10 மணிகள்**

நாட்டுப்புறவியல் அறிமுகம் - நாட்டுப்புறவியல் பாடல்கள் - பாடல் வகைகள் - கதைகள் - கதைகள் வகைப்பாடு.

அலகு - II கதைப்பாடல்கள் **10 மணிகள்**

நாட்டுப்புறக் கதைப்பாடல்கள் - கதைப்பாடல் நம்பிக்கைகளும் பழக்க வழக்கங்களும் - பழமொழிகள் - விடுகதைகள்.

அலகு - III நிகழ்த்துக்கலைகள் **10 மணிகள்**

புராணக் கதைகள் - கலைகள் - கைவினைப் பொருட்கள் - ஆடல் வகைகள் - கூத்துவகைகள் - நம்பிக்கைகள் - நம்பிக்கைகளின் வகைகள் - நாட்டுப்புற சகுனங்கள்.

அலகு - IV விழாக்கள் **10 மணிகள்**

நாட்டுப்புற தெய்வங்கள் - நாட்டுப்புற திருவிழாக்கள்.

அலகு - V விளையாட்டுக்கள் **12 மணிகள்**

நாட்டுப்புற விளையாட்டுக்கள் - நாட்டுப்புற மருத்துவம் - மருத்துவ நம்பிக்கைகள்.

பாடநூல்கள்

- சு. சக்திவேல், நாட்டுப்புற இயல் ஆய்வு, மணிவாசகர் பதிப்பகம்,பாரிமுனை, சென்னை 2010.

(சு. சக்திவேல், நாட்டுப்புற இயல் ஆய்வு, பாட புத்தகத்தில் 1-13 பாடங்கள் மட்டுமே பாடப்பகுதிகளாக சேர்க்கப்பட்டுள்ளன)

பார்வை நூல்கள்

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UTAM607 தண்டியலங்காரம்

பருவம் : ஆறாம் பருவம் **தரம் : 05**
பிரிவு : முதன்மைப்பாடம் -XXIII **மணிநேரம்/வாரம் : 05**

வகுப்பு : III B.A. தமிழ் **மொத்த மணிநேரம் : 65**

நோக்கம்:

மாணவியர்

- இலக்கிய அணி நயங்களைப் பற்றிய அறிவைப் பெறச் செய்தல்.
- இலக்கியங்களை இலக்கணப் பார்வையோடு அடையாளம் காணச் செய்தல்.
- அணி இலக்கணங்களை அறிந்து கொண்டு செய்யுள்களில் பொருத்தி பார்த்தல்.

அலகு - I அணியின் தோற்றம் **13 மணிகள்**

அணி விளக்கம் - தண்டியலங்காரம் - அறிமுகம் - தன்மை - வகைகள் - உவமை வகைகள் - உருவகம் வகைகள்.

அலகு - II அணி வகைகள் **10 மணிகள்**

தீவகம் - வகைகள் -வேற்றுப்பொருள் வைப்பு அணி - வகைகள் - முன்னவிலக்கு - வகைகள் - வேற்றுமை

அலகு - III அணி வகைகள் **10 மணிகள்**

ஏது - வகைகள் - அதிசய அணி - வகைகள் - ஒட்டணி - நுட்பம் - நிரல்நிரையணி.

அலகு - IV அணி வகைகள் **20 மணிகள்**

பரியாணி அணி - அவநுதி - வகைகள் - சிலேடை - வகைகள் - மாறுபடு புகழ் நிலையணி - நிதர்சன அணி

அலகு - V அணி வகைகள் **12 மணிகள்**

பரிவர்த்தனன - வாழ்த்தணி - சீங்கீரணவணி - பாவிக அணி.

பாடநூல்கள்

- தண்டியலங்காரம், கழக வெளியீடு, சென்னை, 1956.
  (வரையறுக்கப்பட்ட அணிகள் மட்டும் பாடப்பகுதிகளாகச் சேர்க்கப்பட்டுள்ளன.)

பார்வை நூல்கள்

- தண்டியலங்காரம், முல்லை நிலையம், தியாகராய நகர், சென்னை,2010.

UTAM609 சங்க இலக்கியம்

பருவம் : ஆறாம் பருவம் **தரம் : 05**
பிரிவு : முதன்மைப்பாடம் - XXIV **மணிநேரம்/வாரம் : 04**
வகுப்பு : III B.A. தமிழ் **மொத்த மணிநேரம் : 65**

நோக்கம்:
மாணவியர்

- சங்க கால மக்களின் வாழ்க்கை முறைகளை அறிந்து கொள்ளுதல்.
- பழந்தமிழ் இலக்கியங்களைத் தெரிந்து கொள்ளல்.
- இலக்கிய மரபுகளைப் பின்பற்றுதல்.

அலகு - I அகஇலக்கியம் (தொகை) **14மணிகள்**

நற்றிணை - (10, 14, 32, 46, 59) - குறுந்தொகை - (3, 15, 20, 40, 43) - கலித்தொகை - முல்லைக்கலி (முதல் 5 பாடல்கள்) - அகநானூறு - (15, 20, 36, 74, 82).

அலகு - II அகஇலக்கியம் (பாட்டு) **14மணிகள்**

பட்டினப்பாலை (முழுவதும்).

அலகு - III புறஇலக்கியம் (தொகை) **12மணிகள்**

புறநானூறு - (73, 74, 183, 188, 214) - பதிற்றுப்பத்து - பரணர் - சேரன் செங்குட்டுவன் (5-ம் பத்து) முதல் 10 பாடல்கள்.

அலகு - IV புறஇலக்கியம் (பாட்டு) **12மணிகள்**

சிறுபாணாற்றுப்படை (முழுவதும்)

அலகு - V அகப்புற இலக்கியம் **13மணிகள்**

பரிபாடல் - திருமால் (15-ம் பாடல்), செவ்வேள் (5-ம் பாடல்), வையை (7-ம் பாடல்).

பாட நூல்கள்

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பார்வை நூல்கள்

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UTAM610 ஊடகத்தமிழ்

பருவம் : ஆறாம் பருவம் **தரம் : 03**
பிரிவு : முதன்மைப்பாடம் - XXV **மணிநேரம்/வாரம் : 04**
வகுப்பு : III B.A. தமிழ் **மொத்த மணிநேரம் : 52**

நோக்கம்:
மாணவியர்

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

அலகு - I ஊடகத்தின் தோற்றமும் வளர்ச்சியும் **10 மணிகள்**

அச்சுக் கலையின் வளர்ச்சி – தமிழ் இதழ்களின் வளர்ச்சி - இதழ் வகைகள் - இயக்க இதழ்கள் - இக்கால இதழ்களின் போக்குகள் - இழிநிலை இதழ்கள் - இதழியல் நெறிமுறைகள்.

அலகு - II அச்சு ஊடகங்கள் **10 மணிகள்**

செய்தித்தாள் - செய்தி வரையறை - செய்திகளின் வகைகள் - செய்தி சேகரித்தலும் செம்மையாக்கமும் - செய்தி நிறுவனங்கள் - இதழ்கள் - இதழியலின் தோற்றம் வளர்ச்சி - இதழியலின் பிற துறைகள் - இதழியலின் கூறுகள் - பருவ, வார, மாத இதழ்கள்

அலகு - III வானொலி **10 மணிகள்**

வானொலியின் வரலாறு - வளர்ச்சி - நிலைய அமைப்பு - தயாரிப்புப் பணிகள் - பல்வேறு வகை ஒலிபரப்புகள் - பண்பலை ஒலிபரப்புகள் - பிறநாட்டுத் தமிழ் வானொலி ஒலிபரப்புக்கள்.

அலகு - IV தொலைக்காட்சி **10 மணிகள்**

தொலைக்காட்சி வரலாறு - நிலைய அமைப்பு - நிலைய அமைப்பு - தயாரிப்புப் பணிகள் - பல்வேறு வகை ஒலிபரப்புகள் - தனியார் தொலைக்காட்சிகள் - தொலைக்காட்சியால் உளவியல் பாதிப்பு.

அலகு - V தமிழ்த் திரைப்பட வரலாறு **12 மணிகள்**

திரைப்படங்கள் - அறிமுகம் - இந்திய திரைப்பட வரலாறு - திரைப்படக்கலை - கதை எடுத்துரைத்தல்(திரைக்கதை) - உரையாடல் அமைத்தல் - திரைப்படமொழி - படத்தொகுப்பு - காட்சி அமைப்பு - திரைப்படங்களும் அழகியலும் - திரைப்பட வகைகள் - குறும்படங்கள் - விளம்பரப் படங்கள் - திரைப்படப் படங்களால் ஏற்படும் சமுதாயத் தாக்கம்.

பாட நூல்கள்

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பார்வை நூல்கள்

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- சமத்துவன்.பவா, *தொலைக்காட்சி உலகம்*, புதுயுகம் செய்முறை செம்மையாக்கம், சென்னை, 2011.

UTAR601 பயிற்சி பட்டறை – III

பருவம் : ஆறாம்பருவம் **தரம் : 01**
பிரிவு : முதன்மைப்பாடம் -XXVI **மணிநேரம்/வாரம் : 02**
வகுப்பு : III B.A தமிழ் **மொத்த மணிநேரம் : 26**

நோக்கம்:
மாணவியர்

- மாணவியர் படைப்புத்திறனைப் பெறுதல்.
- மேடைபேச்சாளராக தன்னை தயார் செய்து கொள்ளல்
- ஆளுமைத்திறனை வளர்த்து சமூகத்தில் தன்னை நிலைநிறுத்திக் கொள்ளல்.

அலகு - I பேச்சாற்றல் **5 மணிகள்**

குரல் வளம் - உச்சரிப்பு - மொழிநடை - குரலில் ஏற்ற இறக்கம் - பிழையின்றி பேசுதல் - பேச்சாளனும் வாசிப்பும் - பிறமொழிச்சொற்களை தவிர்த்தல் - பயிற்சி அளித்தல்.

அலகு - II பட்டிமன்றமும் வழக்காடு மன்றமும் **4 மணிகள்**

கருத்தை வெளிப்படுத்தும் திறன் - சமூகம் பற்றிய தெளிவு - உரையாடல் - துணிவுடன் எடுத்துரைத்தல் - எதிர்மறுத்துரைத்தல்.

அலகு - III நேர்முக வருணணை **6 மணிகள்**

கோயில் திருவிழா, கலை பண்பாட்டு விழா, விளையாட்டு விழா ஆகியன பற்றிய நேர்முக வருணணைகளை வானொலி, தொலைக்காட்சிக்கு எழுதுவதற்கு பயிற்சி அளித்தல்.

அலகு - IV ஒரங்க நாடகம் **5 மணிகள்**

வானொலி அல்லது தொலைக்காட்சி அல்லது திரைப்பத்திற்கு வழங்கப்படும் சூழலைக்கொண்டு ஒரங்க நாடகம் எழுத பயிற்சி அளித்தல்.

அலகு - V நடிப்புத்திறன் **6 மணிகள்**

மொழிப்புலமை - துறைசார் தெளிவு - உச்சரிப்பு - உணர்ச்சி வெளிப்பாடு - இலக்கிய புலமை - சொற்தேர்வு - செந்தமிழ்நடையில் பேசுதல்.

பாட நூல்கள்

- ஞானசம்பந்தன்.கு, *பேசும் கலை*, நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை,2011.
- இராமலிங்கம்.மா, *புதிய உரை நடை*, தமிழ்ப் புத்தகாலயம், சென்னை,2010.
- பரந்தாமனார்.அ.கி., நல்ல தமிழ் எழுத வேண்டுமா, பாரிநிலையம், சென்னை,2010.

UTAS501 பதிப்பியல்

பருவம் : ஐந்தாம் பருவம் **தரம் : 01**
பிரிவு : தன் விருப்பப்பாடம் **மணிநேரம்/வாரம் : 02**
வகுப்பு : III B.A. தமிழ் **மொத்த மணிநேரம் : 26**

நோக்கம் :

மாணவியர்

- நவீன பதிப்பு முறையின் மூலம் வரலாற்றினை அறிதல்.
- கணினி பதிப்பு பற்றிய பயிற்சி பெறுதல்.
- பதிப்பு துறையின் வாயிலாக வேலைவாய்ப்பு பெறல்.

அலகு - I தமிழ்மொழி எழுத்தியல் வரலாறு **9 மணிகள்**

தமிழ் வரிவடிவம் - வட பிராமி - தென் பிராமி உறவு, இந்திய, தென்னிந்திய வரிவடிவ மரபு - ஓவியங்களும் எழுத்தும், வட்டெழுத்து, கோல் எழுத்து, தமிழ் எழுத்து, கிரந்த எழுத்து, எழுத்துச் சீர்திருத்தம்.

அலகு - II கணினி பதிப்பு **9 மணிகள்**

கணினியில் தமிழ் எழுத்துரு வரலாறு - பல்வெறு நிறுவனங்களின் மென்பொருளில் தமிழ் எழுத்துரு - பதிப்பகம் - தனிமனிதர் தமிழ்ப் பதிப்புகளுக்குக் கணினியின் பங்கு -

கணினி பதிப்புகள் - பல் ஊடகப் பதிப்புகள் - இதழ், நூல் இலக்கியம், அறிவியல் உரை, அறிக்கை, அரசாணை முதலான நவீன உள்ளடக்க மொழிப் பதிவு முறைகள்.

அலகு - III காட்சி, ஒலிப் பதிவுகள் **8 மணிகள்**

தமிழ் இன, சமூக, பண்பாட்டு, அரசியல் நிகழ்வுகளின் ஒலி, ஒளிப் பதிவுகள், அவற்றில் மொழிப் பதிவுகள் பங்கு, நாட்டுப்புறவியல், மானிடவியல், சமூகவியல் ஆய்வு மற்றும் ஆவணப்படுத்தும் முயற்சிகளில் ஒலி - ஒளிப் பதிவுகள்.

பாடநூல்கள்

- கோவேந்தன்.வே, *தமிழ் எழுத்தின் தோற்றமும் வளர்ச்சியும்*, வேமன் பதிப்பகம், சென்னை, 2005.

பார்வை நூல்கள்

- பரமசிவம்.கோ, *சுவடிப்பதிப்பு நெறிமுறைகள்*, தமிழ்ப்பல்கலைக்கழகம், தஞ்சாவூர், 2010.
- காசிநாதன்.நடன, *கல்லெழுத்துக் கலை,* மணிவாசகர் பதிப்பகம், சென்னை, 2009.

UTAS502 கல்வெட்டியல்

பருவம் : ஐந்தாம் பருவம் **தரம் : 01**
பிரிவு : தன் விருப்பப்பாடம் **மணிநேரம்/வாரம் : 02**
வகுப்பு : III B.A. தமிழ் **மொத்த மணிநேரம் : 26**

நோக்கம்:

மாணவியர்

- தமிழக தொல்லியல் வரலாற்றினை அறிந்து கொள்ளல்.
- கல்வெட்டு எழுத்துகளைப் பற்றி தெரிந்து கொள்ளல்.
- கல்வெட்டுத்துறையில் வேலை வாய்ப்பினை பெறுதல்.

அலகு - I கல்வெட்டின் வரலாறு **9 மணிகள்**

வரலாறு உருவாக்கத்தில் கல்வெட்டுகளின் பங்கு - கல்வெட்டுகள் எழுதும் முறை - இந்தியக் கல்வெட்டுகளில் காணும் மொழிகள் - கல்வெட்டுகளின் தன்மை.

அலகு - II கல்வெட்டுகளின் பொதுத் தன்மைகள் **9 மணிகள்**

அசோகர் கல்வெட்டுகள் - இந்தியக் கல்வெட்டாய்வின் வரலாறு - தமிழகக் கல்வெட்டுகளின் பொதுத்தன்மைகள் - தென்னிந்தியக் கல்வெட்டாய்வின் தோற்றமும் வளர்ச்சியும் - கல்வெட்டுகளின் காலக்கணிப்பு.

அலகு - III எழுத்துக்களின் தோற்றம் **8 மணிகள்**

எழுத்துக்களின் தோற்றம் - சிந்துவெளி எழுத்துக்கள் - பிராமி - தமிழ் பிராமி - வட்டெழுத்து - கிரந்த எழுத்து - தமிழ் எழுத்துக்கள்.

பாடநூல்கள்:

- ராஜன்,கா, *கல்வெட்டியல்*, மனோ பதிப்பகம், தஞ்சாவூர், 2010.

பார்வை நூல்கள்:

- சுப்புராயலு,எ, *தமிழ் கல்வெட்டியலும் வரலாறும்,* தமிழ்ப்பல்கலைக்கழகம், சென்னை, 2010.
- சுப்பிரமணியன்,தி, *பண்டைத் தமிழ் எழுத்துக்கள்,* உலகத் தமிழ் ஆராய்ச்சி நிறுவனம் சென்னை, 2011.

UTAS503 தகவல் தொடர்பியல்

பருவம் : ஐந்தாம் பருவம் **தரம் : 01**
பிரிவு : தன் விருப்பப்பாடம் **மணிநேரம்/வாரம் : 02**
வகுப்பு : III B.A. தமிழ் **மொத்த மணிநேரம் : 26**

நோக்கம் :

மாணவியர்

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

அலகு - I வானொலி **9 மணிகள்**

இந்தியாவில் ஒலிபரப்பின் வரலாறு - நிகழ்ச்சிகள் அமைக்கும் முறை - வானொலி நாடகங்கள் - பல்வகைச் சித்திரங்கள் - செய்திகள் - இதழ்கள் - வானொலி விளம்பரங்கள்.

அலகு - II தொலைக்காட்சி வரலாறு **9 மணிகள்**

இந்தியாவில் தொலைக்காட்சி தோற்றமும் வளர்ச்சியும் - செயற்கைக்கோள் தொலைக்காட்சி - அலைவரிசைகள் - நிகழ்ச்சித் தயாரிப்பு - நாடகம் - மெல்லிசை - நடனம் - கலந்துரையாடல் - செய்தி - நிகழ்ச்சித் தயாரிப்பு - சமுதாயத் தாக்கம் - தொலைக்காட்சி விளம்பரங்கள்.

அலகு - III திரைப்படங்கள் வரலாறு **8 மணிகள்**

திரைப்படங்கள் - அறிமுகம் - இந்தியத் திரைப்பட வரலாறு - திரைப்படக்கலை - கதை எடுத்துரைத்தல் (திரைக்கதை) - உரையாடல் அமைத்தல் - திரைப்பட மொழி - படத்தொகுப்பு - காட்சி அமைப்பு - திரைப்படங்களும் அழகியலும் - திரைப்பட வகைகள் - குறும்படங்கள் - விளம்பரப் படங்கள் - திரைப்படப் படங்களால் ஏற்படும் சமுதாயத் தாக்கம்.

பாடநூல்கள்:

- செல்வம்,கோ, *உங்கள் வானொலி*, புவனம் பதிப்பகம் சென்னை, 2010.
- நல்லதம்பி,வெ, *தொலைக்காட்சிக் கலை,* வள்ளுவன் வெளியீட்டகம், சென்னை,2013.

பார்வை நூல்கள்:

- அரந்தை நாராயணன், *தமிழ்ச் சினிமாவின் கதை*, நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை, 2010.
- சிவக்குமார்,ஆ, *சினிமாக் கோட்பாடு*, சவுத் ஏசியன் புக்ஸ், சென்னை, 2011.

அகமதிப்பீட்டிற்கான உட்கூறுகள்
இளங்கலைத்தமிழ்

பருவம்	பிரிவு	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	III உட்கூறுகள்	IV உட்கூறுகள்
V	III	முதன்மைப்பாடம்-XVII	**UTAM506**	**சமய இலக்கியம்**	**தகவல் அட்டவணை**	**தலவரலாறு சேகரித்தல்**
		முதன்மைப்பாடம்-XVIII	UTAM505	இதழியல்	தகவல் சேகரித்தல்	இதழ் தயாரித்தல்
		முதன்மைப்பாடம்-XIX	**UTAM508**	**பெண்ணியம்**	**கருத்தரங்கம்**	**நூல் மதிப்பீடு**
		சார்பு விருப்பப் பாடம்-I	UTAA506	மொழிப்பெயர்ப்புக்கலை	கடித மொழிபெயர்ப்பு	சிறுகதை மொழி பெயர்ப்பு
			UTAA507	அற இலக்கியங்கள்	ஒப்படைப்புத்தாள்	வினாடி வினா
			UTAA508	**செவ்வியல் நூல்கள்**	**ஒப்படைப்புத்தாள்**	**வினாடி வினா**
VI	III	முதன்மைப்பாடம்-XX	UTAM603	இலக்கியத் திறனாய்வியல்	ஒப்படைப்புத்தாள்	நூல் திறனாய்வு
		முதன்மைப்பாடம்- XXI	UTAM604	சொற்பொழிவுக்கலை	கருத்தரங்கம்	மேடைப்பேச்சு
		முதன்மைப்பாடம்-XXII	UTAM606	நாட்டுப்புறவியல்	வழக்காறுகளைச் சேகரித்தல்	கள ஆய்வு
		முதன்மைப்பாடம்-XXIII	UTAM607	தண்டியலங்காரம்	ஒப்படைப்புத்தாள்	வினாடி வினா
		முதன்மைப்பாடம்-XXIV	**UTAM609**	**சங்க இலக்கியம்**	**கருத்தங்கம்**	**நூல் மதிப்பீடு**

பயிற்சி பட்டறை

பருவம்	பிரிவு	வகை	பாடக் குறியீடு	பாடத்தலைப்பு	உட்கூறுகள்
VI	**XXVI**	**முதன்மைப்பாடம்**	**UTAR601**	**பயிற்சி பட்டறை**	1. குரல் வளம் 2. குரலில் ஏற்ற இறக்கம் 3. கருத்தை வெளிப்படுத்தும் திறன் 4. மொழிநடை 5. அவையறிதல் 6. உச்சரிப்பு 7. நேர்முக வருணணை 8. வசன நடை 9. ஓரங்க நாடகம் எழுதுதல் 10.மௌன நடிப்பு

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

DEPARTMENT OF ENGLISH

PREAMBLE

UG : Course Profile, list of courses offered to other departments & the syllabi of courses for fifth and sixth semesters along with evaluation components III&IV (with effect from 2015-18 batch onwards) are presented in the booklet.

COURSE PROFILE B.A. ENGLISH

Semester	Part	Category	Course Code	Course Title	Contact Hrs/Week	Credit	
						Min	Max
I	I	Language	UTAL105/ UTAL106	Basic Tamil I Advanced Tamil I French I/ Hindi 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	UENM106	Poetry	6	5	5
	III	Core III	UENM107	Prose	6	5	5
	III	Allied I	UENA103	Literary Terms and Forms	5	4	4
	IV	Value Education			2	1	1
Total					**30**	**21**	**23**
II	I	Language	UTAL205/ UTAL206/	Basic Tamil II Advanced Tamil II French II/ Hindi II/	4	2	3
	II	English	UENL207 / UENL208	General English II / Advanced English II	5	3	4
	III	Core IV	UENM205	Drama	5	5	5
	III	Core V	UENM206	Fiction	5	4	4
	III	Allied II	UENA203	Social History Of England	5	4	4
	IV	Non-Major Elective			4	2	2
	IV	Soft Skills			2	1	1
	V	Extension Activities			-	1	2
Total					**30**	**22**	**25**
III	I	Language	UTAL305/ UTAL306	Basic Tamil III Advanced Tamil III French III/ Hindi 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	5	4	4

	IV	Non-Major Elective			4	2	2
	IV	Value Education			2	1	1
Total					**30**	**22**	**24**
IV	I	Language	UTAL405/ UTAL406	Basic Tamil IV / Advanced Tamil IV French IV / Hindi IV/	4	2	3
	II	English	UENL407 / UENL408	General English IV Advanced English IV	5	3	4
	III	Core VIII	UENM405	Diasporic Literature	5	4	4
	III	Core IX	UENM406	Women' s Writing	5	4	4
	III	Core X	UENM407	Language and Linguistics	5	4	4
	III	Allied IV	UENA403	History of English Literature - II	4	3	4
	IV	Soft Skills			2	1	1
	V	Extension Activities			-	-	2
Total					**30**	**21**	**26**

V	III	Core XI	**UENM509**	**English Language Teaching**	6	5	5
	III	Core XII	**UENM510**	**Commonwealth Literature**	5	5	5
	III	Core XIII	**UENM511**	**Basics of Translation**	6	5	5
	III	Core XIV	**UENM512**	**Literary Criticism- I**	6	6	6
	III	Allied Optional	**UENA503**	**Contemporary Literature**	5	4	4
			UENA504	**Writing Skills**			
	IV	Value Education			2	1	1
	V	Extension Activities					1
Total					**30**	**26**	**27**
VI	III	Core XV	**UENM609**	**English Phonetics**	5	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**	5	5	5
	III	Core XIX	**UENR613**	**Practical Theatre (Lab)**	2	1	1
	III	Core XX	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 Activities			-	-	2
Total					**30**	**28**	**30**
Grand Total					**180**	**140**	**153**

ALLIED OPTIONAL

Semester	Part	Category	Course Code	Course Title	Contact Hrs/week	Credit
V	III	Allied Optional	**UENA503**	**Contemporary Literature**	5	4
			UENA504	**Writing Skills**		

MAJOR ELECTIVE

Semester	Part	Category	Course Code	Course Title	Contact Hrs/week	Credit
VI	III	Major Elective	**UENO603**	**Journalism**	5	4
			UENO604	**Mass Communication**		

EXTRA CREDIT EARNING PROVISION

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**	**Practice of Translation (Self – Study)**	26	1
VI	III	Core	**UENP601**	**Mini-Project**	26	1

UENM509 ENGLISH LANGUAGE TEACHING

Semester : V **Credits : 5**
Category : Core XI **Hours : 6**
Class & Major : III UG **Total Hours : 78**

Objectives:
To enable the students

- Understand English language teaching skills.
- Adapt the new technologies for the teaching and learning process.
- Appraise the new theories and methods in English language teaching.

UNIT – I INTRODUCTION **15 Hrs**

A brief history of English Language teaching-English Language Teaching in India

UNIT – II THEORIES, APPROACHES AND METHODS OF TEACHING ENGLISH **15 Hrs**

Language Acquisition theories -Approaches-Methods and Techniques in ELT - Current trends in ELT.

UNIT – III TEACHING LANGUAGE SKILLS **16 Hrs**

Teaching of Language Skills- Teaching Vocabulary, Teaching Learning, Speaking, Reading and Writing.

UNIT – IV TECHNOLOGY ENABLED LANGUAGE TEACHING **16 Hrs**

SMS Language, Virtual Classroom, Reflective Classroom, Flip classes Blend teaching, E-learning.

UNIT – V DIGITAL TEACHING **16 Hrs**

Integrating technology into secondary English language teaching, Technology Integrated English for Specific Purposes, English for Academic Purposes

Text Books

- M.N.K Bose. *A Text Book of English Language Teaching (ELT) for Indian Students*. New Century Book House (p) Ltd: Chennai, 2010.
- George Yule. *Study of Language*. Cambridge: Cambridge University Press, 2010.

Reference Books

- Meenakshi Sundaram. *Teaching of English*. Kavyamala: Chennai, 2011.
- Richards and Rodgers. Approaches and Methods in Language Teaching. CUP: Cambridge, 2010.

- Gary Motteram. *Innovations in Learning Technologies in Language Teaching:* British Council, London,2013.

UENM510 COMMONWEALTH LITERATURE

Semester : V **Credits : 5**
Category : Core XII **Hours : 5**
Class &Major: III UG **Total Hours :65**

Objectives:
To enable the students

- Identify the background of Commonwealth literature.
- Criticize different themes used by the Common Wealth writers
- Assess the colonial identity in the perspective of commonwealth writers.

UNIT - I POETRY **10Hrs**

Derek Alton Walcott(1930 - 2017) : A Far Cry from Africa
Dom Moraes (1938-) : A Letter
Chinua Achebe (1930 -) : Refugee Mother and Child
Arthur Nortje (1942-) : Letter from Pretoria Central Prison

UNIT - II PROSE **13Hrs**

Margaret Atwood (1939 -) : "Nature as a Monster" from Chapter 2 of Survival: A Thematic Guide to Canadian Literature

Ngugi wa Thiong'o (1938 -) : Chapter 1 & 2 in The Language of African Literature from Decolonizing Mind

UNIT- III SHORT STORY **10Hrs**

Katherine Mansfield (1882-1923) : Bliss, Prelude, Pictures

UNIT- IV DRAMA **16Hrs**

Ngugi Wa Thiongo(1938-) : A Grain of Wheat

UNIT: V NOVEL **16Hrs**

Jamaica Kincaid (1949 -) : Annie John

Text Books

- C.D.Narasimhaiah., *An Anthology of Commonwealth Poetry*, Machmillian India Ltd, Newdelhi, 2004.
- Thiong'o, wa Ngugi. A Grain of Wheat (rev.ed). Johannesberg, South Africa: Heinemann (African Writers Series), 1986.
- Kincaid, Jamaica. *Annie John*. New York: Farrar, Straus & Giroux, 1997. Print.

Reference Books

- Trivedi, H. & M. Mukherjee eds. Interrogating Post-Colonialism (Theory, Text and Context). Shimla: Institute of Advanced Study, 1996.
- Boehmer, Elleke. Colonial and Postcolonial Literature. New York: Oxford University Press, 1995.

- Donnell, Alison, and Sarah Lawson Welsh. *The Routledge Reader in Caribbean Literature*. London: Routledge, 1996. Print.

UENM511 BASICS OF TRANSLATION

Semester : V **Credits : 5**
Category : Core XIII **Hours/Week : 6**
Class &Major : III UG **Total Hours : 78**

Objectives:
To enable the students

- Understand the origin and development of translation.
- Acquire knowledge on various theories and techniques of translation.
- Analyze the concept of practical translation.

UNIT I INTRODUCTION **17 hrs**

Origin and development of Translation – Types of Translation- Tools of Translation- History of Bible Translation.

UNIT II THEORIES OF TRANSLATION **15 hrs**

Theodore Savory- C.J Catford -Eugene Nida**.**

UNIT III SOURCE LANGUAGE TO TARGET LANGUAGE **15 hrs**

Problems and Techniques - Decoding and Recoding- Problems and Equivalence.

UNIT IV TRANSLATION IN DIFFERENT GENRE **15 hrs**

Translation of poetry, Prose, Translating Dramatic Texts.

UNIT V STUDY AND ASSESSMENT OF TRANSLATION **16 hrs**

A.K Ramanujan's Interior Landscape: Classic Tamil Poems.

Text Book

- Susan Bassnett, *Translation Studies,* Routlege 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.

UENM512 LITERARY CRITICISM – I

Semester : V **Credits : 6**
Category : Core XIV **Hours/Week : 6**
Class &Major: III BA English **Total Hours : 78**

Objectives:

To enable the students

- Understand the features in Literary Criticism.
- Differentiate the various methods and technique used by the critics
- Analyze the various literary pieces and evaluate critically.

UNIT- I INTRODUCTION **14Hrs**

Nature and Definition of Criticism, Functions of Criticism, Classical and Romantic Criticism - Qualifications of a critic.

UNIT - II CLASSICAL CRITICISM **16Hrs**

Aristotle (384-322 BC) : Poetics

UNIT - III RENAISSANCE CRITICISM **16Hrs**

Sir Philip Sidney (1554 - 1586) : Apologie for Poetry

UNIT – IV NEO-CLASSICAL CRITICISM **16Hrs**

John Dryden (1631-1700) : An Essay of Dramatic Poesy

UNIT- V ROMANTIC CRITICISM **16Hrs**

William Wordsworth (1770- 1850) : Preface to Lyrical Ballads

Text Book

- Habib, Rafey. *Literary Criticism from Plato to the Present: An Introduction*. Chichester, West Sussex, U.K.: Wiley-Blackwell, 2011. Print.

Reference Books

- Patricia Waugh, *Literary Theory and Criticism an Oxford Guide***.** Oxford UP Chennai, 2014.
- R.S.Malik, *A New Approach to Literary Theory and Criticism,* Atlantic : Chennai, 2014.
- Peter Barry, *Beginning Theory: An Introduction to Literary and Cultural Theory. Viva Books: Chennai, 2010.*
- Bijay Kumar Das, *Twentieth Century Literary Criticism*, Atlantic; 6th Ed. Edition. Nov 2010.
- Prasad, *A Background to the Study of English Literature*, Trinity Press: New Delhi, 2014.

UENA503 CONTEMPORARY LITERATURE

Semester : V **Credits : 4**
Category : Allied Optional **Hours : 5**
Class & Major : III UG **Total Hours : 65**

Objectives:

To enable the students

- Understand the themes in Contemporary Literature.
- Familiarize the representative writers in the different genres of literature.
- Assess the value of life in the contemporary literature.

UNIT– I POETRY **15 Hrs**

Ted Hughes (1930 -1998) : Thrushes
D.H. Lawrence(1885 -1930) : Snake
Alan John Ross (1922- 2001) : Survivors

UNIT – II SHORT STORY **13Hrs**

Alice Munroe (1931-) : Providence
Stephen Leacock (1869-1944) : My Financial Career.

UNIT – III DRAMA **15Hrs**

Harold Pinter(1930-2008) : The Caretaker

UNIT -IV NOVEL **11Hrs**

Yann Martel (1963-) : Life of Pi

UNIT – V SCIENCE FICTION **11Hrs**

William Golding (1911 -1993) : Lord of the Flies

Text Books

- Martel, Yann. *Life of Pi.* Edinburgh: Canongate, 2002. Print.
- Golding, William. *Lord of the Flies*. Stuttgart: Klett, 2007. Print.

Reference Books

- Peter Barry, *Beginning Theory*, Manchester University Press, 2011.
- M.H. Abrams, A Glossary of Literary Terms, Cengage Learning India Private Ltd:New York, 2015.

UENA504 WRITING SKILLS

Semester : V **Credits : 4**
Category : Allied Optional **Hours : 5**
Class &Major: III UG **Total Hours : 65**

Objectives:
To enable the students

- Express their views in the process of writing.
- Analyze the different techniques used in written communication.
- Prepare the writing skills to the different media.

UNIT- I INTRODUCTION 13Hrs

What is Creative Writing?, Defining Creativity, Measuring Creativity, Inspiration and Agency, Creativity and Resistance, Art and Propaganda, Creativity and Madness, Restrictions of an Open Field, Can Creative Writing be Taught? The Importance of Reading.

UNIT- II THE ART AND CRAFT OF WRITING 13Hrs

Tropes and Figures, Style and Register, Formal and Informal Usage, Varieties of English, Language and Gender, Disordered Language, Playing with Words, Grammar and Word Order, Tense and Time, Grammatical Differences.

UNIT- III MODES OF CREATIVE WRITING 15Hrs

Writing to Communicate: The Writer and the Reader, Poetry, Writing Poetry, Definitions of Poetry: What is a Poem? , The Four Functions of Language, What to Write About and How to Start Poetry, Shape, Form and Technique, Fixed Forms and Free Verse, Dominant Modes of Poetry—Lyrical, Narrative and Dramatic, Voices in the Poem. Writing for Films, Writing a Screenplay.

UNIT- IV WRITING FOR THE MEDIA 13Hrs

Introduction to the Print Media, The Broadcast Media, The New Media, Advertising.

UNIT- V PREPARING FOR PUBLICATION 11Hrs

Revising and Rewriting, Proof Reading, Editing, Submitting Your Manuscript for Publication.

Text Book

- Swati Pal, Anuradha Marwah, Anjana Dev, Creative Writing, Pearson India 2011.

Reference Books

- Julia Bell, The Creative Writing, Macmillan Publication, 2013.
- Graeme Harper, Teaching Creative Writing, Bloomsbury Academic, 2011.

UENM609 ENGLISH PHONETICS

Semester : VI **Credit : 5**
Category : Core XV **Hours/Week : 5**
Class & Major: III UG **Total Hours : 65**

Objectives:
To enable students

- Understand the organs of speech and use it appropriately.
- Analyze the variations of consonant and vowel sounds.
- Examine the theory of English phonetics and practice it.

UNIT- I INTRODUCTION **13 Hrs**

The organs of speech - Airstream mechanisms - Definition of phonetics and phoneme - Types of phonetics.

UNIT- II CONSONANTS **13 Hrs**

Definition of Consonants - Classification and Description of Consonants.

UNIT- III VOWELS **13 Hrs**

Definition - The cardinal vowel chart - Pure vowels – Diphthongs - Trip thongs

UNIT- IV PRONUNCIATION **13 Hrs**

Phonology - The Syllable - Accent and Rhythm in connected speech.

UNIT -V PRACTICAL **13 Hrs**

Consonant clusters in English – Intonation - Phonetic Transcription.
Practical Test – Language Lab

Text Book

- Balasubramanian, T,*A Textbook of English Phonetics for Indian Students***,** Trinity: Chennai, 2013.

Reference Books

- Grimson, A.C., *An Introduction to the Pronunciation of English***.** Macmillan: New Delhi, 1982.
- Kansakar, Tej R. *A Course in English Phonetics*. Hyderabad, India: Orient Longman, 1998. Print.
- Roach, Peter. *Introducing Phonetics*. London: Penguin, 1992. Print.

UENM610 TWENTIETH CENTURY LITERATURE

Semester : VI **Credits : 4**
Category : Core XVI **Hours/Week : 5**
Class & Major : III UG **Total Hours :65**

Objectives:
To enable the students

- Understand the different concepts in the Twentieth Century Literature.
- Classify the different styles used by the writers.
- Analyze the literary work of modernism.

UNIT-I POETRY **13Hrs**

W.B.Yeats (1865-1939)	: The Second Coming
D.H.Lawrence (1885 - 1930)	: Snake
T.S.Eliot (1888 - 1965)	: Journey of the Magi
W.H.Auden (1907 - 1973)	: Musee Des Beaux Arts
Seamus Heaney (1939 - 2013)	: Digging

UNIT-II PROSE **13Hrs**

E.M.Forster (1879-1970)	: The Challenge of our time
T.S.Eliot (1888 - 1965)	: Tradition and Individual Talent

UNIT- III SHORT STORY **13Hrs**

Doris Lessing (1919 - 2013)	: Through the Tunnel
Alice Munro (1931 -)	: Boys and Girls

UNIT- IV DRAMA **10Hrs**

John Galsworthy (1867 - 1933)	: Strife

UNIT- V FICTION **16Hrs**

John Fowles (1926-2005)	: The French Lieutenant's Woman
James Joyce (1882 - 1941)	: A Portrait Of The Artist As A Young Man

Text Books

- James Joyce, *A Portrait Of The Artist As A Young Man.* Cambridge University Press:Cambridge University, 2004.
- John Galsworthy, *Strife*. Macmillan Publishers: London, 2010.
- John Fowles, *The French Lieutenant's Woman.* Vintage Classics: India, 2006.

Reference Books

- Nagarajan, M.S., *Spectrum: An Anthology of Modern Prose,* Anu Chitra: Chennai, 2012.

UENM611 LITERARY CRITICISM – II

Semester	**: VI**	**Credits**	**: 6**
Category	**: Core XVII**	**Hours/Week**	**: 6**
Class &Major: III BA English		**Total Hours**	**: 78**

Objectives:

To enable the students

- Understand the current trends in Literary Criticism.
- Apply the concepts of criticism in literary works.
- Classify the various literary theories and evaluate critically.

UNIT I VICTORIAN CRITICISM **15 Hrs**

Mathew Arnold : Study of Poetry

UNIT II NEW CRITICISM **16Hrs**

T.S Eliot : Traditional and Individual Talent

UNIT III ARCHETYPAL CRITICISM **15Hrs**

Northrop Fyre : Archetypes of Literature

UNIT IV READER RESPONSE THEORY **16Hrs**

Roland Barthes : Death of the Author

UNIT V POSTCOLONIAL THEORY **16Hrs**

Edward Said : Crisis (in Orientalism)

Text Book

- Edward W. Said. *Orientalism* , Vintage Books, Massachusetts, 2014.

Reference Books

- Patricia Waugh, *Literary Theory and Criticism an Oxford Guide***,** Oxford University Press, New Delhi, 2014.
- Malik. R.S, *A New Approach to Literary Theory and Criticism*, Atlantic, Chennai, 2014.
- Peter Barry, *Beginning Theory: An Introduction to Literary and Cultural Theory, Viva Books, Chennai, 2010.*
- Leitch, Vinct. B, ed. *The Norton Anthology of Theory and Criticism*, Norton & Co. New York, London, 2010.

UENM612 SHAKESPEARE

Semester : VI **Credits : 5**
Category : Core XVIII **Hours/Week : 5**
Class & Major : III UG **Total Hours : 65 Hrs**

Objectives:
To enable the students

- Understand the dramatic and theatrical conventions of Shakespeare.
- Identify the traits of Shakespeare that made him the man of millennium.
- Examine the plays in modern context.

UNIT I INTRODUCTION **12 Hrs**

Elizabethan Theatre and Modern Theatre. Introduction to Shakespeare's sonnets and plays– Tragedy, Comedy, Historical Plays, Romantic Comedy and Tragic- Comedy.

UNIT II SHAKESPEARIAN SONNETS **12 Hrs**

Sonnet No. 64, 94, 96, 114&124

UNIT III TRAGEDY **14 Hrs**

King Lear
(Context, Source of the Play, Plot overview, Character list, Analysis of Major characters, Themes, Motifs, Symbols and Summary analysis)

UNIT IV COMEDY **14 Hrs**

Much Ado About Nothing
(Context, Source of the Play, Plot overview, Character list, Analysis of Major characters, Themes, Motifs, Symbols and Summary analysis)

UNIT V TRAGIC-COMEDY AND ROMANTIC COMEDY **13 Hrs**

Merchant of Venice

The Two Gentlemen of Verona.
(Context, Source of the Play, Plot overview, Character list, Analysis of Major characters, Themes, Motifs, Symbols and Summary analysis)

Text Book

- William Shakespeare, *The Complete Works of William Shakespeare.* Wordsworth Edition Ltd, *UK,* 2014.

Reference Books

- John James Jacqueline Morley, A Shakespearean Theatre. Salariya Book Company, UK, 2010.
- A.C. Bradley, *Shakespearean Tragedy*, Atlantic Publishers, Chennai, 2013.
- Eachern Mc Clare.Ed., *The Cambridge Companion to Shakespearian Tragedy,* Cambridge UP, Cambridge, 2013.
- William Shakespeare. *Sonnets.* Random House, New York, 2010

UENR613 THEATRICAL PERFORMANCE

Semester : VI **Credits : 1**
Category : Core XIX **Hours : 2**
Class &Major: III UG **Total Hours : 26 Hrs**

Objectives:
To enable the students

- Understand the different techniques used in stage.
- Recognize the performance possibility in dramatic texts.
- Promote acting skills.

UNIT- I INTRODUCTION TO DRAMA 4 Hrs

Origin of Drama- Performance of Rituals – Ritual to Theatre - Egyptian Ritual of Osiris, Greek – Dionysian Festival

UNIT- II TYPES OF THEATERS 4 Hrs

Classical Theatre, Indian Classical Theatre, Elizabethan Theatre, Modern theatres.

UNIT- III COMPARATIVE PLAY READING 6 Hrs

Shakespeare – Speeches of Brutus and Antony from *Julius Caesar*
Indian Plays – Tagore's *Chandalika* (Final Scene)
Samuel Beckett – Waiting For Godot

UNIT- IV ACTING AND STAGE MANAGEMENT 6 Hrs

Voice training – Reading expressively
Gestures and Facial Expressions
Managing acting space
Designing Costumes

UNIT- V PRACTICE OF DRAMA 6 Hrs

Students can choose to perform any from their reading material used in Unit III or can choose any scenes in English drama

Text Book

- Mackey, Sally. Practical Theatre: A Post-16 Approach. Nelson Thornes, Edinburgh, 2007. Print.

Reference Books

- Oscar G. Brockett's *History of the Theatre* (Chapter I) Allyn and Bacon, USA, 2007.Print.
- Friedrich Nietzsche's *The Birth of Tragedy* (Chapter I to IV) Penguin Publications, New Delhi, 2009.Print.

UENO603 JOURNALISM

Semester : VI **Credits : 5**
Category : Major Elective **Hours : 5**
Class & Major : III UG **Total Hours : 65**

Objectives:
To enable the students

- Examine the various fields of journalism.
- Develop the skills of writing for the field of journalism.
- Write articles to be published in Journals and Magazines.

UNIT -I INTRODUCTION 13 Hrs

A Brief Introduction to Journalism- History and Evolution, Definition, Meaning and Scope. Functions of Journalism, Kinds of Journalism, and Principles of Journalism. British and American Style of Journalism - Role of the Press – Social Responsibility of the Press.

UNIT -II NEWS REPORTING 13 Hrs

Principle and Ethics of Journalism. News -Elements of News-Types of News- Sources of News- Gathering News- News Agencies. The Reporter- Qualities of a good reporter - Types of reporting.

UNIT –III WRITING STYLE 13 Hrs

Language and Style – Editorial Writing, Letters to the Editor, article and feature writing, the art of interviewing, Headlines, Crime reporting, Sports Reporting.

Unit -IVNEWS EDITING 13 Hrs

The News Editor, Editing- Role of an Editor - The Sub- editor- Role of a Sub- Editor, His/her qualities - Basic Rules for Editing.

UNIT- V JOURNALIST WRITING FOR DIFFERENT MEDIA 13 Hrs

Writing to Radio, TV, Film ,Online Writing.

Text Books

- Das Ajay. *Journalism: Editing and Journalism,* Omega Publications: New Delhi, 2010
- Das Ajay. *Print and Broadcast Journalism: A Critical Examinations*, Omega Publications: New Delhi, 2010.

Reference Books

- Monita Singh, *Ethics and Codes in Modern Journalism*, An mol Publications Pvt.Ltd,2010.
- Dr.Saroj Kr.Mishra,*RTI and Modern Journalism*, Gyan Geeta Prakashan,2014.
- B.N.Tripati,*Handbook of Journalism and Mass Media*, Saurabh Publishing House,2011.
- Dr. Divyesh Raythatha, Media Law & Journalism Ethics, Pravin Prakashan Pvt, 2012.

- Wendy N.Wyatt, The Ethics of Journalism: Individual, Institutional and Cultural Influences. I .B. Tauris, 2014.

UENO604 MASS COMMUNICATION

Semester : VI **Credits : 5**
Category : Major Elective **Hours : 5**
Class & Major : III UG **Total Hours : 65**

Objectives:
To enable the students

- Acquire knowledge of mass communication and its role in a media organization.
- Write reviews in online journals and newspaper.
- Appraise the historical growth of media, its auxiliary areas and the scope.

UNIT- I COMMUNICATION: AN INTRODUCTION 13 Hrs

Communication - Definition, Nature, Scope, Functions. The Communication Process - The Variable-Types of Communication- Intrapersonal, Interpersonal- Group and Mass Communication-Communication and Change-Communication and Society.

UNIT- II THEORIES OF COMMUNICATION 13 Hrs

Theories of Communication.-Communication Models- Aristotle, Schramm, Berlo, Shannon and Weaver, Laswell, Dance.-Theories on communication effect- magic bullet/hypodermic needle, two-step, limited effect-Role of audience in communication.

UNIT- III DEVELOPMENT OF MEDIA 13 Hrs

Growth and evolution of different media- Folk Media – Print – Radio – Television – Cinema - The different facets of mass media.

UNIT- IV FEATURES OF NEW MEDIA 13 Hrs

New Media- meaning, definition and features. Web-based communication, Online Newspapers and Journals. Limitation and current trends. Future of the Web.

UNIT- V REVIEW WRITING 13 Hrs

Feature of Story – News Writing –Column Writing - Book Review of different Genres – Radio, TV, Film Review and New Media Review.

Text Book

- Keval J.Kumar, *Mass Communication in India*, Jaico Publishing House, Bombay. 2011.

Reference Books

- J Stanley Baran and Dennis K Davi, *Mass Communication and Man - Mass Communication Theory* (4th Ed.), Wadsworth, USA, 2010.
- D.S.Mehta, Mass *Communication and Journalism in India*, Allied Publications, New Delhi. 2012.
- John.R. Bittner, *Mass Communication- an Introduction*, Prentice Hall, New Jersey, USA, 2012.

UENS501 PRACTICE OF TRANSLATION

Semester : V **Credits : 1**
Category : Core **Hours : 2**
Class & Major : III UG **Total Hours : 26**

Objectives:
To enable the students

- Understand the origin and development of translation.
- Identify the similarities between the source text and target text.
- Enhance the ability in translating a text.

UNIT I INTRODUCTION **6 Hrs**

Translation – Methods of Translation

UNIT III POETRY **10 Hrs**

Salma - yeri (Lake),
- Yarum Illatha Idathil (A Deserted Place),
- En Poorviga Veedu 1 (My Ancestral House 1

UNIT III SHORT STORY **10 Hrs**

Ambai – Vahanam (Tamil to English)
Pudhumaipithan - Kadavulum kandasamy pillaiyum

Text Book:

- Susan Bassnett, *Translation Studies,* Routlege Publication, 2014

Reference Books:

Salma, *Pachchai Devathai*, Kalachuvadu Pathippagam, Nagercoil Publications, 2003.Ambai, C.S.Lakshmi, Purple Sea, Paperback, 2001.

III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
V	Core XI	UENM509	English Language Teaching	Assignment	Seminar
	Core XII	UENM510	Commonwealth Literature	Assignment	Seminar
	Core XIII	UENM511	Basics of Translation	Assignment	Seminar
	Core XIV	UENM512	Literary Criticism- I	Paper Presentation	Poster Presentation
	Allied Optional	UENA503	Contemporary Literature	Assignment	Seminar
	Allied Optional	UENA504	Writing Skills	Poetry Writing	Film Review
VI	Core XV	UENM609	English Phonetics	Assignment	Transcription
	Core XVI	UENM610	Twentieth Century Literature	Assignment	Seminar

	Core XVII	UENM611	Literary Criticism- II	Poster Presentation	Seminar
	Core XVIII	UENM612	Shakespeare	Seminar	Report Writing
	Core XIX	UENR613	Practical Theatre	Poster Presentation	Role Play
	Major Elective	UENO603	Journalism	Article Writing	Report Writing
	Major Elective	UENO604	Mass Communication	Report Writing	Poster Presentation

- **UENR613 THEATRICAL PERFORMANCE**

Evaluation Components

CATEGORY	CIA Marks	END SEMESTER Marks
Stage Performance	30	-
Test I	10	-
Role Play	5	-
Test II	10	-
Album Making	5	-
Theory	-	40
Total (100)	**60**	**40**

UENP601 MINI PROJECT

Evaluation Components

CATEGORY	CIA MARKS	END SEMESTER MARKS
Research Proposal	20	-
Collection of Data/ Experimentation	20	-
Analysis of Data/Experimentation result	20	-
Project Report	-	30
Viva Voce	-	10
Total(100)	**60**	**40**

Guidelines for Mini Project

- Students are allowed to choose their mini project on the following areas: British Literature, American Literature and Indian Literature.
- It is mandatory that the mini project should be of single author's work in the concerned areas.
- The mini project should contain not less than 20 pages and not more than 40 pages.

DEPARTMENT OF BUSINESS ADMINISTRATION

Preamble:

UG: Course Profile, list of courses offered to other Department and the syllabi of courses in the fifth and sixth semesters along with evaluation components V & VI with **effect from 2015-18 batch onwards**

COURSE PROFILE – BBA

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	Basic English I/Advanced English	5	3	4
	III	CORE-I	UBAM105	Management Thoughts And Thinkers	2	1	1
	III	CORE-II	UBAM106	Business Organization	5	4	4
	III	CORE-III	UBAM107	Principles of Management	6	5	5
	III	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 I/Advanced Tamil I/ French I /Hindi I	4	2	3
	II	ENGLISH-II	UENL207/UENL208	Basic English I/Advanced English	5	3	4
	III	CORE-IV	UBAM204/ UCOM204/ UCCM203	Business Communication	5	4	4
	III	ALLIED-II	UCOA203 UCOR203	Accounting Package Theory Accounting Package Practical	2 3	2 2	2 2
	III	CORE-V	UBAM206	Business Environment	4	4	4
	III	CORE-VI	UBAR201	Workshop On Decision Making	1	1	1
	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	III	CORE-VII	UBAM308	Marketing Management	6	5	5
	III	CORE-VIII	UBAM309/ UCOM307	Financial Markets and Services	6	5	5
	III	CORE –IX	UCOM305/ UCCM305	Cost Accounting	6	5	5
	III	Allied-III	UMAA301	Business Statistics	6	5	5
	IV	Non Major Elective			4	2	2
	IV	Value Education			2	1	1
				TOTAL	**30**	**23**	**23**
	III	CORE-X	UBAM406	Organisational Behaviour	6	4	4
	III	CORE-XI	UBAM407	Human Resource Management	5	4	4

IV	III	CORE-XII	UBAM405	Production & Materials Management	5	4	4
	III	ALLIED-IV	UMAA410	Quantitative Techniques In Business	5	4	4
	III	ALLIED-V	UCSA405 UCSR409	Computer Applications in Business Computer Applications in Business	3 3	3 2	3 2
	III	CORE –XIII	UBAR401	Workshop On Creative Thinking Skill	1	1	1
	III	CORE-XIV	UBAI401	Summer Internship	-	1	1
	IV	Soft Skill			2	1	1
	V	Extension Programme/ Physical Education			-	-	2
				TOTAL	**30**	**24**	**26**
V	III	CORE-XIV	UBAM507	Research Methodology In Business	6	5	5
	III	CORE-XV	UBAM508	Services Marketing	5	4	4
	III	CORE-XVI	UBAM509	Mercantile Law	6	5	5
	III	CORE-XXIX	UBAM504/ UCOM507/ UCCM507	Management Accounting	6	5	5
	III	ALLIED OPTIONAL-I			5	4	4
	IV	Value Education			2	1	1
				TOTAL	**30**	**24**	**24**
VI	III	CORE-XVII	UBAM608	Strategic Management	5	4	4
	III	CORE-XVIII	UBAM609/ UCOM612	Women Entrepreneurship	5	5	5
	III	CORE-XIX	UBAM610/ UCOM613/ UCCM613	Financial Management	6	5	5
	III	CORE –XX	UBAR601	Workshop On Leadership Skills	1	1	1
	III	CORE-XXI	UBAP601	Project	6	5	5
		Major Elective	UBAO603	Event Management	5	4	4
			UBAO604	Customer Relationship Management			
			UBAO605	Retail Management			
			UBAO606	Emerging Business Practices In India			
			UBAO607	Industrial Relations			
			UBAO608	Rural Marketing			
		VIVA VOCE	UBAM614	Comprehensive Viva		1	1
	IV	Soft Skill			2	1	1
	V	Extension Programme/ Physical Education			-	-	2
				TOTAL	**30**	**26**	**28**
				GRAND TOTAL	**180**	**140**	**149**

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

ALLIED OPTIONAL

Semester	Part	Category	Course Code	Course Title	Contact/ Week	Credit	
						Min	Max
V	III	Allied optional	UBAA504	Travel Management	5	4	4
			UBAA505	Green Management			
			UBAA506	Marketing Communication			
			UBAA507	Women In Management			
			UBAA509	Front Office Management			
			UBAA510	Hospitality Management			

EXTRA CREDIT EARNING PROVISION

Semester	Category	Course code	.Course Title	Contact / Week	Credit	
					Min	Max
II	CORE- XXII	UBAI201	Summer Internship	-	-	1
IV	CORE –XXIII	UBAI401	Summer Internship	-	1	1
V	CORE- XXIV	UBAP501	Mini Project	2	-	1

SELF STUDY PAPER

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

EXECUTIVE WORKSHOP

Semester	Category	Course Code	Course Title	Contact hours / week	Credit	
					Min	Max
II	Core –VI	UBAR201	Decision Making Skills	1	1	1
IV	Core- XII	UBAR401	Creative Thinking Skills	1	1	1
VI	Core- XIX	UBAR601	Leadership Skills	1	1	1

UBAM507 RESEARCH METHODOLOGY IN BUSINESS

Semester : V **Credit : 05**
Category : Core XIV **Hours/week: 06** **Class & Major: III BBA**
Total Hours: 78

Objectives
To enable the students

- Understand the role of research in business.
- Formulate research problem and use different methods of sampling and tools
- Write research report.

UNIT-I INTRODUCTION **15 Hrs**

Definition - Types- Role of research in business studies. Research Problem Identification-Selection -Formulation of research problem - Research design.

UNIT -II FORMULATION OF RESEARCH PROBLEM, RESEARCH DESIGN **16 Hrs**

Research methods; Case study, Survey, Experimental study - Relative advantages. Sampling Methods - Relative merits and demerits of different methods of sampling - Methods of Data Collection - Observation - Questionnaire-Interview Schedule- Advantage and disadvantages of these methods.

UNIT -III RESEARCH METHODS **16 Hrs**

Measurement techniques; Scaling - Meaning – Classification - Techniques. Data collection; Meaning- Methods- Primary and secondary methods- Pre-testing- Processing of data- Editing- Coding - Transcription- Tabulation.

UNIT -IV ANALYSIS AND INTERPRETATION **15Hrs**

Hypothesis; Meaning- - Types - Characteristics- Formulation - source. Testing of hypothesis. Tools; spread sheet, Chi square test, ANOVA - pilot study.

UNIT -V WRITING RESEARCH REPORT: **16 Hrs**

Preliminary steps of writing research report- Essentials of a good report- Style of writing reports tables, figures - format of the report - Guidelines for using quotations, bibliography, and appendices.

Note: Only Theory. No Problems.

Text Books

- Ravilochanan ."P, *Research Methodology,"* Margham Publications, 2015
- Wiliam G. Zikmund, Barry J.Babin, "*Business Research Methods*," South-Western \
  Cengage Learning, 2013.

Reference Books

- Donal Copper.R, *Business research methods*, Tata Mcgraw Hill , 2014
- Kothari C.R, *Research methodology*, Wishva Prakashan , 2013
- Gopal M H, An *Introduction to Research Procedure in Social Sciences,* 2012.

E- resources

- https://www.library.cornell.edu/**research/introduction**
- *www.tru.ca › Open Learning*
- www.skillsyouneed.com/learn/**research-methods**.html

UBAM508 SERVICES MARKETING

Semester : V **Credit :04**
Category : Core XV **Hours/Week :05**
Class & Major: III BBA **Total Hours :65**

Objectives:
To enable the students

- Understand the various concepts of services marketing.
- Use elements of marketing mix in services marketing.
- Implement the strategies for better services.

UNIT-I INTRODUCTION **13 Hrs**

Definition – Service Economy – Evolution and growth of service sector – Nature and Scope of Services – Unique characteristics of services - Challenges and issues in Services Marketing.

UNIT- II SERVICES MARKETING OPPORTUNITIES **12 Hrs**

Assessing service market potential - Classification of services – Expanded marketing mix –Service marketing – Environment and trends – Service market segmentation, targeting and positioning.

UNIT- III SERVICES DESIGN AND DEVELOPMENT **14 Hrs**

Service Life Cycle – New service development – Service Blue Printing – GAP‟s model of service quality – Measuring service quality – SERV-QUAL – Service Quality function development.

UNIT-IV SERVICES DELIVERY AND PROMOTION **13Hrs**

Positioning of services – Designing service delivery System, Service Channel – Pricing of Services, methods – Service marketing triangle - Integrated Service marketing communication.

UNIT-V SERVICES STRATEGIES **13Hrs**

Service Marketing Strategies for health – Hospitality – Tourism – Financial – Logistics -Educational – Entertainment & public utility Information technique Services – case studies

Text Books

- Balaji. B. *Services Marketing & Management*, S.Chand Publication,2011
- Alan Wilson, Valarie A. Zeithaml and Mary Jo Bitner, *Service Marketing*, McGraw-Hill Education, 2014.

Reference Books

- Hoffman, Marketing of Services, Cengage Learning, II nd Edition, 2012.
- Zeithaml Parusuraman and Berry , *Delivering Quality services* , The free press Macmillian,2015.
- Philip Kotler, *Marketing of Non Profit Organization*, Prentice Hall of India (P) Ltd, India, New Delhi,2012.
- Chiristropher H.Lovelock and Jochen Wirtz, Services Marketing, Pearson Education, New Delhi,2012.

E- Resources

- www.managementstudyguide.com/definition-and-characteristics-of-**servi**
- www.businessdictionary.com/definition/**service-marketing**.html
- www.slideshare.net/ch_paki/**services-marketing**

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UBAM509 MERCANTILE LAW

Semester : V **Credit :05**
Category : Core XVI **Hours/Week :06**
Class & Major: III BBA **Total Hours :78**

Objectives:

To enable the students

- Understand the basic concepts of Indian Contract Act, 1872.
- Analyse the various methods of discharge of contract and their remedies.
- Appraise the recent amendments in laws related to business.

UNIT-I INTRODUCTION **15 Hrs**

Indian contract Act, 1872 - Scope - Characteristics - kinds - Essential of contract - Classification of contract – Offers & Acceptance– Lapse & Revocation of offer.

UNIT-II ESSENTIALS OF CONTRACT **15 Hrs**

Consideration & Capacity – coercion – undue Influence – Fraud – Fraudulent - silence – Mistake – Misrepresentation.

UNIT-III DISCHARGE OF CONTRACT **16 Hrs**

Discharge of contract by performance – Tender – Time and place for performance – Breach of contract – Actual Breach – Anticipatory Breach – Remedies for Breach – Damage and its Kinds – Rules for Damages.

UNIT-IV SALE OF GOODS ACT, 1930 &VAT **16 Hrs**

Sale of goods - Difference between sale and agreement to sell - Conditions and warranties - Transfer of property - Performance of contract of sale - Rights of unpaid seller, Meaning – objectives – advantages – disadvantages of VAT – tax credit system – set off of tax credit – levy of VAT.

UNIT-V THE PARTNERSHIP ACT 1932: **16 Hrs**

Registration of Partnership firms- Partners- Types- Rights, Duties and Liabilities – Implied Authority- Expulsion – Insolvency- Death-Transfer of Interest- Position of Minor as a Partner- Dissolution of partnership.

Text Book

- Kapoor, N.D. "*Mercantile Law"*, Sultan chand & Sons, New Delhi, 2015

Reference Books

- Moshal B.S. *Mercantile Law*, Ane Books Private Ltd.2014
- Gulson S.S. Mercantile *Law, 5th Edition*, 2015.
- Padma.T & K.P.C.Rao, *Mercantile laws*, *Sultan chand & sons*, 2014

E-Resources

- *Cacmacsclub.com/cpt-mercantile-law-notes-study-material/html.*
- https://superprofs.com/ca/how-to-prepare-ca-cpt-**mercantile-law**/
- www.sheir.org/**mercantile_law**_notes.html

UBAM504/UCOM507/UCCM507 MANAGEMENT ACCOUNTING

Semester	**: VI**	**Credit**	**: 05**
Category	**: Core XIV / XIII**	**Hours/Week**	**: 06**
Class/Major	**: III BBA/IIIB.Com/III B.Com (CA)**	**Total hours**	**: 78**

Objectives:

Enable the students

- Gain knowledge of basic concepts of management accounting
- Analyze and interpret the financial statements
- Develop accounting skills to take managerial decisions

UNIT-I INTRODUCTION TO MANAGEMENT ACCOUNTING **15 Hrs**

Management Accounting – Meaning, scope, importance and limitations – Management Accounting vs. Cost Accounting – Management Accounting vs Financial Accounting.

UNIT- II ANALYSIS AND INTREPRETATION OF FINANCIAL STATEMENT **16 Hrs**

Financial statement – Nature, objectives and tools– Methods– Comparative Statements , Common Size statement – Trend Analysis.

UNIT- III RATIO ANALYSIS **16 Hrs**

Ratio analysis – Benefits and Limitations, Classification of Ratios – Liquidity, Solvency, Profitability and Turnover Ratios.

UNIT- IV FUND FLOW& CASH FLOW ANALYSIS **15 Hrs**

Fund Flow and Cash Flow Statement – Differences – Advantages – Limitations- Conversion method only.

UNIT-V BUDGETARY CONTROL AND MARGINAL COSTING **16 Hrs**

Budgets and Budgetary Control – Meaning, objectives, Merits and Demerits – Types of Budgets – Production, Cash and Flexible Budget, Marginal Costing (excluding decision making) – Absorption Costing and Marginal Costing – CVP analysis – Break Even analysis and Break even Chart.

Note-Theory – 30%, Problems – 70%

Books

- Srinivasan N.P *Management Accounting*, Sterling Publishers Ltd. , New Delhi, 2014
- Reddy & Murthy, *Management Accounting*, Margham Publications, Chennai, 2015
- Maheswari S.N,*Cost and Management Accounts*, Sultan Chand & Sons, New Delhi, 2015

Reference Books

- Jain And Narang, *Cost and Management Accounts*, Kalyani Publications, New Delhi, 2014
- Pillai.R.S.N & Bhagirathi, *Management Accounting*, S.Chand & Co. Ltd, New Delhi., 2013
- M.Y. *Khan*,P.K. *Jain*, *Management Accounting, Publisher*-Tata McGraw-Hill Education, 2014.

E- Resources

- www.pondiuni.edu.in/storage/dde/downloads/finiii_ma.**pdf**
- www.ddegjust.ac.in/studymaterial/mcom/mc-105.**pdf**
- https://www.saylor.org/site/textbooks/**Managerial**%20**Accounting**.**pdf**

UBAM608 STRATEGIC MANAGEMENT

Semester : VI **Credit : 04**
Category : Core XVII **Hours/week : 05**
Class & Major: III BBA **Total Hrs : 65**

Objectives

To enable the students

- Understand the concept of corporate strategy
- Study various business models
- Analyse the practical corporate strategies.

UNIT I INTRODUCTION **13 Hrs**

Strategy; Definition- Process– Level- Strategic decision making- Issues- Schools of thoughts-Strategic management- definition- Elements- process- Models- the Indian scenario.

UNIT II ENVIRONMENTAL ANALYSIS **14Hrs**

Environment- concept- characteristics- Classification of environmental sectors- Environmental scanning- Factors- Approaches- Sources of information-Methods & Techniques- Pitfalls- Appraisals.

UNIT III SWOT ANALYSIS, STRATEGY FORMULATION AND ANALYSIS 13 Hrs

SWOT analysis - Strategy Formulation, Strategic Factors Analysis Summary (SFAS) Matrix, Business Strategy, Corporate Strategy, Functional Strategy, Strategic Choice.

UNIT IV STRATEGY IMPLEMENTATION **12 Hrs**

Strategy Implementation, Organization Structure, Corporate Culture, Diversification, Mergers and Acquisitions -Evaluation and Control, Strategic Information Systems.

UNIT V STRATEGIC EVALUATION & CONTROL **13 Hrs**

Evaluation- Nature–Importance-Participants- Barriers- Requirements of effective evaluation; Strategic control- Operational control- Techniques – Role of organizational system control.

Text Book

- Azhar Kazmi ,*" Strategic Management & Business Policy* ", Tata Mc Graw hill , New Delhi 2013

Reference Books

- Mamoria C.B and Satish Mamoria, *Business Planning And Policy*, Himalaya Publishing House, Mumbai, 2010
- Sankaran.S, *Business Environment: Policy & Strategic Management***,** Margham Publications, Chennai, 2012
- Francis Sirunilam, *Business policy and strategi, Ane publications Private Ltd, Chennai. 2014*

E- resources

- www.mbaskool.com/business.../7247-**strategic-management-process**.html
- *smallbusiness.chron.com › Managing Employees › Managers*
- *www.mbaskool.com › Concepts › Marketing And Strategy*

UBAM 609/ UCOM612 WOMEN ENTREPRENEURSHIP

Semester : VI **Credit : 05**
Category : Core XVIII **Hours/Week : 05**
Class & Major: III BBA/IIIB.Com/III B.Com (CA) **Total Hours : 65**

Objectives:
To enable the students

- Understand the concept of women entrepreneurship.
- Identify various schemes under various financial institutions.
- Prepare business ideas to establish small scale business

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

Entrepreneur and Entrepreneurship – Concept- Characteristics, Functions and types of entrepreneur; Intrapreneurship, Homepreneurship. Growth of entrepreneurship in India –- Theories of Entrepreneurship

UNIT – II PROJECT IDENTIFICATION **13 Hrs**

Search for a Business Idea- Product, Process identification – Sources and Selection – Project Classification and Identification – Constraints - Project life cycle-Project formulation –Need, Concept, Significance and elements of project formulation – Feasibility analysis – Project report – methods of project appraisal – plant layout- Business ideas, Plan, layout Presentation.

UNIT III: GOVERNMENT POLICIES **14 Hrs**

Concept –growth of women entrepreneur-problems and prospects of women entrepreneurship-Government policies-Financial assistance – various government schemes for women entrepreneurship-Tamilnadu Industrial Corporation for development -Women entrepreneurship in India-Successful women entrepreneurs.

UNIT - IV PROJECT FINANCE **14 Hrs**

Need and Importance - Institutional finance to Entrepreneurs – Commercial banks and Development banks – SIDBI, TIIC, IDBI–Institutional support to entrepreneurs.

UNIT – V ESTABLISHMENT OF SMALL BUSINESS **14 Hrs**

Steps for starting a small Industries – selection of organizations – preparation of project proposal- Procedure and formalities for Registration- Government policy for small and medium scale enterprises - Taxation Benefits to small-scale industry .

Text Books

- Gupta C.B, & Srinivasan N.P, *Entrepreneurial Development*, Sultan Chand&Co, New Delhi,2015
- Saravanavel. P ,*Entrepreneurial Development, Principles, Policies and Programmes,* Ess Pee Kay Publishing House,2013
- Charantimath, *Entrepreneurial Development*& Small Business Enterprise, Pearson Education., New Delhi,2011

Reference Books

- Jayshree Suresh, *Entrepreneurial Development*, Margham Publications,Chennai,2014
- Sujata .V, *Entrepreneurial Development,* Cauvery Publications,Trichy,2012
- *Prasanna Chandra*, *Entrepreneurship Development*, Tata McGraw Hill. Delhi.,2013

E-Resources

- https://www.wegate.eu/list-**e**-learning-**materials**-tools
- www.adam-europe.eu/prj/6726/project_6726_en.pdf
- *www.uwcc.wisc.edu/info/**women**/escap2468.pdf*

UBAM610/UCOM613/UCCM613 FINANCIAL MANAGEMENT

Semester : VI **Credit : 5**
Category : Core XIX **Hours/Week : 6**
Class & Major: III BBA/IIIB.Com/III B.Com (CA) **Total Hours : 78**

Objectives:
To enable the students

- Understand the nature and scope of Financial Management.
- Prepare budgets and take dividend policy.
- Develop the necessary skills and techniques to take decisions in corporate sectors.

UNIT- I INTRODUCTION **13 Hrs**

Finance; Meaning- Scope- Goals. Financial Management: Meaning -Scope- Goals- Profit Maximization and Wealth Maximization in Organization.

UNIT-II CAPITAL STRUCTURE THEORY **16 Hrs**

Meaning - scope – Appraisals: Net Income Approach- Net Operating Income approach - MM approach and Traditional approach – Dividend Policy.

UNIT-III COST OF CAPITAL & LEVERAGES **16 Hrs**

Meaning – Significance - Types. Cost of Capital - Concepts- Importance- Classification: Cost of debt- Cost of Preference shares- cost of equity and cost of retained earnings and weighted average cost of capital- Operating Leverage, Financial Leverage and Combined Leverage.

UNIT-IV CAPITAL BUDGETING
17Hrs

Concept - Importance – Methods Payback period method- Discounted cash flow methods – NPV- present value index and IRR method; Return on Investment method.

UNIT-V WORKING CAPITAL MANAGEMENT & DIVIDEND POLICY 16 Hrs

Working Capital Management –Cash management – Inventory Management – Receivable Management- Dividend theories and policy, types – factors influencing dividend.

Note: (Theory 40% and Problem 60%)
Text book

- Financial Management – R.K.Sharma, Shashi K.Gupta, Kalyani Publications. New Delhi, (2012)

Reference books

- Elements of Financial Management – S.N.Maheswari, Sultan Chand and Sons New Delhi, 2014
- Theory and Problems in Financial Management – M.Y.Khan & P.K.Jain, New Delhi, 2015

E-Resources

- *www.managementstudyguide.com/**capital-structure**.html*

- www.**management**studyguide.com/**financial-management**.html
- *www.sap.com/india/product/**financial**-mgmt.html*

UBAA 504 Travel Management

Semester: V **Credit : 4**
Category: Allied Optional **Hours/Week : 5**
Class & Major: III UG **Total Hours : 65**

Objectives:
To enable the students

- To gain a knowledge about itinerary planning and tour package.
- To identify various trade association .
- To analyze various HRD issues and problems in travel industry.

UNIT: 1 Introduction **12 Hrs**

Meaning of Travel, Need for Travel; Significance of travel in the globalised scenario; concept of travel management, Features & need for travel management-Indian scenario in travel management.

Unit II: Itinerary Development **13 Hrs**

Itinerary planning- domestic, important domestic tourist sports-modes of transport to reach those spots-distance-cultural &Tourist spots of historical significance .

Unit III: Tour package Management 15 Hrs

Itinery planning-International Important tourist spots- Standard package tour- Tour designing Process-Tour brochure, Travel card,travel documentation.

Unit IV: Hospitality Facilities **13 Hrs**

Types of hotels-Fares & hospitality facilities available-Precautions to be taken while staying-Need & Significance of Travel Trade association-MICE-PATA-TAAI.

Unit V: Online Booking **12 Hrs**

Importance- Websites for travelers (Transport & Hospitality)-HRD Systems, models and practices in Travel Industry- Tourism manpower strategies-HRD problems and issues in travel industry.

Text Book:

- Cottman,Travel and tourism, VNR publication, Chennai, 2010.

Reference Books:

- Mowforth,Tourism Sustainability,Ruth udge Publications,New Delhi,2011
- Prabhas Chandra, Global Eco-Torism codes ,protocol &charter,Kaniskha publication, Chennai,2011.
- Milk & Moorivon,Tourism System-Introductory Text,VNR Publications,Chennai,2011.

UBAA505 GREEN MANAGEMENT

Semester :V **Credit : 4**
Category : Allied Optional **Hours/Week : 5**
Class & Major: III BBA **Total Hours : 65**

Objectives
To understand the basic concept of green management.
To develop green economy.
To analyze green competencies in marketing.

Unit I :Introduction **12 Hrs**

Green Management- Definition –Meaning-(Need for Green management, ozone depletion, global warming,) Evolution of Environmentalism-Modes of Greenness. Green Trade-Economy in Isolated system-GATT-Trips and environmental trade-Plant breeders rights(PBRS)-Impact of trade on Environment-Environmental Dumping.

Unit II: Green aid and Debt **8Hrs**

NGO and world bank- Aida for preserving national Identity and environmental controversy-Debt Swaps.

Unit III: Green Politics and future **18 Hrs**

Relationship between Environmental issues and politicians—Technology and Technologist-Green Future-interplay between individual and community –green movement.

Unit IV: Green Economy and Accounting **15 Hrs**

Green Economic process and flow-Economic principle of growth- Green Economics Vs. Orthodox Economics-Environmental economics.

Unit V: Green product and marketing **12Hrs**

Agriculture and plantation-Green houses-clean fuels-clean transport-green energy-Green Education-Waste Management-Green Competencies in marketing.

Text Book:

- S.K Agarwal, Green management,APH Publishing House,New Delhi,2005.

Reference Books:

- Dr. Geetha Jayakumar and Dr.Karpagam,Green Management,Margham Publication,Chennai,2010
- Philip Kotler, Marketing Management,PerencticleHall Of India,2000.,

UBAA506 MODERN MARKETING COMMUNICATION

Semester: V **Credit : 4**
Category: Allied Optional **Hours/Week : 5**
Class & Major: III UG **Total Hours : 65**

Objectives:
To enable the students

- To understand the basic concepts of marketing communication.
- To identify Internet marketing and to develop online public relations.
- To analyze various perceptions of customer in Indian Scenario.

UNIT I: Introduction **12 hrs**
Marketing communication – definition – purpose – integrated marketing communication – Role of communication in value creation and delivery.

UNIT II : Communication Strategy **13 hrs**
The basis of communication strategy – the new model of communication and Strategy - marketing strategy –marketing planning activity-corporate planning process.

UNIT III : Internet Marketing **15 hrs**
Internet marketing communication – Email advertising – website advertising – Sponsorship-E-commerce-Internet marketing-e-bay-e-mall-social media advertising.

UNIT IV : Online Public Relations **13 hrs**
Public relations activity – new methods of online public relations- problems and prospects-Publicity-print media-Magazines-Online Marketing-SMS marketing-Word-of-mouth marketing.

UNIT V : Tele marketing **12 hrs**
Telemarketing – importance of telemarketing – changing perception of customer– the Indian scenario-Automatic vending.

Text Book:

- S.L.Gupta, Advertising and sales promotion, S.Chand,New delhi, 2010.

Reference Books:

- M.Govindaran, Marketing Management,Percentile Hall of India,New Delhi, 2011.
- R.S.N.Pillai & Bagavathi, Marketing Management, S.Chand,New Delhi, 2010.
- C.B.Gupta, Business Communication, S.Chand, New Delhi, 2011.

UBAO507 Women in Management

Semester: V | Credit :5
Category: Allied optional | Hours/ week:5
Class & Major: III UG | Total hours: 65

Objectives:

- To familiarize the students with nature & functions of management.
- To create awareness on the challenges faced by women managers.

Unit I: Introduction **12Hrs**

Meaning- Management- nature, functions of management, qualities of manager- Nature of Women- Challenges to women as managers- case studies

Unit II: History of women in management **15Hrs**

Growing up – gender socialization – history of women managers- Defining glass ceiling – women at top-insights form successful women managers- International women managers- case studies

Unit III: Women in corporate sector **12Hrs**

Life styles of women managers – corporate response to work - work life balance – relationship in workplace-mentoring and networking – case studies.

Unit IV: Women business leaders **13Hrs**

Leadership – lessons from careers of successful women – challenges to women as managers – A review of gender differences in managerial behavior and effectiveness – feminine value – emotion and management – case studies.

Unit V: Laws to protect women at work **13Hrs**

The sexual Harassment of women at work place (Prevention, Prohibition and redressal, ACT 2013) – Equal pay Act 2013 – Pregnant workers Fairness Act 2013 – Women and minimum wages Act 2014 – case studies.

Text Book

- *Gary N. Powell, Women and men in management*, SAGE Publications, 2010.

Reference Books

- *Ronald J Burke, Marilyn Jdavidson, Women in Management worldwide: progress& prospects*,British Library Catalogue,MPG Books,2000.

UBAO 603 EVENT MANAGEMENT

Semester: VI Credits : 4
Category: Major optional Hours/Weeks: 5
Class & Major: III BBA Total Hours : 65

Objectives:

To enable the students

- understand the concepts in event management
- learn the managerial aspects of event management
- ensure Event safety and security.

Unit I- Introduction 10 Hrs

Concept of Event, Meaning of Event Management, Size & type of event, Event Team, Code of ethics- Aim of event, Developing a mission, Establishing Objectives - Preparing event proposal, Use of planning tools

Unit II –Principles of Event Management 15 Hrs

Principles of event Management, concept & designing- Analysis of concept, Logistics of concept.Feasibility, Keys to success, SWOT Analysis- Event Planning & Team Management.

Unit III-HR & Marketing aspects of event management 20Hrs

Protocols, Dress codes, staging, staffing- Leadership, Traits and characteristics- Nature of Marketing, Process of marketing- Marketing mix, Sponsorship- Image, Branding, Advertising -Publicity and Public relations- Leadership skills and Managing team.

Unit IV- Event Safety and Security 10Hrs

Security- Occupational safety- Crowd management- Major risks and emergency planning- Incident reporting, emergency procedures.

Unit V- Accounting Aspects of event management 10Hrs

Budget, breakeven point, cash flow analysis, Profit & loss statement, balance sheet, panic payments, financial control system.

Text Book:

Lynn Van Der Wagen & Brenda R Carlos, Event Management, Percentile Hall of India,New Delhi,2008

Reference Books:,

- Anton Shone & Bryn Parry, Successful Event Management,Vikhas Publications,Chennai,2011.
- Razaq Raj, Paul Walters, Event management, an integrated & practical approach ,Percentile Hall of India,New Delhi,2011.
- A professional approach By Ashutosh Chaturvedi, Event management,S.Chand,New Delhi,2012.

UBAO604 CUSTOMER RELATIONSHIP MANAGEMENT

Semester : VI **Credit :4**
Category : Major Optional **Hours/Week :5**
Class & Major: III BBA **Total Hours :65**

Objectives:
To enable the students

- Understand the importance of customer satisfaction in today's' competitive world.
- Identify CRM process and apply for framework of successful CRM.
- Use the modern technologies to build customer relationship.

Unit-I: Introduction **15 Hrs**

Introduction and significance of customer relationship marketing - Empowerment to service providers-Augment intangible benefits - Visit to the point of usage of the product - Develop partnership with customers - organizing customer clubs - Relationship based pricing schemes - Identifying with social events and concern for societal problem – effective customer communication system - customer complaint monitoring cell - developing customer satisfaction index - concentration on customer satisfaction research - drawing the attention of competitors customers.

Unit-II: CRM Process **15 Hrs**

Benefits of CRM Process- A closed –loop CRM Process – Major Technological Changes - Process flow choice - Repeat or iterative process - Four 'C's of CRM process – CRN process for Marketing Organizations - A Comparison with CMM Levels – Level one : Adhoc or initial ,Level two: Replicable or Repeatable, Level three: Focused or Defined, Level four: Managed, Level five : Optimized.

Unit-III:CRMImplementation. **12hrs**

How to choose the Right CRM solution – A framework for Successful CRM – Implement Customer Performance Measures – Assess Package Solutions Against a mix of criteria - Consider Skill & Organizational Implications – Implementing CRM:AStep-by-step process- CRM implementation steps – Requirements or information gathering – Prototyping & detailed proposal generation - Five phases of CRM Projects - Train & retrain- support, system optimization,& follow up - CRM for client server model - CRM at work - Service files.

Unit-IV: Building CRM. **10 Hrs**

CRM Process framework – Governance Process – Performance Evaluation Process.

Unit-V: An insight into CRM and ECRM. **13Hrs**

Overview of ECRM – Use of Technology in CRM – CRM Technology Tools – Implementation – Reasons and Failure of CRM..

Text Book:

- H.Peeru Mohamed and A.Sagadevan, Customer Relationship Management, Vikas publishing house PVT LTD, 2007

Reference Books:

- Amrit Tiwana, The Essentials Gained to Knowledge Management , E_business and CRM application , Pearson Education, 2001.
- Dr. Ravi Kalakota , E_business, Road Map for Success, Pearson Education, 2000.

UBAO 605 RETAIL MANAGEMENT

Semester : VI	**Credit**	**:**	**4**
Category : Major Optional	**Hours/Week**	**:**	**5**
Class & Major: III BBA	**Total hours**	**:**	**65**

Objectives:

To acquaint with different types of retail outlets.
To understand Customer Management and Show Room Management.
To evaluate different retailing methods for different kinds of products.

Unit- I Introduction: **15 Hrs**

Meaning-Role In Marketing-Difference Between Retailing And Selling, Retail Sales-Outlets-Department Stores, Multiple Shops-Chain Stores-Super Markets-Consumer Cooperative Store Employees-Cooperative Stores-Direct Sales-Petty Shops-Street Vendors.

Unit – II Organization of retail sales **15 Hrs**

Retail Sales – Organization - Sales Manager - Role Duties And Responsibilities Qualities - Salesman - Training Of Salesman - Travelling Salesman – Motivating Salesman-Sales Incentives.

Unit – III Customer Management **15 Hrs**

Customer Management – Difference Types Of Customers – Store Layout And Store Preferences – Why People Buy – Buying Decision Theory – Building Goodwill-Measuring Customer Purchases. Seasonal Variation In Sales-Methods Of Increasing Sales.

Unit – IV Show room Management **15 Hrs**

Show Room Management- Building Layout – Lighting – Window –Display – Interior Display – Checking Shortage – Slow Moving And Unsold Stock Discount Sales – Round The Clock Sales, Returns And Maintenance Of Records – Shops And Establishment Act.

Unit – V Merchanding **10 Hrs**

Retailing of services-Single brand outlet – Multi Brand outlet-Entry of Walmart -

Text Book:

- S.KBaral, S.C.Bihari,Retail Management, AITBS publication,Chennai,2010.

Reference Books:

- Morgenstern M & Strong, Modern Retailing Principles & Practice , Tata Mc GrawHill,Delhi,2010 .
- Davar.SR - Salesmanship & Publicity,Margham Publication, Chennai,2011.
- Schwartz ,Marketing Today A Basic Approach,Kalyani Publications,Chennai,2011.

UBAO606 EMERGING BUSINESS PRACTICES IN MANAGEMENT

Semester : VI **Credit : 4**
Category : Major Optional **Hours/week : 5**
Class & Major : III-BBA **Total Hrs : 65**

Objectives:
To enable the students:

- Understand the emerging business practices in india
- Realize the significance of IT enabled services
- Apply the above in organizational context

Unit - I KNOWLEDGE MANAGEMENT 12 Hrs

Concept – Importance of KM in organizations, learning organizations- KM process in organizations- challenges in creating organisational knowledge- KM strategies – architecture and tools – KM practices- Case studies.

Unit - II SIX SIGMA 14Hrs

Concept-Steps in involved in lunching six sigma-combining six sigma with quality-six sigma strategies-sig sigma process improvements-benefits derived-case studies.

Unit – III IT ENABLED SERVICES IN HRM 15Hrs

Introduction-data and information needed for hr manager-hr management process and HRIS-HRIS and Employee legislation-An integrated view of HRIS.

Unit – IV IT ENABLED SERVICES IN OTHER BUSINESS DOMAIN 13 Hrs

Business/Knowledge Process of sourcing-enterprise resource planning-threads in IT Enabled services-emerging and need of ERP-Strategies for ERP-Case Studies.

Unit –V CORPORATE GOVERENCE 10 Hrs

Concept-Significance in Indian Context,Corporate social responsibility-Role of board of directors-recommendations of birla committee and Naranayana murthy committee-sarbanes-oxley act of 2002

Text Book:

- Awad Elias M.Ghaziri Hassan.M,Knowlede Management,Pearson Education,2009.
- Eckes,Six Sigma For Everyone,John Wiley and Sons,New Jersey,2012.

Reference Books

- Singa,S,Corporate governance,Excel books,2010
- Weston,Chung,Hong,Mergers Restructuring and corporate control,Pentice Hall,2009
- Womack James,Daniel Jones,Daniel Roos, Machine that Changed the world,Harper Perennial, New York.2011

UBAO 607 INDUSTRIAL RELATIONS

Semester : VI **Credit : 5**
Category : Major Elective **Hours/Week : 5**
Class & Major: III BBA **Total Hours : 65**

Objectives
To enable the students

- Understand the basic concepts of Industrial relations.
- Interpret the growth of trade unions and examine workers participation in management.
- Assess the practical industrial relations.

UNIT-I INTRODUCTION 12 Hrs

Industrial Relation; Meaning-Objectives – Scope – Models- Industrial Relations in India –History & growth of IR- Approaches to IR- State and Industrial Relations - Labour Policy –Emerging trends in India-Flexi hours-Tele community.

UNIT-II TRADE UNIONS 13 Hrs

Trade Unionism – Theories of Trade Unionism – Principles, Philosophy and Policies of Indian Labour – Growth of trade unionism in India – Management of Trade unions–Central organizations of Indian trade unions: INTUC, AITUC, HMS, UTUC- Problems of trade unions Main provisions of Trade unions Act, 1926.

UNIT- III INDUSTRIAL DISPUTES 13 Hrs

Industrial disputes & prevention and settlement –Industrial disputes- Meaning, clauses, causes, consequences, Prevention and settlement- Main provisions of IR act, 1947-Standing orders- Main provisions of Industrial Employments(Standing Orders) Act, 1946- Disciplinary Action/ Domestic Enquiry.

UNIT-IV COLLECTIVE BARGAINING
13Hrs

Collective Bargaining - Objectives – Methods - Managements for negotiations - Union organization for bargaining - Pre requisites for the success of collective Bargaining-collective bargaining in India.

UNIT- V WORKERS PARTICIPATION IN MANAGEMENT 14Hrs

Workers participation- Meaning, scope, objectives, levels of participation-conditions –forms –works committee-Joint management council-Scheme of workers participation-shop council and plant council-workers participation share capital.

Text book

- Memoria, C.B.,"Dynamics of Industrial Relations in India", Himalaya Publishing House, Bombay, 2012.

Reference Books

- Ahuja.K.K,*Industrial Relations Theory& Practices*,Kalyani Publishers. New Delhi, 2011.
- Lal Das D.K,*Industrial Relations in India*,Sultan Chand, New Delhi,2012.
- Arun Monappa ,*Industrial Relations in India*, Sultan Chand,New Delhi, 2013.

E-Resources

- https://www.wegate.eu/list-**e**-learning-**materials**-tools
- www.adam-europe.eu/prj/6726/project_6726_en.pdf
- www.uwcc.wisc.edu/info/**women**/escap2468.pdf

UBAO608 RURAL MARKETING

Semester : VI **Credit : 5**
Category : Major Elective **Hours/Week : 5**
Class & Major: III BBA **Total Hours : 65**

Objectives:
To enable the students

- Understand rural marketing scenario in India.
- Examine the consumer behaviour in rural market.
- Analyse the impact of government schemes in rural development.

UNIT-I INTRODUCTION **13 Hrs**

Rural Marketing- Definition- Scope - Concepts- Components- Classification - Rural versus Urban Markets Problems- Rural Marketing Environment: Population- Occupation Pattern- Income Generation-Location of Rural Population- Expenditure Pattern- Land Distribution-Land Use Pattern- Development Programs- Infrastructure Facilities- Rural Credit Institutions.

UNIT- II RURAL CONSUMER BEHAVIOUR **14 Hrs**

Consumer Behaviour – Factors; Social - Technological - Economic – Political. Characteristics of Rural Consumer: Age and Stages of the Life Cycle- Occupation and Income- Economic Circumstances- Lifestyle- Personality and Brand Belief- Information Search and Pre Purchase Evaluation.

UNIT- III RURAL MARKET RESEARCH **12 Hrs**

Sanitizing Rural Market- Research Design - Reference Frame- Research Approach- Diffusion of Innovation- Development Studies- PRA Approach- The Need for PRA- Sampling- Operational Aspects of Data Collection.

UNIT- IV RURAL MARKETING STRATEGIES **12 Hrs**

Segmenting- Targeting and Positioning Segmentation-Basis of Segmentation and Approaches to Rural Segmentation .Product strategy for rural markets. Concept and significance. Product mix and product item decisions- Competitive product strategies- Pricing strategy in rural marketing: Concept- Significance- Objectives- Policy and strategy.

UNIT- V FUTURE OF RURAL MARKETING **14 Hrs**

Introduction- Focused Marketing Strategies- Market Research- Consumer Finance- Rural Vertical- Retail and IT Models- Rural Managers-Glamorize Rural Marketing- Public-Private Partnership- E-Rural Marketing-Case Studies in Indian Context.

Text Book

- Krishnamacharyulu C.S.G. & Lalitha Ramakrishnan, *"Rural Marketing*" – Text and Cases- Pearson education 2015

Reference Books

- Habeeb Ur Rahman, *Rural Marketing*, HPH, New Delhi, 2014.
- Robert Chambers, *"Rural Development: Putting the last first*", Pearson education, New Delhi, 2014
- T.P. Gopal Swamy-, "*Rural Marketing"* Vikas Publishing House, 2012

UBAA509 FRONT OFFICE MANAGEMENT

Semester : VI **Credit : 4**
Category : Allied Optional **Hours/Week : 5**
Class & Major: III UG **Total Hours : 65**

Objectives:

To enable the students

- Understand the essential qualities of front office manager.
- Develop the knowledge of managing front office.
- Prepare front office documents for effective management.

UNIT- I INTRODUCTION **10hrs**

Front Office; Introduction- Functions- Front of the House Operations-Back House Operations - Front Office Structure- Reservation Office - Types of Reservation System- Accepting or Denying Reservation-Generating Reservation Reports - Managing Reservations

UNIT- II FRONT OFFICE RESPONSIBILITIES **15 hrs**

Responsibilities; Introduction - Communication with guest - Guest services - Guest history, Emergency situations. Reservations: Introduction, need, definition and importance of reservation request, individual & group reservation booking, booking instruments, conventional chart, arrival & departure registers, reservation cycle and hotel reservation systems

UNIT-III TELECOMMUNICATIONS **10 hrs**

Introduction - telecommunication equipments (mobile phones, internet, Intranet, E-mail, whats app, face book and recent medias – telecommunication skills, communication over telephone.

UNIT-IV FRONT OFFICE PROCEDURES & RESERVATIONS **15 hrs**

Functions and operations of various systems - Different forms used in front office- Equipments found in front office - Computer applications used in front office -Layout of the front office department - Importance of reservation -Modes of reservation -Channels and sources -Types of reservation -Systems - Cancellation, amendments and overbooking

UNIT-V FRONT OFFICE DOCUMENTS **15 hrs**

Records and Registers - Different Forms, reports and formats used in Front Office –

Tariff structure-Passport, visa, currency, official documents, and health and baggage regulations- Records Management- Etiquette.

Text Book:

- S K Bhatnagar, Front Office Management, Frank Brothers Press, Mumbai 2015

Reference Books

- Chakravarti**,** Concept Of Front Office Management Aph Publishing, 2016
- Andrews, Front Office Mgmt & Operations, Tata Mcgraw-Hill Education, 2014
- Bhatnagar. S, Front Office Management, Frank Bros & Com. New Delhi, 2012.
- Sudhir Andrew, Front Office Management training Manual, Tata McGraw Hill, New Delhi, 2010.

E-Resources

- https://www.wegate.eu/list-**e**-learning-**materials**-tools
- www.adam-europe.eu/prj/6726/project_6726_en.pdf
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UBAA510 HOSPITALITY MANAGEMENT

Semester	**: VI**	**Credit**	**: 4**
Category	**: Allied optional**	**Hours/week**	**: 5**
Class & Major: III UG		**Total Hrs**	**: 65**

Objectives

To enable the students

- Understand the basic concepts of Hospitality and its management.
- Analyze various services rendered under hospitality.
- Prepare to manage hospitality services.

UNIT-I INTRODUCTION **12 Hrs**

Definition, meaning, scope and importance, types and methods. Hospitality – hotels in India, Industrial supply in India, Historical perspective, Economic issues, Organizations, Accommodation – timeshare , Accommodation – caravan and camping, Other activities within the hospitality and leisure industry

UNIT-II LEGISLATION RELATED TO HOTEL MANAGEMENT **13 Hrs**

Food and safety legislation, liquor licensing legislation, Health and safety at work and Planning legislation.

UNIT-III ASPECTS OF MANAGEMENT **15 Hrs**

Commissioning the property, Procurement, Sources of revenue and operating costs, Market segments

UNIT-IV ACCOMMODATION OPERATIONS **12 Hrs**

Marketing, Rooms division, Rooms, Housekeeping, Planning and organising the housekeeping department, Human resource management, financial control

UNIT-V ENVIRONMENTAL ISSUES **13 Hrs**

The environment, Environment initiatives, Environment issues – the hospitality industry, Computer reservations systems, Quality assurance, Total quality management

Text Books

- Stephen Ball, Jones Peter, Kirk David and Lockwood Andrew - "Hospitality Operations": A System Approach (Cengage Learning, 1st Ed.),2013
- Hospitality Management: An Introduction, T. Knowles, Pitman Publishing. 2014

Reference Books

- Lee-Ross Darren - HRM in Tourism and Hospitality (Cengage Learning, 1st Ed.),2012
- Kotler Philip, Bowen John and Makens James - Marketing for Hospitality and Tourism (3rd Edition,Pearson Education 2015).

E-Resources

- https://www.wegate.eu/list-**e**-learning-**materials**-tools
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UBAS501 BUSINESS ETHICS

Semester : V **Credit : 1**
Category : Self study IV **Hours : 2**
Class & Major : III BBA **Total Hours :26**

Objectives:
To enable the students

- Understand ethical foundations of business decisions.
- Employ with practical ethical issues and practices.
- Analyze social responsibility of business.

UNIT-I INTRODUCTION **10 Hrs**

Business Ethics and Values in Business; Role and importance- Definition- Impact on Business Policy and Business Strategy - Role of CEO- Impact on the Business Culture.

UNIT-II TYPES OF ETHICAL ISSUES **8 Hrs**

Ethical Issues – Types; Bribes – Coercion – Deception – Theft – Unfair Discrimination - Exploitation of employees- difference between Ethics, Values and legal.

UNIT- III ETHICAL PRACTICES **8 Hrs**

Internal Ethics – Hiring Employees – Promotion – Discipline – Wages – Job Description. External Ethics – Consumers – Fair Prices – False Claims - Advertisements. – Environment protection – Natural – Physical – Society – Relationship of Values and Ethics – Indian Ethos – Impact on the performance.

Text Book

- Sankaran.S, Business *Ethics and values*, Margham Publication, Chennai, 2012.

Reference Books

- Shyanam L. Kaushal ,*Business ethics concepts, crisis and solution*, Margham publication,Chennai,2013
- Manisha paliwal,*Business Ethics*, New Age International, New Delhi,2010

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UBAS502 CORPORATE SOCIAL RESPOSNSIBILITY

Semester : V	**Credit : 1**
Category : Self study V	**Hours : 2**
Class & Major :III BBA	**Total Hours :26**

Objectives:

To enable the students

- Understand basic sociological concepts and features of CSR.
- Analyse the various implementation of CSR initiative in India.
- Appraise the contemporary issues of CSR in real business environment.

UNIT- I INTRODUCTION **8 Hrs**

Meaning - Definition - History and evolution - Concept of Charity - Corporate philanthropy - Corporate Citizenship, CSR -an overlapping concept. - Relation between CSR and Corporate Governance - Environmental aspect - Chronological evolution – models: Carroll's model- drivers - Factor influencing CSR

UNIT-II CSR LEGISLATION **7 Hrs**

Section 135 of Companies Act 2013- Scope for CSR Activities under Schedule VII- Appointment of Independent Directors on the Board -Computation of Net Profit's implementing Process in India.

UNIT-III CONTEMPORARY ISSUES IN CSR **11 Hrs**

Contemporary issues in CSR - Global Compact Self Assessment Tool - National Voluntary Guidelines by Govt. of India- Understanding roles and responsibilities of corporate foundations- Review current trends - opportunities in CSR - Case Studies

Text Books

- Mark S. Schwartz, *Corporate Social Responsibility: An Ethical Approach*, Broadview press, Chennai, 2011.

Reference Books

- Sanjay K Agarwal, *Corporate Social Responsibility in India Inc publication,* Mumbai 2012.

• Mallin, Christine A *Corporate Governance (Indian Edition)*, Oxford University Press, New Delhi 2014
• Sharma, J.P *Corporate Governance, Business Ethics & CSR*, Ane Books Pvt Ltd, New Delhi, 2012.

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UBAR601 WORKSHOP ON LEADERSHIP SKILLS

Semester : VI **Credit : 1**
Category : Core XXI **Hours/week : 1**
Class & Major : III BBA **Total Hours : 13**

Activities related to following topics

Topics	Activities
Problem solving, Communication skills to build a team.	Stand by your quote, Reality check
Influencing people	Leadership Dance card Centre stage
Decision making and problem solving	Leadership Swap Walking the talk
Team building	Leadership skills plan, Leadership challenged
Motivation and rewards	Leadership values, Leaders to admire

Online References

- http://www.workshopexercises.com/Leadership.htm#Activity%20Listing:
- http://www.studentleadershipchallenge.com/Resources-Activities.aspx
- http://lead.gmu.edu/training-resources/activities-and-exercises/
- https://www.envisionexperience.com/blog/leadership-building-activities-for-the-classroom-a-series

Evaluation Pattern for Executive Workshop

CIA
Daily Practical assessment: 60 marks
Test I
Viva I
Test II
Viva II
ESE
Record/PE/Viva : 40 marks

100marks

III & IV Evaluation Components OF CIA

UG:

Sem	Category	Course Code	Course Title	Component III	Component IV
V	CORE-XIV	UBAM507	Research Methods in Business	Chart Presentation	Questionnaire Preparation
	CORE-XV	UBAM508	Services Marketing	Service marketing in Indian scenario	Experiential learning
	CORE-XVI	UBAM509	Mercantile law	Presentation Of Recent Article from News Papers	Poster presentation
	CORE-XXIX	UBAM504/ UCOM507/ UCCM507	Management Accounting	Assignment on theoretical aspect of Managerial Accounting	Problem solving
VI	CORE-XVII	UBAM608	Strategic Management	Seminar	Case study
	CORE-XVIII	UBAM609	Women Entrepreneurship	Presentation of Business Ideas and Plans	Case study
	CORE-XIX	UBAM610/ UCOM613/ UCCM613	Financial management	Assignment on theoretical aspect	Problem solving
	Major optional	UBAO607	Industrial Relations	Assignment on disputes handling system in Indian Industrial scenario	Case study
		UBAO608	Rural Marketing	Seminar	Case study
V	Allied optional	UBAA509	Front office management	Functions of front office management	Case study
		UBAA510	Hospitality management	Seminar	Presentation of hospitality services
V	Self study IV	UBAS501	Business ethics	Term Paper	Case study
V	Self study V	UBAS502	Corporate social responsibility	Seminar	Term paper

UBAP601 PROJECT

Semester : VI **Credit : 5**
Category : Core XXI **Hours/week :6**
Class : III BBA **Total Hours :78**

Guidelines

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

Research area

- Human resource Management
- Finance
- Marketing
- Production

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

S.NO	Components	Marks	
		CIA	ESE
1.	Review of Literature	10	
2.	Title of the Topic	10	
3.	Statement of the problem	10	
4.	Research Design and statistical tool	10	
5.	Result	10	
6.	Project report	10	
7.	Writing report		20
8	Oral presentation		10
9	Viva-voce		10
Total		**60**	**40**

PG & RESEARCH DEPARTMENT OF COMMERCE

UG **:** Course Profile, list of courses offered to other departments and the syllabi of courses offered in semesters V and VI along with evaluation components III & IV **(with effect from 2015-2018 batch onwards**) are presented in this booklet.

COURSE PROFILE B.Com.

Semester	Part	Category	Course Code	Course Title	Contact / Week	Credit	
						Min	Max
I	I	Part I	UTAL105/UTAL106/ UFRL101/UHIL101	Basic Tamil – I/ Advanced Tamil – I/ French – I/Hindi	4	2	3
	II	Part II	UENL107/UENL108	General English -I / Advanced English- I	5	3	4
	III	Core I	UCOM104/UCCM102	Financial Accounting	6	5	5
		Allied	UCEA103	Business Economics	6	5	5
		Allied	UMAA112	Business Mathematics	5	4	4
		Core II	UCOM103/UCCM103	Fundamentals of Commerce	2	1	1
	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	4	2	3
	II	Part II	UENL207/UENL208	General English II/ Advanced English II	5	3	4
	III	Core III	UCOM203/UCCM202/ UCOA203	Accounting Package- Theory	2	2	2
		Core III Practical	UCOR204/UCCR203/ UCOR203	Accounting Package - Practical	3	2	2
		Core IV	UCOM204/UCCM203	Business Correspondence	4	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	Cost Accounting	6	5	5
		Core VII	**UCOM306 / UCCM306/ UBAM308**	**Marketing Management**	**6**	**5**	**5**
		Core VIII	**UCOM307/UBAM309**	**Financial Markets & Services**	**6**	**5**	**5**
		Allied	UMAA301	Business Statistics	6	5	5
	IV	Non Major Elective			4	2	2
		Value Education			2	1	1
				TOTAL	**30**	**23**	**23**

IV	III	Core IX	UCOM407	Banking Law & Practice	5	4	4
		Core X	UCOM408/ UCCM408	Corporate Accounting	5	4	4
		Core XI	UCOM409/ UCCM409	Business law	6	5	5
		Core XII	**UCOM410 / UCCM410**	**Security Analysis & Portfolio Management**	**5**	**4**	**4**
		Core XIII	**UCOR411**	**Commerce Workshop**	**1**	**1**	**1**
		Allied	UCSA405	Computer Application in Business - Theory	**3**	**3**	**3**
		Allied Practical	UCSR409	Computer Application in Business – Practical	**3**	**2**	**2**
		Soft Skills			2	1	1
	V	Extension Activity Physical Education/NCC			-	-	2
				TOTAL	**30**	**24**	**26**
V	III	**Core XIV**	UCOM505/ UCCM505	Income Tax Law & Practice I	6	5	5
		Core XV	UCOM506/ UCCM506	Company law	5	4	4
		Core XVI	**UCOM507/ UCCM507/ UBAM504**	**Management Accounting**	6	5	5
		Core XVII	UCOM508	Practical Auditing	6	5	5
		Allied Optional			5	4	4
	IV	Value Education			2	1	1
				TOTAL	**30**	**24**	**24**
VI	III	**Core XVIII**	UCOM609/ UCCM609	Indirect Taxation	5	4	4
		Core XIX	**UCOM612/ UBAM609**	**Women Entrepreneurship**	5	5	5
		Core XX	**UCOM613/ UCCM613/ UBAM610**	**Financial Management**	6	5	5
		Core XXI	**UCOM614/ UCCM614**	**Enterprise Resource Planning**	**6**	**5**	**5**
		Core XXII	**UCOR615/ UCCR615**	**Commerce Workshop**	**1**	**1**	**1**
		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**			
	IV	Soft skills			2	1	1
				TOTAL	**30**	**26**	**28**
				GRAND TOTAL	**181**	**140**	**149**

COURSE PROFILE B.Com. (CA)

Semester	Part	Category	Course Code	Course Title	Contact /Week	Credit	
						Min	Max
I	I	Part I	UTAL103/UTAL104/ UFRL101/UHIL101	Basic Tamil – I/ Advanced Tamil – I/ French – I/Hindi	4	2	3
	II	Part II	UENL107/UENL108	General English -I/ Advanced English-I	5	3	4
	III	Core I	UCOM104/UCCM102	Financial Accounting	**6**	**5**	**5**
		Allied	UCSA103	PC Software	**3**	**3**	**3**
		Allied Practical	UCSR108	PC Software – Lab	**3**	**2**	**2**
		Core II	UCCM103/UCOM103	Fundamentals of Commerce	**2**	**1**	**1**
		Allied	UMAA114	Business Mathematics	5	4	4
	IV	Value Education			2	1	1
				TOTAL	**30**	**21**	**23**
II	I	Part I	UTAL203/UTAL204/ UFRL201/UHIL201	Basic Tamil – II/ Advanced Tamil –II/ French – II/Hindi	4	2	3
	II	Part II	UENL205/UENL206	General English/ Advanced English	5	3	4
	III	Core III	UCCM202/UCOM203/ UCOA203	Accounting Package-Theory	**2**	**2**	**2**
		Core III Practical	UCCR203/UCOR204/ UCOR203	Accounting Package Practical	**3**	**2**	**2**
		Allied	UCSA203	Programming in C	2	2	2
		Allied Practical	UCSR205	Programming in C-Lab	3	2	2
		Core IV	UCCM203/UCOM204	Business Correspondence	4	4	4
		Core V	UCCR205	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	UCCM305/UCOM305	Cost Accounting	6	5	5
		Core VII	UCCM306/ UCOM306/UBAM308	Marketing Management	**6**	**5**	**5**
		Allied	UCSA303	Multimedia – Theory	3	3	3
		Allied Practical	UCSR306	Multimedia – Practical	3	2	2
		Allied	UMAA309	Business Statistics	6	5	5
	IV	Non Major Elective			4	2	2
		Value Education			2	1	1
				TOTAL	**30**	**23**	**23**
IV	III	Core VIII	UCCM408/UCOM408	Corporate Accounting	5	4	4
		Core IX	UCCM405	e-Banking	**5**	**4**	**4**
		Core X	UCOM409/UCCM409	Business law	6	5	5
		Core XI	UCCM410	Security Analysis & Portfolio Management	5	4	4
		Core XII	UCCR410	Commerce Workshop	**1**	**1**	**1**

		Allied	UCSA403	Database Management System	3	3	3
		Allied Practical	UCSR405	Database Management System-Lab	3	2	2
	V	Soft skills			2	1	1
		Extension Activity/ Physical Education/NCC			-	-	2
				TOTAL	**30**	**24**	**26**
V	III	Core XIII	UCCM505/UCOM505	Income Tax Law & Practice I	6	5	5
		Core XIV	UCCM506/UCOM506	Company Law	5	4	4
		Core XV	UCCM507/UCOM507/UBAM504	Management Accounting	6	5	5
		Allied	UCSA508	Web designing	3	3	3
		Allied Practical	UCSR506	Web designing - Lab	3	2	2
		Allied Optional			5	4	4
	IV	Value Education			2	1	1
				TOTAL	**30**	**24**	**24**
VI	III	Core XVI	UCCM609/UCOM609	Indirect Taxation	5	4	4
		Core XVII	UCCM612	E- Entrepreneurship	**5**	**5**	**5**
		Core XVIII	UCCM613/ UCOM613/ UBAM610	Financial Management	6	5	5
		Core XIX	UCCM614/UCOM614	Enterprise Resource Planning	**6**	**5**	**5**
		Core XX	UCCR615/UCOR615	Commerce Workshop	**1**	**1**	**1**
		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			
	V	Soft skills			2	1	1
		Extension Activity/ Physical Education			-	-	2
				TOTAL	**30**	**26**	**28**
				GRAND TOTAL	**180**	**140**	**149**

COURSES OFFERED TO OTHER DEPARTMENTS

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

NON MAJOR ELECTIVE

(These courses are offered to all major except B.Com. B.Com. CA, BBA & BA Corporate Economics)

Semester	Category	Course Code	Course Title	Contact/ Week	Credit	
					Min	Max
III	Non Major Elective – II	UCOE302	Women Entrepreneurial Development	4	2	2

NON MAJOR ELECTIVE

(These Courses are offered to all major except B.Com & B.Com. CA, B.B.A. and B.A (Corporate Economics)

Semester	Category	Course Code	Course Title	Contact / Week	Credit	
					Min	Max
III	Non Major Elective – II	UCCE301	Internet Banking	4	2	2

EXTRA CREDIT EARNING PROVISIONS

Semester	Category	Course Code	Course Title	Contact / Week	Credit	
					Min	Max
IV	Core XXVII/ XXV	UCOI401/ PCOI401	Summer Internship	-	-	1

SELF STUDY

Semester	Course code	Course Title
	UCOS501/ UCCS501	**Business Ethics and corporate governance**
	UCOS502/ UCCS502	**Business Analysis**

ALLIED OPTIONAL (B.Com)

(These courses are offered to English, Tamil, Economics and BBA)

Semester	Category	Course Code	Course Title	Contact/ Week	Credit	
					Min	Max
V	**Allied Optional**	UCOA504 **UCOA506**	Practical Auditing **Investment and security market**	**5**	**4**	**4**

ALLIED OPTIONAL (B.Com CA)

(These courses are offered to English, Tamil, and Economics Only)

Semester	Category	Course Code	Course Title	Contact/ Week	Credit	
					Min	Max
V	Allied Optional	UCCA501 UCCA502 **UCCA503**	Office Management Labour Laws **Rural Marketing**	5	4	4

UCOM505/UCCM505 INCOME TAX LAW AND PRACTICE - I

Semester : V **Credit : 5**
Category : Core XIV/ XIII **Hours/Week : 6**
Class & Major: III B.Com / B.Com CA **Total hours : 78**
Objectives:
To enable the students

- Gain knowledge on Principles and Practice of Income Tax Act in India.
- Apply Income Tax provisions for Tax planning

UNIT- I INTRODUCTION **15 Hrs**

Meaning of Income – Canons of Taxation – Important definitions under the Income Tax Act -Scope of Total income – Residential Status – Incomes Exempt from Tax

UNIT- II COMPUTATION OF INCOME FROM SALARIES **16 Hrs**

Income from Salaries – Scope of Salary Income – Deductions from salary Income

UNIT-III COMPUTATION OF INCOME FROM HOUSE PROPERTY **16 Hrs**

Income from House Property – Deductions- Profit and Gains of Business or Profession – Deemed Business profits – Allowed and Disallowed expenses.

UNIT- IV COMPUTATION OF CAPITAL GAIN **15 Hrs**

Capital Gain – Short Term and Long Term Capital Gain – Exempted Capital Gain

UNIT- V COMPUTATION OF INCOME FROM OTHER SOURCES **16 Hrs**

Income from Other Sources – Deductions .

Note: Theory 20% and Problem 80%

Text Books

- Gaur V.P. &Narang D.B., *Income Tax Law & Practice*, Kalyani Publishers, Ludhiana,2016
- Hariharan, *Income Tax,* Vijay Nichole Imprint Pvt ltd,Chennai,2016

Reference Books

- Bupathy R, *A Study on Income Tax & CST*, Prime Knowledge Series, Chennai,2015
- VinodSinghania,(Latest edn) *Students guide to Income Tax*, Taxmann Publication Pvt. Ltd., New Delhi.2015
- DinkarPagare, *Income Tax Law & Practice* , Sultan Chand & Sons,2015
- www.taxmann.com,www.cbdt.gov.in

UCOM506/UCCM506 COMPANY LAW

Semester	**: V**	**Credit**	**: 4**
Category	**: Core XV/XIV**	**Hours/Week**	**: 5**
Class & Major	**: III B.Com / B.Com CA**	**Total hours**	**: 65**

Objectives:

To enable the students

- Understand the Provisions of Company law.
- Form and manage the companies

UNIT- I INCORPORATION OF A COMPANY 12 Hrs

Company – Definition –Characteristics-Corporate Veil- Kinds of Companies – Incorporation – Memorandum of Association – ultra vires – Alteration of Memorandum.

UNIT- II REGISTRATION DOCUMENTS 14 Hrs

Articles of Association – Contents – Alteration – Doctrine of Constructive Notice – Indoor Management – Prospectus-Contents-Consequences for Misstatement in Prospectus.

UNIT- III ISSUE OF SHARES 14 Hrs

Shares – Kinds of Shares-Equity-Preference shares-Allotment of Shares-Minimum Subscription-Share Certificate -Share Warrant – Issue of Shares on Premium and discount – Redemption of Preference shares- forfeiture of shares.

UNIT-IV TRANSFER OF SHARES 13Hrs

Membership of Companies – Transfer and Transmission of Shares – Blank transfer – forged transfer.

UNIT-V MANAGEMENT OF COMPANIES 12Hrs

Management of Companies – Board of Directors –Appointment-Duties and Powers of the Board- Managing Director –Manager-Appointment-Duties and Powers- Company meetings – Notice, Quorum ,Proxy, Minutes, Resolution.

Text Books

- Kapoor N.D ,*Company Law Sultan Chand*, New Delhi,2015
- Avatar Singh, *Company law*,Book Well Publishers, New Delhi,2015

Reference Books

- Kathiresan and Radha ,*Company Law*, Prasanna Publishers, Chennai,2015
- Dr.B. Balanchandran, P.K.Boose, Company Law, *Sultan Chand*, New Delhi, 2015

UCOM507/UCCM507/UBAM504 MANAGEMENT ACCOUNTING

Semester	**: VI**	**Credit**	**: 05**
Category	**: Core XVI/ XV**	**Hours/Week**	**: 06**
Class/Major	**: III B.Com/B.Com (C.A)/BBA**	**Total hours**	**: 78**

Objectives:

To enable the students

- Gain knowledge of the basic concepts of management accounting
- Analyze and interpret the financial statements
- Develop accounting skills to take managerial decisions

UNIT-I INTRODUCTION TO MANAGEMENT ACCOUNTING 15 Hrs

Management Accounting – Meaning, scope, importance and limitations – Management Accounting vs. Cost Accounting – Management Accounting vs Financial Accounting.

UNIT- II ANALYSIS AND INTERPRETATION OF FINANCIAL STATEMENT 16 Hrs

Financial statement – Nature, objectives and tools– Methods– Comparative Statements , Common Size statement – Trend Analysis

UNIT- III RATIO ANALYSIS 16 Hrs

Ratio analysis – Benefits and Limitations, Classification of Ratios – Liquidity, Solvency, Profitability and Turnover Ratios

UNIT- IV FUND FLOW& CASH FLOW ANALYSIS 15 Hrs

Fund Flow and Cash Flow Statement – Differences – Advantages – Limitations - conversion method only.

UNIT-V BUDGETARY CONTROL AND MARGINAL COSTING 16 Hrs

Budgets and Budgetary Control – Meaning, objectives, Merits and Demerits – Types of Budgets – Production, Cash and Flexible Budget, Marginal Costing (excluding decision making) – Absorption Costing and Marginal Costing – CVP analysis – Break Even analysis and Break even Chart.

Note-Theory – 30%, Problems – 70%

Text Books

- Srinivasan N.P *Management Accounting*, Sterling Publishers Ltd. , New Delhi, 2014
- Reddy & Murthy, *Management Accounting*, Margham Publications, Chennai, 2015
- Maheswari S.N,*Cost and Management Accounting*, Sultan Chand & Sons, New Delhi, 2015

Reference Books

- Jain And Narang, *Cost and Management Accounting*, Kalyani Publications, New Delhi, 2014

- Pillai.R.S.N & Bhagirathi, *Management Accounting*, S.Chand & Co. Ltd, New Delhi., 2013
- M.Y. *Khan*,P.K. *Jain*, *Management Accounting, Publisher*-Tata McGraw-Hill Education, 2014.

E- Resources

- www.pondiuni.edu.in/storage/dde/downloads/finiii_ma.**pdf**
- www.ddegjust.ac.in/studymaterial/mcom/mc-105.**pdf**
- https://www.saylor.org/site/textbooks/**Managerial**%20**Accounting**.**pdf**

UCOM508 PRACTICAL AUDITING

Semester : V **Credit : 5**
Category : Core XVII **Hours/Week : 6**
Class & Major:III B.Com **Total hours : 78**

Objectives:

To enable the student

- Have basic knowledge on the principles and practice of Auditing
- Verify the books of accounts and deduct errors and frauds
- Prepare auditing reports

UNIT - I INTRODUCTION **16 Hrs**

Meaning and definition of auditing – Objects – Errors and fraud – importance, advantages of an audit – distinction between Accountancy and Auditing – various types of Audit-Cost,Management, Process & Environment.

UNIT - II AUDIT PLANNING **15 Hrs**

Audit planning – Audit programme – Advantages of audit programme – preliminaries and the commencement of audit, internal check, internal control – internal audit and continuous audit – audit working paper and audit note book

UNIT - III VERIFICATION AND VALUATION OF ASSETS AND LIABILITIES **16 Hrs**

Audit techniques, vouching, verification and valuation of assets and liabilities

UNIT - IV DUTIES & RESPONSIBILITIES OF AN AUDITOR **16 Hrs**

Law relating to appointment of Auditors, Qualification, Rights, duties and liabilities of auditors.

UNIT - V AUDITING REPORT **15 Hrs**

Auditing report- significance –kinds of audit report-Investigation-Meaning-distinction between investigation and auditing – computer applications in auditing.

Text Books

- Tandon,B.N, Sudharsanam S and SundharabahuS*Handbook of Practical Auditing*, S.Chand& Co., Ltd.NewDelhi,2014

- DinkarPagare, *Principles and Practice of Auditing*, Sultan Chand &Sons. New Delhi. 2014

Reference Books

- TandonB.N, *Auditing*, S.Chand& Co., New Delhi,2015
- Spicer &Pegler, *Auditing*, Macmillan Publishers, New Delhi,2015
- Ghatalaia,Spicer and Peglers's,*Practical Auditing*, S.Chand& Co. New Delhi.,2015

UCOM609/UCCM609 INDIRECT TAXATION

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

Objectives:

To enable the students

- Study the concepts of Indirect Tax
- Determine the Indirect Tax Liability
- Apply the provisions of Indirect Tax Laws for tax planning

UNIT - I INTRODUCTION **13 Hrs**

Introduction: Taxes – Objectives of tax – Types of taxes – Direct Vs Indirect taxes- Forms of indirect tax —Features of Indirect taxes — Merits and demerits of indirect taxation.

UNIT - II CENTRAL EXCISE DUTY **12 Hrs**

Central Excise Duty: Meaning — Features - Bases of excise duty — Kinds of excise duty — Basic concepts - Goods - excisable goods - manufacture - manufacture - Valuation of goods –Assessable Value – Transaction value – Conditions – MRP based valuation .

UNIT - III CUSTOMS DUTY **13 Hrs**

Customs Duty: Meaning — Objectives — Scope — Types of customs duty - Valuation of goods under the Customs Act – Baggage rules- Duty drawback.

UNIT - IV CST&VAT **15 Hrs**

Sales Tax Laws: Objectives and scope —Features of CST- Inter-state sale and Intra-state sale - Registration of dealers — goods of special importance — VAT- objectives-features – TIN- VAT invoice – Records to be maintained – Advantages of VAT.

UNIT - V SERVICE TAX **12 Hrs**

Service tax – need for levy of service tax – objectives- Features of service tax - levy and collection of service tax- penalties.

Text Books

- Balachandran. V., *Indirect Taxation*, Sultan Chand & Sons New Delhi,2012
- Datey. VS., *Indirect Taxes*, Taxmann Publications, New Delhi, 2010

Reference Books

- Jain RK., *Central Excise Manual,* Centax Publications, New Delhi, 2010
- Bhatnagar SP., *Customs Law and Procedure,* Centax Publications, New Delhi,2010
- V.Raghuraman and Madhukar N.Hiregange, Central Excise Law and Procedures,
- Centax Publications P Ltd., Delhi, 2009.
- www.taxmann.com,www.cbec.gov.in

UCOM612 /UBAM609/ WOMEN ENTREPRENEURSHIP

Semester	**: VI**	**Credit**	**: 05**
Category	**: Core XIX**	**Hours/Week**	**: 05**
Class/Major	**: III B.Com/ BBA**	**Total hours**	**: 65**

Objectives:

To enable the students

- Understand the concept of women entrepreneurship
- Identify the various schemes under various financial institutions
- Prepare business ideas to establish small scale business

UNIT - I INTRODUCTION TO ENTREPRENEURSHIP 10 Hrs

Entrepreneur and Entrepreneurship – Concept- Characteristics, Functions and types of entrepreneur; Intrapreneurship, Homepreneurship. Growth of entrepreneurship in India –- Theories of Entrepreneurship

UNIT – II PROJECT IDENTIFICATION 13 Hrs

Search for a Business Idea- Product, Process identification – Sources and Selection – Project Classification and Identification – Constraints - Project life cycle-Project formulation –Need, Concept, Significance and elements of project formulation – Feasibility analysis – Project report – methods of project appraisal – plant layout- Business ideas, Plan, layout Presentation.

UNIT III: GOVERNMENT POLICIES 14 Hrs

Concept –growth of women entrepreneur-problems and prospects of women entrepreneurship-Government policies-Financial assistance – various government schemes for women entrepreneurship-Tamilnadu Industrial Corporation for development -Women entrepreneurship in India-Successful women entrepreneurs.

UNIT - IV PROJECT FINANCE 14 Hrs

Need and Importance - Institutional finance to Entrepreneurs – Commercial banks and Development banks – SIDBI, TIIC, IDBI–Institutional support to entrepreneurs.

UNIT – V ESTABLISHMENT OF SMALL BUSINESS 14 Hrs

Steps for starting a small Industries – selection of organizations – preparation of project proposal- Procedure and formalities for Registration- Government policy for small and medium scale enterprises - Taxation Benefits to small-scale industry .

Text Books

- Gupta C.B, & Srinivasan N.P, *Entrepreneurial Development*, Sultan Chand&Co, New Delhi,2015
- Saravanavel. P ,*Entrepreneurial Development, Principles, Policies and Programmes,* Ess Pee Kay Publishing House,2013
- Charantimath, *Entrepreneurial Development*& Small Business Enterprise, Pearson Education., New Delhi,2011

Reference Books

- Jayshree Suresh, *Entrepreneurial Development*, Margham Publications,Chennai,2014
- Sujata .V, *Entrepreneurial Development*, Cauvery Publications,Trichy,2012
- *Prasanna Chandra*, *Entrepreneurship Development*, Tata McGraw Hill. Delhi.,2013

E-Resources

- https://www.wegate.eu/list-**e**-learning-**materials**-tools
- www.adam-europe.eu/prj/6726/project_6726_en.pdf
- *www.uwcc.wisc.edu/info/**women**/escap2468.pdf*

UCOM613/UCCM613/ UBAM610 FINANCIAL MANAGEMENT

Semester	**: VI**	**Credit**	**: 05**
Category	**: Core XX / XVII**	**Hours/Week**	**: 06**
Class/Major	**: III B.Com/B.Com (C.A)/ BBA**	**Total Hours**	**: 78**

Objectives:

To enable the students

- Understand the nature and scope of Financial Management.
- Prepare budgets and take dividend policy
- Develop the necessary skills and techniques to take decisions and corporate sector

UNIT-I INTRODUCTION **13 Hrs**

Financial Management: Meaning – scope- Goals- Profit maximization and wealth Maximization in organization.

UNIT-II CAPITAL STRUCTURE THEORY **16 Hrs**

Meaning - scope – Appraisals: Net Income Approach- Net Operating Income approach - MM approach and Traditional approach – Dividend Policy.

UNIT-III COST OF CAPITAL & LEVERAGES **16 Hrs**

Meaning – Significance - Types. Cost of Capital - Concepts- Importance- Classification: Cost of debt- Cost of Preference shares- cost of equity and cost of retained earnings and weighted average cost of capital- Operating Leverage, Financial Leverage and Combined Leverage.

UNIT-IV CAPITAL BUDGETING **17Hrs**

Concept - Importance – Methods Payback period method- Discounted cash flow methods – NPV- present value index and IRR method; Return on Investment method.

UNIT-V WORKING CAPITAL MANAGEMENT & DIVIDEND POLICY 16Hrs

Working Capital Management –Cash management – Inventory Management – Receivable Management- Dividend theories and policy, types – factors influencing dividend policy.

Note-Theory 40%, Problem 60%

Text Books

- Sharma RK and Shashi K Gupta, *Financial Management* Kalyani Publications. New Delhi, 2012
- *I M Pandey.* Vikas, *Financial Management*, Vikas *Publishing* House Pvt Ltd. New *Delhi,2014*

Reference Books

- S.N.Maheswari , *Elements of Financial Management*, Sultan Chand and Sons New Delhi, 2014
- M.Y.Khan & P.K.Jain, *Theory and Problems in Financial Management* , New Delhi, 2013

E-Resources

- *www.managementstudyguide.com/**capital-structure**.html*
- www.**management**studyguide.com/**financial-management**.html
- *www.sap.com/india/product/**financial**-mgmt.html*

UCOM614 / UCCM614 ENTERPRISE RESOURCE PLANNING

Semester	**: VI**	**Credit**	**: 05**
Category	**: Core XXI / XVIII**	**Hours/Week**	**: 06**
Class/Major	**: III B.Com/B.Com(C.A)**	**Total hours**	**: 78**

Objectives:

To enable the students

- Understand the conceptual model of ERP
- Integrate the benefits of ERP
- Assess the quality management in the enterprise

UNIT – I INTRODUCTION **15 Hrs**

Meaning, Definition of ERP – Conceptual model – Evolution – Structure - Reasons for Development and Growth – Advantages of ERP – Enterprise-overview- ERP and Related Technologies: Business Process Re-engineering – Management Information System – Decision Support System .

UNIT- II MANUFACTURING PERSPECTIVE **16 Hrs**

Perspective –Requirement for Planning – JIT – CAD/CAM – Product Data Management – ERP Modules: - Plant Maintenance – Quality Management – Materials Management.

UNIT - III BENEFITS OF ERP **16 Hrs**

Reduction of Lead Time – Reduction of Cycle Time – Improved Resource Utilization – Reduced Quality Costs – Increased Flexibility – Improved Information accuracy and Decision making capability.

UNIT – IV ERP IMPLEMENTATION LIFECYCLE **16 Hrs**

Introduction – Per-evaluation screening – Project Planning – Gap Analysis – Reengineering – Configuration – Implementation – Testing – Training – Maintenance. Vendors, Consultants and Users: In-house Implementation-Pros and Cons – Vendors – Consultants – End-users.

UNIT - V ERP APPLICATION **15 Hrs**

New Markets – New Channels – Faster Implementation Methodologies – Business Models – Application Platforms – new business segments – Web-enabling – Market Snapshot.

Text book:

- R.B.Vinod Kumar garg and N.K.Venkatakrishnan , *Enterprise wide Resources,* Prentice Hall of India Pvt Ltd, 2012
- Rahul V. Altekar, *Enterprise wide Resource planning-Theory and Practice*, Prentice Hall of India Pvt Ltd, 2011

Reference Books:

- Alexis Leon, *Enterprise Resource Planning,* Tata McGraw Hill Publishing Company Ltd, New Delhi, 2012
- *Dr. Subodh Kesharwani ,Enterprise Resource Planning and Supply* Chain Management, Informatics *Publishing* Limited.,2012

UCOR615/UCCR615 COMMERCE WORKSHOP

Semester : VI **Credit : 01**
Category : Core XXII / XX **Hours/Week : 01**
Class/Major : III B.Com/ B.Com (C.A) **Total Hours : 13**

Objectives:
To enable the students

- Acquire knowledge on documentation procedure with regard to banking , insurance & EXIM
- Manage their filing procedures

VI Semester: Training on usage of banking and insurance forms

1) Application for allotment of PAN
2) Income Tax Return Form
3) Application for refund of IT
4) Central excise forms
5) Custom forms
6) Bill of Lading
7) Letter of Credit
8) Bill of Entry
9) Service tax forms
10) Currency Declaration Form
11) VPP form
12) COD form
13) International Money Order
14) International Postal Order
15) GST Forms

Evaluation Pattern for Commerce Workshop

CIA		**60 Marks**
Daily Practical Assessment	: 20 Marks	
Test I	: 10 Marks	
Viva I	: 10 Marks	
Test II	: 10 Marks	
Viva II	: 10 Marks	
ESE		**40 Marks**
Record	: 10 Marks	
Practical Exam	: 20 Marks	
Viva voce	: 10 Marks	
Total		**100 Marks**

UCCO605 / UCOO605 e-MARKETING

Semester	**: VI**	**Credit**	**: 04**
Category	**: Major Elective**	**Hours/Week**	**: 05**
Class/Major	**: III B.Com/B.Com(C.A)**	**Total Hours**	**: 65**

Objectives:

To enable the students

- Understand the importance of online marketing and its impact on traditional marketing
- Analyze and design a competitive e-CRM
- Develop strategies and innovation in online marketing

UNIT-I e--MARKETING-AN OVERVIEW 12 Hrs

Meaning, Definition, Objectives, Types, e-Malls, e-Storefront, e-Market, Features of e-Marketing, e-marketing: Scope, Benefits and Problems, e-marketing Techniques, Internet Marketing.

UNIT-II e-MARKETING TOOLS 15 Hrs

Objectives, e-Mail Marketing, Creating a Website, Social Media Marketing, Pay-Per-Click Advertising, Search Engine Optimization or Paid Search Engine Listing, Search Engine Marketing, Blogging and Classified Advertising

UNIT-III e-MARKETING MIX STRATEGY AND APPLICATIONS 16 Hrs

Meaning and Objectives- 4Ps in e-Marketing, Additional 3Ps in e-Marketing of the 2P+2C+3S Formula in e-Marketing, Online Advertising, Direct Response Medium, Role of Distribution in e-Marketing.

UNIT-IV METHODS AND TECHNIQUES OF e-MARKETING 12 Hrs

Sales Methods: Advertisements and promotion – salesmanship and public relations. Techniques**:** Advertising Techniques, Sponsorship Techniques, Direct Marketing Techniques, Merchandising Techniques, Online Seminar Techniques.

UNIT-V e-CUSTOMER RELATIONSHIP MANAGEMENT 10 Hrs

Meaning and Concept of e-CRM, Prerequisites for Implementation of e-CRM, Transition from CRM to e-CRM, and Customer Lifecycle, e-CRM and Community Building-Benefits: customer retention and Loyalty.

Text Books

- Judy Strauss and Raymond Frost – *e-Marketing*, Prentice Hall of India Pvt limited, New Delhi, 2014
- PhilipKotler & Gary Armstrong, *Marketing Managemen*t, Publication Prentice Hall 10^{th} Edition,2012.

Reference Books

- Ardath Albee, e-Marketing, *Strategies and complex sale*, Prentice Hall of India Pvt limited, New Delhi, 2012
- William J Stanton, Michael J Etzel, Bruce J Walker, *Fundamental of Marketing,* McGraw Hill,2011
- Cundiff and Still, *Fundamental of Marketing*, Pearson Publications,NewDelhi,2012

UCCO606/UCOO606 INCOME TAX LAW & PRACTICE II

Semester : VI **Credit : 04**
Category : Major Elective **Hours/Week: 05**
Class/Major : III B.Com/B.Com(C.A) **Total Hours : 65**

Objectives:

To enable the students

- Identify the assessment procedures.
- Apply set off and carry forward provisions.
- Assess income tax liability

UNIT- I COMPUTATION OF GROSS TOTAL INCOME 14 Hrs

Clubbing of Income – Set off – Carry forward & Set off - Permissible deductions from Gross Total Income (Sec 80c to 80 U).

UNIT- II COMPUTATION OF TAX LIABILITY 13 Hrs

Schedule of Rates of Tax – Computation of Tax Liability - Assessment of Individuals-Assessment of Agricultural Income

UNIT-III ASSESSMENT OF FIRMS 13 Hrs

Assessment of Firms – Assessment of Companies

UNIT –IV STRUCTURE OF INCOME 13 Hrs

Income Tax Authorities – Structure of Income-tax Department-CBDT- Powers of Tax Authorities

UNIT-V PROCDEURE FOR FILLING OF INCOME TAX RETURNS

12Hrs

Filing of Income Tax returns-PAN-Assessment-Types of Assessment-Self assessment-best judgments assessment- Income escaping assessment - E-filing of returns-Consequences of non - filing of returns- Procedure for Assessment.

Note-Theory - 40 , Problems-60

Text Books

- V.P.Gaur, D.B. Narang & Rajeev Puri, *Income Tax Law & Practice* ,Kalyani Publishing,2014
- Reddy & Murthy,*Income Tax Law & Practice*, Margham Publishing,Chennai,2015

Reference Books

- Vinod K. Singhania & Kapil Singhania,*Direct Taxes Law & Practice*,Taxmann.,2014
- Vinod K. Singhania & Monica Singhania, *Corporate Tax Planning & Business Tax Procedures*,Taxmann.2015

UCCM615 e - ENTREPRENEURSHIP

Semester	**: VI**	**Credit**	**: 05**
Category	**: Core XIX**	**Hours/Week**	**: 05**
Class/Major	**: III B.Com(C.A)**	**Total hours**	**: 65**

Objectives:
To enable the students

- Understand the concept of e- entrepreneurship
- Identify the various e-business sites and its features
- Establish e- business site.

UNIT-I INTRODUCTION **12 Hrs**

Meaning, definition, objectives of e-Entrepreneur, Evolution of e-Entrepreneurship, e-Entrepreneurship Vs Entrepreneurship.

UNIT-II ENTREPRENEURSHIP IN BUSINESS PLAN **13 Hrs**

e -Entrepreneurship in the business plan-Concept of Entrepreneurship-e-entrepreneurship market-e-commerce-e-market-fundamental of e-entrepreneurship, issues, opportunities and challenges in e-entrepreneurship.

UNIT-III e-BUSINESS **12 Hrs**

Creating an e-business –components of an e-business site, additional features need for online payment-e-entrepreneurship and the law creating a mining e-business- B2B.

UNIT-IV e-CONSUMER **15Hrs**

Meaning,definition-meaning-consumer-to-business,consumer-to-consumer(C2C) -Electronic Customer Relationship Management (E-CRM)-Advertising-Global Entrepreneurship Agreement-Guidelines-Better Business Bureau/BBB online.

UNIT-V MYTHS OF e-ENTREPRENEURSHIP **13 Hrs**

Myths of e-Entrepreneurship-common problems in e-Entrepreneurship-Entrepreneur and the Entrepreneurial Process-factors affecting e-Business Success.

Text Books

- Fang Zhao Entrepreneurship and Innovations in E-Business, Idea group publishing,2014

Reference Books

- www.igi.global.com
- www.e – entrepreneurship.in
- www. khawar.nehal @ atrc.net.pk
- www.slideshare.net
- Internal journals,Entrepreneurship and Innovations,IGI Publishing

UCOA504 PRACTICAL AUDITING

Semester	**: V**	**Credit**	**: 04**
Category	**: Allied Optional**	**Hours/Week**	**: 05**
Class/Major	**: III UG**	**Total hours**	**: 65**

Objectives:

To enable the students

- Understand the principles and importance of Auditing
- Verify the books of accounts and detect errors and frauds
- Prepare & submit financial reports

UNIT - I INTRODUCTION **13 Hrs**

Meaning and definition of auditing – Objectives – Errors and frauds – importance, advantages of an audit – distinction between Accountancy and Auditing – various types of Audit

UNIT - II AUDIT PLANNING **12 Hrs**

Audit planning – Audit programme – Advantages of audit programme – preliminaries and the commencement of audit, internal check, internal control – internal audit and continuous audit – audit working paper and audit note book

UNIT - III VERIFICATION AND VALUATION OF ASSET AND LIABILITY **14 Hrs**

Audit techniques, vouching, verification and valuation of assets and liabilities.

UNIT - IV DUTIES & RESPONSIBILITIES OF AN AUDITOR **14 Hrs**

Law relating to appointment of Auditors, Qualification, Rights, duties and liabilities of auditors.

UNIT - V AUDIT REPORT **12 Hrs**

Audit report- significance –kinds of audit report-Investigation-Meaning- distinction between investigation and auditing – computer applications in auditing.

Text Books

- Tandon,B.N, Sudharsanam S and Sundharabahu S *Handbook of Practical Auditing*, S.Chand& Co., Ltd.NewDelhi,2013
- DinkarPagare, *Principles and Practice of Auditing*, Sultan Chand &Sons. New Delhi. 2013

Reference Books

- TandonB.N, *Auditing*, S. Chand& Co., New Delhi, 2014
- Spicer & Pegler, *Auditing*, Macmillan Publishers, New Delhi, 2014
- Ghatalaia, Spicer and Peglers's,*Practical Auditing*, S.Chand & Co. New Delhi., 2014

UCOA505 INVESTMENT AND SECURITY MARKET.

Semester : V **Credit : 04**
Category : Allied Optional **Hours/Week : 05**
Class/Major : III UG **Total Hours : 65**

Objectives:
To enable the students

- Understand the features of investment programmes
- Analyze the various avenues of investment
- Evaluate the challenges in stock market

UNIT – I SHARES **13 Hrs**

Introduction – Investment – Features of an Investment program – Risk of Investment – The Indian Stock markets – Early History and Developments – Types – Primary, Secondary and Derivative Markets – Reforms Since 1990.

UNIT-II DEBENTURES **14 Hrs**

Primary Market- Introduction – New Issue Market – Functions – Underwriting of Securities – Credit Rating of Instruments– Merchant Banking – Private Placement – Fixed Price and Book Building.

UNIT-III SECONDARY MARKET **12 Hrs**

Secondary Market - Listing of Securities – Stock Exchanges – Turnover – Market Capitalization – SEBI- ADR/GDR Prices – Takeover - Trading, Clearing and settlement – Market Indices.

UNIT-IV DEBT MARKET **13 Hrs**

Debt Market – Bond Valuation and Analysis – Share Valuation and Analysis – Government Securities.

UNIT-V DERIVATIVE MARKET **13 Hrs**

Forward future and option only basic- participants in derivative, Instrument used in derivatives.

Text Books

- Bhalla NK, *Investment Management* S.Chand & Co., New Delhi, 2013
- Avadhani, *Investment & Securities Markets in India*, Himalaya Publishing House, New Delhi, 2013

Reference Books

- Donald E Fischer& Ronald J Jordan, *Security analysis and Portfolio Management*, Prentice Hall of India Pvt limited, New Delhi, 2013
- Fact Books, *National Stock Exchange Manual*, 2015

UCCA501 OFFICE MANAGEMENT

(Offered to English, Tamil & Economics Department)

Semester	**: V**	**Credit**	**: 04**
Category	**: Allied Optional**	**Hours/Week**	**: 05**
Class/Major	**: III UG**	**Total Hours**	**: 65**

Objectives:

To enable the students

- Understand the functioning of a modern office
- Gain knowledge on filing and maintenance of records.
- Draft the office correspondence and deal with office machines.

UNIT-I OFFICE MANAGEMENT **13 Hrs**

Office Management: Meaning of office – Objectives of office – Office functions – Office Management – Office organisation – Office administration – Office environment – Office services -Office systems and procedures.

UNIT-II OFFICE LAYOUT **13 Hrs**

Office Layout: Office accommodation and layout – Office forms, design, management and control – Departments of modern office – Office stationary and supplies – Office supervision.

UNIT-III OFFICE CORRESPONDENCE **14 Hrs**

Office Correspondence: Office machines and equipment – Office communication – Office correspondence and Mailing services.

UNIT-IV RECORDS MAINTENANCE **13 Hrs**

Records Maintenance: Filing and indexing – Office equipments – Office Manual – evaluating the records maintenance programme

UNIT-V RECRUITMENT **12Hrs**

Recruitment: Recruitment of office staff – sources of recruitment – training – time keeping and overtime – incentives – labour turnover – morale and productivity.

Text Books

- Chopra R.K. *Office Management*, Sultan Chand.&Sons, New Delhi 2003
- Dr.Balachandaran.V & Dr.Chandarasekaran.V *Office Management* Tata Mc Graw Hill, New Delhi, 2009.

Reference Books

- Prasant K.Ghosh, *Office Management*, Sultan Chand.&Sons, New Delhi 2008 .
- Pillai and Baghavathi, *Office Management*, S. Chand.& Co,New Delhi ,2003.
- Devanarayanan and Raghunathan, *Office Management*, Margham Publications, Chennai, 20

UCCA502 LABOUR LAWS

(Offered to English, Tamil & Economics Department)

Semester	**: V**	**Credit**	**: 4**
Category	**: Allied Optional**	**Hours/Week**	**: 5**
Class/Major	**: III UG**	**Total Hours**	**: 65**

To enable the students

- Gain knowledge on various labour laws.
- Study the work environment.
- Approach and resolve labour problems through labour laws.

UNIT – I THE FACTORIES ACT, 1948 13 Hrs

The Factories Act, 1948 - Definition - Health, Safety and Welfare Provisions – Working hours of adult – Holidays – Employment of women and young person's – Annual leave with wages.

UNIT - II THE WORKMEN'S COMPENSATION ACT, 1923 13 Hrs

The Workmen's Compensation Act, 1923 – Definition – Rules regarding workmen's liability for compensation – Occupational diseases.

UNIT - III THE PAYMENT OF WAGES ACT, 1936 14 Hrs

The Payment of Wages Act, 1936 – Definition – Rules for payment of wages – Deductions from wages - Maintenance of registers & records – Inspectors – Appeal – Penalties.

UNIT - IV INDUSTRIAL DISPUTES ACT, 1947 13 Hrs

Industrial Disputes Act, 1947 – Definition – Strikes, Lock outs ,Lay off , Retrenchment and Closure-Settlement Machinery for Industrial Disputes.

UNIT - V PAYMENT OF GRATUITY ACT, 1972 12 Hrs

Payment of Gratuity act 1972-Meaning of Gratuity-Computation of Gratuity-Conditions-Procedure for Claiming the Gratuity.

Text Books

- Kapoor N.D, *Handbook of Industrial Law*, Sultan Chand & Sons, New Delhi,2008
- Samuel H,*Industrial Law*, Vikhas Publications, New Delhi,2005

Reference Book

- Malhotra,*The Law of Industrial Disputes*, Vikhas Publications, New . Delhi,2007

UCCA503 RURAL MARKETING

Semester : V **Credit : 04**
Category : Allied Optional **Hours/Week : 05**
Class/Major : III UG **Total Hours : 65**

Objectives:
To enable the student

- Understand about rural marketing concepts
- Analyze the various marketing mix related to sales in rural markets
- Assess the working of rural marketing institutions.

UNIT – I CONCEPT AND SCOPE OF RURAL MARKETING 14 Hrs

Rural Marketing - Concept and Scope - Nature of rural markets - attractiveness of Rural markets - Rural Vs Urban Marketing - Characteristics of Rural consumers - Buying Decision process - Rural Marketing Information System - Potential and size of the Rural Markets.

UNIT – II PRODUCT STRATEGY 13Hrs

Selection of Markets - Product Strategy - Product mix Decisions - Competitive Product strategies for rural markets.

UNIT – III PRICING STRATEGY 13 Hrs

Pricing strategy - pricing policies - innovative pricing methods for rural markets - promotion strategy - appropriate media - Designing right promotion mix - promotional Campaigns.

UNIT – IV SALES PROMOTION 12 Hrs

Publicity, Advertisement, personal selling, promotion strategy, Concept -promotion mix.

UNIT – V LOGISTICS MANAGEMENT 13 Hrs

Distribution - Logistics Management - Problems encountered - selection of appropriate channels - New approaches to reach out rural markets – Electronic choupal applications.

Text Books

- A.K. Singh & S. Pandey,*Rural Marketing*: Indian Perspective, New Age International Publishers, 2014
- Agarwal A.N, *Indian Economy*, Vikas Publication, New Delhi,2014
- Sherlakar & sherlakar "Rural Marketing" Himalaya Publishing House Pvt. Lt Delhi 2014

Reference Books

- Philip Kotler, "*Marketing Management"*, Prentice - Hall India Ltd. New Delhi,2014
- CSG Krishnamacharylu & Lalitha Ramakrishna, - "*Rural Marketing"*, Pearson Education Asia. 2012

- Balaram Dogra & Karminder Ghuman, "*Rural Marketing"* , Tata McGraw-Hill Publishing Company, New Delhi, 2012

UCOS501 /UCCS501 BUSINESS ETHICS AND CORPORATE GOVERNANCE

Semester : V **Credit : 1**
Category : Self study **Hours/Week : 2**
Class/Major : III B.Com/B.Com(C.A) **Total Hours : 26**

Objectives
To enable the student

- Understand the importance of corporate social responsibility
- Analyze & apply the implications of business ethics

UNIT – I CORPORATE GOVERNANCE & BUSINESS ETHICS 9 Hrs

Definition, Nature business ethics, characteristics- Importance of ethics and moral values – Corporate Social responsibility-Nature, Characteristics –Corporate Governance-Concept and essentials in corporate sectors- issues and challenges in business.

UNIT II- LEGAL ASPECTS OF ETHICS 9 Hrs

Code of ethics: Competitiveness, organization size, profitability and ethics, Code of ethics in corporate – ethics evaluation, Business and ecological.

UNIT III- ENVIRONMENTAL ISSUES IN THE INDIAN CONTEXT 8 Hrs

Environmental issues in the Indian context- Political – Legal environment, provisions of the Indian constitution – political setup – Major characteristics and their implications for business prominent features of competitions Act.

Text Book:

- CSV Murthy, "*Business Ethics",* Himalaya publishing House, Chennai, 2015
- S.A. Sherleakr, "*Ethics in management"*, Himalaya publishing House, 2014

References:

Ferando, "*Business ethics*", Pearson Publication, Bangalore, 2015

UCOS502/UCCS502 BUSINESS ANALYSIS

Semester : V **Credit : 1**
Category : Self study **Hours/Week : 2**
Class/Major : III B.Com/B.Com(C.A) **Total Hours : 26**

Objectives:
To enable the students

- Understand the scope of business analysis and its holistic approach
- Evaluate the techniques used within each business process model .

UNIT: 1 INTRODUCTION & COMPETENCIES OF A BUSINESS ANALYST 9 Hrs

Origins of business analysis – development – Scope of business analysis work – holistic approach – role and responsibilities of a business analyst-Personal qualities – Business knowledge – professional techniques – the development of competencies .

UNIT II : ENVIRONMENT ANALYSIS 9 Hrs

The context for strategy – strategy development – External environment analysis – Internal environment analysis – SWOT analysis – Executing strategy.

UNIT III: BUSINESS ANALYSIS PROCESS MODEL 8 Hrs

Techniques used within each process model stage-Organizational context – stages of the business analysis process model – objectives of the process model stages – procedures, organizational view – value propositions – process – models – improving business process.

Text Books

- Aswathappa.K,"*Essentials of Business Management"*, Himalaya Publishing House,Mumbai,2012
- Raj Agarwal, "*Business Environment"*, Excel Books, New Delhi,2011

Reference Books

- Balaram Dogra & Karminder Ghuman, "*Rural Marketing Concept & Cases*", Tata McGraw-Hill Publishing Company, New Delhi, 2012

UG V & VI EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
V	Core XIV/ **XIII**	UCOM507/ UCCM507/ UBAM408	Management Accounting	Management Audit Report	Problem Solving
VI	Core XIII/XVI	UCOM613/UCCM613/ UBAM610	Financial Management	Problem Solving	Analysis of P&L ,Balance sheet of Companies
	Core XX	UCOM612/ UBAM609	Women Entrepreneurship	Successful History of women Entrepreneur	Album Making
	Core XXI	UCOM614/UCCM614	Enterprise Resource Planning	Quiz	Poster presentation
	Core XIX	UCCM615	e - Entrepreneurship	Case study	Album Making
	Major	UCOO605/UCCO605	e- Marketing	Poster	Business Quiz

	Elective			presentation	
		UCOO605/UCCO606	Income Tax Law & Practice II	Problem Solving	Commerce Lab (Income Tax Forms)

UG EVALUATION COMPONENTS OF CIA –ALLIED OPTIONAL

Semester	Category	Course code	Course Title	Component III	Component IV
V	Allied Optional	UCOA503	Practical Auditing	Audit Report	Business Quiz
		UCOA506	Investment and security market	Poster Presentation	Case study
		UCCA503	Rural Marketing	Assignment	Case study

MINI PROJECT

Semester	Category	Course Code	Course Title
VI	Core	UCCM607/ U COM607	Mini project

NPTEL ONLINE COURSES OFFERED TO UG AND PG

- Supply Chain Analytics
- Six Sigma
- Principles of Human Resource Management
- Financial Statement Analysis

DEPARTMENT OF BIOCHEMISTRY

Preamble

UG: Course Profile & the syllabi of courses offered in the fifth and sixth semesters along with evaluation components III & IV (**with effect from 2015 - 2018 batch onwards)** and

PG: Course Profile, list of courses offered as self study paper (**with effect from 2015-2017 batch onwards)** and are presented in this booklet.

COURSE PROFILE B.Sc. (Biochemistry)

Semester	Part	Category	Course code	Course Title	Hours per week	Credit	
						Min	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	Basic 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	Chemistry	5	4	4
		Allied practical	UCHR102	Chemistry Practical	3	3	3
	IV	Value education			2	1	1
				TOTAL	**30**	**22**	**24**
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	Basic English II/ Advanced English II	5	3	4
	III	Core III	UBCM202	Biomolecules	5	5	5
		Core practical II	UBCR201	Qualitative analysis of Biomolecules	3	2	2
		Allied II	UMBA201	Microbiology	4	4	4
		Allied II practical	UMBR201	Microbiology Practical	3	3	3
	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	UTAL307/ UTAL308/ UHIL301/UFRL301	Basic Tamil III/ Advanced Tamil III/ Hindi III/ French III	4	2	3
	II	English III	UENL305/ UENL306	Basic 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	4	4	4
		Allied III	UMAA305	Biostatistics	5	4	4
	IV	Non major elective			4	2	2
		Value Education			2	1	1
				TOTAL	**30**	**22**	**24**
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	Basic English IV/ Advanced English IV	5	3	4
	III	Core V	UBCM403	Immunology	5	5	5
		Core VI	UBCM404	Nutrition & Women' s Health	5	5	5
		Core VII	UIDM401	Pharmaceutical chemistry	5	4	4
		Core practical IV	UBCR401	Biochemical Techniques Practical II	4	3	3
	IV	Soft skill			2	1	1
	V	Extension activity/ Physical Education/NCC			-	-	2
				TOTAL	**30**	**23**	**27**
V	III	Core VIII	UBCM501	Enzymes & Intermediary metabolism	6	5	5
		Core IX	UBCM502	Human Physiology	6	5	5
		Core X	UBCM503	Basics of Bioinformatics	6	5	5
		Core practical V	UBCR501	Enzymology practical	5	3	3
		Allied optional			5	4	4
		Value education			2	1	1
				TOTAL	**30**	**23**	**23**
VI	III	Core XI	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	3	3	3
		Core practical VII	UBCR602	Hematology & Urine analysis	3	3	3
		Core XV	UBCP601	Mini project	2	1	1
		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**	**27**	**29**
				GRAND TOTAL	**180**	**140**	**153**

EXTRA CREDIT EARNING PROVISION (Only for Interested Students)

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

UBCM501 ENZYMES AND INTERMEDIARY METABOLISM

Semester : V **Credits : 5**
Category : Core VI **Hours/Week : 5**
Class & Major : III B.Sc Biochemistry **Total Hours : 65**

Objectives:
To enable the Students

- Elucidate how enzymes Catalyze Chemical reactions
- Understand the rate of acceleration of the biochemical reactions in the presence of the biocatalyst (enzymes)
- Analyze the biochemical metabolic pathways

UNIT-I INTRODUCTION 12Hrs

Enzymes -Introduction ; Nomenclature and IUB classification of Enzymes; Enzyme Units Active Site: Mode of action -Lock and key theory and Induced fit theory. Factors influencing enzyme action :Michaelis Men ten equation :Line weaver burke plot:Eadie –Hofstee plot ; Enzyme inhibition –competitive ,non –Competitive and uncompetitive inhibition.

UNIT-II CARBOHYDRATE METABOLISM 15Hrs

Glycolysis -aerobic and anaerobic pathway , oxidation of pyruvate TCT cycle – pathway Anaplerotic reaction ; regulation ,Gluconeogenesis , Glycogenesis , Glycogenolysis –pathway and regulation .pentose phosphate pathway.

UNIT-III LIPID METABOLISM 13Hrs

Biosynthesis of fatty acid. oxidation of fatty acid –carnitine cycle ,beta oxidation Biosynthesis and degradation of lecithin .cephalin phospatidly inositol phosphatidyl phosphatidyl serine ,sphingomylin and plasmalogen .Biosynthesis .of Cholesterol.

UNIT-IV PROTEIN METABOLISM 10Hrs

Fate of dietary proteins .catabolism of aminoacids –Transamination. Oxidative and non-oxidatibe deamination .transdeamination ,decarboxylation , -Urea cycle and its regulation Biosynthesis of Creatinine.

UNIT-V NUCLEIC ACID METABOLISM 15Hrs

Metabolism of purines-Biomedical importance .Biosynthesis of purine nucleotides by De novo and salvage pathway, regulation and degradation, Metabolism of pyrimidines – Biosynthesis of pyrimidine nucleotides by De novo and salvage pathway and degradation.

Text Books

- David L. Nelson, Michael M.Cox, *Lehninger-Principles of Biochemistry* W.H.Freeman and company Newyork, 2005
- Robert k.Murray.et .al *Harpers Biochemistry* .preniecs Hall international .1996

Reference Books

- Trevor Palmer, *Understanding Enzymes*, Scientific Publishers, Fifth Edition.

- Voet & Voet, John Wiley & sons, *Biochemistry*, Prentecs Hall International, 1995.
- Champe P.C and Richard A Harvey, *Lippincotts Biochemistry*, Williams & Wilkins Publishers, 2004.

UBCM502 HUMAN PHYSIOLOGY

Semester : V **Credits : 5**
Category : Core VII **Hours/Week : 5**
Class & Major : III B.Sc Biochemistry **Total Hours : 65**

Objectives:
To enable the Students

- Understand the physical structure of human body and improve their knowledge of the way the body functions
- Appreciate the relationship between the human and environment so as to identify the place of human physiology in the study of Biochemistry.
- Comprehend the functional organization of organ system of human body in order to develop a holistic approach in the study of Biochemistry.

UNIT-I BLOOD AND BODY FLUIDS 12 Hrs

Blood and Body fluids-Composition and functions; Types of blood cells-Morphology and function; Blood coagulation; Blood groups-ABO and Rhesus system. Composition and functions of lymph; Lymphatic system**.**

UNIT –II DIGESTION 15Hrs

Structure and function of different components of digestive system; Digestive juices; Role of various enzymes in digestion process; gastrointestinal hormones; Mechanism of digestion and absorption of carbohydrates, lipids and proteins; Mechanism of HCl formation in stomach.

UNIT –III RESPIRATION 15Hrs

Components of the respiratory system; Diffusion of gases in lungs- Transport of oxygen from lungs to tissues, Transport of CO2 from tissues to lungs.Overall design of urinary system- Kidney structure and its organization; Mechanism of urine formation- Glomerular filtration rate (GFR), Selective reabsorption (active and passive) of substances and secretion.

UNIT-IV NERVOUS SYSTEM 13Hrs

Brief outline of Nervous system- brain (parts and Ventricles); Spinal cord; Structure of neuron; Resting potential and action potential; Propagation of nerve impulse; Structure of synapses; Synaptic transmission ; Structure of neuromuscular junction and mechanism of neuromuscular transmission; Neurotransmitters.

UNITV-MUSCULAR SYSTEM 10Hrs

Types of muscles and their functions; Structure of Skeletal muscle; Myosin; Actin and regulatory proteins; Sarcomere unit; Mechanism of contraction and relaxation of skeletal muscles; Chemical changes during muscle contraction; Source of energy for muscle contraction.

Text Books:

- C.C. Chatterjea (Vol I & Vol II), *Human Physiology*, Medical Allied Agency,

Eleventh Edition, 2006.

- Sembulingam. K and Prema Sembulingam, *Essentials of Medical Physiology*, Jaypee Brothers, New Delhi, 4th Edition, 2006.

Reference Books:

- Guyton & Hall, *Textbook of Medical Physiology*, Reed Elseveir India Private Limited, New Delhi, Tenth Edition, 2000.
- Murray et al, *Harper's Physiological Biochemistry*, Tata McGraw Hill Publication. Co. Limited, New Delhi, 2000,
- RA Agarwal, Anil K.Srivastava, Kaushal Kumar, *Animal Physiology and Biochemistry*, S.Chand, 2008

UBCM503 BASICS OF BIOINFORMATICS

Semester : V **Credits : 5**
Category : Core X **Hours/Week : 6**
Class & Major : III B.Sc Biochemistry **Total Hours : 78**

Objectives:

To enable the students

- Understand the impact of Bioinformatics methodology in Biological Sciences.
- Distinguish between the commercial and research perspectives of Bioinformatics.
- Assess the interface between computational and Biological Science.

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

Bioinformatics-an overview and definition, objectives and scope-genomics, proteomics and computer aided drug design. Bioinformatics and internet – challenges and applications

UNIT-II BIOLOGICAL DATABASE AND ITS TYPES **12 Hrs**

Introduction to data types and source. General introduction of biological database; Nucleic acid databases-NCBI, DDBJ,SWISS-PROT and EMBL. Protein databases – primary, composite and secondary. Specialized genome databases ; SGD, TIGR and ACeDB, structure databases – CATH, SCOP and PBD sum.

Lab demo class-NCBI, EMBL and DDBJ **09 Hrs**

UNIT –III DNA SEQUENCE ANALYSIS **12 Hrs**

DNA sequence analysis- DNA sequence, features of DNA sequence analysis, EST-differential approaches to EST analysis and c-DNA libraries.

UNIT – IV PROTEIN DATA BANK **12 Hrs**

Protein information resources- Biological databases, primary sequence databases, composite protein sequence databases, secondary databases- PROSITE, PRINTS, PROFILES and IDENTITY.

UNIT –V SEQUENCE ALIGNMENT **12 Hrs**

Pair wise alignment – database searching (Needleman algorithm), comparing two sequence - identity and similarity, FASTA and BLAST, Multiple sequence alignment - Definition - Clustal W.

Lab demo class- FASTA, BLAST and Clustal W **09 Hrs**

Text Books

- Attwood T.K and D.J Parry, *Introduction to Bioinformatics*, Pearson Education Ltd., New Delhi 2014.
- N. Gautham, *Bioinformatics-Database and Algorithm*, Narrosa publishing house 2007

Reference Books

- Andreas D Baxevanis and Francis Quellette B F,*Bioinformatics- A Practical guide to the analysis of genes and proteins*, Willey publication, New Delhi 2016.
- Arthur M. Lesk, *Introduction to Bioinformatics*, second edition, oxford university press, UK 2006.
- Jerry Gu, Phlip E Bowrne, *Structural Bioinformatics*, Willey- blockwell publication, New Delhi 2009

e- Resources

- https://www.lehigh.edu/~inbios21/PDF/Fall2008/Lopresti_11142008.pdf
- www.aun.edu.eg/.../Procedure%20**Bioinformatics**22.../Xiong%20-%20Es...
- www.iasri.res.in/**ebook**/CAFT_sd/Concepts%20of%20**Bioinformatics**.pdf
- goldenhelix.com/.../**ebooks**/Teaching-**Bioinformatics**-Concepts-Practical-...
- nptel.ac.in

UBCM501 ENZYMOLOGY PRACTICAL

Semester : V **Credit : 4**
Category : Core Practical –III **Hours /Week : 6**
Class & Major : III B.Sc Biochemistry **Total Hours :78**

Objectives:
To enable the Students

- Understand enzyme activity
- Develop technical competence with respect to kinetics of specific enzymes
- Inculcate the ability to engage in critical enquiry.

1. Assay of serum Alkaline Phosphatase activity

2. Assay of salivary Amylase activity

3. Assay of serum Alanine transaminase activity

4. Assay of serum Aspartate transaminase activity

5. Effect of Ph on salivary amylase activity

6. Effect of temperature on salivary amylase activity

7. Effect of substrate concentration on salivary amylase activity

8. Assay of urease activity

9. Effect of Ph on urease activity

10. Effect of temperature on urease activity

11. Effect of substrate concentration on urease activity

Text Books

- David T .Plummer , *An Introduction to practical Biochemistry*, 1999.
- J.Jayaraman, Laboratory Mannual in Biochemistry,New Age international limited publication, 4th edition, 1992.

Reference Books

- Pattabiraman ,Laboratory Mannual in Biochemistry, 1994.
- Singh .S.P. Practical Mannual of Biochemistry , 6th edition, CBS Publication 2006.

UBCM601 INTRODUCTION TO BIOTECHNOLOGY

Semester : VI **Credits : 4**
Category : Core Paper XI **Hours/Week : 5**
Class & Major : III B.Sc. Biochemistry **Total Hours : 65**

Objectives:
To enable the students

- Understand the importance of biological agents in Biotechnology.
- Apply the principles of biotechnology
- Integrate the Biotechnology industrial process and products

UNIT-I BASICS OF CELL CULTURE **15 Hrs**

Introduction to Cell Culture, Finite vs Continuous Cell Line, Culture Conditions, Cryopreservation, Morphology of Cells in Culture, Applications of Cell Culture. Cell Culture Basics - Cell Lines ,Selecting the Appropriate Cell Line ,Acquiring Cell Lines, Culture

Environment, Adherent vs Suspension Culture, Cell Culture Laboratory, Cell Culture Equipment

UNIT –II TOOLS OF GENETIC ENGINEERING **12 Hrs**

Enzymes: Gel Electrophoresis: AGE and PAGE; Restriction Enzymes, Ligases, Modifying Enzymes - Markers for Selection: selectable and scorable - Examples. Cloning Vectors: Plasmid, phagemid, cosmid, cDNA Clone Bank

UNIT –III METHODS OF GENE TRANSFER **15 Hrs**

Definition, Gene transfer into bacterial cells-Transformation, Transduction and Electroporation. Gene transfer into plant cells-Transfection, Electroporation, Ultrasonication

and particle Bombardment Gun method. Gene transfer into Animal cells – Transfection Liposome mediated gene transfer, Particle Bombardment (Biolistics), Virus vector method and Microinjection.

UNIT –IV TRANSGENESIS **13 Hrs**

Transgenic plants- herbicide resistance, virus resistance and pest resistance. Transgenic animals – Transgenic Sheep, Transgenic mice, Transgenic fish, Transgenic poultry and its applications, GEMOs and gene therapy

UNIT – V MOLECULAR BIOLOGY TECHNIQUES AND APPLICATIONS OF BIOTECHNOLOGY **10 Hrs**

Principles and techniques of nucleic acid- hybridization, Northern, Southern and Western blotting, polymerase chain reaction(PCR), DNA fingerprinting, Molecular Markers-Restriction fragment length polymorphism(RFLP) and Random amplified polymorphic DNA(RAPD).

Text Books

- Dr.R.C.Duby, *Advanced Biotechnology* , S.Chand & company Pvt Ltd, 2016
- Primrose ,*Biotechnology*, Blackwell *Publishing house,1991*
- U.Sathyanarayana, *Biotechnology*,Books and Allied private Ltd,2008

Reference Books

- T.A Brown, *Gene Cloning and DNA Analysis*, Blackwell Publishing Co., 2006
- Jack.W.Christian Maryland, *Biotechnology-Theory and techniques of Plant Biotechnology*, *Animal cell culture & Immunobiotechnology*, CBS Publishers, 2009.
- John E Smith, *Biotechnology*, Fifth edition, Cambridge university press, 2009

e- Resources

- www.springer.com/la/**book**/9781617799822
- www.freebookcentre.net › Medical Books
- www.india**biotech**.in/**Free-e-Books**-Journals.html
- nptel.ac.in

UBCM602 CLINICAL BIOCHEMISTRY

Semester : VI **Credits : 5**
Category : Core Paper XII **Hours/Week : 5**
Class & Major : III B.Sc. Bio Chemistry **Total Hours : 65**

Objectives:
To enable the students

- Understand the diagnostic and therapeutic methodologies available for selective diseases.
- Appraise the various clinical laboratory tests.
- Evaluate the effective information to correlate with clinical diagnostics.

UNIT-I INTRODUCTION TO CLINICAL BIOCHEMISTRY 12 Hrs

Organization of Clinical laboratory, Introduction to instrumentation and automation in Clinical Biochemistry laboratories safety regulation and first aid. General comments on specimen collection, types of specimens for biochemical analysis. Precaution, accuracy, quality control, precautions and limitations. Reference ranges for clinical laboratory tests.

UNIT-II GLUCOSE HOMEOSTASIS-COMPLICATIONS , DISORDERS 13 Hrs

Glucose homeostasis, Diabetes mellitus, hypoglycemia, metabolic complications, GTT and its significance, glycosylated Hb, glycosuria, glycogen storage diseases, galactosemia, fructosuria, ketoacidosis.

UNIT-III LIPIDS-DISORDERS 15 Hrs

Plasma lipids and lipoproteins, hypo and hyperlipoproteinemias, lipidosis, fatty liver, obesity and cardio vascular diseases- hypertension, atherosclerosis, myocardial infarction, congestive heart failure.

UNIT -IV INBORN ERRORS OF METABOLISM 15 Hrs

Clinical manifestation of phenylketoneuria, tyrosinemia, alkaptonuria, homocysteineuria, cysteinuria, cystenosis, maple syrup urine disease, hartnups disease and gout.

UNIT-V CLINICAL DIAGNOSTICS 15 Hrs

Assessment and clinical manifestation of renal, hepatic, pancreatic functions-RFT,LFT. Water and electrolyte balance and imbalance. Bilirubin metabolism , jaundice and its types.

Text Books

- Subodh, R, Saxena, *Medical Biochemistry*, Black printers, New Delhi, 2014.
- Shaun C A Anderson, Suncokayne S A, *Clinical Chemistry concepts and applications*, CBS Publishers New Delhi, 2015.
- Ambika shanmugam, *Fundamentals of Biochemistry for Medical Students*, LWW India *publishing house.2012*
- Vasudevan, *Text book of Medical Biochemistry*, ViJaypee Brothers *Medical Publishers* (P) Ltd,2011.

Reference Books

- Harold Varley, *Practical Clinical Biochemistry*, CBS Publishers, New Delhi, 2005
- N. V. Bhagavan, *Medical Biochemistry*, Fourth edition, Academic Press, 2004.
- Victor W Rodwell, David A Benda, Kathean M, Botham, *Harpers illustrated Biochemistry*, Thirtheenth edition, MC Graw Hill Education, 2015.

UBCM603 MOLECULAR BIOLOGY

Semester	**: VI**	**Credit**	**: 5**
Category	**: Core paper-XI**	**Hours/week**	**: 5**
Class & Major	**: III B.Sc. Bio Chemistry**	**Total hours**	**: 65**

Objectives

To enable the students

- Understand the structure & function of cells
- Acquire working knowledge of gene & to know how genes are expressed

- Understand how the various techniques of molecular biology are applied.
- Appreciate how genetic engineering & biotechnology influence a health care in the next century

UNIT-I **15Hrs**

Experimental evidence to prove DNA as a carrier of Genetic material-Bacterial transformation, Transduction and Conjugation. DNA Replication-types, evidence to show DNA replication is semi conservative; Messelson and Stahl experiment .

UNIT-II **15Hrs**

Transcription in Prokaryotes: Central Dogma, DNA dependent RNA polymerases, Mechanism-, various sites of transcription, rho dependent and independent termination. Post transcriptional modification-mRNA, rRNA and tRNA processing. RNA splicing, editing. Inhibitors of transcription, Eukaryotic RNA polymerases. Reverse transcription and Retro virus.

UNIT-III **15Hrs**

Genetic Code-Definition, deciphering of the genetic code, codon dictionary, salient features, experimental evidences, wobble hypothesis. Translation in Prokaryotes -initiation, elongation, translocation, termination, polysomes.

UNIT-IV **15Hrs**

Operon model - Lac operon positive and negative control, repression and attenution (Trp operon), recombination. Protein targeting, Gene amplification.

UNIT-V **18Hrs**

Gene mutation-Base pair substitution, frame shift mutation, missense mutation, nonsense mutation, mutation in termination codons, silent mutation. Genetic suppression – intragenic and extragenic suppression. Molecular mutation- spontaneous and induced mutation. Chromosome mutation - Changes in the number of chromosomes and changes in the structure of chromosomes. DNA Repair-Definition and mechanism.

Text Books

- David L.Nelson, MichaelM.Cox ,"Lehninger -Principles of Biochemistry", Fourth edition, W.H.Freeman and Company, Newyork.2005,
- David Freifelder,"Molecular cell Biology", Narosa publishing house NewDelhi.1995

Reference Books

- G.Karp.Willey International edition (4th edition),.Cell and Molecular Biology".2005
- Harvey Lodish, David Baltimore, Adrenoldberk, S.LawrenceZipursky, Paul Matsudaira, James darnell,"Molecular Cell Biology", W.H.Freeman& Company, New York1997.
- R.M.Twyman.,"Advanced Molecular cell Biology", W.WisdenViva books private Ltd. New Delhi 2001

UBCR601 CLINICAL BIOCHEMISTRY-PRACTICAL

Semester : VI **Credit : 4**
Category : Core Practical-IV **Hours/Week : 6**
Total Hours : 78

Objectives:
To enable the students

- To develop good clinical practice of diagnostic biochemical tests.
- To develop competence and confidence in the associated calculation skills.
- To develop understanding of the basic principles of clinical analysis.

Colorimetric Estimations:

1.Estimation of Blood Glucose by
a)Folin's Wu method
b)Ortho Toludine method
2. Estimation of cholesterol by Zak's method
3. Estimation of Creatinine by Jaffe's method.
4. Estimation of urea by Diacetyl monoxime method.
5. Estimation of albumin/globulin ratio in serum.
6. Estimation of DNA
7. Estimation of RNA
8. Estimation of bilirubin by Malley Evelyn method.
9. Estimation of protein by biuret method.
10. Estimation of inorganic phosphorous by Fiske and Subbarrow method.

Text Book

- Harold Varley,*Practical Clinical Biochemistry*,CBS Publication,1998.

Reference Book

- Chatterjea,Rana Shinde,*Textbook of Medical Biochemistry*,Jaypee publication,2008.

UBCR602 HEMATOLOGY AND URINE ANALYSIS

Semester : VI **Credit : 3**
Category : Core Practical - VII **Hours/Week : 3**
Class & Major : III B.Sc. Biochemistry **Total Hours : 39**

Objectives:
To enable the students

- Understand good clinical practice of various diagnostic biochemical tests.

- Evaluate different test and procedures related to clinical lab.

1. Hematology

- RBC Count
- Total and differential WBC count
- PCV
- ESR
- Hemoglobin.
- Haematocrit Value

2. Urine Analysis

I. Qualitative analysis of normal and abnormal constituents of urine (Sugar, Ketone bodies, bile salts, aminoacids, urobilinogen, protein, Bence jones protein)

II. Quantitative estimations in urine
   - Glucose by Benetict's method.
   - Uric acid by Caraway's method.
   - Creatinine by modified Jaff's method.

Text Books

- Varley, *Practical Biochemistry*, CBS Publishers, 2005.
- S. K Sawhney, Randhir Singh, *Introductory practical Biochemistry*, Narosa Publishing House, 2011

Reference Books

- G Rajagopal, B D Toora, *Practical Biochemistry for medical*, *Dental and Allied Course*, third edtion, Ahuja Publishing House, 2014.
- Kanai L Mukherjee, *Medical Labaratory Technology* , Tata Mc GRAW- Hill publishing company Limited, fifteenth edition, 2004.
- David T Plummer, *An Introduction to Practical Biochemistry*, Tata Mc GRAW- Hill Publishing Company Limited, fifteenth edition, 1999.

UBCO604 –STEM CELL BIOLOGY

Semester : VI **Credits : 4**
Category : Major Elective **Hours/Week : 5**
Class & Major : III B.Sc Biochemistry **Total Hours :65**

Objectives:

To enable the students

- Understand physiology of stem cells at cellular level.
- Understand the culture of stem cells.
- Identify the diagnosis and management of diseases and disorders with stem cells

UNIT –I INTRODUCTION TO STEM CELLS 15 Hrs

Stem cell definition, kinds of stem cells - Embryonic and adult stem cells. Characteristics of stem cells. Totipotent, Unipotent, oligopotent and pluripotent cells.

UNIT- II GROWTH INDUCING AGENTS **10 Hrs**

Role of bone marrow in cell synthesis, Growth factors – types and their role in cell development.

UNIT- III CELL LINES **12 Hrs**

Cell lines – Types, Commonly used cell lines and selection of cell lines; maintenance of cell culture; Sub culture – Mono layer culture, Criteria for sub culture of mono layer, technique; Suspension cultures.

UNIT- IV EMBRYONIC STEM CELLS **13 Hrs**

Stem cell culture – Embryonic stem cell, methods to produce differentiated cells, maintenance of stem cells. Stem cell bank.

UNIT- V APPLICATIONS OF STEM CELLS **15 Hrs**

Human embryonic stem cell research- Parkinson's Diseases, Diabetes, Heart muscle repair. Applications of stem cells in study of tissue differentiation, molecular signals and testing of new drugs.

Text Books

- U. Sathiyanarayana, *Biotechnology*, Books & Allied (P) Ltd.2007.
- V. Kumaresan, *Biotechnology*, Saras publication, Nagercoil revised edition, 2009.

Reference Books

- R.W Old, S.B Primrose, *An introduction to Genetic Engineering*, Blackwell Science, 2003.
- R.Sasidhara, *Animal Biotechnology*, MJP publishers, 2006.

UBCO605 MOLECULAR ENDOCRINOLOGY

Semester	**: VI**	**Credit**	**: 4**
Category	**: Major optional**	**Hours/week**	**: 5**
Class &Major	**: III B.Sc. Biochemistry**	**Total hours**	**: 65**

Objectives:

To enable the students

- Understand hormonal influence in human physiology
- Determine the familial and medical history relevant to endocrine problems

UNIT-I INTRODUCTION **15 Hrs**

Hormones- definition, classification, biosynthesis, characteristic features. Hormones receptors- Features and Structure, regulation of receptor levels. Mechanism of hormone action. Signal transduction.

UNIT-II TROPIC HORMONES **15 Hrs**

Secretion, biological action, and regulation of growth hormone. Adreno corticotropic hormone, Prolactin, Gonadotropic hormone, Follicle stimulating hormone. Leutinizing

hormone, Antidiuretic hormone and oxytocin. Hyper and Hypopituitarism Disorders- Dwarfism, Gigantism, Acromegaly, Cushing's disease and diabetes insipidus.

UNIT-III THYROID HORMONES **15 Hrs**

Biosynthesis, secretion, transport, regulation and Biological action of thyroid stimulating hormones. Thyroxine. Disorders: Hyperthyroidism & Hypothyroidism disorders- Cretinism, Myxoedema and Hashimoto's diseases, Graves's diseases, Exophthalmos, Toxic goiter and Non-toxic Goiter.

UNIT-IV GLUCOSE HORMONES **10 Hrs**

Synthesis, regulation, biological action of Insulin, Glucagon, Somatostatin and insulin growth factor, Disorders- Diabetes Mellitus, Hypoglycemia.

UNIT-V GLUCOCORTICOIDS AND MINERALOCORTICOIDS **10 Hrs**

Glucocorticoids and Mineralocorticoids- Synthesis, secretion, transport, biological effects, metabolism and excretion. Gonadal hormones-Biological action of androgens and estrogens.

Text Books

- Lohar, S.Prakasa, *Endocrinology- Hormones & human health,* MJP Publishers, 2006.
- Devlin, Thomas, M. *Textbook of Biochemistry (with clinical correlation),* John Wiley & son's publishers, 4th edition, 1992.

Reference Books

- Austin and Short, *Mechanism of hormone action*. Prema Jaypee Brothers, 1992.
- Robert, K. Murray *et al* Appleton and Lange Stanford. Connecticut, *Harper's Biochemistry,* 25th edition, 2005.

UBCO606 PATHOBIOLOGY OF HUMAN DISEASES AND DISORDERS

Semester	**: VI**	**Credits**	**:4**
Category	**: Major Elective**	**Hours/Week**	**:5**
Class & Major	**: III B.Sc Biochemistry**	**Total Hours**	**:65**

Objectives:
To enable the students

- Understand pre-clinical and clinical education in Pathobiology
- Categorize the contemporary in health issues
- Compare normal and abnormal cells in humans that generates new knowledge in pathology

UNIT –I DIGESTIVE TRACT DISORDERS 13 Hrs

Diseases related to digestive tract - Inflammatory bowl syndrome, Electrolyte disorder, liver cirrhosis, food poisoning, GI tract cancers, Peptic ulcer -H.pylori infection.

UNIT- II HAEMODYNAMIC DISORDERS AND CLINICAL PATHOLOGY 13 Hrs

Mechanism of Blood Coagulation, Intrinsic and extrinsic pathways of blood clotting, list the blood clotting factors, fibrinolytic system, importance of coagulation. Blood coagulation profile determination, examination of Bone marrow and it uses

UNIT- III CELL INJURY AND PARASITIC INFECTIONS 13 Hrs

Normal and abnormal cell, Cell Injury- types of cell injury, etiology of cell injury, morphology of cell injury, Cellular swelling .Diagnosis of blood parasites like malarial, filariasis, viruses like hepatitis virus, Vibrio cholera.

UNIT- IV INFLAMMATION 13 Hrs

Inflammatory markers - C reactive protein, Estimation of C- reactive protein, rheumatoid arthritis, rheumatoid fever, tuberculosis and neoplasia.

UNIT- V DISEASES DUE TO MISFOLDED PROTEINS 13 Hrs

Introduction to protein folding and proteosome ,removal of misfolded proteins; etiology and molecular basis for Alzheimer's, Prion diseases, Huntington's chorea, sickle cell anemia and Thalassemia.

Text Books

- P. Chakraborty Gargi Chakraborty, *Practical Pathology* ,New Central Book Agency, Kolkotta 2005.
- Praful B. Godkar ,*Text Book of Medical Laboratory Technology*, Bhalani publishing house, 2014.

Reference Books

- Sir John Dacie, *Practical Haematology,* Churchill Livingstone,London, 5th Edition 2011
- Todd & Sanford, *Clinical Diagnosis & Management by Laboratory Methods* John Bernard Henry All India travellar Booksellar, Delhi, 2009
- Harsh Mohan, *Text Book of Pathology*, 6th edition, Jaypee Brothers2010.

UIDM601 NANOTECHNOLGY IN MEDICINE

Semester : VI **Credits : 4**
Category : Major Elective **Hours/Week : 5**
Class & Major : III B.Sc. Biochemistry **Total Hours : 65**

Objectives:
To enable the students

- Identify the various types of nanomedicine.
- Determine the importance of nanomaterials in nanomedicine

UNIT- I OVERVIEW OF NANOTECHNOLOGY 13 Hrs

Basics of nanotechnology - State of art of nanotechnology- relevance of nanotechnology- impact on economy and future development - applications.

UNIT- II NANOTECHNOLOGY IN EVERYDAY LIFE **13 Hrs**

Nanotechnology based products- daily usage- associated concepts-advantages of using nanotechnology products. Applications of nanotechnology in biomedical fields.

UNIT -III NANOMEDICINE **13 Hrs**

History of the idea – Nanomedicine taxonomy – Bio pharmaceuticals –implantable materials – surgical Aids – diagnostic Tools – imaging. Polymer micelles as drug carriers: polymer micelle structures – drug loading and release – phramacokinetics and Biodistribution – drug delivery applications – clinical trials.

UNIT -IV NANOCAPSULES **13 Hrs**

Introduction – preparation – characteristics of nano Capsules – drug release – applications.

UNIT- V NANOTECHNOLOGY IN MEDICINE AND HEALTH **13 Hrs**

Cardiovascular diseases ,Cancer, Diabetes . Nanotechnology - implants and prosthetics - nanotechnology and burn victims - diagnosis and therapy - drug delivery using nanoparticles - nanotechnology fights infections - Pharmaceutical nanotechnology research.

Text Books

- John Mongillo, *Nanotechnology 101*, Greenwood Press, 2007.
- K.K. Chattopadhyay and A.N. Banerjee, *Introduction to Nanoscience and Nanotechnology*, PHI Learning Ltd, New Delhi, 2009.

Reference Books

- Joe Anne Shatkin, '*Nanotechnology: Health and Environmental risks'*, CRC press, 2008.
- Parag Diwan and Asish ,Bharadwaj, *Nanomedicines*, Ed. By, Pentagan Press, 2006.
- Vladimir P Torchilin *Nanoparticles as Drug Carriers*, Ed., Imperial College Press, North Eastern University, USA, 2006.

e- Resources

- https://booksfree4u.tk/download-nanomedicine-ebook-pdf-free
- https://sites.google.com/site/.../The-Handbook-of-Nanomedicine.pdf
- nptel.ac.in

UBCA502 CLINICAL DIAGNOSTICS

Semester : V **Credit : 4**
Category : Allied optional **Hours/week : 5**
Class & Major : III B.Sc Science students except Biochemistry **Total Hours: 65**
Objectives:
To enable the students

- Gain knowledge in Basic Biochemistry and in their applications to human health.

- Interpret the disease at an earlier stage.
- Acquire a thorough knowledge of normal and abnormal Biochemistry and to apply this knowledge to the understanding of human disease.
- Work effectively in a health care organization.

UNIT – I DISORDERS OF CARBOHYDRATE METABOLISM 15 hrs

Diabetes mellitus – causes, types, complications and treatment. GTT. Difference between diabetes mellitus and diabetes insipidus. Protein calorie malnutrition, Kwashiorkor and Marasmus – causes, complications and its treatment.

UNIT – II DISORDERS OF LIPID METABLISM 15 hrs

Abnormal lipid levels, role of HDL and LDL cholesterol, Atherosclerosis, Coronary heart disease, heart attack, Obesity and its complications.

UNIT – III HORMONAL IMBALANCE 15 hrs

Menstrual cycle, Irregular menstrual cycle, Hormonal imbalance, PCOD and its effects, causes, detection and its treatment.

UNIT – IV KIDNEY DISORDERS 10 hrs

Kidney structure, function, kidney stones, difference between kidney and gall stones, chronic renal failure – causes, symptoms and its treatment.

UNIT – V BLOOD AND BMI 10 hrs

Blood pressure and its regulation, normal and abnormal levels, Blood grouping (ABO & Rh), BMI and its role.

Text Books

- M. N. Chatterjea, Rana Shinde, *Textbook of Medical Biochemistry*, Jaypee Publications, 2008.
- Mukherjee, *Medical Laboratory Techniques*, Tata McGraw – Hill Publishing Company Limited, 15th edition, 2004.

Reference Books

- Swaminathan, *Nutritional Biochemistry*, Bappco Publication, 1999.
- T. M. Devlin, *Textbook of Biochemistry with Clinical Correlations*, John Wiley and Sons Publications, 2005

UBCA503 MICROBIOLOGY

Semester: V **Credit : 4**
Category: Allied optional **Hours/week : 5**
Class & Major: III B.Sc Science students except Biochemistry **Total Hours : 65**

Objectives:
To enable the students

- Understand the basic classification of Microorganisms.
- Understand the basic methods in Microbiology
- Apply the knowledge of microorganism in food preservation and fermentation.

UNIT – I INTRODUCTION TO MICROBIOLOGY 12 hrs

Definition and scope of Microbiology, Contribution of Louis Pasteur ,Robert Koch ,Leenwen hoek to Microbiology and its evolution. Development of Microscope- light microscope ,Dark field ,Phase contrast ,Fluorescence ,Electron microscope- Principles and Application.

UNIT – II CLASSIFICATION OF MICROORGANISMS 15 hrs

Nomenclature , general features of some microorganisms with reference to basic clinical aspects –Algae , Fungi ,Protozoa, Bacteria ,Virus. Structure and function of bacterial cell wall.

UNIT – III METHODS IN MICROBIOLOGY 12 hrs

Culture techniques, Media preparation- Minimal medium ,preservation of culture-Physical and Chemical methods ,Aerobic and Anaerobic culture techniques, growth curve of Bacteria, measurement of growth .Smearing and staining-Simple stain ,differential stain ,special stain (capsular stain ,Endospore stain ,flagella stain) and negative staining.

UNIT – IV FOOD MICROBIOLOGY 14 hrs

Microbial Spoilage of food .Bacterial food poisoning – Endo and Exotoxins .Food preservation and storage-Food Additives

UNIT – V INDUSTRIAL MICROBIOLOGY 12 hrs

Fermentation and Fermented food products and its application. Design of fermenter – Microbial Production of Alcohol – Saccharomyces cerevisiae, Lactic acid – Lactobacillus, Vinegar – Acetobacter, Wine - Saccharomyces cerevisiae and penicillin – penicillium chrysogenum.

Text Books

- R.C.Dubey, D.K.Maheswari, *Textbook of Microbiology*, S.Chand & Company, New Delhi, 2005.
- Michael J.Pelczar, JR,E.C.S. Chan Noel R, Krieg, *Microbiology*, Tata McGraw – Hill, 5th edition .New Delhi, 2005.

Reference Books

- Prescott Harley Klien, *Microbiology*, 6th edition Mc Graw Hill International edition, 2005.

- Ananthanarayan, R. and Paniker, *Text book of Microbiology*, 7th edition, Orient Longman Ltd., New Delhi, 2005.

UBCA504 REPRODUCTIVE BIOLOGY

Semester: V **Credit : 4**
Category: Allied optional **Hours/week: 5**
Class & Major: III B.Sc Science students except Biochemistry **Total Hours: 65**

Objectives:
To enable the students

- Gain knowledge about reproductive system
- Understand the menstrual cycle and identify the changes during menopause stage.
- Aware of the stages of pregnancy, parturition, lactation.

UNIT – MALE REPRODUCTIVE SYSTEM **14 hrs**

Male reproductive system – primary sex organs, structure and functions of testis and prostate gland, Spermatogenesis, Semen and its composition, disorders – Hypergonadism, Hypogonadism.

UNIT – II FEMALE REPRODUCTIVE SYSTEM **14 hrs**

Female reproductive system – primary sex organs, structure and functions of ovary, Ovulation, Oogenesis, disorder – polycystic ovarian disorder, Family planning – pills, Condoms, Intrauterine devices.

UNIT – III MENSTRUAL CYCLE **10 hrs**

Puberty, Menstrual cycle – definition, Changes during menstrual cycle – Ovarian and Uterine. Regulation of menstrual cycle, Menopause – Causes and changes.

UNIT – IV FERTILIZATION AND PREGNANCY **12 hrs**

Pregnancy – Definition, types, stages and metabolic changes during Pregnancy. Fertilization – Infertility in male and female.

UNIT – V PARTURITION AND LACTATION **15 hrs**

Gestation period, Parturition stages, placenta – Introduction, function. Lactation – Milk secretion, Milk ejection**.**

Text Books:

- Sembulingam. K and Prema Sembulingam, *Essentials of Medical Physiology*, Jaypee Brothers, New Delhi, 2nd Edition, 2009.
- Dr.H.D.Singh, *Hand book of Human physiology*, 1st edition, 2007.
- C.C. Chatterjea (Vol I & Vol II), *Human Physiology*, Medical Allied Agency, 11th edition, 2006.

Reference Books:

- Guyton & Hall, *Textbook of Medical Physiology*, Reed Elseveir India Private Limited, New Delhi, 10th edition , 2000.
- Murray et al, *Harper's Physiological Biochemistry*, Tata McGraw Hill Publication. Co. Limited, New Delhi, 2000,
- RA Agarwal, Anil K.Srivastava, Kaushal Kumar, *Animal Physiology and Biochemistry*, 2008.

UBCA505 RURAL WASTE MANAGEMENT

Semester: V **Credit : 4**
Category: Allied optional **Hours/week: 5**
Class & Major: III B.Sc Science students except Biochemistry **Total Hours: 65**
Objectives:
To enable the students

- Understand the basic concepts of Biocomposting, Vermicomposting and Biomass degradation.
- Create awareness on waste water treatment.
- Apply the concept of environmental ethics on waste management.

UNIT –I HOME AND ENVIRONMENT CLEANLINESS 10 hrs

Introduction – Definition, scope and importance of home and environment clean up, Domestic and environment waste, Role of an individual in preserving the environment, disposal methods to remove domestic and environmental waste, use of ecofriendly products like solar kitchens, biogas fuels of environment.

UNIT – II BIOCOMPOSTING AND VERMICOMPOSTING 15 hrs

Biocomposting – Compost, definition, role of microbes, innoculum culture, procedure for Biocomposting, Aerobic and anaerobic composting, Biofertilizer production and plant productivity. Vermicomposting – Definition, concept, vermiculture, procedure and requirements for vermicomposting, Advantages of vermicomposting.

UNIT – III BIOMASS DEGRADATION AND ROLE OF MICROBES 15 hrs

Biomass degradation – definition, microbes in natural habitats – Air, water, soil, role of microorganisms, production of biogas, methods of disposal landfills, incineration, recycling and sustainability, conversion of biofuels, manure for agricultural use.

UNIT – IV WASTE WATER RECYCLING 15 hrs

Waste water management – Definition, waste water production and treatment – collection, transport, processing or disposal of domestic water, waste water – waste water treatment.

UNIT – V ENVIRONMENTAL ETHICS **10hrs**

Definition, Environmental ethics and environment act on higher animals, species and Biodiversity ethics, land ethics.

Text Books:

- Singh.D.P and S.K.Dwivedi, *Environmental Microbiology and Biotechnology* published by new age international private limited, 2009.
- Chandrappa, Ramesha and D.R.Ravi. *Environmental issues, law and technology – An Indian perspective*. Delhi: Research India publications, 2009

Reference Books:

- Trivedi, R.K. *Hand book of environmental laws rules Guidelines, compliances and Standards.* Vol – I and II, Enviro media (R).
- Rao M.N and A.K.Datta. *Waste water treatment*. Oxford and IBH Publ. co .Pvt. ltd., 1987.
- Jadhav, Hand Bhosale. V.M., *Environmental production and laws*. Delhi: Himalaya publishing house, 1995.

UBCP601 PROJECT

Semester: VI **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
III	3	Methodology	10	Viva - voce	10
	4	Accuracy of result	10		-
&	5	Result and Discussion	10		-
	6	Report preparation	10		-
IV		**Total**	**60**		**40**
E		Maximum marks	100		

VALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
V	Core X	UBCM503	Basics of Bioinformatics	Creating protein database	Seminar
VI	Core XI	UBCM601	Introduction to Biotechnology	Model presentation	Seminar
	Core XII	UBCM602	Clinical Biochemistry	Case Study	Seminar
	Major Elective	UBCO606	Pathobiology of Human Diseases and Disorders	Case Study	Seminar
		UIDM601	Nanotechnology in medicine	Model presentation	Seminar

M.SC. BIOCHEMISTRY

EXTRA CREDIT EARNING PROVISION
SELF STUDY PAPER(Only for Interested Students)

Semester	Category	Course code	Course Title	Hrs/ week	Credit	
					Min	Max
III	Self Study Paper	PBCS301/ PBCS302	**Genomics / Proteomics**	2	-	2

PBCS301 GENOMICS

Semester : III **Credit : 2**
Category : Self study **Hours/ week : 2**
Class & Major : II M.Sc. Biochemistry **Total Hours : 26**

Objectives:
To enable the students

- Analyze the importance of genomics.
- Assess the prospects of various applications in genomics.

UNIT-I OVERVIEW OF GENOMICS 07 Hrs

Introduction- Genomics: Structural and Functional Genomics. Sequence - Based Approaches, Comparative genomics, Genome Databases, Human Genome Project.

UNIT-II FUNCTIONAL GENOMICS 09 Hrs

Sequence-Based Approaches, Microarray Based Approaches, Comparison of SAGE and DNA Microarrays. Differential display, Protein functions on genome-wide scale, Knock-out analysis, Anti-sense and RNA interference (RNAi).

UNIT-III METAGENOMICS 10 Hrs

Microbial functional genomics – Metagenomics, Construction of metagenomic library, analysis of metagenomic library – Function driven analysis, Sequence driven analysis. Stable isotopic probing for molecular ecology.

Text books

- J.Zhou, D.K. Thomson. Y.Xu. J.M. Tiedje, *Microbial Functional Genomics* (2004) J.Wiley & Sons Publishers.
- S. B. Primrose and R. M. Twyman,*Principles of Gene Manipulation and Genomics* (2006) Blackwell Scientific Publications.

- C. Cantor and C.L. Smith,*Genomics: The Science and Technology Behind the Human Genome Project* (2000). Edited by C. Cantor and C.L. Smith, Wiley-Interscience, New York.

References books

- Richard J Reece , *Analysis of Genes and Genomes*, Wiley Publications, 2003
- Mount, D. *"Bioinformatics: Sequence and Genome Analysis"*; Cold Spring Harbor Laboratory Press, New York. 2004
- Baxevanis, A.D. and Francis Ouellellette, B.F. *"Bioinformatics – a practical guide to the analysis of Genes and Proteins"*; John Wiley & Sons, UK,1998.

E- Resources

- www.freebookcentre.net › Medical Books › genetics Books
- www.springer.com/in/book/9780306463129
- nptel.ac.in

PBCS302 PROTEOMICS

Semester	**: III**	**Credit**	**: 2**
Category	**: Self study**	**Hours/Week**	**: 2**
Class & Major	**: II M.Sc. Biochemistry**	**Total Hours**	**: 26**

Objectives:

To enable the students

- Appraise the knowledge about prospects of proteomics.
- Integrate the various techniques in proteomics research.

UNIT- I INTRODUCTION TO PROTEOMICS 07 Hrs

Evolution of proteomics from protein chemistry, Proteome and proteomics, Promises of proteomics, Techniques commonly used for proteome analysis**. Challenges and future prospects of proteomic research.** Proteome maps

UNIT- II ABUNDANCE-BASED PROTEOMICS 09 Hrs

Two-dimensional electrophoresis (2-DE) and analytical mass spectrometry (MS) techniques, drawbacks associated with the gel-based techniques , **Interactomics: techniques to study protein-protein interactions**

UNIT - III GEL-BASED PROTEOMICS 10 Hrs

Two dimensional gel electrophoresis (2-DE), Staining procedures to visualize 2-D gels, Tools for analysis of gels, Fluorescence 2-D Difference Gel electrophoresis (DIGE), Merits and demerits of gel-based proteomic techniques.

Text books

- D.C. Liebler, *Introduction to Proteomics: Tools for the New Biology*, Humana Press, 2002.
- R.M. Twyman, *Principles of Proteomics*, Bios Scientific Pub., 2004.
- T.D. Veenstra, J.R. Yates III, *Proteomics for Biological Discovery*, John- Wiley & Sons, Hoboken, New Jersey, USA; 2006.

Reference books

- R. Hubert, *Protein Biochemistry and Proteomics* (The Experimenter Series), Academic Press, 2006.

- R. Westermeier, T. Naven, H-R. Höpker, *Proteomics in Practice*: A Guide to Successful Experimental Design, , Wiley-VCH, 2008.

e- Resources

- www.freebookcentre.net / Medical Books/ genetics Books
- www.springer.com/in/book/9780306463129
- nptel.ac.in
- file.zums.ac.ir/ebook/38-Introduction to Proteomics 20Tools.

DEPARTMENT OF CHEMISTRY

PREAMBLE

UG **:** Course profile, list of courses offered to other departments and the syllabi of courses offered in the first two semesters along with evaluation components III and IV **(with effect from 2015-2018 batch onwards)**

M.Phil.: Course profile, list of courses offered and the syllabi of courses offered in the first two semesters along with evaluation components III and IV **(with effect from 2017-2018 batch onwards)**are presented in the booklet.

COURSE PROFILE B.Sc (Chemistry)

Semester	Part	Category	Course code	Course Title	Contact Hrs/ Week	Credits	
						Min	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	Basic 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	Analytical Chemistry	4	4	4
		Core Practical I	UCHR204	Semimicro Qualitative Inorganic Analysis	3	-	-
		Allied I	UPHA101	Allied Physics - I	3	3	3
		Allied Practical I	UPHR102	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	Basic English-II/ Advanced English-II	5	3	4
	III	Core IV	UCHM202	General Chemistry –II	6	6	6
		Core Practical I	UCHR204	Semimicro Qualitative Inorganic 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
	V	Extension Programme/ Physical Education/NCC			-	1	2
				Total	**30**	**24**	**27**
III	I	Tamil/Hindi/French	UTAL305/ UTAL306/	Basic Tamil-III/ Advanced Tamil-III/	4	2	3

			UHIL301/ UFRL301	Hindi-III/ French-III			
	II	English	UENL307/ UENL308	Basic English-III/ Advanced English-III	5	3	4
	III	Core V	UCHM303	General Chemistry –III	4	4	4
		Core Practical II	UCHR404	Volumetric Analysis	3	-	-
		Core VI	UCHM304	Separation & Purification Techniques	3	3	3
		Allied	UMAA306	Algebra, Differential Calculus and Trignometry	5	5	5
	IV	NME			4	2	2
		Value Education			2	1	1
				Total	**30**	**20**	**22**
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	Basic English/ Advanced English	5	3	4
	III	Core VII	UCHM403	General Chemistry –IV	6	5	5
		Core Practical II	UCHR404	Volumetric Analysis	3	4	4
		Core VIII	UCHM404	Instrumental Method of Analysis	5	5	5
		Allied	UMAA406	Integral Calculus, Laplace Transform & Ordinary Differential Equation	5	5	5
	IV	Soft skill	USKS401		2		
	V	Extension Programme/ Physical Education/NCC			-	-	2
				Total	**30**	**24**	**28**
V	III	Core IX	UCHM504	Inorganic Chemistry – I	5	4	4
		Core X	UCHM505	Organic Chemistry –I	6	5	5
		Core XI	UCHM506	Physical Chemistry –I	5	4	4
		Core Practical III	UCHR603	Gravimetric Analysis	2	-	-
		Core Practical IV	UCHR604	Organic Analysis & Preparation	2	-	-
		Core Practical V	UCHR605	Physical Chemistry Practical	3	-	-
		Allied Optional			5	4	4
	IV	Value education			2	1	1
				Total	**30**	**18**	**18**
VI	III	Core XII	UCHM607	Inorganic Chemistry II	4	4	4
		Core XIII	UCHM608	Organic Chemistry II	4	4	4
		Core XIV	UCHM609	Physical Chemistry II	4	4	4
		Core XV	UCHM610	Physical Chemistry III	4	4	4
		Major elective	UCHO602 UCHO603 UCHO604 UCHO605	Polymer Chemistry Medicinal Chemistry Forensic Chemistry Chemistry of Dyes	5	4	4
		Core Practical III	UCHR603	Gravimetric Analysis	2	4	4
		Core Practical IV	UCHR604	Organic Analysis & Preparation	2	4	4
		Core Practical V	UCHR605	Physical Chemistry Practical	3	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**	**34**	**36**

Grand Total	**180**	**140**	**153**

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
VI	Core	UCHS601/ UCHP601	Green Chemistry (Self Study Paper)/ Project	**2** **-**	**-** **-**	**1** **1**

LIST OF COURSES OFFERED TO OTHER DEPARTMENTS

ALLIED AND ALLIED OPTIONAL COURSES

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	Chemistry – II	3	3	3
I	III	Allied Practical-I	UCHR103	Volumetric & Organic Analysis	3	2	2
IV	III	Allied Practical-II	UCHR403	Volumetric & Organic 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	UCHE204	Food Chemistry	4	2	2
III	IV	Non major elective	UCHE302 UCHE303	Cosmetics and Detergents Green Chemistry	4 4	2 2	2 2

UCHM504 INORGANIC CHEMISTRY – I

Semester : V **Credit : 4**
Category : Core IX **Hours/Week : 4**
Total Hours : 52

Objectives:

- To comprehend the nature of metals of d block elements
- To learn the basic concept and theory in Co-ordination chemistry.
- To create an awareness of the biological aspects of metal.

Unit - I **12 Hrs**

Transition metals- Position in periodic table – electronic configuration and oxidation states of 1^{st}, 2^{nd} & 3^{rd} transition series elements. Variable valency – application as reductants/oxidants [Cr(VI), Mn(VII), Fe(II),Fe(III),Cu(II),Hg(II)]

Comparitive study of Ti , V, Cr, Mn, Fe group metals- occurrence , oxidation state and magnetic properties.

preparation and uses - Ammonium molybdate, V_2O_5 , UF_6

Preparation and uses of alloys - Ti, Zr, Pt, Th, and U.

Unit - II **12 Hrs**

Introduction of Co-ordination Chemistry- Definition of terms used- classification of ligands –chelation and effect of chelation- Co-ordination number and stereo chemistry of complexes- Nomenclature. Isomerism in Complexes- Structural and stereo isomerism in 4 and 6 co-ordination complexes.

Unit – III **11 Hrs**

Theory of co-ordination chemistry- Werner theory- EAN rule. Theory of bonding- Valence bond theory – hybridization- geometry and magnetic properties- failure of VBT. Crystal field theory – spectrochemical series – splitting of d-orbitals in octahedral ,tetrahedral and square planer complexes – crystal field stabilization energy- calculation of CFSE in octahedral and square planer complexes. Comparison of VBT and CFT.

Unit -IV **7 Hrs**

Inert and Labile complexes- Factors affecting stability- stability constant-Irving William order of stability- Jahn- Teller effect- substitution reactions in co-ordination complexes- trans effect.

Unit-V **10 Hrs**

Biological importance of metal ions: Metallo enzymes, active sites, transition metal ions in biology, heme proteins, haemoglobin, myoglobin, cytochromes, iron- sulphur proteins, ruberedoxin, ferredoxin, vit B12.

Biological aspects of Fe, Zn, Mg, Co, and Mo. Role of Na, K, Ca & P.

Text Books:

- P.L.Soni – *"Inorganic chemistry"*-20^{th} revised edition- Sultan Chand (2006)

- B.R. Puri, L.R. Sharma and K.C.Kallia – *"Inorganic chemistry"* – Vallabh Publications (2003)
- W.U.Malik, G.D.Tuli and R.D.Madan–*"Selected topics in inorganic chemistry"* –7th edition- S.Chand Publications(2003)

Reference Books:

- J.E. Huheey, Harper and Collins –*"Inorganic chemistry"* – 4th edition-Pearson education pvt.Ltd(2000).
- J.D.Lee – *"Concise Inorganic chemistry"* –5th edition –Black well science limited (2006).
- B.K.Sharma – *"Industrial chemistry"* – Goel Publications House(1994)
- R.K. Das – *"Industrial chemistry"* – Kalyani Publications, New Delhi (1982)
- K.Burger – *"Coordination chemistry"* – Butterworthy (1973)
- D.A. Skoog and D.M.West – *"Fundamentals of analytical chemistry"* – Holt Reinhard and Winston Publication – IV Edition (1982)
- Cotton and Wilkinson- *"Advanced Inorganic chemistry"*- 5th Edition – Wiley and Sons(1988).

UCHM505 ORGANIC CHEMISTRY - I

Semester	**: V**	**Credits**	**: 5**
Category	**: Core X**	**Hours/Week**	**: 6**
Class Major	**: III-B.Sc. Chemistry**	**Total Hours**	**: 78**

Objectives:

To enable the students

- Impart knowledge about thiols, ethers, organonitrogen and carbonyl compounds
- Write the mechanism of different organic reactions
- Identify the structure of organic compounds by various spectroscopic techniques

UNIT – I CHEMISTRY OF THIOLS AND ETHERS 15Hrs

Thiols-nomenclature-methods of preparation-properties and uses. Thioethers-nomenclature-methods of preparation-properties and uses. **Ethers-**nomenclature-isomerism-methods of preparation-properties and uses.-Diethyl ether-preparation- properties-comparison of ethers and alcohols.

UNIT – II ORGANO NITROGEN COMPOUNDS 15 Hrs

Nitro compounds and amines - Conversion of nitro benzene to ortho, Para, and meta dinitrobenzene, TNT. Aromatic nitro compounds- reduction in neutral, acidic and alkaline media. Relative basic strengths of aliphatic and aromatic amines. Ring Substitution in aromatic amines. Diazotization and its mechanism.**Diazomethane and diazoacetic ester-**preparation, structure and synthetic uses.

UNIT-III CARBONYL COMPOUNDS AND THEIR DERIVATIVES 15 Hrs

Carbonyl polarization: Reactivity of carbonyl group- Mechanism of Aldol, Perkin, Knoevnagal reactions and Benzoin condensation- Claisen, Wittig, Cannizaro, Reformatsky

reactions. Mechanisms of reaction of MPV, Halo form and Michael addition. - Norrish type I and II reactions.

UNIT-IV SPECTROSCOPY –UV VISIBLE-AND IR SPECTROSCOPY 16Hrs

types of electronic transitions- chromophore and auxochromes. FTIR:Fingerprint region –types of molecular vibrations- fundamental vibrations for linear and nonlinear molecules (CO_2 and H_2O) -characteristic IR absorption bands for. 1. Alcohols and ethers 2. Aldehyde and ketone, 3. Cis and Trans isomers, 4.Inter and intra hydrogen bonding

UNIT-V NMR SPECTROSCOPY AND MASS SPECTROMETRY 17 Hrs

H^1 NMR Spectroscopy:chemical shifts- shielding and deshielding effects- factors influencing chemical shifts- splitting of signals- spin-spin coupling-advantages of using TMS as a reference. **Mass Spectrometry**-Basic principle, mass spectrum- molecular ion peak – base peak- isotopic peak-metastable peak- nitrogen rule-general fragmentation modes-fragmentation of n-butane, 1-butanol and benzene, toluene, Mc-lafferty rearrangement of Butanal and 2-pentanone.

. **Text Books**

- Soni.P.L – "*Text Book of Organic Chemistry*" – Sultan Chand ,2010.
- Bahl and Arun Bahl – "*Advanced Organic Chemistry*" – S. Chand,2014
- Sharma.Y.R. – *" Elementary Organic Spectroscopy"* – S. Chand & company Ltd,2016
- Gopalan.R – *" Elements of Analytical Chemistry"* – Sultan Chand & Sons ,2010.
- Peter Sykes " *A Guide book to mechanism in organic chemistry* " sixth edition,2013.

Reference Books

- Morrison and Boyd .R.T – "*Organic Chemistry*" – VI Edition – prentice Hall of India, New Delhi,2010.
- P.S.Kalsi- Organic Spectroscopy –New age International Publications ,2012.

UCHM506 PHYSICAL CHEMISTRY-I

Semester : V **Credits : 4**
Category : Core XI **Hours/Week : 4**
Total Hours : 52

Objectives:

- To improve the ability of mathematical calculations involved in Physical Chemistry.
- To enable the students to understand the concepts of thermodynamics and apply it to more space physical and chemical system.
- To make the students know the concepts of Chemical Kinetics and to apply the concepts of Kinetics to different processes.

Unit-I 8 Hrs

Partial Molar Properties: chemical potential – Gibbs Duhem equation – effect of temperature and pressure on chemical potential –chemical potential in systems of ideal gases – Duhem Margules equation.

Homogeneous catalysis- Definition- function of a catalyst in terms of Gibbs free energy of activation. Heterogeneous catalysis- Application of catalysis.

Unit-II **13 Hrs**

Phase rule: concepts of phase, components and degrees of freedom with examples. Gibb's phase rule-derivation, Classius-Clapeyron equations and their applications to equilibria in phase transitions.(Solid-liquid ,liquid –vapour, solid-vapour)

One component system: Phase diagram-water and sulphur systems.

Reduced phase rule : Two component systems - Simple Eutectic: Lead-Silver system - Formation of compound with congruent melting point:$FeCl_3$ -water system , other examples Formation of compound with incongruent melting point: Na-K system

Unit-III **8 Hrs**

Adsorption: Physisorption & chemisorption- Freundlich adsorption isotherm – Langmuir adsorption isotherm –BET equation (no derivation) application of adsorption.

Concept of fugacity & activity- determination of fugacity of a gas- change of fugacity with temperature. Activity & activity coefficient- determination of activities –variation of activity of a gas with temperature & pressure- Nernst distribution law –Limitations- Thermodynamic derivation – Applications.

Unit-IV **12 Hrs**

Chemical Kinetics I

Order and Molecularity of reactions: Definition of rate, order rate law , rate constants , molecularity –Simple reactions involving zero , first , second and third order reactions derivations of rate equations for zero , first , second and third order reactions- pseudo first order reactions . Derivation for time for half – change with examples .Methods to determine order of reactions .Problems based on order ,rate equations and $t_{1/2}$.

Types of reactions: reversible or opposing , consecutive and parallel reactions (simple ideas only) . Thermal chain reactions (i) H_2 and Br_2 reaction (ii)Dissociation of acetaldehyde steps involved only (no kinetics expressions needed)

Unit-V **11 Hrs**

Chemical Kinetics II

Theories of chemical reaction rates: Factors affecting chemical reactions – nature of reactants concentration ,catalyst ,solvent polarity and ionic strength

(only qualitative ideas) Arrehenius theory of chemical reaction rates collision theory of bimolecular and unimolecular reactions . Lindemann hypothesis, Transition state or absolute reaction rate theory (ARRT)

Text Books:

- Puri Sharma Pathania - "*Principles of Physical Chemistry*"- Shoban Lal Nagin Chand & Co,Jalandhar.(2009)
- P. L. Soni – "*Text book of physical chemistry*" – Sultan Chand.(2006)

Reference Books:

- Negi and Anand – "*Physical chemistry*" – New Age(2000).
- Kundu and Jain – "*Physical Chemistry"* – S. Chand.(1999)

UCHR603 GRAVIMETRIC ANALYSIS

(This replaces the course UCHR601 Gravimetric Analysis found in Academic Council Booklet-II)

Semester :V & VI **Credit : 4**

Category : Core Practical III **Hours/Week : 2+2**

Total Hours : 26 26

Objectives:

To enable the students

- Analyze the ions or metals present in the given substance by gravimetric method.
- acquire quantitative skills to get accurate result.

Experiments:

Part I :Gravimetric Estimation

1. Estimation of sulphate as barium sulphate.
2. Estimation of barium as barium sulphate.
3. Estimation of barium as barium chromate.
4. Estimation of lead as lead chromate.
5. Estimation of calcium as calcium oxalate monohydrate.
6. Estimation Zinc or magnesium as oxinate.

Part-II

1. Physical constant(melting & boiling point)

Text Books:

- V. Venkateswaran, R. Veerasawamy & A. R. Kulandaivelu, "Basic Principles of practical Chemistry", S. Chand & Sons Publications, 1998.

Reference Books:

- "Vogel's, "Text book of Quantitative Chemical Analysis", 5th edtion, ELBS/ Longman, England, 1989.
- A. O. Thomas – "Practical chemistry" – Scientific book center, Cannanore(1999)
- S. Sundaram – "Practical chemistry" – 3 Volumes – S. Viswanthan(1998)

UCHR604 ORGANIC ANALYSIS AND PREPARATION

(This replaces the course UCHR602 Organic Analysis found in Academic Council Booklet-II)

Semester : V & VI **Credit :4**

Category : Core Practical-IV **Hours/Week : 2 + 2**

Total Hours : 26 + 26

Objectives:

To enable the students

- Analyze the special element and functional group present in the given organic compound.
- Acquire skill to prepare the organic compound.

I) Organic preparations:

1. Oxidation (Benzaldeyde to benzoic acid).
2. Hydrolysis (Methly salicylate or ethylbenzoate to the acid).
3. Nitration (metadinitrobenzene or picric acid).
4. Halogenation (Parabromoacetanilide from acetanilide).
5. Diazotisation (methyl orange).
6. Acylation (Benzoylation of betanaphthol).

II) Micro Level Organic Analysis:

Reaction of the following functional groups:

Aldehyde, ketone, carboxylic acid (mono and di) , ester, carbohydrate (reducing), phenol, aromatic primary amine, amide, nitro compounds and anilide. Analysis of organic compound containing one functional group and characterization with a derivative.

Text Books:

1. V. Venkateswaran, R. Veerasawamy & A. R. Kulandaivelu, "Basic Principles of practical Chemistry", S. Chand & Sons Publicaations, 1998.

Reference Books:

1. A. O. Thomas, "Practical chemistry", Scientific book center, Cannanore, 1999.
2. S. Sundaram, "Practical chemistry", 3rd Vol, 1998.
3. Vogel's, "Text book of practical organic chemistry", Longman, 1998.

UCHR605 PHYSICAL CHEMISTRY PRACTICAL

(This replaces the course UCHR501 Physical chemistry practical found in Academic Council Booklet-II)

Semester : V & VI **Credit : 5**
Category : Core Practical-V **Hours/Week : 3+2**
Total Hours : 39 +26

Objectives:
To enable the students

- Acquire skills through the experimental techniques.
- Interpret the experimental results.

1. **Distribution law:**
   a) Determination partition coefficient of iodine between carbon tetra chloride and water.
   b) Equilibrium constant of the reaction $KI + I_2 = KI_3$
2. **Kinetics :**
   Determination of the orders of the following reactions.
   a) Acid catalysed hydrolysis of an ester (methyl or ethyl acetate).
3. **Molecular weight of solute** – Rast method using naphthalene, meta dinitrobenzene and diphenyl as solvents.
4. **Heterogeneous equilibria:**
   Phenol – water system CST.
5. **a) Effect of impurity** – 1 % NaCl or 2% Succinic acid solutions on phenol determination of the concentration of the given solution.
   b) Determination of the transition temperature of the given salt hydrate.
   $Na_2S_2O_3.5H_2O$, $CH_3COONa.H_2O$, $SrCl_2.6H_2O$, $MnCl_2.4H_2O$.
6. **Electrochemistry: Conductivity:**
   a) Determination of cell constant.
   b) Conductometric titration of a strong acid against a strong base.
7. **Potentiometric titration**

a) strong acid against a strong base.

8. Calorimetric Titration.

9. Polarimetric – Inversion of Sugar.

Text Books:

- V. Venkateswaran, R. Veerasawamy & A. R. Kulandaivelu, "Basic Principles of practical Chemistry", S. Chand & Sons Publicaations, 1998

Reference Books:

- Vogel's, "Text book of Quantitative Chemical Analysis", 5 th Edition, ELBS/ Longman, England, 1989.
- O. Thomas, "Practical chemistry", Scientific book center, Cannanore, 2000.
- S. Sundaram, "Practical chemistry", 3rd Vol , 1999.

UCHM607 INORGANIC CHEMISTRY – II

Semester : VI **Credits : 4**
Category : Core XII **Hours/Week : 4**
Total Hours : 52

Objectives

- To create awareness about the basic principles involved in Nuclear chemistry.
- To take the students to an advanced level of nuclear chemistry.
- To comprehend the nature of metals of f block elements
- To enhance the students to know about applications of nuclear energy

Unit - I Subatomic particles **10 Hrs**

Protons, neutrons, electrons, mesons – properties. Fundamental particles of the nucleus – nucleon terminology nuclides, isotopes, isobars, isotones, mirror nuclei. Nuclear radius, nuclear mass and nuclear forces operating between the nucleons . N/P ratio, curves, stability belts.

Unit – II Radio activity **12 Hrs**

Natural radioactivity — radioactive series including neptunium series – group displacement law. Artificial radioactivity – induced radioactivity – uses of radio isotopes – nuclear energy – fission – fusion – fertile and fissile isotopes . Nuclear reactors – accelerators (charged particles). Fission – chain reaction. Working principles – Conventional reactors and breeder reactors – disposal of nuclear wastes – fusion – controlled fusion
mention of cold fusion. A comparison of nuclear energy with other sources of energy. Applications – energy tapping, analytical – carbon dating, neutron activation analysis. Labeling to study kinetics of reaction, medical, agriculture and industrial applications.

Unit - III Nuclear processes **10 Hrs**

Induced, spontaneous, a, b, b^+ , electron capture. Nuclear reactions – classification – examples – stellar energy – radioactivity – detection – GM counter – scintillation counter – rate of decay – determination – half life, , Geiger – Nuttal rule – Induced radio – Activity.
Nuclear binding energy- Mass defect simple calculation involving mass defect and B.E per nucleons. Magic numbers – liquid drop model – Shell model.

Unit-IV Chemistry of f block elements **12 Hrs**

comparative accounts of lanthanide and actinides, occurrence, elements, oxidation, state, magnetic properties , colour and spectra - lanthanide contraction – causes, consequence and uses – comparison between 3d and 4f block elements.

Unit - V Applications of nuclear energy **8 Hrs**

carbon dating- neutron activation analysis- isotopic dilution analysis- radiography- Identification of isotopes.

Text Books:

- P.L.Soni – *"Inorganic chemistry"*-20th revised edition- Sultan Chand (2006)
- B.R.Puri, L.R.Sharma and K.C.Kallia –*"Inorganic chemistry"*– Vallabh Publications (2003)
- W.U. Malik, G.D. Tuli and R.D Madan – *"Selected topics in inorganic chemistry"* – 7th edition- S.Chand Publications(2003)

Reference Books

- Arnikar.H.J,"*Essentials of Nuclear Chemistry*", New Age International,2009
- R.Gopalan,"*Elements of Nuclear Chemistry*",Vikas Publishing House,2003.

UCHM608 ORGANIC CHEMISTRY - II

Semester : VI **Credit : 4**
Category : Core XIII **Hours/Week : 4**
Class & Major : IIIB.Sc. Chemistry **Total Hours : 53**

Objectives:
To enable the students

- Acquire knowledge on heterocyclic compounds, natural products, proteins and nucleic acids
- Determine the molecular rearrangement mechanism
- Appraise the applications of various compounds in research.

UNIT-I HETEROCYCLIC COMPOUNDS **12 Hrs**

Aromatic heterocyclic compounds-five membered and fused heterocyclic rings: Pyrrole, Furan, Thiophene and Indole- Nomenclature-structure-preparation and properties – Aromaticity –Relative reactivity of pyrrole, furan and thiophene towards electrophilic substitution reaction. Synthesis : Indole - Fischer – Indole synthesis, Reissert synthesis. Six membered and fused heterocyclic compounds: Pyridine, quinoline, isoquinoline – Preparation and properties

UNIT-II NATURAL PRODUCTS **10 Hrs**

Terpenoids and Alkaloids occurance – **Terpenes:** Definition – general properties – isoperene rule – structural elucidation of citral, geraniol, α-terpenol and camphor. **Alkaloids:** Definition – general properties – classification – isolation – structure determination of conine, piperine, Nicotine.

UNIT- III AMINO ACIDS, PEPTIDES, PROTEIN AND NUCLEIC ACIDS **9 Hrs**

Amino acids: Nomenclature – classification – essential and non essential aminoacids – preparation – Zwitter ion, isoelectric point and reaction.**Peptides:** N-terminal and C-

terminal Amino acids – Nomenclature – Determination – Peptide synthesis – structure determination of peptides – end group analysis.**Nucleic acids:** types of nucleic acids

UNIT-IV CARBOHYDRATES 10 Hrs

Classification – monosaccharide - preparation of glucose and fructose - structure determination of glucose and fructose – Reactions - Mutarotation, cyclic hemiacetal forms of D-glucose – Fischer and Haworth projection of glucose and Fructose. Determination of ring size of glucose and Fructose –Definition of Disaccharides and polysaccharides.

UNIT-V MOLECULAR REARRANGEMENT 12 Hrs

Mechanism of Pinacol – pinacolone,wolf, Beckmann, Hofmann, curtius and Lossenrearrangement Bayer-Villigerreaction mechanism and applications. Favorski and Fries rearrangement.

Text Books

- Soni .P.L – "*Text Book of Organic Chemistry*" – Sultan Chand ,2010.
- Bahl and Arun Bahl – "*Advanced Organic Chemistry*" – S. Chand,2014.
- Gurdeep Chatwal -"*Chemistry of Natural Products"*- Himalaya Publishing House, 2010.
- I.L Finar "Natural *products in stereo chemistry*" sixth edition, 2010.

ReferenceBooks

- Morrison and Boyd .R.T – "*Organic Chemistry*" – VI Edition – prentice Hall of India, New Delhi,2010
- Ahluwalia, Rakesh Kumar Parashar .V.K. – "*Organic Reaction Mechanisms"* – Narosa publishing House ,2011.
- Kalsi P.S. – "*Stereochemistry , conformations and mechanisms*"- New Age International publishers,2005.

UCHM609 PHYSICAL CHEMISTRY-II

Semester : VI **Credits : 4**
Category : Core XIV **Hours/Week : 4**
Class & Major : III-B.Sc. Chemistry **Total Hours : 52**

Objectives:
To enable the students

- Acquire the knowledge about the essential concepts of physical chemistry
- Analyze the various photophysical and photochemical processes
- Evaluate the physical concepts of molecular spectroscopy in molecular interaction

UNIT-I GROUP THEORY 12 Hrs

VSEPR Theory - symmetry operations and symmetry elements (E, C_n, σ, S_n, i) - products of symmetry operations - groups and properties of a groups - classes and subgroups - group multiplication table - point groups.

UNIT-II PHOTOCHEMISTRY 08 Hrs

Law of Photochemistry, Jablonski diagram: photophysical processes – fluorescence and phosphorescence - conditions for phosphorescence emission - quantum yield –

determination of quantum yield.Kinetics of H_2 -Cl_2 and H_2-Br_2 reactions- basic concepts of photosensitization –chemiluminescence and bioluminescence.

UNIT- III ELECTRO CHEMISTRY-I 12 Hrs

Electrolytic conductance, specific equivalent and molar conductance, measurement – variation of conductance with dilution for strong and weak electrolytes
Kohlraush's law - applications of conductivity measurements - conductometric titrations - Ionic mobility- transport number and its determination by Hittorff's and moving boundary methods-Debye-Huckel Onsager equation - verification of Onsager equation, Wien effect and Debye-Falkenhagen effect

UNIT-IV ELECTRO CHEMISTRY-II 13 Hrs

Electrode potential**:** standard electrode potentials, reference electrodes–primary and secondary reference electrode - saturated calomel electrode –Importance of electrochemical series -Derivation of Nernst equation and its use in calculating EMF of cells - relationship between EMF and (i) free – energy changes (ii) enthalpy changes (iii) entropy changes - liquid junction potential - applications of EMF- potentiometric titrations- acid – base and redox titrations.

UNIT-V PHYSICAL PRINCIPLES OF MOLECULAR SPECTROSCOPY 7 Hrs

Doppler broadening - line spectra and band spectra – molecular spectra- rotational spectra of diatomic molecules – reduced mass – relative intensities of rotational spectral lines - vibrational spectra of diatomic molecules – zero point energy – Electronic spectra: Franck-Condon principle – electronic spectra of diatomic molecule

Text Books

- Puri, Sharma and Pathania -"*Principles of Physical Chemistry* - Shoban Lal Nagin Chand & Co, Jalandhar,2010.
- Soni.P.L, – "*Text book of physical chemistry*" – Sultan Chand ,2011.
- Colin N. Banwell and Elaine M. McCash *Fundamentals of Molecular Spectroscopy* – 04th Edition, Tata McGraw Hill Education Pvt. Ltd., 2012.

Reference Books

- Negi and Anand – "*Physical chemistry*" – New Age International Publishers,2010.
- Kundu and Jain – "*Physical Chemistry*" – S. Chand ,2010.

UCHM610 PHYSICAL CHEMISTRY III

Semester : VI	**Credits :4**
Category : Core XV	**Hours/Week :4**
Class & Major : III-B.Sc. Chemistry	**Total Hour :52**

Objectives:
To enable the students

- Distinguish between the ionic and chemical equilibrium
- Classify the various properties incorporating with colloids
- Assess the applications of solid state chemistry

UNIT –I CHEMICAL EQULIBRIUM 10Hrs

Reversible reaction – characteristics of chemical equilibrium – law of mass action – equilibrium constant– heterogeneous equilibria – Le Chatelier's principle– synthesis of ammonia : Haber process – manufacture of sulphuric acid by contact process

UNIT-II IONIC EQULIBRIUM 12 Hrs

Ostwald's dilution law – experimental verification of Ostwald's law – limitations - common-ion effect – factors influence degree of dissociation –solubility products – application of solubility products principle in qualitative analysis

UNIT-III COLLOIDS 10Hrs

Characteristics, preparation of sols- dispersion methods-aggregation methods-purification of sols- dialysis – optical properties of sols: tyndall effect, Brownian movementand electrophoresis - stability of sols- cleansing action of soaps and detergents – applications of colloids.

UNIT-IV SOLID STATE CHEMISTRY- I 10Hrs

Introduction to solids – crystalline and amorphous, unit cell, bravis lattices and x-raystructure determination (NaCl and KCl only) –. Radius ratio rules – coordination number. packing arrangement -different structure types in solids – rock salt, zinc blende, wurtzite and fluorite

UNIT-V SOLID STATE CHEMISTRY-II 10Hrs

Isotropic and anisotropic crystals - miller indices, space lattice, crystal -unit cells — derivation of bragg's equation — defects in crystals – stoichiometric and non stoichiometric.

Text Books

- Bahl and Arun Bahl – "*Essential of Physical Chemistry*", S. Chand ,2014.
- Puri Sharma Pathania - "*Principles of Physical Chemistry*, Shoban Lal Nagin Chand & Co, 2010.

Reference Books

- Anthony R.West *" SolidState Chemistry and Applications*" ,Johnwiley,2010.

UCHO602 POLYMER CHEMISTRY

Semester : VI **Credit : 4**
Category : Major Optional **Hours/Week : 5**
Class and Major : III B.Sc. Chemistry **Total Hours : 65**

Objectives:

- To Provide students with an overview of the structure and composition of polymers , types of polymerization and.a working knowledge of polymer nomenclature
- To introduce students to polymer processing techniques .
- To expose students to the applications of polymers in everyday life

Unit-I 13 **Hrs**

Introduction to polymers

Monomers, Oligomers, Polymers and their characteristics -Classification of polymers; Natural, synthetic, linear, cross linked and network, plastics, elstomers, fibres, Homopolymers and Co-polymers-Bonding in polymers: Primary and secondary bond forces in polymers; cohesive energy and decomposition of polymers. Molecular mass of polymers, M_n and M_w

Unit-II 11 **Hrs**

Mechanism for polymerization

Chain growth polymerization: Cationic, anionic, free radical polymerization, Stereo regular polymers: Ziegler Natta polymers. Step growth polymers

Unit- III **11Hrs**

Techniques of polymerization and polymer degradation

Bulk, Solution, Suspension, interfacial and gas phase polymerization. Types of polymer Degradation, Thermal degradation, mechanical degradation, photo degradation, photo stabilizers.

Unit-IV **17 Hrs**

Industrial polymers

Raw material, preparation, fiber forming polymers, elastomeric material. **Thermoplastics:** Polyethylene, Polypropylene, polystyrene, polyacrylonitrile, poly vinyl chloride, poly tetra fluoro ethylene, nylon and polyester.**Thermosetting plastics:** Phenol formaldehyde and expoxide resin. **Elastomers**: Natural rubber and synthetic rubber- Buna-N, Buna-S and neoprene.**Conducting polymers**: Elementary ideas ; examples: poly sulphur nitriles, poly phenylene, poly pyrrole and poly acetylene.

Unit-V **13Hrs**

Introduction to polymer processing

Compounding: polymer Additives: Fillers, Plasticizers antioxidants and thermal stabilizers fire retardants and Colorants. **Processing Techniques**: Calendaring, die casting, compression moulding, injection moulding, blow moulding, extrusion moulding and reinforcing.

Text Book:

- V.R. Gowariker , "*Polymer Science*", Wiley Eastern, 1995.

Reference Books:

- G.S. Misra , "*Introductory polymer Chemistry*", New Age International (Pvt) Ltd, 1996
- A.Kumar & S.K.Guptha, "*Fundamentals and Polymer Science & Engineering*", Tata McGraw-Hill, 1978.
- F.N. Billmeyer, "*Textbook of Polymer Science*", Wiley Interscience, 1971

UCHO603 MEDICINAL CHEMISTRY

Semester	**: VI**	**Credits**	**:4**
Category	**: Major elective**	**Hours/Week**	**: 5**
Class & Major	**: III-B.Sc. Chemistry**	**Total Hours**	**: 65**

Objectives:

To enable the students

- Understand the essential concepts of medicinal chemistry
- Categorize various drug candidates and its mechanism of action
- Design and synthesize drug molecules by appropriate chemical moieties

UNIT-I INTRODUCTION **16 Hrs**

Important terminology used in medicinal chemistry - The mechanism of action of drugs - metabolism of drug.Naming of drugs - Assay in general.**Drug and their mode of action**: Causes of common disease and their treatment by drugs – Encapsulation. Indian medicinal plants- traditional practice. Testing of potential drugs using experimental animals- Clinical trial and wide spread use after the approval – side effects.

UNIT-II ANTIBIOTICS 15 Hrs

Synthesis, assay and uses of chloramphenical, streptomycin and penicillin. Structural features – SAR – Functional group responsible for drug action –structural modification that

enhance and retard the potency (for the above drugs).**Action of drug**: Drug action and physiochemical properties, hydrophobicity, electronic effect, steric effect.

UNIT-III ANTIPYRETICS AND ANALGESICS 10 Hrs

Classification - Action of analgesics - Narcotics Analgesics – Morphine and its derivatives with reference to SAR - Synthetic Analgesics – Pethidines and Methadones. - Antipyretic analgesics – Salicylic acid derivates, Indolyl derivatives and p- amino phenol derivatives – mechanism of action.

UNIT-IV NARCOTICS AND NON NARCOTICS 13Hrs

Tranquilizers - Sedatives - psychedelic drugs (LSD) Antineo plastic and Hypoglycemic Drugs: Diabetics- cause and control- organic pharmaceutical aids and their role as preservatives, antioxidants, colouring, flavouring and sweetening agents, emulsifying agents- stabilizing and suspending agents – ointment bases.

UNIT-V SYNTHESIS OF DRUGS AND CHEMICAL USES 11Hrs

Procaine hydrochloride, meprobamate, oxy-phenbutazone, hydralazine hydrochloride, methyl dopa, propranolol hydrochloride, iso propamide iodide, chloropheniramine maleate, indomethacin and ibuprofen.

Text books

- Sudha.P.N – "*Applied Chemistry*", Supra Associates vellore,1998.
- Jayashree Ghosh -"*Fundamental concepts of Applied Chemistry*", S.Chand Publications,1999.

Reference books

- Billmeyer . F –"*Text book of polymer science*", – New Age international,2002.

UCHO604 FORENSIC CHEMISTRY

Semester : VI **Credit : 4**
Category : Major elective **Hours/Week :5**
Class&Major : III-UG **Total Hours : 65**

Objectives:

To enable the students

- Identify the food contamination and food poisons
- Examine suitable method for detecting the crime, forgery and medical aspects

UNIT- I FOOD ADULTRATION 15 Hrs

Contamination of wheat, rice, dhal, milk, butter- With clay, sand, stone, water and toxic chemicals (e.g. Kasseri dhal with mentanil yellow).Food poisons - natural poisons (alkaloids, nephrotoxins), pesticides (DDT, BHC, Follidol), Chemical poisons (KCN). First aid and Antidotes for poisoned persons. Heavy metal (Hg, Pb, Cd) Contamination of Sea food. Use of neutron activation analysis in detecting poisoning (e.g., As in human hair).

UNIT -IITRANSPORTATION **10 Hrs**

Drunken driving- breath analyzer for ethanol. Incendiary and timed bombs in road andrailway tracks. Defusing live bombs. Hit -and-go traffic accidents- paint analysis by AAS. Soill of toxic and corrosive chemicals (e.g., conc.acids) from tankers.

UNIT- III CRIME DETECTION **15 Hrs**

Accidental explosions during manufacture of matches and fire-works (as in Sivakasi). Human bombs, possible explosives (gelatin sticks,RDX). Metal detector devices and other security measures for VVIP. Composition of bullets and detection of powder burns. Scene of crime: finger prints and their matching using computer records. Smell tracks and police dogs. Analysis of blood and other body fluids in rape cases.Typing of blood. DNA fingerprinting for tissue identification in dismembered bodies. Blood stains on clothing. Cranial analysis (head and teeth).

UNIT-IVFORGERYAND COUNTERFEITING **13 Hrs**

Detecting forgery in bank cheques / drafts and educational records (mark lists, certificates), using UV-light. Alloy analysis using AAS to detect counterfeit coins. Checking silver line water mark in currency notes. Jewelers - detection of gold purity in 22 carat ornaments, detecting gold plated jewels, authenticity of diamonds (natural, synthetic, glassy).

UNIT-VMEDICAL ASPECTS **12 Hrs**

Misuse of scheduled drugs. Burns and their treatment by plastic surgery. Metabolite analysis, using mass spectrum – gas chromotography. Detecting steroid consumption among athletes and race horses.

Text Books

- Richard Safestein, Criminalistics: *An Introduction to Forensic Science (College Version), Pearson Pentice Hall, 2014*
- S. H. James, Jon J Noardby, Forensic Science:*An Introduction to Scientific and Investigative Techniques, CRC Press, 2009*

Reference Books

- Ngaire E. Genge, *The Forensic Casebook: The Science of Crime Scene Investigation. ebury digital, 2008*

UCHO605 DYES AND TEXTILE FIBER

Semester : VI **Credits :4**
Category : Major elective **Hours/Week :5**
Class&Major: III-UG **Total Hours :65**

Objectives:
To enable the students

- Understand the various dye molecules and its properties
- Categorize the preparation and properties of fibers, polymers, dyes and its applications

UNIT – I DYES AND DYE INTERMEDIATES **15 Hrs**

Classification of Dyes (based on their use and on their structures) – Classes of Dyes for dyeing On different Fabrics (Natural and Manmade).Important dyestuff intermediates – their names and structures. General properties of Dye Stuff – Linearity, coplanarity, Fastness properties, Fluorescene, optical brighteners.

UNIT – II FIBER SCIENCE 15 Hrs

Fiber Classification – Properties (Count, Denier, Tex, staple Length, Spinning properties,Strength, elasticity and creep) Natural Fibres – Cotton, Wool, Silk – General Characteristics.Synthetic Fibres – Polyamide Fibre (Nylon 66 – Preparation Nylon degradation) – Polyester Fibre (Preparation, degradation) – Polyacrylonitrile Fibre (Preparation, Properties) – Viscose (Preparation and Properties). Identification Tests for Cellulose, Cotton, wool, silk, Rayon, Acrylic,Viscose, Polyamide and Polyester Fibres.

UNIT – III DYE APPLICATIONS-I PRE TREATMENTS 15 Hrs

Sizing and Desizing – Purpose – Desizing methods (Hydrolytic and Enzymatic). Scouring – Purpose – Kier boiling – Alkali Scouring – Acid Scouring – Principles involved in these methods. Bleaching – Methods (Hypochlorite, Peroxide and Bleaching Powder bleaching).

UNIT – IV DYE APPLICATIONS- II PRINCIPLES OF DYEING 15 Hrs

Dye bath preparation – M.L.Ratio – Fixation of Dye and additive concentration on the basis of weight of the material – Methods of expressing the concentrations in Dye bath (gpl). Dyeing assistants – Wetting agent (TR Oil – Preparation and Purpose) – Anionic and Non-ionic detergents (Examples, Functions)- Leveling agents(Examples, functions) – Fasters improvers (Example functions) –Dispersing agents (Examples, functions) – Exhausting agents (Examples, Functions) –Mordants – Ingrain. Dye bath Receipe model (Dyeing of cotton with Reactive dyes, sulfur dyes, Aboic dyes – Dyeing of Polyester with disperse dyes with and without carriers, Dyeing of silk with metal; complex dyes).

UNIT – V DYE APPLICATIONS – II 15 Hrs

Vat Dyeing – Classification of Vat dyes – Vatting – Dyeing procedure – Exhaution in vat dyeing – Oxdation. Reactive Dyeing – Hot and cold brand – Principles involved in the Dyeing Process – batch and continuous processes. Dyeing of Polyester and Blends – Function of dispersing agents – Fiber swelling – Carrier dyeing – High temperature dyeing – Selection of dye stuff.

Text books

- Shenai, V.A. – *An Introduction to Dye Stuff and intermediates, Sevak*Publications, Wadela, Bombay, 1984
- Abrahard E.N.- *Outlines of Chemistry of Dye Staff and intermediates* – Chemical publishing, New York.1989

References books

- Chatwal and Anand , "*Synthetic Organic Dyes*", Himalaya Publishing House, 2009

UCHA502 INDUSTRIAL CHEMISTRY

Semester : V **Credit : 4**
Category : Allied Optional **Hours/Week : 5**

Total Hours : 65

Objectives:

- To help the students to know about the various types of fuels and its uses.
- To know the basic knowledge about petroleum refiners.
- To provide knowledge about the refractory, glass, paints etc that are used in everyday life.

Unit I **11 Hrs**

Paints – definition – requisite of a good paints – constituents of paints – formulation of paints – failure of a paint film – varnishes – characteristics – constituents . Enamels – lacquers – emulsion paints – special paints – cement paints – water repellent paints.

Cement –chemical composition and manufacture of cement – setting of cement and hardening of cement.

Unit II **16Hrs**

Glasses – Properties and manufacture of glass – Composition and uses of various types of glasses.

Synthetic fibers: Introduction, requerments of the fiber, natural & synthetic fibers,preaperation of synthetic fibers, rayon, acetate rayon,viscous rayon,nylon-66, terylyne,decron,taflon.

Clay – plasticity of clay – White wares – manufacturing – stoneware composition and uses – optical fibers .

Unit - III **11 Hrs**

Explosives – classification – primary explosives – low explosive – high explosives – precautions during storage of explosives – blasting fuses – manufacture of important explosives

Propellants – classification of propellants.

Unit - IV **16 Hrs**

Fuels: Classification of fuels – calorific value – requisite of a good fuel – wood – coal as fuels – classification of coal. Petroleum – cracking knocking – octane rating – gasoline or petrol – diesel – high speed and low speed diesels – uses, Advantages and disadvantages of kerosene, LPG and non-petroleum chemicals-Composition, Uses, advantages and disadvantages of natural gas, coal gas, oil gas, producer gas, water gas, bio gas, petrochemicals.

Unit - V **11 Hrs**

Refractories – characteristics of Refractories - properties of Refractories Composition and uses of common refractory bricks .

Petroleum refinery: Occurrence , composition of petroleum, orgin, mining, refining of petroleum, fractional distillation, purification, increasing the yield of petrol

Text Books

- . B.K. Sharma *"Industrial Chemistry*" –.Goel Publications (1994)

Reference Books

- . R. K. Das, "*Industrial Chemistry*" , Kalyani Publications, New Delhi (1982)
- Chakrabarthy .B.N." *Industrial Chemistry"*,Oxford & IBH Publishing.Co. Pvt.Ltd.(1981).

UCHA504 DAIRY CHEMISTRY

Semester : V **Credits : 2**
Category : Allied Optional **Hours/Week : 5**
Class & Major : III-UG **Total Hours : 65**

Objectives:

To enable the students

- Locate various bodies to recognize dairy products
- Analyze the various components present in the milk products
- Evaluate the various properties and processes incorporating with milk products

UNIT-I GENERAL **15Hrs**

Dairy development in India – Dairy Cooperatives – NDRI, NDDB, TCMPF - Operation Flood – Nutritive value of milk ICMR recommendation of nutrients – Milk production in India and TamilNadu with reference to Global milk production – Per capita availability of milk in India and Tamil Nadu – Role of milk and milk products in human nutrition.

UNIT- II CONSTITUENTS AND NUTRITIVE VALUE **13Hrs**

Constituents of Fat, Protein-Casein, whey protein, carbohydrate, minerals, Enzymes, colour, Flavour and aroma nutritive value.

UNIT-III PROPERTIES OF MILK **12Hrs**

Physical properties-effect of Heat, effect of Acid, effect of enzyme, effect of phenolic compounds and salts. Microbial spoilage.

UNIT- IV MILK PRODUCTS **13Hrs**

Non-Fermented products-Skim milk, Evaporated milk, Dry milk, Sweetened condensed milk, Standardized milk, Toned milk, sterilized milk, Ultra high temperature (UTH) processed milk, Flavored milk. Fermented milk products-Butter, cheese, panneer and curd.

UNIT- V PROCESSING IN MILK **12Hrs**

Physico-chemical changes of milk due to- Boiling, Sterilization, Pasteurization. Fermentation of Lactose. Role of milk and milk products in cookery.

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

Reference Books

- Awapapa.J - "Introduction to biological chemistry" – prentice hall,2013.
- N.P. Wong, R. Jenness, M.Keeney and E.H.Marth - "*Fundamentals of dairychemistry*", CBS Publishers, 2001.

UCHA505 AGRICULTURAL CHEMISTRY

Semester : V **Credits : 2**
Category : Allied Optional **Hours/Week : 5**

Class & Major: III-UG **Total Hours : 65**

Objectives:

To enable the students

- Acquire knowledge on agricultural chemistry
- Categorize the importance of fertilizers and its classification
- Evaluate various components associated with pesticides and herbicides

UNIT -I SOIL CHEMISTRY **12 Hrs**

Soil analysis . Composition of soil : Organic and Inorganic constituents. Soil acidity : buffering capacity of soils. Limiting of soil. Absorption of cations and anions : availability of soil nutrients to plants.

UNIT- II FERTILIZERS **13 Hrs**

Peat and organic manures (composts). Role of humus. Effluent form gobar gas plants. Use of fertilizers : urea, DAP, Super phosphate, Gypsum, NPK-mixed fertiizers, Optimal addition of Fertilizers to obtain estimated yields.

UNIT- III PESTICIDES-INSECTICIDES **15 Hrs**

Insecticides: stomach and contact poisons. Plant derivatives : pyrethrine, Nicotine and rotenone Synthetic organic: carbophos, carbaryl, p-DCB, dimethoate, butachlor, Endrin, Aldrin (Chemical name and uses). Rodenticdes.

UNIT- IVFUNGICIDES- HERBICIDES **15 Hrs**

Fungicides: Inorganic (Bordeaux Mixture) and organic(dithiocarbamate). Industrial fungicides: creosote fractions. Herbicides and weedicides : Selective and non-selective, 2, 4-D and 2, 4, 5-t (structure and function) Intenerated pest management. Sex attractants for insect control. Sustainable agriculture.

UNIT- V PLANT GROWTH REGULATORS **10 Hrs**

3-Indole acetic acid: Naphthalene acetic acid: Ethepon (2-chloroethyl phosphoric acid): Alar (succinin acid-2, 2-dimethyhydrzine :) their function. Plant hormones: Gibberlin, Cyclocel, Phosphon, dwarfing compound (CCC: 2-Chlorethyl-trimethyl ammonium chloride). Defoliants

Text Books

- Austin.G.T, "*shreve's Chemical Process Industries*,5th edition, Mc-Graw-Hill, 1984.
- Yagodin.B.A. (Ed), "*Agricultural Chemistry*", Volumes I&II, Mir Publishers (Moscow), 1976.

Reference Books

- Ulysses S. Jones , Fertilizers and Soil Fertility, Brady Co. U.S., 1982
- Chavan, U. D., Patil, J. V, Key Notes on Agriculture Chemistry and Soil Science, Wiley India Pvt Ltd , 2015

UCHA506 ENVIRONMENTAL CHEMISTRY

Semester : II **Credit : 4**
Category : Allied optional **Hours/Week : 5**
Class&Major : III UG **Total Hours : 65**

Objectives:
To enable the students

- List the various principles of ecology and science
- Analyze the various energy sources and its development
- Organize the awareness about hydrocarbon based pollution and waste management

UNIT–I ECOLOGY 13Hrs

Ecosystem ; Biome & ecosystem ; Energy flow through the ecosystem ; Food hain& webs ; Ecological pyramids ; Biological Magnification Hydrologic Cycle, carbon cycle, oxygen cycle, nitrogen cycle, phosphorus cycle, sulphur cycle, forest ecosystem,

UNIT-II ENERGY RESOURCES 13 Hrs

Global Energy Consumption ,Conventional sources of energy for Man- kind, Biomass or Dried organic matter, Fossil Fuels or Coal , Oil and Natural gas, Nuclear energy – Nuclear Power Generation ,The Potential of Fusion Reaction, Hydro Electric power. The Dependence of Human Society on Fossil Fuels. Non –Conventional energy sources. Alternative sources of energy for man -kind ,Wind power , Energy from oceans - Tidal Energy,, Energy of waves, thermal energy of oceans. Geo – thermal energy . Direct use of solar energy, Bio- mass based energy- Bio –gas, petro plants, Dendrothermal Energy. Hydrogen as the future fuel.

UNIT-III POLLUTION BY HYDRO CARBON 13 Hrs

Oil spills, Natural oil seeps, Problem Associated with crude petroleum pollution;- Light and medium Fraction of crude oil. Heavier Fraction, Greases, Waxes and Tar. Ecological problems caused by crude Petroleum, Fate of crude petroleum in marine environment, Oil spill cleaning operations.

UNIT-IV SOLID WASTE MANAGEMENT 13 Hrs

Management of solid wastes Resistant to Degradation ;(1)Handling of the problem of Leachates (2) Disposal of solid wastes Resistant to Degradation (i) Incineration (ii) Pyrolysis and verification of solid wastes (iii) Microbial Degradation (iv) Sorting and Recycling of solid wastes resistant to degradation.

UNIT – V SCIENCE OF ENVIRONMENT 13 Hrs

Introduction , Method of Expressing , Pollutant concentration , Particle Dispersion, Stoichiometry, Acid – Base Reaction , Colloids , Mass balance Reactor for waste

Treatment, Basics of Microbiology, Environmental Quality Objective, Policies on Development project and their impacts.

Text Books

- Asthana .D.K & Meera Asthana, '*Environment Problems and solution's*, S. Chand and company, New Delhi, 2010.
- Benny Joseph, *Environmental studies*, Tata McGraw Hill, New Delhi, 2012.

Reference Books

- *Environmental Studies*, Bharathidasan University Pub,2010.
- Rajamannar, *Environemntal Studies*, Evr College Pub, 2012.

- Kalavathy.S, *Environmental Studies*, Edition 2004, Bishop Heber College Pub, 2011.

UCHS601 GREEN CHEMISTRY

Semester : VI **Credit : 1**
Category : Self study **Hours/ week : 2**
Class & Major : III B.Sc. chemistry **Total Hours : 26**

To enable the students

- Trace the principles of green chemistry and its development
- Evaluate the green synthetic routes for solvent free reactions

UNIT-I Introduction **10 Hrs**

Definition-The current status of chemistry and the environment-Evolution of the environmental movement-The role of chemists andgoals-prevent waste-synthetic methods to design-awareness of toxicity and theirchemical products.

UNIT –II Examples of green chemistry **08 Hrs**

Green reactions-green reagents- green solvents and reaction conditions-green chemical products.

UNIT – III Future trends in green chemistry **08 Hrs**

Oxidation reagents and catalysts- biomimetic-multifunctional reagents- combinatorial green chemistry-current pollution problems- energy focus.

Text Books

- Dr.Kidwai, "*Green Chemistry theory & practice*", Boston, December 1997.

Reference Books

- Collins .T.J. " *Green Chemistry*" in Mac Millan encyclopedia of chemistry, Mac Millan Inc., New York.
- Anastas .P.T. & Williamson .T.C. "*Green Chemistry*" Oxfor Univ. Press, 1996.
- Breslow.R, "*Chemistry Today and Tomorrow*", American Chemical Society, Washington, DC.

UCHP601 PROJECT

Semester : VI **Credit :1**
Category : Project
Class&Major: III-B.Sc., Chemistry

Objectives:
To enable the students

- Acquire the research knowledge about the subject
- Analyze the experiments on their own knowledge

Mini-Project:

- This course will be offered as Project for the final year UG students under extra credit earning provision to gifted students outside the class hours.
- It could be done either individual or as a group with the maximum of three students

Evaluation Scheme for the Project (Internal-60 + External-40)
Internal assessment:

S. No	Component	Marks
1	Review of the literature	
2	Title of the topic	10
3	Experimental	10
4	Characterization	20
5	Result and Discussion	30
6.	Conclusions	
	Total	60

External assessment:

1. **Report : 10**
2. **Presentation : 20**
3. **Viva-Voce : 10**
   Total : 40

III and IV EVALUATION COMPONENT OF CIA

Semester	Course Code	Course Title	Component-III	Component-IV
	UCHM607	Inorganic Chemistry I	Assignment	Seminar
	UCHM608	Organic Chemistry I	Problem solving	Seminar
	UCHM609	Physical Chemistry I	Problem solving	Seminar
	UCHM607	Inorganic Chemistry II	Assignment	Seminar
	UCHM608	**Organic Chemistry II**	Poster	Seminar
	UCHM609	**Physical Chemistry II**	Problem solving	Seminar
	UCHM610	**Physical Chemistry III**	Assignment	Seminar
	UCHO602 **UCHO603** **UCHO604** **UCHO605**	Polymer Chemistry **Medicinal Chemistry** **Forensic Chemistry** **Dyes and Textile Fiber**	Assignment	Seminar
	UCHA502 **UCHA504** **UCHA505** **UCHA506**	Industrial Chemistry **Dairy Chemistry** **Agricultural Chemistry** **Environmental Chemistry**	Assignment	Seminar

COURSE PROFILE M.Phil (Chemistry)

Semester	Category	Course code	Course title	Hrs per week	Credits	
					Min	Max
I	Core paper I	MCHM105	Research Methodology	6	5	5
	Core Paper II	MCHM106	Instrumental methods of Analysis	6	5	5
	Core Paper III	MCHM107	Special Area of study	6	5	5
II	Core paper IV	MCHD201	Dissertation and Viva-voce	30	15	15

Paper Presentation (minimum one) and /or Publication of Articles in Journals (minimum one) is mandatory for submission of Dissertation

MCHM105 RESEARCH METHODOLOGY

Semester : I **Credit : 5**
Category : Core I **Hours/Week : 6**
Class & Major: M.Phil chemistry **Total Hours : 78**

Objectives:
To enable the students

- Understand thenature and importance of research
- Acquire the knowledge about various sources of literature and good laboratory safety practices
- Appraise the methodology of scientific writing

UNIT –I - Literature Survey **16 hrs**

Sources of information – Primary, Secondary, Tertiary sources – Journals – Journal abbreviations – Abstracts – Current titles – Reviews – Monographs – Dictionaries – Textbooks – Current contents – Introduction to Chemical Abstracts and Beilstein – Subject Index, Substance Index, Author Index, Formula Index and other Indices with examples.
Web resources – E-Journal – Journal access – TOC alerts – Hot articles – Citation index – Impact factor – H-Index – E-Consortium – UGC infonet – E-Books – Internet discussion groups and communities – Blogs – Preprint server – Search engines: Scirus, Google Scholar, ChemIndustry, Wiki – Databases: ChemSpider, Science Direct, SciFinder, Scopus.

UNIT –II - Methods of Scientific Writing **16 hrs**

Introduction to technical writing – types of report – title and abstract - writing dissertation and thesis – report of thesis work, laboratory observation – records – preparation of manuscripts and posters – writing review articles and book reviews – preparing research proposals for grants – ethics in scientific publication – formats foe some national and international journals.

UNIT –III Good Laboratory Safety Practices **16 hrs**

Definition and principles of good laboratory safety practices (GLP) and applications – GLP training : resources, rules, characterization, documentation and quality assurance – Facilities : building and equipments – stepwise implementation of GLP

Safe working procedure and protective environment, protective apparel, emergency procedure and first aid, laboratory ventilation, Safe storage and use of hazardous chemicals, procedure for working with substances that pose hazards, flammable or explosive hazards

UNIT –IV Data Analysis **15 Hrs**

Types of Error, significant figures- Accuracy, precision - Methods of expressing Accuracy and precision, mean, standard deviation, Hypothesis testing, null hypothesis and alternative hypothesis, levels of confidence and significance, hypothesis testing for mean, t-Test

UNIT –V Computational Methods **15 Hrs**

Applications of computer packages: Origin, Chemdraw, Chemsketch, Endnote and Crossref. Introduction of computational chemistry - *Ab initio* methods- Density functional methods- Semi-empirical and empirical methods.

Reference Books

- 3.A.M Coghill and L. R. Gardson, The ACS style guide- Effective communication of scientific information, 03rd edition, Oxford University Press, 2006
- Maeve O‟Connor, *Writing successfully in science,* Chapman and Hall, London, 1995.
- Handbook good laboratory practice (GLP) quality practices for regulated non clinical, research and development
- James P Lewis, Fundamentals of Project Management, 03rd Edition, AMACOM, 2006
- K. Arora, Ed. The patents act 1970 as amended by the patents act 2005, Professional book publishers, 2005

MCHM106 INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS

Semester : I **Credit : 5**
Category : Core II **Hours/Week :6 Class &**
Major : M.Phil chemistry **Total Hours : 78**

Objectives:

To enable the students

- learn about the principles and instrumentation of various spectroscopic techniques
- Acquire knowledge about various spectroscopic techniques and its use for the characterization of compounds
- Understand the electro and thermos analytical techniques

UNIT-I UV, IR SPECTROSCOPYAND MASS SPECTROMETRY **16Hrs**

Ultraviolet spectroscopy- instrumentation - components-single beam and double beam system- Applications of ultraviolet spectroscopy. IR spectroscopy- selection rule- instrumentation - components-single beam and double beam system- sample handling- Applications of IR spectroscopy .Mass spectrometry-Basic Instrumentation - recording of mass spectrum- resolution of mass spectrometer- base peak, isotopic peaks, meta stable peak,

parent peak - nitrogen rule - ring rule -McLafferty rearrangement - Applications of mass spectrometry.

UNIT-II NMR AND EPR SPECTROSCOPY 16Hrs

Basic principles of NMR specroscopy-1D NMR- identification of simple organic compounds using ^{1}H NMR and ^{13}C NMR –2D NMR -basic principles and Applications of ^{1}H-^{1}H COSY, ^{1}H-^{13}C COSY- Structural identification of organic compounds using UV, IR and NMR and massspectroscopic data .

Basic concepts of ESR spectroscopy – Hyperfine splitting- Applications of EPR to some simple systems like hydrogen atom, methyl radical, p-benzosemiquinone and naphthalene anion, Cu(II), Fe(II), Mn(II) and Ni(II) complexes – Spin-trapping.

UNIT- III X- RAY DIFFRACTION AND MOSSBAUER SPECTROSCOPY 15Hrs

Types of crystal systems -principles of X-ray diffraction- Bragg's law- determination of crystal structure, X-Ray spectroscopy- principles-instrumentation-applications.
Mossbauer spectroscopy- principles, instrumentation and applications.

UNIT- IV MICROSCOPY TECHNIQUES 15Hrs

Scanning Electron Microscopy(SEM), Transmission electron microscopy (TEM) - Scanning transmission electron microscopy (STEM). Scanning probe microscopy - Atomic force microscopy (AFM), Scanning tunneling Microscopy (STM).

UNIT- V ELECTRO ANALYTICAL & THERMO ANALYTICAL METHODS 16Hrs

Basic principles and applications of Cyclic voltametry - basic principles of thermo gravimetric analysis (TGA)- applications of thermo gravimetric analysis, differential thermal analysis(DTA) and its applications - study of organic reactions and catalysts.

TextBooks

- Gurdeep R. Chatwal and Sham K. Anand, *instrumental methods of chemical analysis*, 5th edition, Himalaya publishing house, 2005.
- J. Mohan, *Organic Spectroscopy Principles and Applications*, CRC; 2nd Ed., 2004.
- Y. R. Sharma, *Elementary organic spectroscopy*, 4th edition, S. Chand & company LTD, 2012.
- R. Gopalan, P.S. Subramanian, K. Rengarajan, *Elements of analytical chemistry*, 3rd edition, Sultan chand & sons, 2013

Reference Books

- P.M. Silverstein, F.X. Wester, *Spectroscopic Identification of Organic Compounds*, 6th Ed., Wiley, 1998.
- S.M. Khopkar, *basic concepts of analytical chemsitry*, 3 rd edition, New age international publishers, 2009.
- W. Kemp, *Organic Spectroscopy*, 3rd Ed., MacMillon, 1994.
- D.L. Pavia, G.M. Lampman and G.S. Kriz, *Introduction to Spectroscopy*, Brooks Cole, 3rd Ed., 2000.
- H. Gunther, NMR spectroscopy, *basic principles, concepts and application inchemistry*, John Wiley & Sons, 2nd Ed., 1995.
- R. S. Drago, *Physical Methods in Chemistry*, Saunders, 1977.
- J. A. Weil, J. R. Boldton and J. E. Wertz, *Electron Paramagnetic Resonance*: *Elementary\ Theory and Practical Applications*, John Wiley and sons, 1994.

III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course code	Course title	Component III	Component IV
I	Core I	MCHM105	Research Methodology	Term paper	Seminar
	Core II	MCHM106	Instrumental methods of Analysis	Term paper	Seminar
	Core III	MCHM107	Special Area of study	Term paper	Seminar

Special Area Study:

1. Research topic to be decided during the course Research methodology paper in the Semester I.
2. Syllabus forthe special area study to be evolved by the respective guide according to the topic of the dissertation.
3. The Unit I and II must provide the macro background of the paper.
4. Unit III, IV and V with reference to the research topic chosen by the candidates.
5. No end semester examination for special area study.

Assessment

Comprehensive Exam	50 marks
Term paper & Viva voce (Unit I & II)	25 marks
Seminar (Unit II, IV & V)	25 marks

Total	100 marks

Evaluation of M. Phil Dissertation

Dissertation and viva voce 200 marks

S. No.	Criteria	Evaluation	
		CIA (Valuation by Faculty Guide)	**ESE (Average of Internal & External marks)**
1.	Choice of the Problem & Defining the Problem	20	-
2.	Review of Literature	20	-
3.	Research Proposal	20	-
4.	Collection of Data / Experimentation	20	-
5.	Analysis of Data / Experimentation result	20	-
6.	Preparation of Report I Draft II Draft III Draft Final Draft	20	-
7.	Project Report		60
8.	Viva Voce		20
	Total	**120**	**80**

DEPARTMENT OF MATHEMATICS

Preamble

UG : Course Profile, list of courses offered to the other departments & the syllabi of courses offered in the V and VI semesters (With effect from 2015-2018 batch onwards)

COURSE PROFILE B.Sc. (Mathematics)

Semester	Part	Category	Course code	Course Title	Contact Hrs/ week	Credit	
						Min	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	Basic English-I/Advanced English-I	5	3	4
	III	Core I	UMAM103	Fundamentals of Mathematics	2	1	1
	III	Core II	UMAM104	Differential calculus	5	4	4
	III	Core III	UMAM105	Analytical Geometry	6	5	5
	III	Allied	UMAA111	Mathematical Statistics	6	5	5
	IV	Value			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	Basic English II/Advanced English-II	5	3	4
	III	Core IV	UMAM204	Integral Calculus	5	5	5
	III	Core V	UMAM402/ UMAM205	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 Equation	5	4	4
	III	Core VIII	UMAM307	Introduction to Probability Theory	4	4	4
	III	Allied	UCSA303	Mathematical Programming in C	3	3	3
	III	Allied Practical	UCSR305	Mathematical Programming in C Practical	3	2	2
	IV	Non Major Elective			4	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-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	5	4	4
	III	Core XI	UMAM404	Mathematical modeling	5	4	4
	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 programme /Physical Education			-	-	2
				TOTAL	**30**	**22**	**26**
V	III	Core XII	UMAM507	Modern Algebra	**6**	**5**	**5**
	III	Core XIII	UMAM508	Sequence And Series	**6**	**5**	**5**
	III	Core XIV	UMAM602/ UMAM509	Complex Analysis	5	5	5
	III	Allied	UCSA507	Object Oriented Programming Using Java	3	3	3
		Allied Practical	UCSR508	Object Oriented Programming Using Java	3	2	2
	III	Allied Optional			5	4	4
	IV	Value Education			2	1	1
				TOTAL	**30**	**25**	**25**
VI	III	Core XVII	UMAM610	Linear Algebra	**6**	**6**	**6**
	III	Core XVIII	UMAM611	Real Analysis	**6**	**6**	**6**
	III	Core XV	UMAM612	Astronomy	**6**	**6**	**6**
	III	Core XVI	UMAM613	Operations Research	**5**	**5**	**5**
	III	Major elective	UMAO604	MAT lab for beginners	5	4	4
			UMAO605	Numerical Methods using Java			
			UMAO606	Fundamental Mathematics for construction			
	III	Comprehensive Viva	UMAM614		-	1	1
	IV	Soft Skill			2	1	1
	V	Extension programme/ Physical Education			-	-	2
				TOTAL	**30**	**29**	**31**
				GRAND TOTAL	**180**	**140**	**153**

EXTRA CREDIT EARNING PROVISION

Semester	Part	Category	Course code	Course Title	Contact Hrs/ week	Credit	
						Min	Max
II	III	Core	UMAI201	Summer Internship	-	-	1
IV	III	Core	UMAI401	Summer Internship	-	-	1
VI	III	Core	UMAP601 UMAS601 UMAS602 UMAS603	Mini project Fourier Transforms Simulation Number Theory(Self study Paper)	**2**	**1**	**1**

COURSES OFFERED TO OTHER DEPARTMENTS-UG ALLIED

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	Mathematics for Physics-I	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
I B.A (C.E)			UMAA105/ UMAA213	Statistics-I	5	4	4
I 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	Algebra, Differential Calculus and Trigonometry	5	5	5
II B.Sc BIO			UMAA305	Bio-Statistics	5	4	4
II B.A(CE)			UMAA205/ UMAA303	Statistics-II	5	5	5
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
			UMAE205	Mathematics of Finance	**4**	**2**
III			UIDE302/ UMAE302	Numerical Methods using C++	4	2
			UMAE402/UMAE306	Operations Research for Managers	4	2
			UMAA501/UMAE305	Statistical Data Analysis through SPSS	4	2
			UMIE304	Basics for TANCET	4	2
			UMAE502/UMAE308	Mathematics for Competitive Exams	4	2
			UMAE309	Applied Mathematics	**4**	**2**

ALLIED OPTIONAL

Class & Major	Semester	Category	Course Code	Course Title	Contact Hrs/ week	Credit	
						Min	Max
III UG	V	Allied Optional	UMAA502/UMAA510 UMAA512	Space Science / Discrete Mathematical Structures	5	4	4

UMAM507 MODERN ALGEBRA

Semester : V **Credits : 5**
Category : Core XII **Hours/Week : 6**
Class & Major: III B.Sc Mathematics **Total Hours : 78**

Objectives:
To enable the students

- Understand the Algebraic structures such as Groups, Rings and Ideals
- Compare the operations of Group structures with Rings and Ideals.
- Solve the problems based on the basic algebraic structures.

UNIT-I GROUP **15 Hrs**

Definition of a Group – Some Preliminary Lemmas – subgroups.

Chapter-2: Sec 2.1 – 2.4

UNIT-II NORMAL SUBGROUPS **15 Hrs**

Counting Principle, Normal subgroups and quotient groups, Homomorphism.

Chapter-2: Sec 2.5 – 2.7

UNIT-III AUTOMORPHISMS **15 Hrs**

Automorphisms - Cayley theorem - Permutation Groups.

Chapter-2: Sec 2.8 – 2.10

UNIT-IV RINGS **18 Hrs**

Definition and examples – Some special classes of Rings – Integral Domain – Homomorphisms of Rings – Ideals and Quotient Rings- More Ideals and Quotient Rings.

Chapter-3: Sec 3.1 – 3.4

UNIT-V IDEALS **15 Hrs**

The field of an integral domain – Euclidean ring-polynomial rings.

Chapter-3: Sec 3.5 – 3.7

Text Book

- Herstein.I.N, "*Topics in Algebra*", John Wiley & Sons (Asia) Pvt. Ltd, 2nd edition, 2013.

Reference Books

- Santiago, M.L., "*Modern Algebra*", Tata McGraw-Hill Publishing Co., 2001, Chapters 1-4 except the section 2.3 and 2.12
- John B. Fraleigh, "*A first course in Abstract Algebra*", Addison Wesley publishing Co., 7th edition, 2003.

e- Resources

- http://matterhorn.dce.harvard.edu/engage/ui/index.html#/1999/01/82345
- https://ocw.mit.edu/courses/mathematics/18-703-modern-algebra-spring-2013/lecture-notes/

UMAM508 SEQUENCES AND SERIES

Semester : V **Credits : 5**
Category : Core XIII **Hours/Week : 6**
Class & Major: III B.Sc Mathematics **Total Hours : 78**

Objectives:

To enable the students

- Gain the Knowledge of Sequences and Series of real numbers.
- Understand the concept of Metric Spaces and, differentiate the sets and functions defined on it
- Illustrate the Sequences and Series, and analyze them.

UNIT-I FUNCTIONS **15 Hrs**

Functions – Real valued functions – Equivalence – Countability and Real numbers – Least Upper Bound.
Chapter 1: Sec :1.4 to 1.7

UNIT-II LIMITS OF SEQUENCES **15 Hrs**

Definition – Subsequence – Limit of a Sequence – Convergent Sequence – Divergent Sequence – Bounded Sequence – Monotone Sequence.
Chapter 2: Sec :2.1 to 2.6.

UNIT-III CONVERGENT SEQUENCES AND SERIES **16 Hrs**

Operations on Convergent Sequence Operations on Divergent Sequence – Limit Superior and Limit Inferior – Cauchy Sequence.
Series : Convergence and Divergence – Series with Non- negative terms – Alternating Series – Conditional Convergence and Absolute Convergence.
Chapter 2: Sec :2.7 to 2.10
Chapter 3: Sec :3.1 to 3.4

UNIT-IV REARRANGEMENT OF SERIES **16 Hrs**

Rearrangement of series – tests for absolute convergence – series whose terms form a non – decreasing sequence – summation by parts. Limits and metric spaces: limit of a function of the real line – metric space – limits in metric spaces.
Chapter 3: Sec: 3.5 to 3.8
Chapter 4: Sec: 4.1 to 4.3

UNIT-V CONTINUOUS FUNCTIONS ON METRIC SPACES **16 Hrs**

Functions continuous at a point on the real line – Reformulation - Functions Continuous on a Metric Spaces – open Sets – Closed Sets.
Chapter 5: Sec: 5.1 to 5.5

Text Book

- R.Goldberg "*Methods of Real Analysis*". Oxford & IBH Publishing Co. New Delhi, 2009.

Reference Books

- Tom M. Apostol," *Mathematical Analysis*", Addison –Wesley New York, 4th Edition, 2004.
- Malik,S.C. and Savita Arora, "*Mathematical Analysis*",Wiley Eastern Limited New Delhi, 2010.
- Sanjay Arora and Bansi Lal,"Introduction to Real Analysis", Satya Prakashan, New Delhi, 2000.

e- Resources

- http://nptel.ac.in/courses/122104017/

UMAM602/509 COMPLEX ANALYSIS

Semester : VI **Credit : 5**
Category : Core XIV **Hours/Week : 5**

Class & Major : III B.Sc Mathematics **Total Hours : 65**

Objectives

To enable the students

- Understand imaginary value and concept winding around imaginary numbers.
- Apply the methods to solve problems in pure as well as in applied mathematics.

UNIT-I FUNCTIONS **13 Hrs**

Function of a complex Variable – Mappings – Limits - Theorems on Limits - Limits involving the Point at Infinity - Continuity – Derivatives - Differentation Formulas – Cauchy-Riemann Equations – Sufficient Conditions for Differentiability – Polar Coordinates – analytic Functions - Harmonic Functions.

Chapter 2: Sec:9-20, 22

UNIT-II LINEAR TRANSFORMATIONS **13 Hrs**

Linear Transformations – The Transformation w=1/z – Linear Fractional Transformations – An Implicit Form - Mappings of the upper Half Plane – Exponential and Logarithmic Transformations – The Transformation w=sinz – Preservation of Angles – Further Properties.

Chapter 8: Sec 68-74

Chapter 9: Sec 79, 80

UNIT-III CONTOURS **12 Hrs**

Contours – Contours Integrals – Examples - Cauchy–Goursat's Theorem (without proof) - Simply and Multiply connected Domains (Theorems without proof) – Cauchy's Integral Formula – Derivatives of Analytic Functions – Maximum Moduli of Functions.

Chapter 4: Sec 31-33,36,38-40,42

UNIT- IV RESIDUES & POLES **14 Hrs**

Taylors Series – Examples - Laurents Series – Examples – Residues – Residue theorems – The Three Types of Isolate Singular Points – Residues at Poles – Zeros and poles of Order m.

Chapter 5: Sec 44-47

Chapter 6: Sec 53-56

UNIT-V IMPROPER INTEGRALS **13 Hrs**

Evaluation of Improper Integrals – Improper Integrals Involving Sines and Cosines – Steady Temperatures – Steady Temperatures in a Half Plane – A Related Problem – Temperatures in a Quadrant – Electrostastic Potential – potential in a Cylindrical Shape.

Chapter 7: Sec 60,61

Chapter 8: Sec 84-89

Text Book:

- R.V.Churchill and J.W.Brown, "*Complex Variables and Applications*" McGraHill International Book Co., Singapore, 1984.
  Sections 8 to 20, 29 to 39, 41, 43 to 46,,54 to 60, 63 to 68, 70, 74

Reference Books:

- Duraipandian. P and LaxmiDuraipandian,"*Complex analysis*":Emerald Publishers,Chennai, 1976.
- S.Ponnusamy "*Foundations of Complex Analysis*", Narosa Publishing House, NewDelhi, 2000.

UMAM610 LINEAR ALGEBRA

Semester : VI **Credits : 6**
Category : Core XIII **Hours/Week : 6**
Class & Major : III B.Sc Mathematics **Total Hours : 78**

Objectives:
To enable the students

- Understand the concepts of Vector spaces, linear transformations and Matrix Algebra.
- Solve system of linear equations and assess the nature of solutions.
- Compute determinants and canonical forms of a matrix.

UNIT-I VECTOR SPACES & DUAL SPACES **18 Hrs**

Elementary Basic Concepts – Linear Independence and bases- Dual Spaces

Chapter-4: Sec 4.1 – 4.3.

UNIT-II INNER PRODUCT SPACES & LINEAR TRANSFORMATION **17Hrs**

Inner Product Spaces- The Algebra of Linear Transformation- Characteristic Roots

Chapter-4: Sec 4.4, Chapter-6: 6.1-6.2.

UNIT-III MATRIX & CANONICAL FORMS **17 Hrs**

Matrix - Canonical forms: Triangular forms-Nilpotent Transformations.

Chapter-6: Sec 6.3 – 6.5.

UNIT-IV MATRIX OPERATIONS **13 Hrs**

Trace and Transpose – Determinants.

Chapter-6: Sec 6.8 – 6.9.

UNIT-V HERMITIAN-UNITARY & NORMAL TRANSFORMATIONS **13 Hrs**

Hermitian-Unitary & Normal Transformations

Chapter-6: Sec 6.10.

Text Book

- Herstein,I.N., "*Topics in Algebra*", John Wiley & Sons, INC, 2th edition, 2013.

Reference Books

- Kumaresan.S., "*Linear Algebra A geometric Approach*" PHI Learning Private Limited New Delhi, 10th edition, 2000.
- Santiago, M.L., "*Modern Algebra*", Tata McGraw-Hill Publishing Co., 2003,
- John B. Fraleigh, "*A first course in Abstract Algebra*", Addison Wesley publishing Co., 7th edition, 2003.

e- Resources

- http://nptel.ac.in/courses/111106051/
- https://www.khanacademy.org/math/linear-algebra

UMAM611 REAL ANALYSIS

Semester : VI **Credits : 6**
Category : Core XVIII **Hours/Week : 6**
Class & Major : III B.Sc Mathematics **Total Hours : 78**

Objectives:
To enable the students to

- Understand the sequence and series of functions, and fundamental properties of real numbers.
- Construct rigorous mathematical proofs of basic results in real analysis.
- Apply principles of real analysis to perform Riemann integration.

UNIT-I CONNECTEDNESS, COMPLETENESS **15 Hrs**

More about Opensets, Connected Sets – Bounded Sets and Totally Bounded Sets – Complete Metric Spaces.
Chapter 4 : Sec 6.1 to 6.4

UNIT-II COMPACTNESS **15 Hrs**

Compact Metric Space – Continuous Functions on Compact Metric Spaces – Continuity of Inverse Functions – Uniform Continuity.
Chapter 6: Sec 6.5 to 6.8

UNIT-III RIEMANN INTEGRATION **16 Hrs**

Definition of the Riemann Integral – Existence of Riemann integral(Statement only)- Properties of the Riemann Integral – Derivatives – Rolle's Theorem – The Law of the Mean – Fundamental Theorem of Calculus.
Chapter 7: Sec 7.2 to 7.8

UNIT-IV IMPROPER RIEMANN INTEGRATION **16 Hrs**

Improper integrals – Cauchy's Principle Value -Taylor's Theorem: Taylor's formula with Different Forms of Remainder – The Binomial Theorem – L'Hospitals Rule.
Chapter 7 : Sec 7.9 & 7.10

Chapter 8 : Sec 8.5 to 8.7

UNIT-V SEQUENCES AND SERIES OF FUNCTIONS **16 Hrs**

Pointwise Convergence of Sequence of Functions – Uniform Convergence of Sequence of Functions – Consequence of Uniform Convergence – Convergence and Uniform Convergence of Series of Functions.

Chapter 9 : Sec 9.1 to 9.4

Text Book

- Richard Goldberg "*Methods of Real Analysis*" Oxford & IBH Publishing Co. New Delhi, 2009.

Reference Books

- Tom M.Apostol ,*"Mathematical Analysis",* Addison-Wesley publishing Company Inc.New York, 2nd Edition, 2004.
- Malik,S.C. and Savita Arora,*"Mathematical Analysis"*,Wiley EasternLimited.New Delhi, 2010.
- Sanjay Arora and Bansi Lal ,*"Introduction to Real Analysis"*, SatHya Prakashan ,New Delhi, 2000.

e- Resources

- https://nptel.ac.in/syllabus/111106053/

UMAM612 ASTRONOMY

Semester : VI **Credits : 6**
Category : Core XV **Hours/Week : 6**
Class & Major: III B.Sc Mathematics **Total Hours : 78**

Objectives:
To enable the students

- Gain the knowledge of spherical trignometers, time scale in the universe, phases of moon and zones of earths.
- Apply the Kepler's laws to study the planetary motion.

UNIT - I SPHERICAL TRIGNOMETERS **15 Hrs**

Relevant formula of spherical trignometers (all Without Proof) – Celestial sphere-diurnal motion.

Chapter 1 & 2

UNIT - II ZONES OF EARTH **16 Hrs**

Zones of earth – Dip of the Horizon – Twilight – Astronomical refraction – Tangent and cassinies formulae – Properties and simple problems.

Chapter 3: Sec 1, 5, 6

UNIT - III KEPLER'S LAW **16 Hrs**

Kepler's law(statement only) – Newton's Deduction from them – three anomalies of the earth and relations between them – times – equation of time, season.

Chapter 6, chapter 7 : Sec 1, 2

UNIT - IV CONVERSION OF TIME **16 Hrs**

Conversion of time – years and calendar – heliocentric parallax – geometric parallax – annual parallax – Aberration of Light – simple problems.

Chapter 7: Sec 4

Chapter 9

UNIT - V ECLIPSES **15 Hrs**

Moon (omitting moon liberations) – Phases of Moon – Harvest Moon – Metonic cycle – Lunar Mountain – Earth shine – Tides -Eclipses.

Chapter 12 & 13

Text Book

- Kumaravelu.S, *"Astronomy for Degree Classes*", Mission press, Palayamkottai, 2000.

Reference Books

- Ramachandran .G.V, "*Astronomy*", Mission Press, Palayamkottai, 2000.
- Rukumani Ramachandran, *"Astronomy for Graduates and post graduates classes*", Trichirapally.

UMAM613 OPERATIONS RESEARCH

Semester : VI **Credits : 5**
Category : Core XVI **Hours/Week : 5**
Class & Major: III B.Sc Mathematics **Total Hours : 65**

Objectives:

To enable the students

- Gain the knowledge of optimization techniques
- Analyze the systems of queuing and networking
- Solve real life problems in Business and Management.

UNIT-I LINEAR PROGRAMMING PROBLEM **15 Hrs**

Linear Programming problem - Mathematical formulation of the problem - Graphical solution method – Some exceptional cases- simplex method problem- simplex Algorithm. Artificial Variable techniques - Big - M method, Two phase method.

Chapter 2 : Section 2.1-2.4

Chapter 3: Section 3.1- 3.4

Chapter 4: Section 4.1, 4.3, 4.4

UNIT-II TRANSPORTATION AND ASSIGNMENT PROBLEMS 13 Hrs

Transportation problem - The Transportation Algorithm - degeneracy in transportation problem-unbalanced transportation problem. The Assignment problem - The assignment algorithm, Simple problems.

Chapter 10: Section 10.1-10.3, 10.5, 10.6, 10.8-10.10, 10.12-10.13

Chapter 11: Section 11.1 -11.4

UNIT-III SEQUENCING PROBLEM AND GAME THEORY 13 Hrs

Sequencing problem - n jobs through 2 machines, n jobs through k machines - two jobs through k machines, Simple problems. Game Theory - Two persons Zero sum game - The maximin minimax principle - Saddle points - Games without saddle points - Mixed Strategies - Graphical solution of 2 X n and mX2 games - Dominance property.

Chapter 12: Section 12.1-12.6

Chapter 17: Section 17.1-17.7

UNIT-IV QUEUING THEORY 14 Hrs

Queuing Theory- Queuing system- Elements of Queuing system-Operating Characteristic of a queuing system- Deterministic Queuing system-Probability distributions in Queuing systems-Classification of queuing models- Definition of transient and steady state-Poisson queuing systems (upto Model –VI)

Chapter 21: section 21.1-21.9

UNIT-V PERT AND CPM 10 Hrs

Introduction-Basic components-Logical Sequencing Rules of network construction-Concurrent Activities-Critical Path analysis –probability consideration in PERT.

Chapter 25: Section25.1-25.7

Text Books

- Kanti Swaroop, Gupta P.K. and Manmohan, "*Problems in Operation Research*", Sultan Chand & Sons, Delhi, 2010.

Reference Books

- J.K.Sharma, "*Operations Research: Theory and Applications*", Macmillan ,Delhi, 2001.
- Ravindran A., Philips D.T. and Solberg J.J., "*Operation Research*", John Wiley & Sons.,New York, 1987.
- Taha H.A., "*Operations Research*", Macmillan publishing Company, New York, 2003.

UMAO604 MATLAB FOR BEGINNERS

Semester : VI **Credits : 4**
Category : Major Elective **Hours/Week : 5**
Class & Major: III B.Sc Mathematics **Total Hours : 65**

UNIT I MATLAB BASICS **13 Hrs**

Input and output – Recovering form problem – Algebraic or Symbolic Computation – Vectors and Matrices – Functions – Managing Variables – Graphics

Chapter 2 : page no.7- 26

UNIT II SCRIPT FILES IN MATLAB **14 Hrs**

The MATLAB Interface – M- Files – Loops – Presenting results – Fine Tuning M-Files –Programs in Algebra And Arithmetic.

Chapter 3: Page no. 27 -44

UNIT III DATA FUNCTIONS AND MATRICES IN MATLAB **14 Hrs**

Data Classes – Functions and expressions –More about M-Files –Complex Arithmetic –More OnMatrices – Doing Calculus with MATLAB

Chapter 4 : page no. 45- 58

UNIT IV MATLAB GRAPHICS

10Hrs Two Dimensional plots – time dimensional plots – figure windows

Chapter 5 : page no. 59- 68

UNIT V SIMULINK

14Hrs A Simple differential equation – An Engineering example – Communication with the workspace

Chapter 8 : page no. 111- 120

Text Book

- Brian R.Hunt, Ronald L.Lipsman and Jonathan M.Rosenberg, "*,A Guide to Matlab"*Cambridge University Press,2006

Reference Book

- Chapman & Hall/CRC" *Basics Of Matlab & Beyond*" CRC Press LLC, 2000.

UMAO605 NUMERICAL METHODS WITH JAVA

Semester : VI **Credits : 4**
Category : Major Elective **Hours/Week : 2+3**
Class & Major : III B.Sc Mathematics **Total Hours : 26+39**

Objectives:
To enable the students

- Acquire the knowledge in Numerical Methods.
- Solve the Numerical problems using JAVA programming.

UNIT – I SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATION

5T+7P Introduction – Beginning an iterative method – The method of successive bisection – The method of false position – Newton-Raphson iterative methods.

Chapter 3: Section 3.1 – 3.5

Practical

- Write a programme to find a root of the equation using
  - Bisection method given two initial points.
  - False position method given two initial points.
  - Newton-Raphson method given an initial point.

UNIT – II SOLUTION OF SIMULTANOUES ALGEBRAIC EQUATIONS

5T+8P Gauss Elimination method – pivoting methods – III conditioned equations – Refinement of the solution obtained by Gauss elimination – Gauss-Seidal iterative Method.

Chapter 4: Section 4.1-4.6

Practical

- Write a programme to solve the simultaneous equation using
  - Gauss elimination Method.
  - Gauss Seidal iterative Method.

UNIT – III INTERPOLATION

5T+8P Lagrange's interpolation – Difference tables – Truncation errors interpolation.

Chapter 5: Section 5.1-5.4

Practical

- Write a programme to find the value of y when x is given using
  - Lagrange's Interpolation method.
  - Newton's forward difference formula.
  - Newton's backward difference formula.

UNIT – IV NUMERICAL DIFFERENTIATION AND INTEGRATION

6T+8P Formula for Numerical Differentiation – first and second order differentiation using Newton's forward and backward difference – Numerical Integration – Trapezoidal – Simpson's rule (Only $1/3^{rd}$ rule).

Chapter 8: Section 8.2, 8.3 & 8.4

Practical

- Write a program to find the first and second order differentiation using
  - Newton's forward difference formula.
  - Newton's backward difference formula.
- Write a program to evaluate the integrals using
  - Trapezoidal rule.
  - Simpson's rule.

UNIT – V NUMERICAL SOLUTION OF DIFFERENTIAL EQUATION

5T+8P

Euler's Method – Euler's improved method – Taylor's series method – Runge-Kutta method.

Chapter 9: Section 9.1-9.4

Practical

- Write a program to solve the numerical solution of ordinary first order differential equation by
  - Euler's method.
  - Taylor series method.
  - Runge-Kutta second order method.

Text Book

- Rajaraman.V " Computer Oriented Numerical Methods" Third Edition, Prentice Hall of India Private Limited, New Delhi 2001.

Reference Books

- Jain M.K, Iyengar S.R.K and Jain R.K, "Numerical Methods for Scientific and Engineering Computation", Second Edition, Wilsey Eastern Ltd. New Delhi.
- Froberg C.E, "Introduction to Numerical Analysis", Second edition Addison – Wesely Publication Company, 1992.

UMAO606 FUNDAMENTAL MATHEMATICS FOR CONSTRUCTION

Semester : VI **Credits : 4**
Category : Major Optional **Hours/Week : 5**
Class & Major: III B.Sc Mathematics **Total Hours : 65**

Objectives:
To enable the students

- Understand Concept of transposition and evaluation of formulae of construction
- Apply principles of area and volume for calculating concrete mix, flooring, painting
- Design setting-outs for a simple building site

UNIT - I CONVERSION AND EVALUATION OF FORMULAE 12 Hrs

Introduction - Length – Conversion factors – Use of the graphical method – Mass- Area volume and capacity – Temperature – Transpositions of formulae – Evaluation of formulae.
Chapter 9: Section 9.1-9.5.
Chapter 6: Section 6.1-6.2.

UNIT - II AREAS AND VOLUMES OF STRUCTURES 14 Hrs

Introduction – Area of triangles-Area of quadrilaterals – Area of circles – Application of area to practical problems- Cavity walls- Volumes introduction- volume of prism, cylinders, pyramids and cones- Mass, volume and density- concrete mix and its constituents.
Chapter 11: Section 11.1-11.5.
Chapter 12: Section 12.1-12.4.

UNIT – III SPECIAL STRUCTURES AND MATERIALS 15 Hrs

Introduction - Surface area of a pyramid - Frustum of a pyramid - Surface area of a cone - Frustum of a cone- Costing materials Introduction - Foundations - Cavity walls - Flooring – Painting.

Chapter 17: Section 17.1-17.3.

Chapter 15: Section 15.1-15.5

UNIT - IV ELEVATION AND DEPRESSION **12 Hrs**

Introduction - The trigonometrical ratios - Trigonometric ratios for 30°, 45°, 60° - Angles of elevation and depression - Stairs - Roofs - Excavations and embankments.

Chapter 13: Section 13.1-13.7.

UNIT - V SETTING OUT **12 Hrs**

Introduction - Setting out a simple building site - Bay windows and curved brickwork - Checking a building for square corners - Circular arches - Elliptical arches.

Chapter 14: Section 14.1-14.6.

Text Books

- Surinder Singh Virdi and Roy T. Baker, "*Construction Mathematics*", Elsevier Publications,2007.

Reference Books

- Lal.D *," construction managements and PWD accounts",* kataria and sons publishers New Delhi, 2 nd edition, 2012.
- Alfred Webster and Kathryn bright,*"Mathematics for the carpentering and the construction trade"*, 2nd edition, Pearson education trust ,2010.

UMAE205 MATHEMATICS OF FINANCE

Semester	**: II**	**Credit**	**: 2**
Category	**: NME**	**Hours/Week**	**: 4**
Class & Major	**: I UG**	**Total Hours**	**: 52**

Objectives:

To enable the Students

- Understand the time value of money, methods for valuing a series of payment, amortization of loans and cash flow.
- Calculate interest rates and rate of return earned by an investment

UNIT - I INTEREST RATE MEASUREMENT **10 Hrs**

Interest accumulation and effective rates of interest – Effective rates of interest and compounding –simple interest – accumulated amount function –present value and equations of value

Chapter 1: Sec 1.1 -1.2

UNIT - II VALUATION OF ANNUITIES **12 Hrs**

Level payment of annuities – Accumulated value of an annuity- Present value of an annuity- annuity- immediate and annuity- due – Level payment annuities – some generalizations –differing interest and payment period – continuous annuities- solving for the

number of payment in an annuity –solving for the interest rate in an annuity.
Chapter 2: Sec 2.1 -2.2

UNIT- III LOAN REPAYMENT **10 Hrs**

The Amortization method of loan repayment – the amortization schedule – retrospective form of outstanding balance – additional properties of amortization – amortization of a loan with level of payments.
Chapter 3: Sec 3.1 -3.2

UNIT – IV MEASURE THE RATE OF RETURN OF AN INVESTMENT 10 Hrs

Internal rate of return and net present value – the internal rate of return on a transaction- uniqueness of the internal rate of return – project evaluation using net present value- Alternative methods of valuing investment returns – dollar – weighted and time – weighed rate of returns – dollar – weighted rate of return.
Chapter 5: Sec 5.1 -5.2.1

UNIT - V CASH FLOW DURATION AND IMMUNIZATION **10 Hrs**

Duration of a set of cash flows and bond duration- duration of a portfolio of series of cash flows- asset liability matching and immunization
Chapter 7: Sec 7.1 -7.2

Text Books

- Samuel A. Broverman, *"Mathematics of Investment and Credit"*, ACTEX Publications, 4th ed., 2008.

Reference books

- The Faculty of Actuaries and Institute of Actuaries, *"Subject CT1: Financial Mathematics"*, Core Technical. Core reading for the 2009 examinations.
- Stephen G. Kellison, "*The Theory of Interest"*, McGraw-Hill, 3rd ed., 2009.
- John McCutcheon and William F. Scott, *"An Introduction to the Mathematics of Finance*", Elsevier Butterworth-Heinemann, 2006.

UMAE309 APPLIED MATHEMATICS

Semester	**: III**	**Credit**	**: 2**
Category	**: NME**	**Hours/Week**	**: 4**
Class & Major	**: II UG**	**Total Hours**	**: 52**

Objectives:
To enable the Students

- Understand the properties of Matrix and Partial differential equations, and graphs.
- Apply the concept of linear algebra and graph theory for scientific computing
- Analyze numerical problems in science applications.

UNIT - I LINEAR ALGEBRA **10 Hrs**

Linear system of equations – Gauss Elimination - Rank of matrix – inverse of a matrix – Gauss Jordan Elimination- applications.

Chapter 7: Sec 7.2 -7.3,7.8

UNIT - II LINEAR ALGEBRA (CONTD.) 10 Hrs

The matrix Eigen value problem – Eigen value and Eigen vectors- some applications of Eigen value problems.

Chapter 8: Sec 8.1 -8.2

UNIT- III NUMERICAL APPLICATIONS 10 Hrs

Solution of equations by iterations – Newton Rapson Method- Interpolation – Lagrange's interpolation – Spline interpolation

Chapter 19: Sec 19.2 -19.4

UNIT – IV MEASURE THE RATE OF RETURN OF AN INVESTMENT 10 Hrs

Basic Concepts of PDE –Modeling – Wave equation –Heat equation -Applications

Chapter 12: Sec 12.1 -12.2, 12.5

UNIT – V APPLICATIONS OF GRAPHS 12 Hrs

Graphs and Digraphs- Computer representation of graphs – shortest paths problems- Spanning tree-Applications

Chapter 23: Sec 23.1, 23.2, 23.4

Text Books

- Erwin Kreyszig, *"Advanced Engineering Mathematics",*Wiley publications, Tenth edition, 2016.

Reference Books

- Grewal.B.S, "*Higher Engineering Mathematics"* Khanna Publications,43rd edition, 2015.

UMAA510 SPACE SCIENCE

Semester : V **Credits : 4**
Category : Allied Optional **Hours/Week : 5**
Class &Major : III UG **Total Hours : 65**

Objectives:

To enable the students

- Gain the knowledge of spherical trignometers, time scale in the universe, phases of moon and zones of earths.
- Apply the Kepler's laws to study the planetary motion.

UNIT - I SPHERICAL TRIGNOMETERS 13 Hrs

Relevant formula of spherical trignometers (all Without Proof) – Celestial sphere-diurnal motion.

Chapter 1 & 2

UNIT - II ZONES OF EARTH **13 Hrs**

Zones of earth – Dip of the Horizon – Twilight – Astronomical refraction – Tangent and cassinies formulae – Properties and simple problems.

Chapter 3: Sec 1, 5, 6

UNIT - III KEPLER'S LAW **13 Hrs**

Kepler's law(statement only) – Newton's Deduction from them – three anomalies of the earth and relations between them – times – equation of time, season.

Chapter 6, chapter 7 : Sec 1, 2

UNIT - IV CONVERSION OF TIME **13 Hrs**

Conversion of time – years and calendar – heliocentric parallax – geometric parallax – annual parallax – Aberration of Light – simple problems.

Chapter 7: Sec 4

Chapter 9

UNIT - V ECLIPSES **13 Hrs**

Moon (omitting moon liberations) – Phases of Moon – Harvest Moon – Metonic cycle – Lunar Mountain – Earth shine – Tides -Eclipses.

Chapter 12 & 13

Text Book

- Kumaravelu.S, *"Astronomy for Degree Classes*", Mission press, Palayamkottai, 2000.

Reference Books

- Ramachandran .G.V, "*Astronomy*", Mission Press, Palayamkottai, 2000.
- Rukumani Ramachandran, *"Astronomy for Graduates and post graduates classes*", Trichirapally.

UMAA512 DISCRETE MATHEMATICAL STRUCTURES

Semester : V **Credits : 4**
Category : Allied Optional **Hours/Week : 5**
Class &Major : III UG **Total Hours : 65**

Objectives

To enable the students

- Understand graph theory, automata theory and coding theory with applications in computer algorithm.
- Apply these concepts in these concepts.

UNIT-I LOGIC **13 Hrs**

Statement and Notation, Connectives - Conjunction, disjunction, negation, Statement Formulas and Truth tables, Conditional and Bi-Conditional, Atomic and Compound statements,, Well formed Formulae ,Tautology , Equivalence of Formulae, Duality Law**.**

Chapter 9: Sec 9.1-9.5, 9.7, 9.8, 9.10

UNIT-II NORMAL FORMS **12 Hrs**

Normal Forms- Disjunctive Normal Forms, Conjunctive Normal Forms, Principal Normal Forms- Principal Disjunctive Normal Forms , Principal Conjunctive Normal Forms.

Chapter 9: Sec 9.11, 9.12

UNIT-III CODING THEORY **10 Hrs**

Introduction, Hamming Distance, Encoding a Message, Group Codes, Procedure for Generating Group Codes, Decoding and Error Correction, An Example of Simple Error Correcting Code.

Chapter 8: Sec 8.1-8.7

UNIT-IV GRAPH THEORY **15 Hrs**

Graph-Basic Definition, Subgraph, Graph Isomorphism, Some special cases of Graphs, Paths, Cycles and Connectedness, Matrix Representation of a Graph, Incidence Graph, Path Matrix

Chapter 11: Sec 11.1, 11.2

UNIT-V AUTOMATA LANGUAGES AND COMPUTATIONS **15 Hrs**

Introduction-Finite Automata, Definition of Finite Automation, Representation of Finite Automation, Acceptability of a string by a Finite Automation, Language accepted by a Finite Automation, Non-deterministic Finite Automata, Acceptability of /string by Non-deterministic Finite Automata, Equivalence of FA and NFA, Procedure for finding an FA equivalent to a given NFA, Properties of Regular sets, Decision Algorithm for Regular Sets**.**

Chapter 12: Sec 12.1-12.12

Text Book

- Dr.Venkatraman.M.K., Sridharan.N.,Chandrasekaran.N., *"Discrete Mathematics",* The National PublishingCompany, Chennai 2012.

Reference Books

- Bernard Kolman, Robert C.Busby, Sharon Ross, "*Discrete Mathematical Structures*", Prentice Hall of India, New Delhi, 2002.
- Narsingh Deo, *"Graph Theory with Applications to Engineering and Computer Science",* Prentice Hall of India Private Limited, New Delhi, 2001.

UMAP601 PROJECT- HISTORY OF MATHEMATICIANS

Semester : VI **Credits : 1**
Category : Major **Total Hours : 6**
Class &Major : III B.Sc. Mathematics

Objectives

To enable the students

- Acquire in-depth knowledge about Mathematicians & their contributions
- Understand the evolution of Mathematical concepts.

Guidelines :

- This course is offered as an individual project to the gifted students at UG level under extra credit earning provision.
- A student can choose any one of the mathematicians listed below:

List of Mathematicians

1. **Issac Newton**
2. **Archimedes**
3. **Carl F.Gauss**
4. **Leonhard Euler**
5. **Bernhard Riemann**
6. **Joseph- Lousi Lagrange**
7. **David Hilbert**
8. **Euclid of Alexandria**
9. **Gottfried W. Leibniz**
10. **Karl W. T. Weierstrass**
11. **Rene Descartes**
12. **Augustin Cauchy**
13. **Carl W.T. Weierstrass**
14. **George Cantor**
15. **Srinivasa Ramanujan**
21. **Arybhata**
22. **Pierre- Simon Laplace**
23. **Jean le Rond d'Alembert**
24. **Jacob Bernoulli**
25. **Hermann G.Grassmann**
26. **JosephLioville**
27. **Joseph Fourier**
28. **Stefan Banach**
29. **Albert Einstein**
30. **Daniel Berboulli**
31. **Adrie-Marie Legendre**
32. **Johannes Kepler**
33. **Laurent Schwartz**
34. **Hermann Minkowski**
35. **Bhascara Achrarya**

16. Arthur Cayley

17. Pythagoras of Samos

18. Leonardo 'Fibonacci'

19. William R. Hamilton

20. Charles Hermite

36. Niels Abel

37. Jules Henri Poincare

38.Andrei Henri Poincare

39. Godrey Harold Hardy

40. John Ederson Littlewood

1. Neumann
2. Leonardo Pisano Blgollo
3. Andrey N. Kolmogorov
4. Richard Dedekind
5. Michael F. Atiyah
6. FelixChristian Klein
7. Brook Taylor
8. Siemann Denis Poisson
9 George Polya
10. Alfred Clebsch

Project report limited to 20-25 pages includes

- Life History of an eminentMathematicians whom you admire
- The challenges faced in the Research
- Analysis of the Research
- Outcomes & applications of the Research findings

Evaluation

S. No	Criteria	Evaluation	
		CIA (Valuation by Faculty Guide) (60)	ESE (Average of Internal & External Marks) (40)
1	Life History of Mathematicians	10	-
2	Contribution im the field	10	-
3	Challenges facedin Research	10	-
4	Analysis	10	-
5	Outcomes & applications	20	-
6	Written Report	-	20
7	Oral Presentation	-	10
8	Viva - Voce	-	10
Total		**100**	

UMAS601 FOURIER TRANSFORMS

Semester : VI **Credits : 1**
Category : Self Study **Hours/Week : 2**
Class & Major: III B.Sc Mathematics **Total Hours : 26**

Objective
To enable the students

- Understand the mathematical principles on Fourier transforms
- Formulate and solve some of the physical problems of engineering.

UNIT - I GENERAL FOURIER TRANSFORMS **09 Hrs**

Statement of Fourier integral theorem – Fourier transform pair –simple problems- Applications

UNIT - II FOURIER SINE AND COSINE TRANSFORMS **09 Hrs**

Fourier sine and cosine transforms – Properties – Applications.

UNIT – III PROPERTIES OF FOURIER TRANSFORMS **08 Hrs**

Properties Fourier Transforms – Transforms of simple functions- Convolution theorem –Parseval's identity.

Text Books

- Veerarajan T., "*Transforms and Partial Differential Equations*", Tata McGraw Hill Education Pvt. Ltd., New Delhi, Second reprint, 2012.
- Grewal B.S., "*Higher Engineering Mathematics*", Khanna Publishers, 42ndEdition, Delhi,2012

Reference Books

- Bali. N.P and Manish Goyal, "*A Textbook of Engineering Mathematics*", Laxmi Publications Pvt Ltd, 7thEdition, 2007.
- Narayanan S., Manicavachagom Pillay.T.K and Ramanaiah.G "*Advanced Mathematics for Engineering Students"* Vol. II & III, S.Viswanathan Publishers Pvt Ltd. 1998.

UMAS602 SIMULATIONS

Semester : VI **Credit : 1**
Category : Self Study **Hours/Week : 2**
Class & Major: III B.Sc Mathematics **Total Hours : 26**

Objectives :
To enable the students

- Understand the techniques of simulations.
- Gain in depth knowledge in operation of system.

UNIT-I INTRODUCTION **09 Hrs**

Introduction- Appropriate simulation - advantages and disadvantages of simulation - application areas in communication - computer and software design - systems and systems environment - components of a system - discrete and continuous systems

UNIT- II MODEL OF A SYSTEM **09 Hrs**

Model of a system - types of models - discrete-event simulation- steps in a simulation study. Simulation Examples- Simulation of queueing systems - on-demand and inventory systems - simulation for reliability analysis etc.

UNIT-III DISCRETE EVENT SIMULATION **08 Hrs**

General Principles- Concepts in discrete event simulation: event scheduling/time advance algorithms - world views. List Processing: properties and operations - data structures and dynamic allocation – techniques.

Text Books

- Jerry Banks, John S. Carson II, Barry L. Nelson and David M. Nicol, "*Discrete-Event System and Simulation"*, Prentice Hall of India, New Delhi, 2005
- Averill M. Law, *"Simulation modeling and analysis (SIE)",* Tata McGraw Hill India, 2007
- David Cloud, Larry Rainey, *"Applied Modeling and Simulation"*, Tata McGraw Hill, India.

Reference Books

- Gabriel A. Wainer, "*Discrete-event modeling and simulation: a practitioner's approach"*, CRC Press, 2009.
- Bernard P. Zeigler, Herbert Praehofer, Tag Gon Kim, *"Theory of modeling and simulation: integrating discrete event and continuous complex dynamic systems"*, Academic Press, 2000.
- Averill M. Law, W. David Kelton, *"Simulation modeling and analysis"*, McGraw Hill, 2000.

UMAS603 NUMBER THEORY

Semester : VI **Credit : 1**
Category : Self study **Hours/Week : 2**
Class & Major: III B.Sc Mathematics **Total Hours : 26**

Objectives:
To enable the students

- Understand the basics of Number Theory.
- Apply Number Theory to other related fields.

UNIT - I THE FUNDAMENTAL THEOREM OF ARITHMETIC 09 Hrs

Introduction – Divisibility - Greatest common divisor - Prime numbers – the fundamental theorem of arithmetic – the of series of reciprocals of the primes.

Chapter-1: Section:1.1-1.6.

UNIT - II ARITHMETICAL FUNCTIONS 09 Hrs

Introduction – The mobius function $\mu(n)$ – the Euler totient function $\phi(n)$ – A relation connecting ϕ and μ – A product formula for $\phi(n)$.

Chapter-2: Section:2.1-2.5.

UNIT - III DIRICHLET MULTIPLICATION 08 Hrs

The Dirichlet Product of arithmetical functions – Dirichlet inverses and the mobius inversion formula - Multiplicative functions

Chapter-2: Section:2.6-2.9.

Text Book

- Tom M.Apostol "*Introduction to Analytic Number Theory*"Springer-Verlag New York 2000.

Reference Books

- Neal Koblitz, "*A Course in Number Theory and Cryptography*", Springer – Verlag, New York, 1987.
- John Stillwell "*Elements of Number Theory* , Springer – Verlag, New York, 2000.

Evaluation : III and IV components of CIA

Semester	Category	Course Code	Course Title	Component -III	Component -IV
V	III	UMAM507	Modern Algebra	Poster Presentation	Seminar
	III	UMAM508	Sequence and Series	Investigation of Sequence and Series	Seminar
VI	III	UMAM610	Linear Algebra	Poster Presentation	Seminar
	III	UMAM611	Real Analysis	Poster Presentation	Seminar
	III	UMAM612	Astronomy	Poster Presentation	Seminar
	III	UMAM613	Operations Research	Problem Solving	Seminar
	III	UMAO606	Construction Mathematics	Problem Solving	Seminar
II	III	UMAE205	Mathematics of Finance	Assignment	Problem Solving
III	III	UMAE309	Applied	Assignment	Seminar

			Mathematics		

DEPARTMENT OF PHYSICS

Preamble

UG **:** Course Profile, list of courses offered to other departments and the syllabi of courses offered in semesters V and VI along with evaluation components III & IV (**with effect from 2015-2018 batches onwards**)

PG **:** Course Profile, PG –Service learning (**with effect from 2015-2018 batches onwards**)

COURSE PROFILE: B.Sc. (Physics)

Semester	Part	Category	Course code	Course Title	Contact Hrs/week	Credit	
						Min	Max
I	I	Language	UTAL105,UTAL106/ UHIL101/UFRL101	Basic Tamil-I/Advanced Tamil I/Hindi/French	4	2	3
	II	English	UENL107,UENL108	Basic English-I/Advanced English-I	5	3	4
	III	Core I	UPHM101	Fundamentals of Physics	2	1	1
	III	Core II	UPHM103	Mechanics	5	5	5
	III	Core III	UPHM104	Thermal and Statistical Physics	4	4	4
	III	Core Practical-I	UPHR101	Mechanics and Thermal Physics Practical's	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	Basic English-II/Advanced English-II	5	3	4
	III	Core IV	UPHM202	Properties of Matter and Acoustics	3	3	3
	III	Core V	UIDM201	Material science	4	4	4
	III	Core Practical-II	UPHR202	Properties of Matter and Acoustics Practical's	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**	**23**	**26**
III	I	Language	UTAL305,UTAL306/ UHIL301/UFRL301	Basic Tamil-III/Advanced Tamil-III/Hindi/ French	4	2	3
	II	English	UENL307,UENL308	Basic English-III/Advanced English-III	5	3	4
	III	Core VII	UPHM302	Optics and Laser Physics	6	5	5
	III	Core Practical-III	UPHR302	Optics and Laser Physics Practical	3	2	2
	III	Allied	UCSA304	Mathematical Programming using C	3	3	3
	III	Allied Practical	UCSR307	Mathematical Programming using C Lab	3	2	2
	IV	NME	-	-	4	2	2
	IV	Value Education	-	-	2	1	1
				TOTAL	**30**	**20**	**22**

Semester	**Part**	**Category**	**Course Code**	**Course Title**	**Contact Hrs/week**	**Credit**	
						Min	**Max**
IV	I	Language	UTAL405,UTAL406/ UHIL401/UFRL401	Basic Tamil-IV/Advanced Tamil-IV/Hindi/ French	4	2	3
	II	English	UENL407, UENL408	Basic English-IV/Advanced English-IV	5	3	4
	III	Core VIII	UPHM402	Electricity and Magnetism	4	4	4
	III	Core IX	UPHM405	Atomic and Molecular physics	6	5	5
	III	Core Practical-IV	UPHR404	Electricity and Magnetism Practical	3	3	3
	III	Allied	UCHA401/UCHA402	Chemistry-II	3	3	3
	III	Allied Practical	UCHA402/UCHR403	Volumetric and Organic Analysis-I	3	2	2
	IV	Soft Skill			2	1	1
	V	Extension Programme / Physical Education			-	-	2
				TOTAL	**30**	**23**	**27**

Semester	**Part**	**Category**	**Course Code**	**Course Title**	**Contact Hrs/week**	**Credit**	
						Min	**Max**
V	III	Core XI	UPHM501	Quantum Mechanics and Relativity	5	5	5
	III	Core XII	UPHM505	Basic Electronics	5	4	4
	III	**Core XIII**	**UPHM509**	**Mathematical physics**	**6**	**5**	**5**
	III	**Core XIV**	**UPHM510**	**Radiation physics**	**4**	**3**	**3**
	III	Core Practical-V	UPHR501	Electronics Practical -I	3	3	3
	III	Allied Optional			5	4	4
	IV	Value Education			2	1	1
				TOTAL	**30**	**23**	**23**

Semester	**Part**	**Category**	**Course Code**	**Course Title**	**Contact Hrs/week**	**Credit**	
						Min	**Max**
VI	III	Core XV	UPHM608	Solid State Physics	5	5	5
	III	**Core XVI**	**UPHM609**	**Numerical methods and Basic Computational Physics**	**5**	**5**	**5**
	III	Core XVII	UPHM607	Digital Electronics and Microprocessor	5	4	4
	III	Core XVIII	UPHM603	Nuclear Physics	5	5	5
	III	Core Practical VI	UPHR604	Electronics Practical II	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			-	-	2
				TOTAL	**30**	**28**	**30**
				GRAND TOTAL	**180**	**140**	**153**

LIST OF COURSES OFFERED TO OTHER DEPARTMENTS
NON-MAJOR ELECTIVES

Semester	**Part**	**Category**	**Course Code**	**Course Title**	**Contact Hrs/week**	**Credit**	
						Min	**Max**
II	IV	Non Major elective	UPHE202	Applied physics	4	2	2
			UPHE203	Biomedical instrumentation			
			UPHE204	**Electrical appliances**			
III	IV	Non Major Elective	UPHE304/UPHE503	Telecommunication System	4	2	2
			UPHE303	Servicing and maintenance of home appliances			

ALLIED

Semester	**Part**	**Category**	**Course Code**	**Course Title**	**Contact Hrs /week**	**Credit**	
						Min	**Max**
I	III	Allied	UPHA102	Allied Physics-I	3	3	3
II	III	Allied	UPHA203	Allied Physics-II	3	3	3
III	III	Allied	UPHA303	Digital Electronics	3	3	3
III	III	Allied	UPHR303	Digital Electronics Practical	3	2	2
IV	III	Allied	UPHA402	Electronics(For Mathematics major)	3	3	3
IV	III	Allied	UPHR402	Electronics(For Mathematics	2	2	2

				major) Practical			

ALLIED OPTIONAL

Semester	Part	Category	Course Code	Course Title	Contact Hrs /week	Credit	
						Min	Max
V	III	Allied Optional	UPHA501	Conservation of Energy	5	4	4
			UPHA502	Laser for medical diagnosis	5	4	4
			UPHA503	**Fibre optic communication**	5	4	4

INTERDISCIPLINARY

Semester	Part	Category	Course Code	Course Title	Hrs /week	Credit	
						Min	Max
VI	III	Core XVIII	UIDM601	Solid state chemistry	4	4	4

EXTRA CREDIT EARNING PROVISION

Semester	Part	Category	Course Code	Course Title	Hrs/week	Credit	
						Min	Max
V	III	Core XX	**UPHS508**/UPHP603	**Solar Energy Applications (self study) /Mini Project**	-	-	1
II	III	Core VI	UPHI201	Summer Internship	-	-	1
IV	III	Core X	UPHI401	Summer Internship	-	-	1

UPHM501 QUANTUM MECHANICS AND RELATIVITY

Semester : V **Credit : 5**
Category : Core XI **Hours/Weeks : 5**
Class & Major: III B.Sc Physics **Total Hours : 65**

Objectives:
To enable the students

- Understand the basic concepts of Quantum Mechanics and fundamental postulates of Relativity.
- Expose the students to the applications of Quantum Mechanics and Relativity.

UNIT- I FOUNDATIONS OF WAVE MECHANICS 11Hrs

Introduction-Inadequacy of classical mechanics-dual nature of light and matter-de Broglie wavelength-Compton effect-Experiments of Davisson-Germer and G.P.Thomson-The electron microscope-Heisenberg Uncertainty principle-Applications of Uncertainty principle.

UNIT -II SCHRODINGER EQUATION 14Hrs

Schrodinger equation – physical interpretation of wave function – probability current density-Ehrenfest theorem-Eigen function and Eigen value-Eigen value equation-Orthogonal eigenfunctions-reality of energy equivalence.

UNIT- III APPLICATIONS OF SCHRODINGER EQUATION 14Hrs

Free particle-Particle in a bound state-Eigen functions and eigenvalues of a particle in a rectangular potential-reflection and transmission co-efficient rectangular potential-particle in 1-d well of finite depth-Bound states-One dimensional linear harmonic oscillator.

UNIY-IV SPECIAL THEORY OF RELATIVITY 13Hrs

Frames of references-Inertial frames and non-inertial frames-Galilean transformation – Michelson-Morley experiment-Interpretation of the results-Postulates of special theory of relativity-Lorentz transformation equations-Length contraction-Time dilation-transformation of velocities-Redefining momentum-Variation of mass with velocity-Mass-energy equivalence.

UNIT-V APPLICATIONS OF QUANTUM MECHANICS 13Hrs

Teleportation-instantaneous communication-Quantum computers-Quantum tunnelling-Quantum Sensing and imaging-Quantum metrology-The transistor-Energy harvesters-ultra precise thermometer-Lasers-Random less generator-Quantum cryptography-Ultra price clocks.

Text Books

- P.M.Mathews and K.Venkatesan, *A Text book of Quantum Mechanics*, Tata McGraw-Hill, New Delhi,2005.
- R.Murugesan, *Modern Physics*, S.Chand & Company Ltd., New Delhi,2008.

Reference Books

- Narlikar, *Lectures on General theory of Relativity*, Macmillan India Ltd.,2004.
- Ghatak and Loganathan, *Introduction to Quantum Mechanics*, Macmillan India Ltd.,2004
- Arthur Beiser, *Concepts of Modern Physics*, McGraw Hill Education,2006.

UPHM505 BASIC ELECTRONICS

Semester : V **Credit : 4**
Category : Core XII **Hours/week : 5**
Class & Major: III B.Sc Physics **Total Hours : 65**

Objectives:

- Introduce the various principles of analog electronics and its applications to various electronic instruments.
- Provide a theoretical basis for the electronics experiments and the students will be doing in their practical sessions.

UNIT-I SEMICONDUCTOR DEVICES 13 Hrs

Classification of solids in terms of forbidden energy gap – Effect of temperature on Fermi level – Semiconductor diode – Characterisitics-Zener diode – Working and output characteristics Voltage Stabilization using zener diode– Transistor construction and working – Types of Biasing – Characteristics in CE,CB,CC mode.

UNIT-II RECTIFIERS AND MULTIVIBRATORS 14 Hrs

Half-wave and Full-wave Bridge rectifiers –Ouput and efficiency of full wave rectifier. Expressions for efficiency and Ripple factor – Application: Regulated power supply using Zener diode. Multivibrators – Types of multivibrators – Astable, Monostable, Bistable Multivibrator – circuit details and operations.

UNIT-III CIRCUIT ANALYSIS AND OSCILLATORS 15 Hrs

Network Analysis – Thevenin's, Norton's and Maximum Power Transfer theorems Wave-shaping circuits: Differentiating circuit – output waveforms – Integrating circuit – Output waveforms - Clipping and Clamping circuits – Types and applications. Fundamental principles of oscillators – concept of positive feedback – Types of oscillators – Hartley, Colpitts, Phase shift and Wien bridge oscillators - their analysis.

UNIT-IV AMPLIFIERS AND POWER ELECTRONICS 13 Hrs

Voltage and power amplifiers – Classification of amplifiers – RC coupled amplifier – Frequency response curve – Power amplifier – Characteristics – Emitter follower. FET,MOSFET, UJT and SCR – Construction and working – Output characteristics – parameters of FET – SCR as half and full wave rectifiers.

UNIT-V OPERATIONAL AMPLIFIERS 10 Hrs

Introduction – Characteristics of an ideal OP-AMP – CMRR – the slew rate – Inverting/Non-inverting Amplifiers - Adder and difference amplifiers - Differential amplifier – Integrator, Voltage follower, comparator.

Text Books:

- V.K. Metha, *Principle of Electronics*, S. Chand & Company Ltd., New Delhi. 2001
- R.S. Sedha, *A Text book of Applied Electronics*, S. Chand & Company Ltd., New Delhi, 2005.

Reference books:

- Theraja, B.L.., *Basic Electronics*, S. Chand & Company Ltd., New Delhi, 2005.
- Gaykwad A., *Operational Amplifiers and Linear Integrated circuits*, Printice Hall of India Pvt., Ltd., May 1995.
- Jacob Millman and Christos C. Halkias, *Integrated Electronics*, Tata McGraw – Hill, New Delhi, 1991.

UPHM509 MATHEMATICAL PHYSICS

Semester : V **Credits : 5**
Category : Core XIII **Hours/Week : 6**
Class & Major : III B.Sc. Physics **Total Hours : 78**

Objectives:

To enable the students

- Attain the basic mathematical knowledge.
- Apply mathematical knowledge for understanding physical phenomenon.
- Appreciate the applications of Physics through Mathematical concepts.

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 16 Hrs

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 16 Hrs

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.

Reference books

- B.S. Grewal, *Higher Engineering Mathematics*, Khanna Publishers, 43rd Edition, 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.
- P.R. Vittal, *Allied Mathematics*, Margham Publishers, Chennai -2010.

e-Resources

- Vitaly Bychkov, *Examples on use of vector analysis in physics* - www.umu.se/digitalAssets/141/141566_vector-analysis-in-physics-vbyv.pdf

UPHM510 RADIATION PHYSICS

Semester : V **Credits : 3**
Category : Core XI **Hours/Week : 4**
Class& Major: III B.Sc. Physics **Total Hours : 52**

Objectives:

To enable the students

- Acquire knowledge about the ionizing and non-ionizing radiations.

- Understand the interaction of radiations with tissues and related health issues.
- Realize the useful applications of radiations in medical diagnosis and radiation therapy.

UNIT- I ELECTROMAGNETIC RADIATIONS 11 Hrs

Electromagnetic spectrum-classification-ionizing radiation-different source of non-ionizing radiation-radio frequency, microwaves, Infrared, visible and ultraviolet radiation (qualitative)-production-physical properties – generation of electromagnetic radiations.

UNIT-II RADIOACTIVE ISOTOPES 10Hrs

Natural and artificial radioactive source-production of isotope-reactor produced isotope-cyclotron- produced isotope- Synthesis of radioactive isotopes such as ^{37}Cs, ^{60}Co, ^{192}Ir, ^{125}I, Na, Fe,P, applications.

UNIT- III RADIATION REDUCTION 10Hrs

Elementary ideas of radiation production-protective materials-radiation effects-somatic,genetic stochastic and deterministic effect, personal monitoringdevices – Luminescence - thermoluminescence (TL) – thermostimulated luminescence (TSL) – photostimulated luminescence (PSL) - TLD film badge-pocket dosimeter.

UNIT- IV RADIATION INSTRUMENTATION 10 Hrs

Radiological imaging- digital radiography-X-Ray film-cassette-computer tomography scanner- X-Ray detection method - Gamma camera-radiation measurement by GM counter.

UNIT-V RADIATION THERAPY 11 Hrs

Radiotherapy-deep therapy machine-basics of teletherapy units-deep X-Ray, telecobalt units-heavy ion therapy-carbon ion therapy-neutron therapy.

Text Books

- Dr.K.Thayalan-Jayapee brothers, *Basic Radiological physics*, Medical publishing Pvt, Ltd. New Delhi, 2009.
- Lakshmanan, A, *Luminescence and Display Phosphors*, Nova publishers, 2008.

Reference Books:

- Faiz M.Khan, *The physics of Radiation therapy*, Lippincott Williams, 2014.
- Thomas F.Delaney, Hanne M.Kooy, *Proton and Charged particle Radiotherapy*, Lippincott Williams & Wilkins, 2008.
- S. W. S. McKeever, *Thermoluminescence of Solids*, Cambridge University Press, 2011.
- Reuven Chen, Vasilis Pagonis, *Thermally and Optically Stimulated Luminescence: A Simulation Approach*, John Wiley & Sons, 2011.

- Bushberg, Seibert, Leidholdt and Boone Lippincot, *The essential physics of medical imaging,* Williams and Wilkins, Second Edition, 2011.
- Chandra-Lippincot, *Nuclear medicine physics,* Williams and wilkins, 2011.

UPHR501 ELECTRONICS PRACTICAL I

Semester : V **Credit : 3**
Category : COREPRACTICAL-V **Hours/week : 3**
Class & Major: III B.Sc Physics **Total Hours : 39**

Objectives:
To enable the Students

- Understand the theoretical concepts of electronics by actual experiments
- Design simple electronics circuits and make measurements.
- Appreciate the significance of electronics in practical life.

1. V-I Characteristics of Zener diode
2. Chracteristics of Transistor in CE configuration
3. Full wave - Bridge rectifier
4. Voltage stabilization of using Zener diode
5. Operational amplifier as Adder, Subtractor, Inverting and non-inverting amplifier.
6. Operational amplifier as Integrator, Differentiator, and voltage follower.
7. Differentiating, Integrating, Clipping and clamping circuits.
8. RC coupled amplifier - Frequency Determination

Optional

1. Half wave bridge rectifier
2. Junction diode – Characteristics

Text book

- N.Srinivasan, S.Balasubramanian & R.Ranganathan, *The text book of Practical Physics,* Sultan Chand & sons 2006.

Refrence Book

- Prof.A.Ponnusamy, & Prof. B.Amalanathan, Practical Physics, Bright Publishers.
- C.C.Ouseph, G.Rangarajan, A *The text book of Practical Physics*, Viswanathan Publishers – Part I, 1990.

UPHM 608 SOLID STATE PHYSICS

Semester: VI **Credit : 5**
Category: Core XV **Hours/week : 5**
Class & Major: III B.Sc Physics **Total Hours : 65**
Objectives:

- To understand the basic concepts of crystal structure and materials science.
- To understand the mechanical properties of metals and electron theory of metals.
- To acquire knowledge about X- Rays and XRD techniques.

UNIT-I CRYSTAL STRUCTURE **14 Hrs**

Classification of solids – unit cell – Crystal lattice and basis- Seven classes of crystals – Bravais lattice - Miller indices – Symmetry operations – Point groups and space groups – Types of lattice (plane lattice with bcc and fcc). Structure of crystals: simple cubic, hcp, fcc and bcc. Examples: NaCl, Diamond and ZnS structures. Crystal imperfections – Types of imperfections.

UNIT-II ELECTRON THEORY OF METALS **12 Hrs**

Classical free electron theory – Draw backs of classical theory- Quantum theory of free electron- Somerfield's model for free electron (1D solids, generalization for 3D solids) - Electron energies in a metal – Band theory of solids - energy gaps – Density of states – Bands in conductors, insulators and semiconductors – Factors affecting electrical resistance of materials.

Unit-III (a) Classification of Materials **13 Hrs**

Advanced materials and modern material structure - Types of bonds and their energies – Bond formation mechanism – Ionic and covalent bonds. Ceramics – thermal and electric properties – Uses.

(b) Mechanical Properties of Metals

Elastic deformation - Plastic deformation - Interpretation of tensile stress-strain curves –Yield criteria and macroscopic aspects of plastic deformation - Property variability and design factor

Unit-IV (a) X-Rays and XRD **13 Hrs**

X-Rays - Absorption of X- Rays - X-Ray spectra - Diffraction of X-Rays by crystals – Bragg's law- Laue method - Rotating crystal method – Powder photographic method.

(b) Non destructive Testing

Radiographic method – Ultrasonic method. Equipments used for NDT –Electron microscope – Scanning electron microscope (SEM)

Unit-V: Magnetic Materials and Dielectrics **13 hrs**

Types of magnetic materials - Magnetic permeability, magnetization, susceptibility, electric current in atoms - Bohr magneton – Electron spin - Magnetic moment due to nuclear spin - Quantum theory of paramagnetism – Quantum theory of ferromagnetism, I-H curve. Magnetic moments due to electron spin – Ferromagnetism the domain structure – Soft and hard magnetic materials. Polarization electronic, ionic, orientation and space charge polarization – temperature and frequency effects – electric break down – ferroelectric materials.

Text Books:

- R. B. Gupta, *Material Science for AMIE*, Umesh Publications, 2001.
- S. O. Pillai., *Solid State Physics*, Wiley eastern Ltd., 2005

Reference Books:

- Kittel C., *Introduction to Solid State Physics,* Wiley Eastern, VII Ed, 1996.
- G. K. Narula, K.S. Narula, V.K. Gupta., *Materials Science*, Tata McGraw Hill,1989.
- Raghavan. V, *Materials Science and Engineering a first course,* Prentice Hall of India (pact), 1990.

UPHM609 - NUMERICAL METHODS AND BASIC COMPUTATIONAL PHYSICS

Semester : VI **Credit : 5**
Category : Core XVI **Hours/week : 5**
Class &Major : III B.Sc. Physics **Total Hours : 65**

Objectives:

To enable the students

- Understand different numerical methods and their applications.
- Acquire the knowledge about Basic Computing.
- Apply the computational techniques for simple physics applications**.**

UNIT - I NUMERICAL SOLUTION OF LINEAR AND NONLINEAR EQUATIONS 12 Hrs

Newton - Raphson method; iterative rule - termination criteria - rate of convergence – drawbacks - Simultaneous linear algebraic equations: Augmented matrix - Gauss elimination – Jordan's modification - Inverse of a matrix by Gauss-Jordan method

UNIT - II INTERPOLATION AND CURVE FITTING 12Hrs

Interpolation: Newton's interpolation - Linear interpolation - Higher-order polynomials - Divided differences - Gregory-Newton forward and backward interpolation formulae – error in interpolation - Lagrange interpolation.

Curve fitting: Method least-squares - normal equations - straight-line, exponential fits and power-law fits.

UNIT - III NUMERICAL DIFFERENTIATION, INTEGRATION AND ODE 12Hrs

First and second-order derivatives: central difference formulae **Numerical integration:** trapezoidal, Simpson's 1/3 rules - Truncation error – composite trapezoidal, and Simpson's 1/3 rules. **ODE:** Euler and fourth-order Runge-Kutta methods for first order ODE.

UNIT - IV PROGRAMMING IN C 14Hrs

Programming methodologies - Scientific programming languages - Programming in C- Variables-expressions and statement- operators-library function- data input and output - structure of C programming- control statements- functions- global variables-arrays- Character-strings - Structures.

UNIT - V COMPUTATIONAL PHYSICS 15Hrs

Developing Algorithm and C-Programming for: Motion of a projectile including air drag (Feynmen - Newton method) - Electric field due to a point charge and N charges - Comparison between analytical and numerical techniques : Curve Fitting; Principle of least squares and fitting a straight line.

Text books

- Douglas W. Harder, Richard Khoury, *Numerical Analysis*, University Of Waterloo, *2010*.
- Annette M. Burden, Richard L. Burden, J. Douglas Faires, *Numerical Analysis*, 10th edition, 2016.
- Balagurusamy E, ANSI C (for unit IV).

Reference books

- S.S.Sastry, *Introductory Methods of Numerical Analysis*, PHI,New Delhi, 2003.
- *Numerical Methods in Science and Engineering*, The National Publishing Co. Madras 2001.

- K.Sankara Rao, *Numerical methods for scientist and Engineers*, third edition, PHI learning private limited, 2012.

UPHM607 DIGITAL ELECTRONICS AND MICROPROCESSOR

Semester: VI **Credit : 4**
Category: CORE-XVII **Hours/week : 5**
Class & Major: III B.Sc Physics **Total Hours : 65**

Objectives:

- Acquire knowledge about the basics of digital electronics and microprocessor
- Develop a simple real time programs using microprocessor 8085

UNIT-I FUNDAMENTALS IN LOGIC GATES 13 Hrs

Number system-binary number system-decimal and binary conversion-binary to decimal conversion-octal number system-hexadecimal number system-Codes-BCD code-ASCII code-Binary arithmetic-Binary addition-subtraction, AND,OR circuits using diodes-NOT using transistors-NAND,NOR and EXOR-functions and their truth tables. NAND and NOR as universal gates.

UNIT-II BOOLEAN ALGEBRA AND ITS SIMPLIFICATION 13 Hrs

Boolean Algebra-De Morgan's theorem and its circuit-Duality theorem, simplification of Boolean equations-Karnaugh Map-pairs, quads, octets-Half adder-Full adder-Half subtractor-Full subtractor-Digital Computer-Parity Checker

UNIT-III DATA PROCESSING CIRCUITS, COUNTERS AND REGISTERS 13 Hrs

Multiplexers-Demultiplexers-Decimal to BCD Encoder-Flip-flops-RS flip-flops-Clocked RS flip-flops-D flip-flops-JK flip-flops- JK Master Slave flip flops-Shift registers-Counters-Asynchronous Counters-Omitted States-Modulus Counters-BCD Counters-Updown Counters-Synchronous Counter-Decayed Counter-D/A Counter-A/D Counter.

UNIT-IV INTRODUCTION TO MICROPROCESSORS AND PROGRAMMING TECHNIQUE 13 Hrs

Introduction to Microcomputers - Microprocessors and Assembly Languages - Microprocessor 8085 – Internal Architecture and its operations - Programming Techniques such as looping, counting, and indexing-addressing modes-Data transfer instructions-Dynamic Debugging.

UNIT-V ASSEMBLY LANGUAGE PROGRAMMING 12Hrs

BCD to binary and binary to BCD Conversions-BCD to HEX and HEX to BCD conversions-ASCII to BCD and BCD to ASCII Conversions-BCD to Seven Segment LED Code conversions-Binary to ASCII and ASCII to Binary conversions-Multibyte addition-Mutibyte Subtraction-BCD addition-BCD subtraction-Mutiplication and Division

Text Books

- Malvino and Leech, *Digital Principles and Application*, 4th edition, Tata McGraw Hill, New Delhi, 2003.
- V.Vijayendran, Fundamental of Microprocessor 8085, S.Viswanathan Pubishers, Chennai 2004

Refrence Books

- R.S. Gaonkar, *Microprocessor Architecture, Programming and Applications with8085/8080A*, Wilwy Eastern Limited, 1990.
- Anokh Singh and A.K.Chabra, *Fundamentals of Digital Electronics and Microprocessors*, 2nd edition, S.Chand & C0 Ltd, New Delhi, 2005.
- V.K.Metha, *Principle of Electronics*, S.Chand & Co Ltd, New Delhi, 2001.

UPHM603 NUCLEAR PHYSICS

Semester: VI **Credit : 5**
Category: Core XVIII **Hours/week : 5**
Class & Major: III B.Sc Physics **Total Hours : 65**

Objectives:

- To acquire knowledge of the nucleus and its various models.
- To get a basic idea of elementary particles and understand the principles of particle accelerators.
- To understand the phenomena of radioactivity, nuclear fission and fusion.

UNIT-I NUCLEUS AND NUCLEAR MODELS 13 Hrs

General properties of nucleus (Size, Mass, Density, Charge, Spin, Angular momentum, magnetic dipole moment) – Binding energy – BE/A and stability of nucleus – Packing fraction – Nuclear forces - Definitions – Properties- Meson theory. The liquid drop model - Semi empirical mass formula - The shell model – Evidence for shell model - Collective model.

UNIT-II ELEMENTARY PARTICLES 12 Hrs

Elementary particles – Introduction - Classifications – Particle interactions: Gravitational, electromagnetic, strong and weak interactions. Conservation laws: invariance

under charge, parity, CP, time and CPT. Particles and antiparticles - Electron and positron - Proton and antiproton - Neutron and antineutrons - Mesons: muons, Pions, K-mesons, η-mesons - Hyperons:$\sum$, Λ^-, Ξ, Ω- hyperons. Antimatter – Quark model.

UNIT-III DETECTORS **14 Hrs**

Interaction between energetic particles and matter – Heavy charged particles – Electrons – Gamma ray- Ionization chamber – Solid state detectors- GM Counter- Scintillation counter - Wilson cloud chamber.

Particle Accelerators-Introduction – Linear accelerator – Cyclotron – Synchrotron – Synchrocyclotron - Betatron , Electron synchrotron - Proton synchrotron.

UNIT-IV RADIOACTIVITY **12 Hrs**

Natural radioactivity – Alpha, Beta and Gamma rays – Properties – Modes of decay of radioactive nuclides and decay laws. β- decay: β^-, β^+ and electron capture decay - Allowed and forbidden transitions - Parity violation in β decay - Alpha decay- Geiger-Nuttal law- Gamma ray spectra- Laws of radioactivity: Soddy- Fajan's law- Law of radioactive disintegration- Half life period- Mean life period(definition and expression) - Artificial radio activity- Preparation of radio active isotopes- Applications of radio isotopes.

UNIT-V NUCLEAR FUSION AND FISSION **14 Hrs**

Nuclear fission- Energy released in fission- Bohr and Wheeler's theory- Chain reaction- Multiplication factor - Critical size- Natural Uranium and chain reactions- Atomic bomb- Nuclear reactor - Nuclear fusion- Source of stellar energy- CN- cycle- Proton-Proton cycle – Hydrogen bomb – Controlled thermo nuclear reactions. Cosmic rays – origin of cosmic rays – Latitude effect – Azimuth effect – Altitude effect – Seasonal, diurnal changes – Primary and secondary cosmic rays - Cascade theory of shower – Pair-production and annihilation – Van Allen belts.

Text Books:

- Arthur Beiser., *Concept of Modern Physics*, Tata McGraw hill, Sixth edition, 2006.
- R Murugeshan and Kiruthiga Sivaprasath., *Modern Physics* S. Chand & Co., 2008.
- D. C. Tayal., *Nuclear Physic*, Himalaya Publishing House, 2009

Reference Books:

- B. L. Cohen., *Concept of Nuclear Physics*, Tata McGraw Hill, 1988
- R.R.Roy and B.P.Nigam, *Nuclear Physics*, Wiley-Eastern, 1979
- W.E.Burchema., *Elements of Nuclear Physics*, ELBS, Longman,1988
- Kaplan, *Nuclear Physics*, Narosa publishers, 2002.

UPHR604 ELECTRONICS PRACTICAL II

Semester: VI **Credit : 3**
Category: Core Practical-VI **Hours/week : 3**
Class & Major: III B.Sc Physics **Total Hours : 39**

Objectives:

To enable the Students

- Understand the theoretical concepts of electronics by experiments
- Execute the simple real time programs using microprocessor 8085

1. AND, OR, NOT gates-Verification of truth tables
2. Universal Building Block NAND and NOR gates
3. Construction of half and full adders using NAND gate - Verification of truth tables

4. Construction of RS, JK and D flip flop
5. Program for code conversion (BCD to HEXA, ASCII to BCD) using 8085
6. Program for code conversion (BCD to Binary, 8-bit Subtraction using 8085
7. Program for code conversion(HEXA to BCD, BCD to ASCII) using 8085
8. Program for (Binary to BCD) and 8-bit Addition using 8085

Text book

- N.Srinivasan, S.Balasubramanian & R.Ranganathan, *The text book of Practical Physics*, Sultan Chand & sons 2006.
- Fundmental of microprocessor 8085 by V.Vijayendran, S.Viswanathan Pubishers, Chennai 2004.

Refrence Book

- Prof.A.Ponnusamy, & Prof. B.Amalanathan, Practical Physics, Bright Publishers.
- C.C.Ouseph, G.Rangarajan, A *The text book of Practical Physics*, Viswanathan Publishers – Part I, 1990.
- R.S. Gaonkar, Microprocessor Architecture, Programming and Applications with8085/8080A, Wilwy Eastern Limited, 1990.

UPHO601 NANO PHYSICS

Semester :VI **Credit :4**
Category : Core Elective **Hours/Week :5**
Class & Major: III B.Sc Physics **Total Hours :65**
Objectives:

- To provide basic ideas on nanotechnology and nanoscience.
- To introduce the potential applications of nanotechnology.

UNIT-I NANOSCALE SYSTEMS 13 Hrs

Length, energy, and time scales - Quantum confinement of electrons in semiconductor nanostructures: Size effect and properties of nanostructures- Top down and Bottom up approach.

UNIT-II QUANTUM DOTS 13 Hrs

Excitons and Excitonic Bohr radius – difference between nanoparticles and quantum dots - Preparation through colloidal methods - Epitaxial methods- MOCVD and MBE growth of quantum dots - spectroscopy of Quantum Dots: Absorption and emission spectra - photo luminescence spectrum - optical spectroscopy

UNIT-III NANOTUBES 13 Hrs

Single walled and Multi walled Nanotubes (SWNT and MWNT) - synthesis and purification - synthesis of carbon nanotubes -pyrolysis technique - arc-discharge method – nanowires – preparation – VLS mechanism of growth - Self-assembled monolayers - Electrochemical techniques

UNIT-IV CHARACTERIZATION 13 Hrs

SEM– Principle of Transmission Electron Microscopy (TEM) and High resolution TEM- Principle and working of Atomic Force Microscopy (AFM) and Scanning probe microscopy (SPM) - near-field Scanning Optical Microscopy — applications to nanostructures

UNIT-V NANOTECHNOLOGY **13 Hrs**

Applications of nanoparticles, quantum dots, nanotubes and nanowires for nanodevice fabrication –nanoparticles based solar cells and quantum dots based white LEDs – CNT based transistors

Text Books:

- G. Timp, *Nanotechnology* ,AIP press, Springer-Verlag. Editor, New York, 1999
- Charles Poole, *Introduction to nanotechnology*.

Reference Books:

- A.S Edelstein, *Nanomaterials Synthesis properties and applications*, Editor:- A.S Edelstein, IOP Publishing, UK (1996).
- Hari Singh Nalwa, *Nanostructured materials and nanotechnology*, Concise Edition, Editor:-; Academic Press, USA (2002).
- Hari Singh Nalwa , *Hand book of Nanostructured Materials and Technology*, Vol.1-5, Editor, Academic Press, USA (2000).
- John Dinardo, Weinheim, *Nanoscale characterization of surfaces & interfaces*, Wiley-VCH, 2nd ed, Cambridge, 2000.

UPHO602 ASTROPHYSICS

Semester:VI **Credit :4**
Category: **Core Elective** **Hours/Week :5**
Class & Major: III B.Sc Physics **Total Hours :65**
Objectives:

To enable the students

- Understand basis ideas of Astrophysics and its measurements.
- Understand the details about solar systems.
- Know about stellar evolution
- Get the knowledge of galaxies and its formations.

UNIT-1 NATURE OF ASTROPHYSICS **13Hrs**

The nature of astrophysics, scale of the universe, angular measure, parallax, inverse square law of light and the definition of flux, brightness and the magnitude system-magnitudes and colours, distance modulus, electromagnetic radiation, black body radiation, spectroscopy-Kirchhoff's law.

UNIT-II SOLAR SYSTEM **12Hrs**

Surface features of the sun in white and monochromatic light, internal structure, photosphere. Sunspots and magnetic fields on the sun. Solar activity, planets and their satellites- surface features, internal structure, atmosphere and magnetic fields of earth, moon and planets – origin of solar systems.

UNIT-III STELLAR SPECTRA **15Hrs**

HR diagram, HD & MK spectra classification of stellar spectra. Radiations law and basic ideas of spectral lines formation- Explanation of stellar spectra in terms of Boltzmann and Saha equation.

UNIT-IV STELLAR EVOLUTION **12Hrs**

Stellar structure, nuclear reactions, HSEQ, Radiation transport-Stellar evolution, degeneracy pressure, mass-limits for stars-more stellar evolutions-high mass stars and compact objects, supernovae and stellar clusters, Inter stellar medium.

UNIT-V THEORIES OF UNIVERSE **13Hrs**

The milky way-Black holes, white dwarfs and Neutron stars- Other galaxies –clusters of galaxies, the Hubble law – cosmology and the Big Bang theory

Textbooks

- K.S.Krishnasamy, Astro Physics a Modern Perspectives, Reprint New Age International (p) Ltd, NEW DELHI, 2002.
- Baidyanath Basu, An Introduction To Astrophysics, Prentice Hall Of India Private Ltd., NEW DELHI, 2 nd printing, 2001.
- R.Murugasen, Modern Physics, S.Chand & Co Ltd, NEW DELHI, 11th Revised edition, 2003.

Reference Books

- S.Kumaravelu, Astronomy, Janki Calendar Corporation, sivasakthi, 1993.
- Baker and Fredrick, Astronomy, 9th edition, Van No Strand Rein hold &Co, New York,1964.

UPHO603 FUNCTIONAL MATERIALS

Semester : VI **Credits : 4**
Category : Core Elective **Hours/Week : 5**
Class&Major: III B.Sc Physics **Total Hours : 65**

Objectives:
To enable the students

- Acquire the knowledge about the properties of functional materials.
- Analyze the properties associated with the different materials.
- Apply the concepts of materials in different applications.

UNIT - I OPTICAL MATERIALS **11 Hrs**

Introduction to optical materials – Absorption and emission process – Luminescence - types of luminescence (qualitative) - Mechanism of fluorescence and phosphorescence process — Quantum efficiency (statement only) - Phosphors – LED (principle, construction and working) - white LED –Applications

UNIT – II SUPERCONDUCTING MATERIALS **14 Hrs**

Introduction to superconductivity – Occurrence of superconductivity – transition temperature - properties – BCS theory - Type I and II superconductors – High temperature superconductors – Structure and properties of $YBa_2Cu_3O_{9-X}$ and $HgBa_2CaCuO_6$ compounds – Applications – SQUID, CRYOTRON, Magnetic levitation - Other applications

UNIT – III DIELECTRIC MATERIALS **14 Hrs**

Dielectric materials – types – local (internal) field – Classsius-Mossotti relation – dielectric breakdown – dielectric loss - Piezoelectric, pyroelectric, ferroelectric, thermoelectric materials - Applications - supercapacitors and transformer

UNIT – IV BIOMATERIALS **13 Hrs**

Introduction to Biomaterials – Physiochemical parameters of biomaterials – Concepts of biocompatibility - Types – Biometals and alloys – Bio glass and bioglass ceramics – Biopolymer and bio composites – Hydroxyapatite and Tricalcium phosphate -Properties and application.

UNIT –V MODERN FUNCTIONAL MATERIALS **13 Hrs**

Properties and applications of electro-optic materials – magneto-optic materials – Photoconductive polymers - Carbon nanotubes (Single and Multi walleds) - Composite materials – Particle and fibre reinforced composite materials and its applications.

Text Books

- V. Rajendiran, *Material Science*, Tata McGraw Hill, 2015.
- V. Ragavan, *Materials science and engineering*, PHI Learning private Ltd, 2013.

Reference Books

- S.O.Kasab, *Principles of Electronic Devices*, Tata McGraw Hill, 2015.
- William D. Callister, David G. Rethwisch, *Materials science and Engineering*, Wiley-India, 2013.
- PK. Palanisamy, *Materials Science*, Scitech Publications (India), 2010.

UPHE204 - ELECTRICAL APPLIANCES

Semester : II **Credits : 2**
Category : NME **Hours/week : 4**
Class & Major: I UG **Total Hours : 52**

Objectives:

To enable the students

- Understand the principles and functions of basic circuit elements.
- Know the safety precautions.
- Service and maintain the home appliance.

UNIT-I-INTRODUCTION TO BASIC COMPONENTS **10Hrs**

Resistor-capacitor-inductor-diodes-Transisitor-ac-dccurrent-Transformer measurements of as ammeter-voltmeter-multimeter

UNIT-II TOOLS AND EQUIPMENT **12 Hrs**

Soldering and de-soldering techniques -Screw Driver, Cutting Pliers, Top Spanner, Neon Tester. Heavy Duty Screw Driver. Nose Pliers Hydrometer. High Discharge Tester, Battery charger, Technicians tool kit, Digital multimeter, Clip on ammeter.

UNIT-III HOME APPLIANCES **10 Hrs**

Electric Heater- Electric Iron -Electric Kettle- Ceiling Fan- Table Fan-Washing Machine- Automatic Iron -Microwave oven-Cooking Range -Storage Heater -Wet Grinder -Air Cooler- Electronic devices -principle-working and circuit diagram.

UNIT-IV ELECTRICAL APPLIANCES **10 Hrs**

Speaker- mike-LCD and LED TV-LCD/ LED Projector-DTH System-ink jet & Laser printer-CCTV-Water purifier(RO and UV technologies) -Vacuum cleaner-Inverters, battery maintenance and UPS-principle-working and circuit diagram

UNIT-V SAFETY PRECAUTIONS **10 Hrs**

Practice procedure for electrical and personal safety measures - Concept of Insulation – Wood, Ceramics and Insulation Tapes – Uses of Electrical Tester in appropriate Appliances.

Text Books

- S.P.Sharma, *VCR priciples, maintaince and repair*, Tata Mc Graw Hill, New Delhi, 2016
- B.L.Theraja, *A text book of electrical Technology*, S.Chand and company, New Delhi, 2016.

Reference Books

- J.B. Gupta, *Electrical Machines*, SK Kataria and Sons New Delhi, 2016.
- A.K.Mani, *Colour Television and video technology*, CSB publisher, 2016.
- Edward, *Electrical Technology*, ELBS Publication, 2014.
- *Service manuals*, BPB Publication New Delhi, 2016.

UPHA503- FIBRE OPTICS COMMUNICATION

Semester : V **Credit : 4**
Category : Allied Optional **Hours/week : 5**
Class &Major: III UG **Total Hours : 65**

Objectives:

To enable the students

- Understand the basic concepts of optics.
- Study fibre optic communication.
- Apply fibre optic communication in different fields.

UNIT- I FUNDAMENTAL OF LIGHT **12 Hrs**

Reflection- Refraction- Transmission- Refractive Index- Snell's Law- Dispersion - Total Internal Reflection, Scattering, Interference, Diffraction, Polarization (Qualitative), Brewster's Law - Multiple reflections.

UNIT- II LASERS **14 Hrs**

Basic Principle of Laser – Absorption and Emission - Einstein Coefficients - condition for light amplification - Population Inversion – Pumping Mechanism- Threshold Condition - Optical Resonators - Three level and four level laser systems - CO_2 and Semiconductor lasers – Application of Lasers in Communication.

UNIT- III PRINCIPLE OF OPTICAL FIBRE COMMUNICATION **13 Hrs**

History of Fibre optic communication - Basic characteristics of optical fibre - Propagation of light through optical FIBRE - Acceptance angle - Numerical aperture – Types of optical Fibres (material, mode and refractive index) - Fabrication technique of fibre (Double crucible method).

UNIT- IV TRANSMISSION CHARACTERISTICS **13 Hrs**

Fibre optical communication system (Block diagram); Light Sources (LASER), Detector (LED) - Connectors – Couplers - Losses in optical FIBREs ; Attenuation, Dispersion, Bending.

UNIT - V APPLICATIONS OF OPTICAL FIBRE **13 Hrs**

Waveguide – Advantages of Optical fibres in communication – FIBRE Optic sensor (Active and Passive sensor) – Temperature and Displacement Sensor – Application of optical FIBRE communication- Telecommunication, Data storage and Defense - FIBRE Endoscope

Text Books:

- Ajoy Ghatak and K. Thyagarajan, *Introduction to fibre optics*, Cambridge University press, 6th ed., 2006.
- John M. Senior, *Optical fibre communications: Principles and practice*, PHI, 2nd edition.

Reference Books:

- Gerd Keiser, *Optical fibre communications*, McGraw-Hill, 2nd edition.
- B.B. Laud, *Lasers and Non-Linear optics*, New Age International, New Delhi.
- Govind P. Agrawal, *fibre-Optic communication systems*, John Wiley, 2003.

UPHS508 SOLAR ENERGY APPLICATIONS

Semester : V **Credit : 1**
Category : Self Study **Hours/week : 2**
Class&Major : III B.Sc Physics **Total Hours : 26**

Objectives:
To enable the students

- Learn the fundamental concepts of solar energy and radiation collecting instruments

- Approach for the storage of solar energy along with solar energy collectors
- Execute the different solar material in various applications

UNIT - I SOLAR LIGHTING **8 Hrs**

Solar cell – Working principle of a solar cell – Solar home lighting systems – Solar street lighting systems - Solar lanterns – Applications - Rural electrification process – Case studies.

UNIT - II SOLAR COOKING **9 Hrs**

Introduction – Types of solar cookers – Advantages and disadvantages - Box type – Parabolic dish cooker - Performance evaluation of solar cookers – Testing of a solar cooker – Applications of solar cooking - Case studies.

UNIT - III SOLAR DESALINATION **9 Hrs**

Introduction – Necessity for desalination – Study on various desalination techniques – Comparison between conventional and solar desalination – Basics of solar still - Simple solar still – Material problems in solar still – Solar disinfection and its methods – Case studies on various desalination techniques .

Text Books:

- HP Garg and J Prakash, *Solar Energy: Fundamentals and Applications*, Tata McGraw Hill, 2014.
- Suhatme and Nayak, *Solar Energy: Principles of Thermal Collection and Storage*, Tata McGraw Hill, 2012.

References Books:

- SM Sze, Kwok K Ng, *Physics of semiconductor devices*, third edition, John Wiley & Sons, 2012.
- Rai, G.D., *Solar Energy Utilization*, Khanna Publishers Delhi, 2011.
- Daniel J. O'Connor, *101 patented solar energy uses*, Van Nostrand Reinhold Co., 2011.
- Martin A. Green, *Solar Cells Operating Principles, Technology, and System Applications,* Prentice- Hall, 2013.

E-Resources

- Time to Shine e-book by Michael Grupp –www.kobo.com

UPHP603 PROJECT

Semester : V **Credit : 1**
Category : Project **Total Hours : 30**
Class&Major : III B.Sc. Physics
Objectives:

To enable the students

- Acquire the experimental based knowledge about their subject.
- Conduct the experiments on their own knowledge.

Project:

- This course will be offered as mini project for the final year UG Students under extra earning credit provision to gifted students outside the class hours.
- It could be done either individual or as a group with the maximum of three students.

Evaluation scheme for the project (Internal 60 + External 40)

Assessment:

S.NO	INTERNAL		EXTERNAL	
	COMPONENT	**WEIGHTAGE**	**COMPONENT**	**WEIGHTAGE**
1.	Review of the literature	10	Report	10
2.	Title of the topic	10	Presentation	20
3.	Experimental section	10	Viva-voce	10
4.	Accuracy of result	10	-	-
5.	Result and discussion	10	-	-
6.	Project report preparation	10	-	-
		60	-	40
	TOTAL	100		

Evaluation: III and IV components of CIA

Semester	Category	Course Code	Course Title	Component-III	Component-IV
V	Core XIII	UPHM509	Mathematical Physics	Problem Solving	Seminar
	Core XIV	UPHM510	Radiation Physics	Assignment	Seminar
	Allied optional	UPHA503	FIBRE optic communication	Power point presentation	Poster presentation
VI	Core XVI	UPHM609	Computational Physics	Problem Solving in analytical method	Programming in using numerical method

	Major Elective	UPHO603	Functional Materials	Assignment	Power point presentation

M.Sc PHYSICS

Semester	Category	Course Code	Course Title	Credit	
				Min	Max
II	PG Service learning	PHYX201	Energy Audit	-	1

PHYX201- ENERGY AUDIT

Semester : II **Credit : 1**
Category : PG Service Learning **Total Hours : 40 hrs**
Class & Major: M. Sc Physics
Objectives:
To enable the students

- Understand about the Energy audit and its measurements.
- Acquire the knowledge about the practical auditing methodology.
- Interpret the power optimization.

INTRODUCTION TO ELECTRICAL POWER AND ELECTRICITY

Electrical parameters - definitions - resistive, inductive, capacitive loads - active power - reactive power - apparent power - power factor - linear and non-linear loads – electricity demand (kVA/kW) calculation - electricity tariff.

ELECTRICAL DISTRIBUTION SYSTEM

HT supply – control - distribution transformer - power control centre (PCC) - captive generator - power cables - motors - LT power capacitors - lighting – UPS - servo stabilizer - electrical measuring instruments - importance of measurements - types of meters - instantaneous measuring meter

Activity

Purpose: To gain the basic knowledge and understanding about audit the energy for electrical consumption.

1. To study and analyze the power utilization for the given building area/room.

2. To measure and calculate the voltage/current of an available electrical system (Lights and Fans) and equipments.
3. To analyze the power utilization and make the strategy for power consumption in the electrical items.
4. To submit the detailed report with the conclusion made during the audit.

References

1. M.Muthuvelan and H.Balasubramanian, *A practical guide to reactive power management in industry*, 2012, SITRA publication, Coimbatore-641014, email:info@sitra.org.in, www.sitra.org.in
2. Wayne C Turner, *Energy Management Handbook*, The Fairmount Press, Inc., 1997.
3. IEEE Recommended practice for energy management in industrial and commercial facilities, IEEE STD 739-1995 (Bronze Book).
4. TERI, *Handbook on energy audit & Management*, TERI Press, New Delhi.
5. Francisco C.DE LA ROSA, *Harmonics and Power systems*, Indian edition, CRC press, 2010.
6. Ramasamy Natarajan, *Power system capacitors*, Indian edition, CRC press, 2010.
7. Ewald F.Fuchs, Mohammad A.S.Masoum, *Power quality in power systems and electrical machines*, Indian edition, Elsevier Inc, 2008.

DEPARTMENT OF COMPUTER SCIENCE

Preamble

UG **:** Course Profile, list of courses offered to other departments and the syllabi of courses in the fifth and sixth semesters along with evaluation components III & IV (With effect from 2015-18 batch onwards),

PG **:**Self Study Course Profile, list of courses and the syllabi of courses in the third and fourth semesters along with evaluation components III & IV (With effect from 2016-18 batch onwards),

COURSE PROFILE B.Sc. (Computer Science)

Semester	Part	Category	Course Code	Course Title	Contact Hrs/Week	Credit	
						Min	Max
I	I	Language	UTAL105 / UTAL106/ UHIL101/ UFRL101	Basic Tamil-I/ Advanced Tamil–I/ Hindi-I / French-I	4	2	3
	II	English	UENL105/ UENL106	General English-I/ Advanced English-I	5	3	4
	III	Core I	UCSM104/ UCAM105	Programming in C	5	4	4
	III	Core II	UCSM105	Information Technology	4	3	3
	III	Core Practical I	UCSR106	Computer Operations	2	1	1
	III	Core Practical II	UCSR107/ UCAR103	Programming in C- Lab	3	3	3
	III	Allied I		Statistical Methods	5	4	4
	IV	Value Education			2	1	1
Total					**30**	**21**	**23**
II	I	Language	UTAL205/ UTAL206/ UHIL201/	Basic Tamil-II/ Advanced Tamil–II/ Hindi-II/French-II	4	2	3

			UFRL201				
	II	English	UENL205/ UENL206	General English-II/ Advanced English-II	5	3	4
	III	Core III	UCSM205/ UCAM204	Data Structures and Algorithms	3	3	3
	III	Core IV	UCSM204/ UCAM203	Object Oriented Programming using C++	4	4	4
	III	Core Practical III	UCSR204/ UCAR203	Object Oriented Programming and Data Structures using C++ - Lab	3	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			-	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	UENL305/ UENL306	General English-III/ Advanced English-III	5	3	4
	III	Core V	UCSM304	Java Programming	5	4	4
	III	Core Practical IV	UCSR305	Java Programming-Lab	4	3	3
	III	Allied III	UPHA303	Digital Electronics	3	3	3
	III	Allied Practical	UPHR304	Digital Electronics – Practical	3	2	2
	IV	Non-Major Elective			4	2	2
	IV	Value Education			2	1	1
				Total	**30**	**20**	**22**
IV	I	Language	UTAL405/ UTAL406/ UHIL401/ UFRL401	Basic Tamil-IV / Advanced Tamil–IV/Hindi-IV / French-IV	4	2	3
	II	English	UENL405/ UENL406	General English-III/ Advanced English-III	5	3	4
	III	Core VI	UCSM405/ UCAM405	Data Communication Network	4	3	3
	III	Core VII	UCSM406	Web programming	4	4	4
	III	Core VIII	UCSM407	Data Base Management System	5	4	4
	III	Core Practical V	UCSR409	Web Programming – Lab	3	3	3
	III	Core Practical VI	UCSR404	Data Base Management System – Lab	3	3	3
	IV	Soft skill			2	1	1
	V	Extension Programme / Physical Education			-	-	2
				Total	**30**	**23**	**27**

V	III	Core IX	UCSM506	**Middleware Technologies**	5	5	5
	III	Core X	UCSM507	**System Analysis and Design**	5	5	5
	III	Core XI	UCSM508	**Microprocessor and its Application**	5	5	5
	III	Core Practical VII	UCSR509	**Middleware Technologies – Practical**	4	3	3
	III	Core Practical VIII	UCSR510	**Web Application – Practical**	4	4	4
	III	Allied Optional			5	4	4
	IV	Value Education			2	1	1
Total					**30**	**27**	**27**
VI	III	Core XII	UCSM608	**Multimedia System Design**	5	4	4
		Core XIII	UCSM609/ UCAM606	**Operating System**	5	4	4
	III	Core XIV	UCSM610	**Big Data Tools**	4	4	4
	III	Core Practical IX	UCSR606	**Operating System – Practical**	4	3	3
	III	Core Project	UCSP601	Project	5	5	5
	III	Major-Elective	UCSO606/ UCSO607	**Network Security / Mobile Technologies**	5	4	4
	III	Viva – Voce	UCSM611	Comprehensive Viva Voce	-	1	1
	V	Extension Programme / Physical Education			-	-	2
	IV	Soft skill			2	1	1
Total					**30**	**26**	**28**
Grand Total					**180**	**140**	**153**

EXTRA CREDIT EARNING PROVISION

Semester	Part	Category	Course Code	Course Title	Hrs/week	Credit	
						Min	Max
II	III	Core	UCSI201	Summer Internship / Working Model	-	-	1
IV	III	Core	UCSI401	Summer Internship	-	-	1
V	III	Self Study Paper	UCSS501/ UCAS501	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

ALLIED COURSES OFFERED TO OTHER DEPARTMENTS

Class & Major	Semester	Category	Course Code	Course Title	Contact Hrs/Week	Credit

B.Com with Computer Applications	I	Allied	UCSA103	PC Software	3	3
	I	Allied Practical	UCSR108	PC Software – Lab	3	2
	II	Allied	UCSA203	Programming in C	3	3
	II	Allied Practical	UCSR205	Programming in C - Lab	3	2
	III	Allied	UCSA303	Multimedia	3	3
	III	Allied Practical	UCSR306	Multimedia – lab	3	2
	IV	Allied	UCSA403	Database Management System	3	3
	IV	Allied Practical	UCSR405	Database Management System - Lab	3	2
	V	Allied	UCSA508	Web Designing	3	3
	V	Allied Practical	UCSR506	Web Designing - Lab	3	2
BBA, B.Com and Economics	IV	Allied	UCSA405	Computer Applications in Business	3	3
	IV	Allied Practical	UCSR410	Computer Applications in Business – 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	UCSA304	Mathematical Programming using C	3	3
	III	Allied Practical	UCSR307	Mathematical Programming using C – Lab	3	2

ALLIED OPTIONAL

Semester	Part	Category	Course Code	Course Title	Contact Hrs/week	Credit
V	III	Allied Optional	UCSA504	Digital Logic Fundamentals	3T+2P	5
			UCSA511	**Web Programming**	3T+2P	5

NON-MAJOR ELECTIVE

Semester	Part	Category	Course Code	Course Title	Contact Hrs/week	Credit
II	IV		UCSE202	Office Automation	2T+2P	2

		Non Major Elective	UCSE204	Office Automation Tools	4P	2
			UCSE205	Multimedia Techniques	4P	2
III			UCSE302	Programming in C	2T+2P	2
			UCSE304	HTML Programming	4P	2
IV			UCSE402	Programming in C++	2T +2P	2
			UCSE403	Multimedia and its Applications	2T+2P	2
			UCSE404/ UCSE502	Visual Programming	2T +2P	2
			UCSE405/ UCSE503	Web Designing	2T+2P	2

UCSM506 MIDDLEWARE TECHNOLOGIES

Semester : V **Credit : 5**
Category : Core IX **Hours / Week : 5**
Class & Major : III B.Sc CS **Total Hours : 65**

Objectives:
To enable the students

- Understand Principles of programming using a .NET Framework.
- Analyze the importance of server side programming and web development.
- Develop applications for distributed environments.

UNIT - I .NET FRAMEWORK 12 Hrs

Introduction to .NET – Benefits of .NET Framework – The ASP.NET Technologies – The ASP.NET Life Cycle – Understanding ASP.NET 4.0 Page Directives –Working with Server Controls – Implementing Code Sharing- Compilation in ASP.NET 4.0.

UNIT - II APPLICATION STRUCTURE AND STATE 12 Hrs

Structure of an Application - The Application Domain - The Application Lifetime - The Application Directory Structure - The Global.asax Application File - Using States - HTTP Handlers - Postback and Cross-Page Posting.

UNIT - III WEB STANDARD CONTROLS 15 Hrs

The Control Class - The WebControl Class - Label - Button – TextBox - Literal – PlaceHolder - HiddenField - FileUpload - Image - ImageButton - ImageMap - ListBox – DropDownList – BulletedList - HyperLink – LinkButton - CheckBox – CheckBoxList – RadioButton – RadioButtonList – Table – Panel – Wizard - Xml – View – MultiView – Substitution – Localize – Calendar – AdRotator.

UNIT - IV OTHER WEB CONTROLS 13 Hrs

Navigation Controls: TreeView – Menu – SiteMapPath. Validation Controls: BaseValidator – RequiredFieldValidator- RangeValidator – RegularExpressionValidator – CompareValidator – CustomValidator – Validation Summary.

UNIT - V DATABASE CONTROLS **13 Hrs**

Working with Database Controls: GridView - DataList - DetailsView - FormView – ListView- Repeater – DataPager – Chart – QueryExtender -SqlDataSource – AccessDataSource - LinqDataSource – ObjectDataSource – XmlDataSource – EntityDataSource – SiteMapDataSource.

Text Book

- *ASP.NET 4.0 Black Book*, Dreamtech Press publications 2012.

Reference Book

- *.NET 4.0 programming (6-in-1) Black book,* Dreamtech Press publications 2011.

e- Resource

- https://www.tutorialspoint.com/asp.net/asp.net_tutorial.pdf

UCSM507 SYSTEM ANALYSIS AND DESIGN

Semester	**: V**	**Credits**	**: 5**
Category	**: Core X**	**Hours/Week**	**: 5**
Class	**: III B.Sc CS**	**Total Hours**	**: 65**

Objectives:

To enable the students

- Understand the principles of System Analysis and Design and the "professional and ethical" responsibilities of practicing the computer professionals.
- Analysis and Design of system of small sizes and specify the importance of linking the information systems to business needs.
- Plan and undertake an individual project and deliver coherent, structured verbal and written technical reports.

UNIT - I INTRODUCTIONTO SYSTEM ANALYSIS AND DESIGN **14 Hrs**

Define Data, Information, and System - System component - System Analysis- Business system concepts - Categories of Information System - Scope of Information System- System Development Life Cycle- system prototype.

UNIT - II ROLE OF IMFORMATION SYSTEM **13 Hrs**

Role of information system - Information system planning - Fact finding techniques - Tools for documenting procedure and decisions - Structured Analysis - Data flow analysis - Features and tools of data flow strategy - Advantage of data flow analysis - Physical and Logical data flow diagrams.

UNIT - III FEATURES OF DATA DICTIONARY **14 Hrs**

Data dictionary features - Processes in the Data dictionary - Application Prototype - Steps in prototype methods - Use of Prototypes - A Prototyping example - System Design - Objectives in designing an information system - software development specification.

UNIT – IV ELEMENTS OF DESIGN **14 Hrs**

Elements of design - Design of output - Design of Database Interaction - Design of Input - Design of control - Design of Procedure - Design of Program specification. Design of computer output - types of output - Tabular format - Screen design - Design of Input and Output controls - data capture guideline, design of source documents.

UNIT - V PROCESS MODELS **10 Hrs**

Software Engineering Process Models: Waterfall – Incremental – Evolutionary – Specialized Process Model – Agile Process Model.

Text Books

- Ned, Kock**,** *Systems Analysis & Design Fundamentals: A Business Process Redesign Approach*, south Asia edition, 2008.
- Awadh, *System Analysis and Design*, McGraw Hill, edition 2, 2012.
- Roger S Pressman, *Software Engineering A Practitioners Approach*, Seventh Edition, McGraw Hill International Edition, 2010.

Reference Books

- James A. Senn, *Analysis & Design of Information system*, McGraw Hill, 2013.
- Modern Systems Analysis and Design, Jeffrey A. Hoffer, Pearson India, 2011

e-Resources

- https://www.scribd.com/doc/7325348/Systems-Analysis-and-Design-Full-Book-1
- http://nptel.ac.in/syllabus/106108102/

UCSM508 MICROPROCESSOR AND ITS APPLICATIONS

Semester	**: V**	**Credit**	**: 5**
Category	**: Core XI**	**Hours/Week**	**: 5**
Class & Major	**: III B.Sc CS**	**Total Hours**	**: 65**

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 **14 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 AND APPLICATIONS **13 Hrs**

8085 Instruction Timing and Execution – Serial Port – Interfacing Input/Output Devices – 8085 Interrupts – Interrupt Controller – Direct Memory Access Transfer – Direct Memory Access Controller – Applications – Traffic Light Controller – Interfacing Keyboard and Display.

UNIT - III 8086 MICROPROCESSOR **14 Hrs**

Introduction – 8086 Architecture – 8086 Addressing Modes – Accessing Immediate and Register Data – Accessing Data in Memory - 8086 Instruction Set – Data Movement Instructions – Arithmetic and Logic Instructions – Program Control Instructions.

UNIT - IV 80286 AND 80386 MICROPROCESSORS **14 Hrs**

Introduction to Intel 80286 – Basic Programming Model – 80286 Architecture Memory Organization – 80386 Pins and Signals – Introduction to Intel 80386 Microprocessor – Block Diagram and Registers.

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

UCSR509 MIDDLEWARE TECHNOLOGIES - PRACTICAL

Semester	**: V**	**Credits**	**: 3**
Category	**: Core Practical VII**	**Hours/Week**	**: 4**
Class & Major	**: III B.Sc CS**	**Total/Hours**	**: 52**

Objectives:
To enable the students

- Improve the programming skills in .NET.
- Design a database with enhanced models and techniques.

- Create web based applications for distributed environments.

LAB EXERCISES:

1. Create a feedback application using web controls.
2. Create a web page using Image map and calendar control.
3. Create a web page using File Upload, Hyperlink and Link button.
4. Creating and Using a Simple User Control.
5. ADO.NET application to insert, delete, update records in database.
6. Create a simple web page using all validation controls.
7. Create a web page using ad rotator & menus.
8. Create a web page using grid view, form view, detail view and list view.
9. Data List and Repeater control.
10. Create a web page to manage the session.

UCSR510 WEB APPLICATION - PRACTICAL

Semester	**: V**	**Credits**	**: 4**
Category	**: Core Practical VIII**	**Hours/Week**	**: 4**
Class & Major	**: III B.Sc CS**	**Total Hours**	**: 52**

Objectives:
To enable the students

- Explore markup language features and create interface web pages for real time.
- Acquire knowledge about open source JavaScript libraries.
- Design and implement Dynamic Websites.

Lab Exercises:

1. Develop static pages (using only HTML) of an online Book store. The pages should resemble: www.amazon.com

2. The website should consist of the following pages. Home page, Registration and user Login, User profile page, Books catalog, Shopping cart, Payment By credit card, order confirmation.

3. Validate the registration, user login, user profile and payment by credit card pages using JavaScript.
4. An XML file which will display the Book information which includes the following:
    i. Title of the book
    ii. Author Name
    iii. ISBN number
    iv. Publisher name
    v. Edition
    vi. Price

5. Document Type Definition (DTD) to validate the above XML file. Display the XML file as follows. The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns. Use XML schemas XSL and CSS for the above purpose.

6. a. Install TOMCAT web server. While installation assign port number 8080. Make sure that these ports are available i.e., no other process is using this port.

   b. Access the above developed static web pages for books web site, using these servers by putting the web pages developed in program1 and program2 in the document root. Access the pages by using the urls: http://localhost:8080/CS/books.html

7. User Authentication: Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and, pwd4 respectively. Write a servelet for doing the following.

   a. Create a Cookie and add these four user id's and passwords to this Cookie.
   b. Read the user id and passwords entered in the Login form and authenticate with the values (user id and password) available in the cookies. If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display "You are not an authenticated user".

8. Install a database (MySQL/Oracle): Create a table which should contain at least the following fields: Name, Password, Email-ID, and Phone Number (these should hold the data from the registration form). Practice 'JDBC' connectivity. Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page.

UCSA508 WEB DESIGNING

Semester	**: V**	**Credits**	**:3**
Category	**: Allied**	**Hours/Week**	**:3**
		Total Hours	**:39**

Objectives:
To enable the students

- Understand the basics of internet.
- Design webpage using HTML tags.
- Develop client side program using java script.

UNIT – I INTERNET BASICS **8 Hrs**

Basic concepts – communicating on the internet – domains – server identities – Establishing connectivity on the internet – client IP address – how IP addressing came into existence? – TCP/IP and its Services – TCP - Introduction to HTML Introduction – Information files creation – Web server – web client / browser – HTML – Commonly used

HTML commands – Titles and footers – text formatting – emphasing material in a web page – text styles – other text effects.

UNIT – II LISTS **7 Hrs**

Types of list - Adding Graphics to HTML Documents – Border- width and height – align – alt attributes – Tables – width and border – cellpadding and cellspacing – bgcolor – colspan and rowspan.

UNIT – III LINK **6 Hrs**

Linking Documents – Links – images as hyperlinks - Frames – Introductions to frames.

UNIT – IV INTRODUCTION TO JAVA SCRIPT **9 Hrs**

JavaScript in web pages – javascript – Writing javascript into HTML – basic programming techniques – operators and expression in javascript – javacscript programming constructs - Forms used by a Website – The form object – other built-in objects in javascript – user defined objects.

UNIT – V DYNAMIC HTML **9 Hrs**

Cascading style sheets – Font, Color, Text, Border, Margin and List attributes – class - using SPAN tag – External style sheet –Using DIV Tag.

Text Book

- Ivan Bayross, *Web Enabled Commercial Application Development using HTML,DHTML, JavaScript, PERL, CGI*, Fourth edition, BPB Publication, New Delhi, 2010.

Reference Books

- Thomas A Powell, *The Complete Reference, HTML and CSS*, Fifth edition, McGraw Hill, New Delhi,2005.
- Steven Holzner, *HTML Black Book*, reprint edition, Wiley Publication, New Delhi, 2009.

UCSR506 WEB DESIGNING - LAB

Semester : V **Credit : 2**
Category : Allied Practical **Hours/Week : 3**
Total Hours : 39

Objectives:
To enable the students

- Create HTML program using tags.
- Design webpage using CSS.
- Develop website for the real time applications.

Lab exercises: **39 Hrs**

1. Design a Web Page using tags of different Heading Styles with all formatting tags
2. Time table generation using tables
3. Create a index of book using list
4. Design a Web Page using frames and anchor tags

5. Create a Web Page with various Text Styles and effects using CSS
6. Creating a web page using Frames for Advertisement
7. Design a Bill for shopping mall using Form controls
8. Creation of E-Book using list, frames and anchor tags
9. Creating a web page using External style sheet
10. Display an image as background for a web page using CSS

UCSA505 தமிர்க் கணினி

பருவம் : ஐந்தாம் பருவம் **தரம் :5** **பிரிவ : சார்பஜப் பாடம்**

மணி நெரம்.்.வாரம் :3.2 வகுப்பஜ : ஐஐஜ டீ.யு வுயஅடை

டிமாத்த மணிநெரகள் :39.26

நொக்கம்:

- மாணவர்கள் தமிரில் கணினி குறித்த அழப்படை அறிவை டிபறுதல்.
- தகவல் டிதாடர்பியல் சார்ந்த துறைகளில் வெலை வாய்ப்பினைப் டிபறுதல்.

அலகு-1 **8.2 மணிகள்**

கணினி – அறிமுகம் - முக்கியத்துவம் - பயன்கள் - வரலாறு வகைகள் - தமிர்க் கணினியின் வன்டிபாருள் மற்றும் டிமன்டிபாருள் அறிமுகம்.

டிசய்முறை:

- கணினி வரைபடம் (ஆள ீயைவெ) அறிமுகம்

அலகு-2 **8.4 மணிகள்**

தமிர்க் கணினிச் டிசயல்முறைகள் அறிமுகம் 'டர்! - முக்கிய ஆணைகள - 'விண்டொ'வின் பயன்பாட்டுக்கான அறிமுகம். நொட்பெடு

டிசய்முறை:

- நொட்பெடு டிசயல்முறைகள் அறிமுகம்
- டர்! ஆணைகள்

அலகு-3 **9.4 மணிகள்**

வார்த்தை (றுழசன) டிசயல்முறைகள் அறிமுகம் - அச்சியலும்.

டிசய்முறை:

- மாணவியஜடைய மதிப்டிபண் பட்ழயலை தயாரிக்கவஜம்
- மாணவியஜடைய வார்க்கை குறிப்பை தயாரிக்கவஜம்

அலகு-4 **9.6 மணிகள்**

எம்ள்! பவர் பாயிண்ட் அறிமுகம் மற்றும் டிசம்மையாக்கம்.

டிசய்முறை:

- எம்ள்! பவர் பாயிண்ட் நிரலாக்க உருவகம்.
- எம்ள்! பவர் பாயிண்ட் பயன் படுத்தி ப்டிரடிசண்டெசன் தயாரிக்கவஜம்.

அலகு-5 **9.6 மணிகள்**

வலைப்பின்னல் கொட்பாடுகளின் வரலாறு –இணையம் - டிசயல்முறை- இ-டிமயில் - தெடல் - களம் - தெடும் யெந்திரம்.

டிசய்முறை:

- புழழபடந-ன் தெடுடிபாறி
- மின்னங்சல் அனுப்பஜம் முறை
- புழழபடந-ன் டிமாரிடிபயர்ப்பஜ

பாடநூல்

- பர்!கரன் - கணினிப் பயன்பாடுஇ தமிர்ப் பல்கலைக் கர்கம்இ தண்சாவர்.

UCSA507 OBJECT ORIENTED PROGRAMMING USING JAVA

Semester	**: V**	**Credit**	**: 3**
Category	**: Allied**	**Hours/Week**	**: 3**
Class & Major	**: III B.Sc Maths**	**Total Hours**	**: 39**

Objectives:

To enable the students

- Understand the concepts of oops.
- Design and build Java applications
- Overview all the features of the language and its associated Package

UNIT – I FUNDAMENTALS OF OOPS **7 Hrs**

Fundamentals of OOPS: Basic Concepts – Benefits of OOP – Application of OOP – Java Evolution – Overview of Java – Data types, Variables and Constants - Operators – Control Statements.

UNIT – II CLASSES AND CONSTRUCTORS **8 Hrs**

Introducing Classes, Objects and Methods: Defining class – Creating Objects – Accessing Class Members – Constructors – Method overloading – Static Members – Inheritance

UNIT – III INTERFACES AND PACKAGES **9 Hrs**

Interfaces: Defining Interfaces – Extending Interfaces –Implementing Interfaces - Package: Java API Package - Naming Conventions – Creating & Accessing a Package – using a Package - Adding a class to a Package – Hiding Classes – Multithreaded Programming: Life cycle of a Thread – Managing Errors and Exceptions.

UNIT – IV APPLET **8 Hrs**

Applet: Introduction – How Applets Differ from Applications – Building Applet Code – Applet Life Cycle – Applet Tag – Adding Applet to HTML File – Running the Applet – Graphics Programming.

UNIT – V FILES IN JAVA **7 Hrs**

Managing Input and output files in Java: stream classes - Byte Stream classes – Character stream classes - I/O Exceptions – Creation of Files - Random Access Files – Other Stream Classes.

Text Book

- Balagurusamy. E., *Java Programming*, 2nd Edition, Tata McGraw Hill, New Delhi, 2010.

Reference Book

- Cay. S. Horst Mann & Gary Cornell, *Core java, Volume I*, Seventh Edition, Sun Microsystem Press Java Series, New Delhi, 2006.

UCSR508 OBJECT ORIENTED PROGRAMMING USING JAVA –LAB

Semester	**: V**	**Credit**	**: 2**
Category	**: Allied Practical**	**Hours/Week**	**: 3**
Class & Major	**: III B.Sc Maths**	**Total Hour**	**: 39**

Objectives:

To enable the students

- Write Java code in the form of both applications and applets.
- Implement Exception and threads
- Creating files using I/O Packages

LAB EXERCISES

1. Random Number Generation using predefined Random class.
2. Implement Mathematical function using predefined math package.
3. Implementing string manipulation using string and string buffer classes
4. Simple programs using Classes and Objects
5. Implementing Inheritance concepts with simple programs.
6. Implementing Thread Based Applications
7. Implementing Exception Handling.
8. Implementing Interfaces and Packages Concepts.
9. Implementing Graphics using Applet.
10. Sequential File Manipulations.

UCSA504 DIGITAL LOGIC FUNDAMENTALS

Semester: V	**Credits : 4**
Category: Allied Optional	**Hours/week: 3T+2P**
	Total Hours: 39+26

Objectives:

To enable the students

- To provide an in depth knowledge of the design of digital circuit.
- To design and implement combinational circuit
- To design and implement synchronous and asynchronous circuit

UNIT – I NUMBER SYSTEMS & CODES **7 Hrs**

Number Systems & Codes: Number System - Base Conversion - Binary Codes - Code Conversion. Digital Logic: Logic Gates - Truth Tables - Universal Gates.

UNIT – II BOOLEAN ALGEBRA AND BINARY ARITHMETICS **9 Hrs**

Boolean algebra: Laws & Theorems - SOP, POS Methods - Simplification of Boolean Functions - Using Theorems, K-Map, Prime - Implicant Method - Implementation using

Universal Gates. Binary Arithmetic: Binary Addition - Subtraction - Various Representations of Binary Numbers - Arithmetic Building Blocks - Adders - Subtracters.

UNIT – III COMBINATIONAL LOGIC **7 Hrs**

Combinational Logic: Multiplexers - Demultiplexers - Decoders - Encoders - Code Converters - Parity Generators & Checkers - PAL - PLA.

UNIT – IV SEQUENTIAL LOGIC **8 Hrs**

Sequential Logic: RS, JK, D, and T Flip-Flops - Edge-Triggered - Master-Slave Flip-Flops. Registers: Shift Registers - Types of Shift Registers.

UNIT – V COUNTERS AND MEMORY **8 Hrs**

Counters: Asynchronous Counters Ripple, Mod, Up-Down Counters- Decoding Gates - Synchronous Counters - Ring, Decade, Presettable, Shift Counters. Memory: Basic Terms & Ideas - Magnetic Memories - Memory Addressing - Types of ROMs - Types of RAMs.

Implementation of logic gates **26 Hrs**

1. Logic Gates using discrete components.

II Implementation of Logic circuits

1.Verification of Associative law for AND, OR gates.
2.Verification of Demorgans Law

III Adder and Subtractor

1.Implementation of Half- Adder and Half- Subtractor.
2.Implementation of Full-Adder and Full Subtractor.

Text Books

- Leach D.P. & Malvino A.P., *Digital Principles and Applications*, Fifth Edition, TMH, 2002.
- Morris Mano M., *Digital Logic and Computer Design*, PHI, 2001.

Reference Books

- Bartee T.C., *Digital Computer Fundamentals*, 6th Edition, Tata McGraw Hill, 1991.
- Tocci, R.J., *Digital System Principles and Applications*, 8th Edition.

UCSA511 WEB PROGRAMMING

Semester	**: V**	**Credit**	**: 5**
Category	**: Allied Optional**	**Hours/week**	**: 3T +2P**
Class & Major	**: III UG**	**Total Hours**	**: 39+26**

Objectives:

To enable the students

- Acquire knowledge about scripting techniques.
- Create Web Applications.
- Design Dynamic web pages using scripting techniques.

UNIT – I INTERNET & HTML **7 Hrs**

Concepts – Communicating on the Internet – Internet Domains – Internet Server Identifies – Connectivity on the Internet – Client IP address – TCP/IP and Services – TCP – Files creation – Web Server – Web Client/Browser – HTML Tags & Commands

UNIT – II LIST, TABLE & FRAMES **8 Hrs**

Types of Lists – Graphics to HTML Documents – Tables – Links – Images as Hyperlinks - Frames.

UNIT – III JAVASCRIPT **8 Hrs**

JavaScript in web pages – Writing JavaScript into HTML – Basic Programming Techniques – Operators and Expressions – Constructs – Conditional Checking – Conditional Checking – Super Controlled –Endless Loops – Functions – User Defined Functions - Dialog Boxes.

UNIT – IV DOCUMENT OBJECT MODEL **8 Hrs**

JSSS DOM **–** Understanding Objects – Browser Objects – Object Hierarchy – Events Using JavaScript – Form Object – Other Built in Objects – User Defined Objects – Cookies.

UNIT – V DYNAMIC HTML **8 Hrs**

Cascading Style Sheet: Font – Color – Text – Border – Margin – List Attributes – Class – SPAN Tag – External Style Sheets – DIV Tag.

LAB EXERCISES: **Total Hours : 26**

11. Design a Web Page using tags of different Heading Styles with all formatting tags
12. Time table generation using tables
13. Create a index of book using list
14. Creating a web page using Frames for Advertisement
15. Design a Bill for shopping mall using Form controls
16. Creation of E-Book using list, frames and anchor tags
17. Create a web page to accept 5 numbers from user and perform validation and display sum of 5 numbers using Java Script.
18. Create a webpage to accept string for manipulation. Find and replace, Reverse etc.
19. Create a webpage for Mark sheet Processing. Validate the input data and apply CSS.
20. Creating a web page using External style sheet.

Text Book

- Bayross I, *Web Enable Commercial Application Development using HTML, DHTML, Java Script, Perl CGI*, Fourth Revision edition, BPB Publications, New Delhi, 2010.

Reference Books

- Thomas A Powell, *the Complete Reference, HTML and CSS*, Fifth edition, McGraw Hill, New Delhi, 2010.
- Steven Holzner, *HTML Black Book*, reprint edition, Wiley Publication, New Delhi, 2012.
- Jaworshi J, *Mastering JavaScript*, BPB Publications, New Delhi, 2011.

UCSM608 MULTIMEDIA SYSTEM DESIGN

Semester	**: VI**	**Credit**	**:4**
Category	**: Core XII**	**Hours/Week**	**:5**
Class & Major	**: III B.Sc. CS**	**Total Hours**	**:65**

Objectives:
To enable the students

- Understand the Multimedia Design and Image Security techniques
- Analyze and Compare various Compression, Multimedia file formats and Storage media.
- Develop integrated and collaborative multimedia systems.

UNIT – I MULTIMEDIA SYSTEM DESIGN 11 Hrs

Multimedia Elements - Multimedia Applications - Multimedia System - Architecture - Evolving Technologies for Multimedia Systems - Multimedia Databases.

UNIT – II COMPRESSION AND DECOMPRESSION TECHNIQUES 16 Hrs

Types of Compression - Binary Image Compression Schemes – Color, gray scale and Still-Video Image compression - Discrete Cosine Transform - Video Image Compression - MPEG Coding methodology - Audio Compression. Data and File format standards: RTF, TIFF,RIFF, MIDI, JPEG, AVI, MPEG standards, TWAIN.

UNIT – III MULTIMEDIA INPUT AND OUTPUT TECHNOLOGIES 13 Hrs

Key Technology Issues - Pen Input - Video and Image Display Systems - Print Output Technologies - Image Scanners - Digital Voice and Audio - Video Images and Animation - Full Motion Video.

UNIT – IV STORAGE AND RETRIEVAL TECHNOLOGIES 11 Hrs

Magnetic Media Technology - RAID-Level-0 To 5 - Optical Media - WORM optical drives - Hierarchical Storage Management - Cache Management for storage systems.

UNIT –V MULTIMEDIA APPLICATION DESIGN 14 Hrs

Types of Multimedia systems - Virtual Reality Design - Components of Multimedia system – Multimedia Authoring System – Multimedia Authoring tools- User Interface Design - Hypermedia Messaging – Distributed Multimedia Systems.

Text Book

- Tay Vaughan , *Multimedia: Making it work*, 8th edition, Tata McGraw-Hill, 2011.

Reference Books

- Weixel, Fulton, Barksdale.Morse, *Multimedia Basics*, Easwar Press 2004.
- Fred Halsall, *Multimedia Communications*, Addison Wesley, 2000.
- Ze-Nian Li and Mark S. Drew, *Fundamentals of Multimedia*, (Low Price Edition), Pearson Education, 2004

e - Resources

- https://yslaiseblog.files.wordpress.com/2013/10/gfx-multimedia-making-it-work-8th-edition.pdf
- http://www.philadelphia.edu.jo/academics/halrefai/uploads/Chapter1PDF.pdf

UCSM609/UCAM606 OPERATING SYSTEM

Semester	**: VI**	**Credit**	**:4**
Category	**: Core XIII**	**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 THE 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

UCSM610 BIGDATA TOOLS

Semester	**: VI**	**Credit**	**:4**
Category	**: Core XIV**	**Hours/week**	**:4**
Class & Major	**: III B.Sc CS**	**Total Hours**	**:52**

Objectives:
To enable the students

- Understand the basics concepts of Big data use cases and solutions.
- Build and maintain reliable, scalable, distributed systems with Apache Hadoop and also write Map-Reduce based Applications.
- Learn difference between conventional SQL and NoSQL(MongoDB) query language.
- Design MongoDB based Big data Applications.

UNIT - I INTRODUCTION **10 Hrs**

Introduction– distributed file system–Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, and Big data applications. Algorithms using mapreduce

UNIT - II HADOOP **11 Hrs**

Big Data – Apache Hadoop & Hadoop EcoSystem– Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.

UNIT - III HDFS, HIVE AND HIVEQL, HBASE **10 Hrs**

HDFS-Overview, Installation and Shell, Java API; Hive Architecture and Installation, Comparison with Traditional Database, HiveQL Querying Data- Sorting And Aggregating, Map ReduceScripts, Joins & Subqueries, HBase concepts- AdvancedUsage, SchemaDesign,

AdvanceIndexing- PIG,Zookeeper- how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper.

UNIT - IV SPARK & NoSQL **10 Hrs**

Introduction to Data Analysis with Spark, Downloading Spark and Getting Started, Programming with RDDs, Machine Learning with MLlib. NoSQL – Uses - Types of NoSQL databases - Advantages of NoSQL, Use of NoSQL in Industry, SQL vs NoSQL, NewSQL

UNIT - V DATA BASE FOR THE MODERN WEB **11 Hrs**

Introduction to MongoDB - key features, Core Server tools - Creating and Querying through Indexes, Constructing queries on Databases - Collections and Documents - MongoDB Query Language.

Text Books

- Chris Eaton,Dirk derooset al. *Understanding Big data* , McGraw Hill, 2012.

- Boris lublinsky, Kevin t. Smith, AlexeyYakubovich, *Professional Hadoop Solutions*, Wiley.
- *BIG Data and Analytics* , Sima Acharya, Subhashini Chhellappan, Willey MongoDB in Action, Kyle Banker,Piter Bakkum , Shaun Verch, Dream tech Press.

Reference Books

- VigneshPrajapati, *Big Data Analyticswith R and Haoop*, Packet Publishing 2013.
- Tom White, *HADOOP: The definitive Guide*, O Reilly 2012.

e– Resources

- http://www.bigdatauniversity.com/
- http://www.coreservlets.com/hadoop-tutorial/#Pig-1
- http://in.reuters.com/tools/rss
- http://www.altova.com/xmlspy.html
- https://www.w3.org/RDF/

UCSR606 OPERATING SYSTEM - PRACTICAL

Semester	**: VI**	**Credit**	**: 3**
Category	**: Core Practical IX**	**Hours/Week**	**: 4**
Class &Major	**: III B.Sc CS**	**Total Hours**	**: 52**

Objectives:
To enable the students

- Understand the design aspects of Operating system.
- Implement CPU scheduling algorithm and Banker algorithm used for Deadlock avoidance.
- Implement Memory Management and Page Replacement Algorithm.
- Stimulate various algorithms using C Program.

LAB EXERCISES:

Write a Program using C

1. CPU Scheduling Algorithms to find turnaround time and waiting time.
   a) FCFS b) SJF c) Round Robin (preemptive)

2. Process Synchronization to simulate the concept of Dining-Philosophers problem.

3. Deadlock Management Techniques
   - Simulate Bankers algorithm for the purpose of deadlock avoidance.
   - Simulate disk scheduling algorithms
     a) FCFS b) SCAN

4. Simulate the following contiguous memory allocation techniques
   a) Worst-fit b) Best-fit c) First-fit

5. Simulate page replacement algorithms
   a) FIFO b) LRU c) LFU

UCSO606 NETWORK SECURITY

Semester	**: VI**	**Credit**	**:4**
Category	**: Major Elective**	**Hours/Week**	**:5**
Class	**: III B.Sc CS**	**Total Hours**	**:65**

Objectives:
To enable the Students

- Understand the Cryptography and Network Security concepts and application.
- Acquire knowledge in various types of Encryption and Decryption mechanism.
- Classify and evaluate computer and security threats and models.

UNIT - I INTRODUCTION **13 Hrs**

The concepts of Security- the Need for Security - Security Approaches- Principles of Security- Types of Attacks. Convention Encryption: Conventional Encryption Mode- Steganography- Classical Encryption Techniques - Simplified DES- Block Cipher Principles - The Data Encryption Standard - The Strength of DES - Differential and Linear Cryptanalysis - Block Cipher Design Principles - Block Cipher Modes of operation - Conventional Encryption algorithms.

UNIT - II PUBLIC KEY ENCRYPTION AND HASH FUNCTIONS **12 Hrs**

Public Key Cryptography - Principles of Public Key Cryptosystems - The RSA Algorithm - Key Management - Diffie Hellman Key Exchange - Elliptic Curve Cryptography Message Authentication and Hash Functions Authentication Requirements - Authentication Functions - Message Authentication Codes - Hash Functions - Security of Hash Functions.

UNIT - III HASH AND MAC ALGORITHMS **12 Hrs**

Introduction Nifty things to do with a Hash - MD5 Message Digest Algorithm - Secure Hash Algorithm (SHA-I) - RIPEMD - HMAC - CMAC - Digital Signatures - Authentication Protocols -Digital Signature Standard.

UNIT - IV NETWORK SECURITY APPLICATIONS 15 Hrs

Authentication Applications - Kerberos - X.509 authentication service - public key Infrastructure (PKI) - Electronic Mail Security - Pretty Good Privacy - S/MIME - IP Security - IP Security Overview - IP Security Architecture - Authentication Header - Encapsulating payload - combining security association - Key Management - Web Security - Web Security Considerations - Secure Socket Layer & Transport Layer Security - Secure Electronic Transaction - Introduction to Wireless security.

UNIT - V INTRUDERS, VIRUSES, WORMS AND CYBER SECURITY 13 Hrs

Intruders - Intrusion detection - password management - Viruses and Related Threats - Distributed Denial of service attacks - Firewall Design Principles - Trusted Systems - virtual private network (VPN). Introduction to Cyber Security – Goals of Cyber Security – Computer Forensics – Steganography – Cyber Crime – Vulnerability Assessment.

Text Books

- William Stallings *Cryptography and Network Security*, Sixth edition Prentice Hall 2013.
- AtulKahate, *Cryptography and Network Security*, Tata McGraw-Hills, 2006.

Reference Books

- Neal Krawetz, *Introduction to Network Security*, Thomson Business Press, 2007.
- EricMaiwald, *Information Security Series*, Fundamental of Network security, Dreamtech press, 2004.

e– Resource

- http://www.nptel.ac.in/courses/106105031

UCSO607 MOBILE TECHNOLOGIES

Semester : VI **Credit : 4**
Category : Major Elective **Hours/Week : 5**
Class : II1 B.Sc CS **Total Hours : 65**

Objectives:
To enable the Students

- Understand the Wireless communication and its devices.
- Examine Wireless Communication Protocols, and Principles.
- Determine the network infrastructure requirements to support mobile devices.

UNIT - I INTRODUCTION 12 Hrs

Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmission – Multiplexing – Spread Spectrum and cellular systems – Medium Access Control – Comparisons.

UNIT - II TELECOMMUNICATIONS SYSTEM 12 Hrs

Telecommunication System – GSM – Architecture – Sessions – Protocols – Hand over and Security – UMTS and IMT 2000 – Satellite System.

UNIT - III WIRELESS LAN **16 Hrs**

Introduction-Wireless LAN advantages-IEEE 802.11 Standards-Wireless LAN Architecture-Mobility in Wireless LAN-Deploying Wireless LAN-Mobile Ad hoc Networks and Sensor Networks-Wireless LAN Security-Wireless Access in Vehicular Environment-Wireless Local Loop-HiperLAN- Bluetooth – MAC Layer – Security and Link Management.

UNIT - IV MOBILE IP **13Hrs**

Mobile IP: Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies.

UNIT-V WIRELESS APPLICATION PROTOCOL **12 Hrs**

Wireless Application Protocol (WAP) – Architecture – XML – WML Script – Applications.

Text Book

- Jochen Schiller, *Mobile Communication*, 2nd Edition, Pearson Education, Delhi, 2003.

Reference Books

- Uwe Hansmann, Lothar Merk, Martin S Nicklons and Thomas Stober, *Principles of Mobile Computing*, Springer, 2003.
- William Stallings, *Wireless Communications and Networks*, Pearson Education, 2002.
- Kaveh Pahlavan, Prasanth Krishnamoorthy, *Principles of Wireless Networks*, First Edition, Pearson Education, 2003.
- Sandeep Singhal, *the Wireless Application Protocol: Writing Applications for the Mobile Internet*.

e - Resources

- https://sgar91.files.wordpress.com/2011/10/mobile_communications_schiller_2e.pdf
- http://www.geethanjaliinstitutions.com/engineering/coursefiles/downloads/ece/wcn.pdf

UCSS501/UCAS501 PYTHON PROGRAMMING

Semester : V **Credits :2**
Category : Self Study Paper **Hours/Week :2**
Total Hours :26

Objectives:
To enable the students

- Understand the Python is a useful scripting language for developers.
- Learn to design object -oriented programs with Python classes.
- Design and program in Python applications.

UNIT - I OVERVIEW OF PYTHON PROGRAMMING 7 Hrs

Introduction to Python: Structure of a Python Program, Elements of Python , Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators.

UNIT - II CREATING PYTHON PROGRAMS AND STRUCTURES 9 Hrs

Input and Output Statements, Control, Numbers, Strings, Lists, Tuples, Dictionary, Date & Time, Modules, Defining Functions, Exit function, default arguments

UNIT –III ADVANCED PYTHON AND PROGRAMMING IN PYTHON 10Hrs

Objects and Classes, Inheritance, Regular Expressions, Event Driven Programming, GUI Programming.

Menu Driven Program

a. To convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
b. To find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
c. To calculate the sum and product of two compatible matrices.
d. Number Series (Fibonacci Series, Sum Series, Pyramid and Factorial)
e. Simple Calculator
f. Payroll
g. Mark statements

Text Book

- T. Budd, *Exploring Python*, TMH, 1st Ed, 2011

Reference Book

- Allen Downey, Jeffrey Elkner, Chris Meyers, *How to think like a computer scientist: learning with Python*, Freely available online.2012

e-Resources

- http://docs.python.org/3/tutorial/index.html
- http://interactivepython.org/courselib/static/pythonds
- http://www.ibiblio.org/g2swap/byteofpython/read/

UCSS502/UCAS502 ANDROID APPLICATIONS

Semester :V **Credits :2**
Category : Self Study Paper **Hours/Week :2**
Total Hours :26

Objectives:

To enable the students

- Understand the basic concepts of OOP in Java.
- Analyze the various development tools.
- Design and program Android applications.

UNIT – I INTRODUCTION AND OVERVIEW OF OOPS USING JAVA 8 Hrs

History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture. OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine.

UNIT – II OOP USING JAVA AND DEVELOPMENT TOOLS 8 Hrs

Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project – Hello Word, run on emulator, Deploy it on USB-connected Android device.

UNIT – III USER INTERFACE ARCHITECTURE, DESIGN AND DATABASE 10 Hrs

Application context, intents, Activity life cycle, multiple screen sizes. Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners (Combo boxes), Images,

Menu, and Dialog**.** Database: Understanding of SQLite database, connecting with the database.

Text Book

- James C. Sheusi, *Android application development for java programmers*, Publisher: Cengage Learning, 2013.

e-Resources

- http://www.developer.android.com
- http://developer.android.com/training/basics/firstapp/index.html
- http://docs.oracle.com/javase/tutorial/index.htm (Available in the form of free downloadable ebooks also).
- http://developer.android.com/guide/components/activities.html
- http://developer.android.com/training/multiscreen/screensizes.html
- http://developer.android.com/guide/topics/ui/controls.html

LAB EXERCISES

1. Create “Hello World” application. That will display “Hello World” in the middle of the screen in the emulator. Also display “Hello World” in the middle of the screen in the Android Phone.
2. Create an application with login module. (Check username and password).
3. Create spinner with strings taken from resource folder (res >> value folder) and on changing the spinner value, Image will change.
4. Create a menu with 5 options and selected option should appear in text box.
5. Create a list of all courses in your college and on selecting a particular course teacher-incharge of that course should appear at the bottom of the screen.
6. Create an application with three option buttons, on selecting a button colour of the screen will change.
7. Create and Login application as above. On successful login, pop up the message.

UCSS601/UCAS601 ANGULAR JS

Semester : VI **Credits :2**
Category : Self Study Paper **Hours/Week :2**
Total Hours :26

Objectives:
To enable the students

- Acquire knowledge in Architecture and Services.
- Create factories to share data between controllers.
- Develop interactive front end apps.

UNIT – I INTRODUCTION **7 Hrs**

Introduction, Architecture - Advantages - Dynamic Binding - Directives

UNIT – II DATA BINDING & SERVICES **9 Hrs**

Controllers - Scope – Services- Factories - Expressions - Form Validations

UNIT – III TEMPLATES, ROUTING & HACKING **10 Hrs**

Filters - Custom Directives – Routing- Making an API Call - Modules - Dependency Injection.

Text Book

- Pawel Kozlowski and Peter Bacon Darwin, *Mastering web application development with AngularJS*, PacktPublishing, Birmingham- Mumbai, 2013.

e- Resource

- www.guru99.com/angularjs-introduction.html.

UCSS602 /UCAS602 GREEN COMPUTING

Semester : VI **Credits :2**
Category : Self Study Paper **Hours/Week :2**
Total Hours :26

Objectives:
To enable the students

- Minimizing energy consumption for the IT estates.
- Purchasing green energy and using green suppliers.
- Reduce the paper and other consumables used.
- Minimize equipment disposal requirements.

UNIT - I OVERVIEW **7 Hrs**

Overviews and issues - Current initiatives and Standards organization planning for Green computing.

UNIT – II POLICIES ISSUES, HARDWARE AND CONSUMPTION ISSUES **9 Hrs**

Policies – metrics - The acorns diagram Consumption Issues: Minimizing power usage, Cooling - Going paperless – recycling - Hardware consideration.

UNIT – III GREENING PROCESS **10 Hrs**

The Greening Process: Datacenter design and Redesign -Virtualization-server - virtualization solutions, Implementation - Storage virtualization - Virtualization types - Storage virtualization solutions - server savings - storage savings.

Text Book

- Toby J.Velte, Anthony T.Velte, Robert ElsenPeter, *Green IT*, McGrawHill, 2008.

Reference Books

- John Lamp, *The Greening IT*, IBM Press, 2005.
- Lawrence Webber, Michael Wallace, *GreenTech*, AMACOM publication, USA, 2009.

EVALUATION COMPONENT

Semester	Part	Category	Course Code	Course Title	Component III	Component IV
V	III	Core IX	UCSM506	Distributed Technologies	Assignment	Seminar
	III	Core X	UCSM507	System Analysis and Design	Assignment	Seminar
	III	Core XI	UCSM508	Microprocessor and its Applications	Assignment	Simple Program Writing
	III	Core Practical VII	UCSR509	Distributed Technologies – Practical	DPA	Viva Voce
		Core Practical VIII	UCSR510	Web Application – Practical	DPA	Viva Voce
VI	III	Core XII	UCSM608	Multimedia and its Applications	Assignment	Problem Solving
		Core XIII	UCSM609	Operating System	Assignment	Seminar
	III	Core XIV	UCSM610	Big Data Technology	Assignment	Seminar
	III	Core Practical IX	UCSR606	Operating System – Practical	DPA	Viva Voce
	III	Core Project	UCSP601	Project	DPA	Viva Voce
	III	Major-Elective	UCSO606/ UCSO607	Network Security / Mobile Technologies	Working Model	Case Studies

SELF STUDY PAPERS EVALUATION COMPONENTS

Semester	Part	Category	Course Code	Course Title	Component III	Component IV
V	III	Self Study	UCSS501/ UCAS501	Python Programming	Problem Solving	Simple Application Development
V	III	Self Study	UCSS502/ UCAS502	Android Applications	Problem Solving	Simple Application Development
VI	III	Self Study	UCSS601/ UCAS601	Angular JS	Problem Solving	Simple Application Development
VI	III	Self Study	UCSS602/ UCAS602	Green Computing	Assignment	Case Study

M.Sc Computer Science

Extra Credit Earning Provision
Self Study Paper (only for interested students)

Semester	Category	Course Code	Course Title	Hrs/week	Credit	
					Min	Max
III	Self Study Paper	PCSS301/PCAS502	R-Programming	2	-	2
III	Self Study Paper	PCSS302/PCAS503	Rich Internet Applications	2	-	2
IV	Self Study Paper	PCSS401/PCAS601	Silverlight Applications	2	-	2
IV	Self Study Paper	PCSS402/PCAS602	Extreme Programming	2	-	2

PCSS301/PCAS502 R-PROGRAMMING

Semester : III **Credits :2**
Category : Self Study Paper **Hours/Week :2**
Total Hours :26

Objectives:
To enable the students

- Explore and understand the use of R documentation.
- Understand basic non-linear functions in models.
- Understand how to link data, statistical methods, and actionable questions.

UNIT - I INTRODUCTION **7 Hrs**

Overview and History of R, Getting Help, Data Types, Sub setting, Vectorized Operations, Reading and Writing Data.

UNIT - II STRUCTURE, RULES AND TOOLS **9 Hrs**

Control Structures, Functions, lapply, tapply, split, mapply, apply, Coding Standards, Scoping Rules, Debugging Tools, Simulation, R Profiler.

UNIT - III R - PROGRAMMING BASIC, SEARCHING AND SORTING **10 Hrs**

- Basic Programming
    1. To print text on the screen.
    2. Sum of ‘n’ numbers
    3. Multiplication Table
- Function
    9. Return the largest element in a list.
    10. Compute the running total of a list.
    11. Palindrome Check
- Implement the following sorting algorithms:
    1. Selection sort,
    2. Insertion sort,

3. Bubble Sort

- Implement linear search.
- Implement binary search.
- Implement matrices addition, subtraction and Multiplication

Text Book

- W. N. Venables, D. M. Smith, *An Introduction to R, R-core team*, 2015.

Reference Books

- Roger, *R Programming for Data Science*, published on 20-07-2015.
- Brenton Kenkel's, *An Introduction to R,* Jan 31, 2013.

PCSS302/PCAS503 RICH INTERNET APPLICATIONS

Semester : III **Credits :2**
Category : Self Study Paper **Hours/Week :2**
Total Hours :26

Objectives:
To enable the students

- Knowledge in web services.
- Learn about Ajax
- Build "modernizing" applications.

UNIT - I INTRODUCTION **7 Hrs**

Web 2.0 Folksonomies and Web 2.0, Software as a service. Multiple delivery channels(Voice – VOXML, and ANT (HTML) - Social Networking.

UNIT - II OVERVIEW AND SAP **9 Hrs**

Client side programming – Overview of Java Script - Objects in Java Script - Regular expressions - Overview of XML - DTD and XML Schema - DOM and SAX Parsers - CSS – XSLT, Web Services- SOA -SOAP - WSDL - REST Services. JSON Format- Ajax introduction - XML HTTP object comparison with I frames.

UNIT – III MXML AND FLEX **10 Hrs**

Building Rich Internet Application- Flash Player - Flex framework - MXML introduction - Action Script Introduction - working with Action Script - Flex Data binding - Common UI Components usingDatagrids. Tree controls - Pop up controls etc, Mashup using Flex and Ajax. Web services in Flex. Semanticweb(Web 3.0).

Text Books

- Ivan Bayross, *Web Enabled Commercial Applicaton Development using HTML, DHTML, Javascript*, Perl CGI, BPB Publications, 2007.
- Colin Moock, *Essential Actionscript 3.0*, O'Reilly publications, 2007.
- Steven Holzner, *Ajax Bible*, Wiley India Edition, 2007.
- Justin Gehtland et al, *A Web 2.0 Primer Pragmatic Ajax*, SPD Publications, 2006.

PCSS401/PCAS601 - SILVERLIGHT APPLICATIONS

Semester : IV **Credits : 2**
Category : Self Study Paper **Hours/week : 2P**
Total Hours : 26

Objectives:
To enable the students

- Build new applications in Silverlight Applications.
- Design Framework and Deploy in Silverlight Applications

LAB EXERCISES: (Choose any Eight)

1. Building Silverlight Business Applications
2. Consuming Data
3. Manipulating Data
4. Implementing User Controls and Navigation
5. Presenting Items, Classes, and Dependency Properties
6. Using Local Assets
7. Implementing Advanced Media Techniques in Silverlight
8. Developing Silverlight Media Framework Solutions
9. Interacting with Hardware Programmatically
10. Globalizing and Localizing Applications
11. Building Dynamic Silverlight Applications
12. Deploying Silverlight Applications
13. Implementing the MVVM Design Pattern
14. Creating a Windows Phone Application

e-Resources:

- https://www.tutorialspoint.com/silverlight/
- ftp://103.81.117.86/E BOOKS/Microsoft Silverlight/Microsoft Silverlight 4 STEP BY STEP.pdf
- https://www.microsoft.com/en-in/learning/course.aspx?cid=10554

PCSS402/PCAS602 - EXTREME PROGRAMMING

Semester : IV **Credits : 2**
Category : Self Study Paper **Hours/week : 2**
Total Hours : 26

Objectives:
To enable the students

- Study about the problems in software quality.
- Understand the methods to improve the software quality.
- Gain knowledge about the implementation of XP.

UNIT –I THE PROBLEM **6 Hrs**

Risk - The Basic Problem - A Development Episode -Economics of Software Development -Four Variables.

UNIT – II DESIGN STANDARDS **5 Hrs**

Cost of Change -Learning to Drive - Four Values Communication.

UNIT –III THE SOLUTION **5 Hrs**

A Quick Overview - Management Strategy -Facilities Strategy -Splitting Business and Technical Responsibility.

UNIT –IV STRATEGIES **5 Hrs**

Planning Strategy -Development Strategy -Design Strategy.

UNIT –V IMPLEMENTING XP **5 Hrs**

Adopting XP -Retrofitting XP -Lifecycle of an Ideal XP Project - Roles for People - 20–80 Rule - XP Hard –XP at Work.

Text Book

- Kent Beck, *Extreme Programming Explained: Embrace Change*, Addison-Wesley, September 2004.

Reference Book

- *Chromatic*, *Extreme Programming Pocket Guide*, O'Reilly, 2003.

SELF STUDY PAPERS EVALUATION COMPONENTS

Semester	Category	Course Code	Course Title	Component III	Component IV
V	Self Study	PCSS301/ PCAS502	R-Programming	Problem Solving	Problem Solving
V	Self Study	PCSS302/ PCAS503	Rich Internet Applications	Assignment	Web Page Designing
VI	Self Study	PCSS401/ PCAS601	Silver Light Applications	Application Development	Application Development
VI	Self Study	PCSS402/ PCAS602	Extreme Programming	Assignment	Comparative Study

DEPARTMENT OF COMPUTER APPLICATIONS & ISM

Preamble

UG : Course profile, list of courses offered to the other departments and the syllabi of courses in the V & VI semesters along with evaluation components III & IV (with effect from 2015-2018 batch onwards) and

PG : Course profile, list of courses offered to the other departments and the syllabi of courses in the V & VI semesters along with evaluation components III & IV (with effect from 2015-2018 batch onwards) are presented in the booklet.

COURSE PROFILE: BCA

Semester	Part	Category	Course Code	Course Title	Contact/ Week	Credit	
						Min	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	UCAM105/ UCSM104	Programming in C	5	4	4
	III	Core II	UCAM106	Digital Logic Computer Design	4	3	3
	III	Core Practical I	UCAR103/ UISR103	Introduction to Computer Applications	2	1	1
	III	Core Practical II	UCAR104/ UCSR105	Programming in C- Practical	3	3	3
	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	UCAM203/ UCSM204	Object Oriented Programming using C++	4	4	4
	III	Core IV	UCAM204/ UCSM205	Data Structure and Algorithms	3	3	3
	III	Core Practical III	UCAR203/ UCSR204	Object Oriented Programming and Data Structures using C++ - Practical	3	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			-	1	2
				Total	**30**	**23**	**26**
III	III	Core V	UCAM307	Java Programming	5	4	4
	III	Core VI	UCAM308	MIS and ERP	5	3	3
	III	Core VII	UCAM309	User Interface Design	5	5	5
	III	Core Practical IV	UCAR303	Java Programming - Practical	4	3	3
	III	Allied III	UCOA303	Financial Accounting	5	5	5
	IV	Non-Major Elective			4	2	2
	IV	Value Education			2	1	1
				Total	**30**	**23**	**23**
IV	III	Core VIII	UCAM404	Database Management System	5	4	4
	III	Core IX	UCAM403	Object Oriented Analysis and Design	4	3	3
	III	Core X	UCAM405/ UCSM405	Data Communication Networks	4	3	3
	III	Core XI	UCAM406	Data Mining and Warehousing	4	3	3
	III	Core Practical V	UCAR402	Database Management System Practical	3	3	3
	III	Core Practical VI	UCAR403	Case Tools Lab	3	3	3
	III	Allied IV	UCOA403/ UCOR403	Accounting Package	5	5	5
	IV	Soft skill			2	1	1
	V	Extension Programme/ Physical Education			-	-	2
				Total	**30**	**25**	**27**
V	III	Core XII	UCAM501	Visual Programming	4	3	3
	III	Core XIII	UCAM504	Software Engineering	5	5	5
	III	Core XIV	UCAM505	Web Programming	4	3	3
	III	Core XV	UCAM506	Multimedia and its Applications	4	3	3
	III	Core Practical VII	UCAR504	Visual Programming Practical	3	2	2
	III	Core Practical VIII	UCAR505	Web Programming Practical	3	2	2
	III	Allied Optional			5	4	4
	IV	Value Education			2	1	1
				Total	**30**	**23**	**23**

VI	III	Core XVI	UCAM606/ UCSM609	Operating System	5	4	4
	III	Core XVII	UCAM607	Software Testing	6	4	4
	III	Core XVIII	UCAM608	Computer Graphics	4	4	4
	III	Core Practical IX	UCAR602	Operating System Practical	3	3	3
	III	Core Project	UCAP601	Project Work	5	4	4
	III	Major-Elective	UCAO605/ UCAO604	Big Data Analytics/ 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			-	-	2
Total					**30**	**25**	**27**
Grand Total					**180**	**140**	**149**

EXTRA CREDIT EARNING PROVISION

Semester	Part	Category	Course Code	Course Title	Contact/ Week	Credit	
						Min	Max
II	III	Summer Internship	UCAI201	Summer Internship	-	-	1
IV	III	Summer Internship	UCAI401	Summer Internship	-	-	1
V	III	Self Study	UCSS501/ UCAS501	Python 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

NON-MAJOR ELECTIVES-UG

Semester	Part	Category	Course Code	Course Title	Contact/ Week	Credit
II	IV	NME	UCAE205	Desktop Publishing	4	2
			UCAE206	PC Hardware Troubleshooting	4	2
III	IV		UCAE305	Internet Applications	4	2
			UCAE306	Web Tools	4	2

ALLIED OPTIONAL

Semester	Part	Category	Course Code	Course Title	Contact Hrs/ Week	Credit
V	III	Allied Optional	UCAA504	R-Programming	3T+2P	4
V	III	Allied Optional	UCAA505	Android Applications	3T+2P	4

UCAM501 VISUAL PROGRAMMING

Semester : V **Credits : 3**
Category : Core XII **Hours/week : 4**
Class & Major : III BCA **Total Hours : 52**

Objectives:

To enable the students

- Understand the standard and custom controls in Visual Studio Environment.
- Implement application design specifications with a visual object-oriented.
- Inculcate knowledge on event-driven programming language.

UNIT- I **12 Hrs**

Customizing a form- Writing a simple program- Tool box- Creating control- Name property- Command button- Access keys- Image control- Text boxes- Labels- Message boxes- Grid- Editing tools- Variables data types- String number.

UNIT- II **10 Hrs**

Displaying information- Determinate loops, indeterminate loops- Conditionals Built in function- Function and Procedure.

UNIT - III **10 Hrs**

Arrays- List- Control arrays- Grid control- Project with multiple form- Do events and sub main- Error Trapping.

UNIT - IV **10 Hrs**

VB objects - Dialogue boxes- Common Dialog control- Menus- MDI forms.

UNIT -V **10 Hrs**

File handling - File system controls - File system objects - ADODB Connection – ActiveX Control.

Text Book

- Gary Cornell, *Visual Basic 6 from the Ground up*, Tata McGraw Hill - 1999.

Reference Books

- Brian siler and Jeff Sorts, U*sing Visual Basic 6*, Prentice hall India, 2002.
- Noel Jerke, *Visual Basic 6 (The Complete Reference*), Tata McGraw Hill, 1999.
- Deitel & Deitel, T.R. Nieto, *Visual Basic 6* , Pearson Edition- 2005.
- Allen Jones, Matthew MacDonald, Rakesh Rajan, Todd Herman, *Visual Basic2005 Recipes: A Problem-Solution Approach*, APress, 2007.

UCAM504 SOFTWARE ENGINEERING

Semester	**: V**	**Credits**	**: 5**
Category	**: Core XIII**	**Hours/Week**	**: 5**
Class & Major	**: III BCA**	**Total Hours**	**: 65**

Objectives:

To enable the students

- Introduce the basic concepts of Software Engineering and the various phases in Software development.
- Understand User Conceptual Models and Interface Design.
- Specification of participatory design & interactive debugging.

UNIT- I **13 Hrs**

Introduction to Software Engineering – Software – The changing nature of the software. A Generic view of Process: Software Engineering Layered Technology – A Process Framework –Personal & Team Process Models. Process Models: Waterfall – Incremental – Evolutionary – Specialized process models – Agile Process Models.

UNIT- II **13 Hrs**

Requirement Engineering: Requirement engineering task- Eliciting requirements – Building Analysis Model – Data Modeling Concepts-Flow oriented modeling– Class Based Modeling. Design Engineering: – Design Concepts – Design Models –Data design-Architectural Design.

UNIT- III **13 Hrs**

Modeling Component Level Design: – Component – Designing Class-Based Components – Conducting Component-Level Design. Performing User Interface Design: Golden Rules – User Interface Analysis & Design –Interface Design Steps – Design Evaluation.

UNIT- IV **13 Hrs**

Testing Strategies – A Strategic Approach to Software Testing – Strategic Issues – Test Strategies for Conventional & Object Oriented Software – Validation Testing – System Testing – The Art of Debugging Testing Tactics – Software Testing Fundamentals – Black Box and White Box Testing – Basis Path Testing – Control Structure Testing.

UNIT-V RISK MANAGEMENT **13 Hrs**

Risk Management: Risk strategies-Software risk-Risk Identification, Projection, Refinement, Mitigation, Monitoring and Management.Quality Management: Quality Concepts – Software Quality Assurance–Formal technical reviews- Software Reliability.

Text Book

- Roger S. Pressman," *A Practitioner's Approach Software Engineering*" –. Sixth Edition. McGraw Hill International Edition,2005.

Reference Books

- Sommerville I, "*Software Engineering*", 5th edition, Addison Wesley, 1996 Shooman, Software Engineering, McGraw Hill, 1983.
- David Gustafson, "*Software Engineering*", Schaum's outlines, Tata McGraw – Hill, 2003.
- Waman S. Jawadekar. "*Software Engineering"*: Principles and Practice McGraw Hill, 2004.

UCAM505 WEB PROGRAMMING

Semester	**: V**	**Credit**	**: 3**
Category	**: Core XIV**	**Hours / Week**	**: 4**
Class & Major	**: III BCA**	**Total Hours**	**: 52**

Objectives:
To enable the students

- Understand the concepts of web programming languages.
- Analyze the various controls for designing web applications.
- Develop the web applications using .Net Technologies.

UNIT - I HTML AND JAVASCRIPT **10 Hrs**

World Wide Web – XHTML - Cascading style sheet- JavaScript – Date – Array - Pattern matching using regular expressions - Dynamic documents with java script.

UNIT - II .NET FRAMEWORK AND APPLICATION STRUCTURE **10 Hrs**

Introduction to .NET - Benefits of .NET Framework - Structure of an Application - The Application Domain - The Application Lifetime - The Application Directory Structure - The Global.asax Application File - Using States - HTTP Handlers - Postback and Cross-Page Posting.

UNIT - III WEB STANDARD CONTROLS **12 Hrs**

The Control Class - The Web Control Class - Label - Button – TextBox - Literal - PlaceHolder – Hidden Field – File Upload - Image – Image Button – Image Map – List Box – DropDownList – Bulleted List - HyperLink – Link Button - CheckBox – CheckBoxList – Radio Button – RadioButtonList – Table – Panel – Wizard - Xml – View – MultiView – Substitution – Localize – Calendar – AdRotator.

UNIT - IV OTHER WEB CONTROLS **10 Hrs**

Navigation Controls: Tree View – Menu – Site Map Path - Validation Controls: Base Validator – RequiredField Validator- Range Validator – Regular Expression Validator – Compare Validator – Custom Validator – Validation Summary.

UNIT - V DATABASE CONTROLS **10 Hrs**

Working with Database Controls: Grid View - DataList - Details View - Form View – List View- Repeater – Data Pager – Chart – Query Extender –Sql DataSource – Access DataSource - Linq DataSource – Object DataSource – Xml DataSource – Entity DataSource – SiteMap DataSource.

Text Books

- I.Bayross, *Web enabled commercial Application Development using HTML, DHTML, Javascript*, Perl CGI, Fourth edition, BPB Publications, New Delhi, 2010.
- Kogent Learning Solutions Inc.,"*ASP.NET 4.0 Black Book*", Dreamtech Press publications, 2012.

Reference Book

- Kogent Learning Solutions Inc., *.NET 4.0 programming (6-in-1) Black Book*, Dreamtech Press publications, 2011.

e-Resources

- http://www.w3schools.com
- http://www.youtube.com

UCAM506 MULTIMEDIA AND ITS APPLICATIONS

Semester	**: V**	**Credits**	**: 3**
Category	**: Core XV**	**Hours/Week**	**: 4**
Class & Major	**: III BCA**	**Total Hours**	**: 52**

Objectives:
To enable the students

- Learn about multimedia and their technologies.
- Inculcate knowledge on Media, Text, Image, Audio, Video, Animation etc.
- Analyze the future planning strategies in multimedia projects.

UNIT – I INTRODUCTION **10 Hrs**

Multimedia–Definitions, CD-ROM and the Multimedia Highway, Uses of Multimedia, Introduction to making multimedia – The Stages of project, the requirements to make good multimedia, Multimedia skills and training, Training opportunities in Multimedia. Motivation for multimedia usage, Frequency domain analysis, Application Domain.

UNIT - II HARDWARE AND SOFTWARE **08 Hrs**

Multimedia Hardware–Macintosh and Windows production Platforms, Hardware peripherals – Connections, Memory and storage devices, Media software– Basic tools, making instant multimedia, Multimedia software and Authoring tools, Production Standards.

UNIT - III SOUND AND VIDEO **12 Hrs**

Multimedia – making it work – multimedia building blocks – Text, Sound, Images, Animation and Video, Digitization of Audio and Video objects, Data Compression: Different algorithms concern to text, audio, video and images etc., Working Exposure on Tools like Dream Weaver, Flash and Photoshop.

UNIT – IV MULTIMEDIA AND THE INTERNET **12 Hrs**

History, Internet working, Connections, Internet Services, The World Wide Web, Tools for the WWW – Web Servers, Web Browsers, Web page makers and editors, Plug-Ins and Delivery Vehicles, HTML, VRML, Designing for the WWW – Working on the Web, Multimedia Applications – Media Communication, Media Consumption, Media Entertainment, Media games.

UNIT – V MULTIMEDIA FUTURE **10 Hrs**

Digital Communication and New Media, Interactive Television, Digital Broadcasting, Digital Radio, Multimedia Conferencing, Assembling and delivering a project-planning and costing, Designing and Producing, content and talent, Delivering, CD-ROM technology.

Text Books

- S.Gokul, *Multimedia Magic*, 2nd Edition, BPS Publication, New Delhi, 2008.
- T. Vaughan, *Multimedia: Making it work*, 9thEdition, Tata McGraw Hill, New Delhi,2014

Reference Books

- Ranjan Parekh, *Principles of Multimedia*, 2nd Edition, 2013.
- R. Steinmetz and K. Naharstedt, *Multimedia: Computing, Communications Applications*, Pearson Education, Delhi, 2012.

e-Resources

- http://www.w3schools.com
- http://www.youtube.com
- http://www.nptel.ac.in/courses/117105083

UCAR504 VISUAL PROGRAMMING - PRACTICAL

Semester	**: V**	**Credits**	**: 2**
Category	**: Core Practical VII**	**Hours/Week**	**: 3**
Class & Major	**: III BCA**	**Total Hours**	**: 39**

Objectives:
To enable the students

- Acquire practical knowledge and develop skills on visual programming.
- Design a Database with enhanced models and Techniques.
- Develop real time applications.

Lab Exercises:

1. Building simple application using form object.
2. Working with intrinsic controls.
3. Application with menus.
4. Pay-roll System.
5. Inventory Processing System.
6. Railway Reservation System.
7. Library Management System.
8. Hostel Management System.
9. Online Hotel Management System.
10. Alumnae Registration.

UCAR505 WEB PROGRAMMING - PRACTICAL

Semester	**: V**	**Credits**	**: 2**
Category	**: Core Practical VIII**	**Hours/Week**	**: 3**
Class & Major	**: III BCA**	**Total Hours**	**: 39**

Objectives:
To enable the students

- Understand the real time requirements of web based programs.
- Explore the functionalities of web tools.
- Develop the client-server architecture.

Lab Exercises:

1. Create a Calculator program using JavaScript.
2. Create a web page using Image map and calendar control.
3. Create a web page using File Upload, Hyperlink and Link button.
4. Creating and Using a Simple User Control.
5. ADO.NET application to insert, delete, update records in database.
6. Create a simple web page using all validation controls.
7. Create a web page using AdRotator & menus.
8. Create a web page using grid view, form view, detail view and list view.
9. Data List and Repeater control.
10. Create a web page to manage the session.

UCAM606 OPERATING SYSTEM

Semester	**: VI**	**Credits**	**: 4**
Category	**: Core XVI**	**Hours/Week**	**: 5**
Class & Major	**: III BCA**	**Total Hours**	**: 65**

Objectives:
To enable the students

- Acquire knowledge on basics of operating system.
- 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 THE 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

UCAM607 SOFTWARE TESTING

Semester	**: VI**	**Credits**	**: 4**
Category	**: Core XVII**	**Hours/Week**	**: 6**
Class & Major	**: III BCA**	**Total Hours**	**: 78**

Objectives:
To enable the students

- Acquire the knowledge of Software Testing.
- Apply the different levels of Testing to debug the errors.
- Evaluating the Software quality to review the result report.

UNIT - I INTRODUCTION **15 Hrs**

Testing as an Engineering Activity – Role of Process in Software Quality – Testing as a Process – Basic Definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support for Developing a Defect Repository.

UNIT - II TEST CASE DESIGN **16 Hrs**

Introduction to Testing Design Strategies – The Smarter Tester – Test Case Design Strategies – Using Black Box Approach to Test Case Design Random Testing – Requirements based testing – positive and negative testing - Boundary Value Analysis – decision tables - Equivalence Class Partitioning state-based testing– cause effect graphing – error guessing.

Compatibility testing – user documentation testing – domain testing Using White–Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing - Coverage and Control Flow Graphs – Covering Code Logic – Paths – Their Role in White–box Based Test Design – code complexity testing – Evaluating Test AdequacyCriteria.

UNIT - III LEVELS OF TESTING **16 Hrs**

The Need for Levels of Testing – Unit Test – Unit Test Planning –Designing the Unit Tests. The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – scenario testing – defect

bash elimination - System Testing – types of system testing - Acceptance testing – performance testing - Regression Testing – internationalization testing – ad-hoc testing - Alpha – Beta Tests – testing OO systems – usability and accessibility testing.

UNIT - IV TEST MANAGEMENT **16 Hrs**

People and organizational issues in testing – organization structures for testing teams – testing services - Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process - Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.

UNIT - V CONTROLLING AND MONITORING **15 Hrs**

Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation – Test metrics and measurements –project, progress and productivity metrics – Status Meetings Reports and Control Issues – Criteria for Test Completion – SCM – Types of reviews – Developing a review program – Components of Review Plans– Reporting Review Results. – Evaluating software quality – defect prevention – testing maturity model.

Text Books

- Srinivasan Desikan and Gopalaswamy Ramesh, *Software Testing – Principles and Practices*", Pearson education, 2010.
- Aditya P.Mathur, *Foundations of Software Testing*, Pearson Education,2013.

Reference Books

- Sandeep Desai, Abhishek Srivastava, *Software Testing: A Practical Approach*, 2nd Edition, Dreamtech Press, 2016.
- Boris Beizer, *Software Testing Techniques*, Second Edition, Dreamtech, 2008.

e-Resources

- http://www.w3schools.com
- http://www.youtube.com

UCAM608 COMPUTER GRAPHICS

Semester	**: VI**	**Credits**	**: 4**
Category	**: Core XVIII**	**Hours/Week**	**: 4**
Class & Major	**: III BCA**	**Total Hours**	**: 52**

Objectives:

To enable the students

- Acquire Knowledge on two and three dimensional graphical structures.
- Analyze the Multimedia compression and animations.
- Design 2D and 3D objects for animation.

UNIT – I 2D PRIMITIVES **10 Hrs**

A survey of computer graphics – Overview of Graphic systems – Elements of pictures created in computer graphics – Graphics input primitives and devices Drawing primitives in open GL and Basic open GL programming – open GL basic Graphics primitives – Output primitives – Line, Circle and Ellipse drawing algorithms – Attributes of output primitives.

UNIT – II 2D GEOMETRIC TRANSFORMATIONS **10 Hrs**

2D Viewing – Window-Viewport Transformation – Two dimensional Geometric transformations – Line, Polygon, Curve and Text clipping algorithms.

UNIT – III 3D CONCEPTS **12 Hrs**

Projections – Three dimensional object representation – Parallel and Perspective Polygons, 69 Splines, Quadric Surfaces – Visualization of data sets – 3D affine transformations 3D Rotations using Quaternions – Viewing – Visible surface identification – Color Models, 3D Transformations in open GL.

UNIT – IV VISIBLE SURFACE DETECTION METHODS **10 Hrs**

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods.

UNIT – V COMPUTER ANIMATION **10 Hrs**

Computer animations: Design of animation sequence – General computer animation functions – Raster animation – Computer animation languages, key frame systems, motion specifications.

Text Books

- Donald D. Hearn, M. Pauline Baker and Warren Carithers, *Computer Graphics with OpenGL*, Fourth Edition, Pearson Education, 2010.
- Foley, VanDam, Feiner and Hughes, *Computer Graphics Principles & practice*, second edition in C, Pearson Education, 2009.

Reference Book

- F.S.Hill, *Computer Graphics using OPENGL*, Second edition, Pearson Education, 2010.

e-Resources

- http://www.w3schools.com
- http://www.youtube.com
- http://www.nptel.ac.in /courses/106106090/
- http://www.nptel.ac.in /courses/106102063/

UCAR602 OPERATING SYSTEM PRACTICAL

Semester	**: VI**	**Credits**	**: 3**
Category	**: Core practical XI**	**Hours/Week**	**: 3**
Class & Major	**: III BCA**	**Total Hours**	**: 39**

Objectives:
To enable the students

- Understand the different types of processes.
- Implement various process scheduling algorithms.
- Develop the shell script for file operations.

Lab exercises:

1. Creation of a child, Orphan and Zombie process
2. Demonstration of wait and Signal function
3. Create a program using IPC pipes and message queues.
4. Simulation of FCFS process scheduling
5. Simulation of Round Robin process scheduling
6. Simulation of SJF process scheduling
7. Demonstration of process synchronization using signals
8. Deadlock avoidance using banker's algorithm.
9. Implement Page replacement algorithm
10. Write a shell script program to create, read, write, append and compare two files.

UCAO605 BIG DATA ANALYTICS

Semester	**: VI**	**Credit**	**: 4**
Category	**: Major Elective**	**Hours/Week**	**: 5**
Class & Major	**: III BCA**	**Total Hours**	**: 65**

Objectives:
To enable the students

- Understand the importance of Big Data.
- Analyse the modern data analytical tools.
- Apply algorithm in various real-time applications.

UNIT - I INTRODUCTION TO BIG DATA **13 Hrs**

Introduction to Big Data – Characteristics of bigdata – Importance of Big data – Fraud Detection patterns – Risk patterns for modeling and Management – Big data and the Energy sector.

UNIT - II DATA ANALYSIS **13 Hrs**

Introduction to Big Data Platform – Challenges of conventional systems - Web data – Evolution of Analytic scalability - analytic processes and tools - Modern data analytic tools.

UNIT – III HADOOP **13 Hrs**

Introduction to Hadoop – Components of Hadoop – Applications of Hadoop – Compression – Security – Enterprise integration in hadoop.

UNIT - IV STREAM COMPUTING **13 Hrs**

Introduction to Streams Concepts – Stream data model and architecture - Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window - Realtime Analytics Platform(RTAP) applications IBM Infosphere – Big data at rest – Infosphere streams – Data stage – Statistical analysis – Intelligent scheduler – Infosphere Streams.

UNIT - V FRAMEWORKS AND APPLICATIONS **13 Hrs**

IBM for Big Data – Map Reduce Framework - Hadoop – Hive – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Hbase – Impala – Analyzing big data with twitter – Big data for E-Commerce – Big data for blogs.

Text Books

- Paul Zikopoulos, Chris Eaton, Paul Zikopoulos, *Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data*, McGraw Hill, 2011.
- AnandRajaraman and Jeffrey David Ullman, *Mining of Massive Datasets,* Cambridge University Press, 2012.

Reference Books

- Jay Liebowitz, *Big Data 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.

e-Resources

- http://www.w3schools.com
- http://www.youtube.com

UCAO604 CLOUD COMPUTING

Semester	**: VI**	**Credits**	**: 4**
Class & Major	**: III BCA**	**Hours/week**	**: 5**
Category	**: Major Elective**	**Total Hours**	**: 65**

Objectives

To enable the students

- Understand the evolution of cloud computing and its services.
- Design and development of simple cloud service.
- Apply the applications of cloud computing in various services.

UNIT – I INTRODUCTION **12 Hrs**

Cloud-definition, benefits, usage scenarios, History of Cloud Computing – Cloud Architecture - Types of Clouds - Business models around Clouds – Major Players in Cloud Computing - issues in Clouds - Eucalyptus - Nimbus - Open Nebula, CloudSim.

UNIT – II CLOUD SERVICES **13 Hrs**

Types of Cloud services: Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service - Monitoring as a Service – Communication as services. Service providers- Google, Amazon, Microsoft Azure, IBM, Salesforce.

UNIT – III COLLABORATING USING CLOUD SERVICES **15 Hrs**

Email Communication over the Cloud - CRM Management - Project Management- Event Management - Task Management – Calendar - Schedules - Word Processing – Presentation – Spreadsheet - Databases – Desktop - Social Networks and Groupware.

UNIT – IV VIRTUALIZATION FOR CLOUD **13 Hrs**

Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization – System VM, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

UNIT – V SECURITY, STANDARDS AND APPLICATIONS **12 Hrs**

Security in Clouds: Cloud security challenges – Software as a Service Security, Common Standards: The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security, End user access to cloud computing, Mobile Internet devices and the cloud.

Text Book

- John Rittinghouse & James Ransome, *Cloud Computing, Implementation, Management and Strategy*, CRC Press, 2010.

Reference Books

- David E.Y. Sarna *Implementing and Developing Cloud Application*, CRC press 2011.
- Lee Badger, Tim Grance, Robert Patt-Corner, Jeff Voas, NIST, Draft, *Cloud computing synopsis and recommendation*, May 2011.
- Anthony T Velte, Toby J Velte, Robert Elsenpeter, *Cloud Computing : A Practical Approach*, Tata McGraw-Hill 2010.
- Michael Miller, *Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate*, Que Publishing, August 2008.

UCAA504 R – PROGRAMMING

Semester	**: V**	**Credits**	**: 4**
Category	**: Allied Optional**	**Hours/week**	**: 3T+2P**
		Total Hours	**: 39+26**

Objectives:

To enable the students

- Understand the concepts of R - Programming.
- Identify the Vectors, Arrays and Matrices in R.
- Develop programs using R.

UNIT – I AN INTRODUCTION TO R **7 Hrs**

Introduction and preliminaries - Simple manipulations; numbers and vectors - Objects, their modes and attributes - Ordered and unordered factors - Arrays and matrices - Lists and data frames.

UNIT – II THE ART OF R PROGRAMMING **8 Hrs**

R Programming – Getting Started – Vectors – Matrices – List – R-Programming Structures – R-Functions – Doing Math in R.

UNIT – III GETTING STARTED **8 Hrs**

A First R session – Introduction to Functions – R Data Structure.

UNIT – IV VECTORS **8 Hrs**

Scalars, Vectors,Arrays and Matrices – Declarations – Recycling – Common vector operations – Using all() and any() – Vectorized operations – NA and NULL values – Filtering – A Vectorized if then else.

UNIT – V INPUT/OUTPUT AND STRING MANIPULATION **8 Hrs**

Accessing the Keyboard and Monitor – Reading and Writing files – Accessing the Internet. An Overview of String Manipulation Function – Regular Expressions – Creating graphics – Customizing Graphics.

Lab Exercises

Write a program in R

1.Prints 'Hello World' to the screen.
2. Multiplication table for numbers up to 12.
3. Function that returns the largest element in a list.
4. Check whether a string is a palindrome.
5. Implement Insertion sort, Bubble Sort
6. Implement linear search and binary search.
7. Matrices addition, subtraction and Multiplication

Text Books

- W. N. Venables, D. M. Smith and the R Core Team ,*An Introduction to R,* 2015.
- Norman Matloff , *The Art of R Programming: A Tour of Statistical Software Design,* 2014.

Reference Books

- Roger, *R Programming for Data Science*, published on 2015.
- Brenton Kenkel's, *An Introduction to R,* 2013.

e-Resources

- http://www.w3schools.com/r.pdf
- https://www.tutorialspoint.com/r/

UCAA505 ANDROID APPLICATIONS

Semester : V **Credits : 4**
Category : Allied Optional **Hours/week : 3T+2P**
Total Hours : 39+26

Objectives:

To enable the students

- Understand the overview of Android.
- Work with View Groups, Image views and Graphics.
- Design simple android application.

UNIT – I OVERVIEW OF ANDROID **07 Hrs**

Introducing Android - Discussing about Android Applications - The Manifest File - Downloading and Installing Android - Exploring the Development Environment - Developing and Executing the First Android Application.

UNIT – II ACTIVITIES AND FRAGMENTS **08 Hrs**

Working with Activities: Creating an Activity- Starting an Activity -Managing the Lifecycle of an Activity - Fragments : Fragment Implementation- Finding Fragments - Adding, Removing and Replacing Fragments.

UNIT – III USER INTERFACE USING VIEWS **08 Hrs**

Working with View Groups - Using the Spinner - Designing the Views - Handling UI Events - Specialized Fragments - Creating Menus.

UNIT – IV HANDLING PICTURES AND MENUS **08 Hrs**

Working with Image Views - Designing Context Menu for Image View - Using the AnalogClock and DigitalClock Views – Internal and External Storage -SQLite Database.

UNIT – V SIMPLE APPLICATIONS **08 Hrs**

E-mailing and Networking in Android and Working with Graphics and Animation - Building an Application to Send Email - Working with Animations.

Lab Exercises

8. Create “Hello” application. Display “Hello World” in the middle of the screen in the Android Phone.
9. Android application for adding two numbers.
10. Write android program to change the background image of the screen.
11. Perform the calculator operations.
12. Create an application with three option buttons, on selecting a button colour of the screen will change.
13. Develop android application for alarm clock.
14. Develop android application for login page.

Text Book

- *Android Application Development (upto Android 4.4),* Black Book TM, Kogent Learning Solutions Inc., Dreamtech, 2012.

Reference Book

- James C. Sheusi, *Android application development for java programmers*, Cengage Learning, 2013.

e-Resources

- https://www.tutorialspoint.com/android/android_pdf_version.htm
- https://www.tutorialspoint.com/android/android_tutorial.pdf

UCSS501/UCAS501 PYTHON PROGRAMMING

Semester	**: V**	**Credits**	**: 2**
Category	**: Self Study Paper**	**Hours/Week**	**: 2**
		Total Hours	**: 26**

Objectives:

To enable the students

- Understand the Python is a useful scripting language for developers.
- Learn to design object -oriented programs with Python classes.
- Design and program in Python applications.

UNIT - I OVERVIEW OF PYTHON PROGRAMMING 07 Hrs

Introduction to Python: Structure of a Python Program, Elements of Python , Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators.

UNIT - II CREATING PYTHON PROGRAMS AND STRUCTURES 09 Hrs

Input and Output Statements, Control, Numbers, Strings, Lists, Tuples, Dictionary, Date & Time, Modules, Defining Functions, Exit function, default arguments.

UNIT –III ADVANCED PYTHON AND PROGRAMMING IN PYTHON 10Hrs

Objects and Classes, Inheritance, Regular Expressions, Event Driven Programming, GUI Programming.

Menu Driven Program

h. To convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
i. To find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
j. To calculate the sum and product of two compatible matrices.
k. Number Series (Fibonacci Series, Sum Series, Pyramid and Factorial)
l. Simple Calculator
m. Payroll
n. Mark statements

Text Book

- T. Budd, *Exploring Python*, TMH, 1st Ed, 2011.

Reference Book

- Allen Downey, Jeffrey Elkner, Chris Meyers, *How to think like a computer scientist: learning with Python*, Freely available online.2012.

e-Resources

- http://docs.python.org/3/tutorial/index.html
- http://interactivepython.org/courselib/static/pythonds
- http://www.ibiblio.org/g2swap/byteofpython/read/

UCSS502/UCAS502 ANDROID APPLICATIONS

Semester : V **Credits : 2**
Category : Self Study Paper **Hours/Week : 2**
Total Hours : 26

Objectives:
To enable the students

- Understand the basic concepts of OOP in Java.
- Analyze the various development tools.
- Design and program Android applications.

UNIT – I INTRODUCTION AND OVERVIEW OF OOPS USING JAVA 08 Hrs

History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture. OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine.

UNIT – II OOP USING JAVA AND DEVELOPMENT TOOLS 08 Hrs

Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project – Hello Word, run on emulator, Deploy it on USB-connected Android device.

UNIT – III USER INTERFACE ARCHITECTURE, DESIGN AND DATABASE 10 Hrs

Application context, intents, Activity life cycle, multiple screen sizes. Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners (Combo boxes), Images, Menu, and Dialog**.** Database: Understanding of SQLite database, connecting with the database.

Text Book

- James C. Sheusi, *Android application development for java programmers*, Publisher: Cengage Learning, 2013.

e-Resources

- http://www.developer.android.com
- http://developer.android.com/training/basics/firstapp/index.html
- http://docs.oracle.com/javase/tutorial/index.htm (Available in the form of free downloadable ebooks also).
- http://developer.android.com/guide/components/activities.html
- http://developer.android.com/training/multiscreen/screensizes.html
- http://developer.android.com/guide/topics/ui/controls.html

LAB EXERCISES

1. Create “Hello World” application. That will display “Hello World” in the middle of the screen in the emulator. Also display “Hello World” in the middle of the screen in the Android Phone.
2. Create an application with login module. (Check username and password).
3. Create spinner with strings taken from resource folder (res >> value folder) and on changing the spinner value, Image will change.
4. Create a menu with 5 options and selected option should appear in text box.
5. Create a list of all courses in your college and on selecting a particular course teacher-incharge of that course should appear at the bottom of the screen.
6. Create an application with three option buttons, on selecting a button colour of the screen will change.
7. Create and Login application as above. On successful login, pop up the message.

UCSS601/UCAS601 ANGULAR JS

Semester : VI **Credits : 2**
Category : Self Study Paper **Hours/Week : 2**
Total Hours : 26

Objectives:
To enable the students

- Acquire knowledge in Architecture and Services.
- Create factories to share data between controllers.
- Develop interactive front end apps.

UNIT – I INTRODUCTION **07 Hrs**

Introduction, Architecture - Advantages - Dynamic Binding – Directives.

UNIT – II DATA BINDING & SERVICES **09 Hrs**

Controllers - Scope – Services- Factories - Expressions - Form Validations.

UNIT – III TEMPLATES ,ROUTING & HACKING **10 Hrs**

Filters - Custom Directives – Routing- Making an API Call - Modules - Dependency Injection.

Text Book

- Pawel Kozlowski and Peter Bacon Darwin, *Mastering web application development with AngularJS*, PacktPublishing, Birmingham- Mumbai, 2013.

e- Resource

- www.guru99.com/angularjs-introduction.html

UCSS602 /UCAS602 GREEN COMPUTING

Semester : VI **Credits : 2**
Category : Self Study Paper **Hours/Week : 2**
Total Hours : 26

Objectives:
To enable the students

- Minimizing energy consumption for the IT estates.
- Purchasing green energy and using green suppliers.
- Reduce the paper and other consumables used.
- Minimize equipment utilization requirements.

UNIT - I OVERVIEW **07 Hrs**

Overviews and issues - Current initiatives and Standards organization planning for Green computing.

UNIT – II POLICIES ISSUES, HARDWARE AND CONSUMPTION ISSUES 09 Hrs

Policies – metrics - The acorns diagram Consumption Issues: Minimizing power usage, Cooling - Going paperless – recycling - Hardware consideration.

UNIT – III GREENING PROCESS **10 Hrs**

The Greening Process: Datacenter design and Redesign -Virtualization-server - virtualization solutions, Implementation - Storage virtualization - Virtualization types - Storage virtualization solutions - server savings - storage savings.

.**Text Book**

- Toby J.Velte, Anthony T.Velte, Robert ElsenPeter, *Green IT*, McGrawHill, 2008.

Reference Books

- John Lamp, *The Greening IT*, IBM Press, 2005.
- Lawrence Webber, Michael Wallace, *GreenTech*, AMACOM publication, USA, 2009.

III and IV Evaluation Components of CIA

Semester	Part	Category	Course Code	Course Title	Component III	Component IV
V	III	Core XII	UCAM501	Visual Programming	Problem Solving	Application Development
	III	Core XIII	UCAM504	Software Engineering	System Modeling	Software Testing
	III	Core XIV	UCAM505	Web Programming	Program Writing	Webpage Design
	III	Core XV	UCAM506	Multimedia and its Applications	Assignment	Seminar
	III	Core Practical VII	UCAR504	Visual Programming-Practical	DPA	Viva-Voce
	III	Core Practical VIII	UCAR505	Web Programming Practical	DPA	Viva-Voce
VI	III	Core XVI	UCAM606/ UCSM609	Operating System	Problem Solving	Case Study
	III	Core XVII	UCAM607	Software Testing	System Modeling	Case Study
	III	Core XVIII	UCAM608	Computer Graphics	Poster Presentation	Seminar
	III	Core Practical IX	UCAR602	Operating System Practical	DPA	Viva-voce
	III	Major-Elective	UCAO605	Big Data Analytics	Assignment	Seminar
	III	Major-Elective	UCAO604	Cloud Computing	Working Model	Seminar

ALLIED OPTIONAL

Semester	Part	Category	Course Code	Course Title	Component III	Component IV
V	III	Allied Optional	UCAA504	R-Programming	Problem Solving	Program Writing
V	III	Allied Optional	UCAA505	Android Applications	Assignment	Seminar

SELF STUDY PAPER

Semester	Part	Category	Course Code	Course Title	Component III	Component IV
V	III	Self Study	UCSS501/ UCAS501	Python Programming	Problem Solving	Simple Application Development
V	III	Self Study	UCSS502/ UCAS502	Android Applications	Problem Solving	Simple Application Development
VI	III	Self Study	UCSS601/ UCAS601	Angular JS	Problem Solving	Simple Application Development
VI	III	Self Study	UCSS602/ UCAS602	Green Computing	Assignment	Case Study

COURSE PROFILE: MCA

Semester	Category	Course Code	Course Title	Contact/ Week	Credit	
					Min	Max
I	Core I	PCAM103	Mathematical Foundation	4	3	3
	Core II	PCAM108	Marketing Management	5	3	3
	Core III	PCAM110	C Programming	5	4	4
	Core IV	PCAM111	Web user Interface design	4	3	3
	Core Practical I	PCAR105	C Programming –Practical	3	2	2
	Core Practical II	PCAR106	Web user interface design-Practical	3	2	2
	Core		Library	1	-	-
	Non Major Elective I			5	4	4
			Total	**30**	**21**	**21**
II	Core V	PCAM205	Database Management System	5	4	4
	Core VI	PCAM206	Applied Statistics	5	4	4
	Core VII	PCAM207	Object Oriented Programming using C++	4	4	4
	Core VIII	PCAM208	Data Structures and Algorithms	4	3	3
	Core Practical III	PCAR203	Database Management System-Practical	3	2	2
	Core Practical IV	PCAR204	Object Oriented Programming using C++ -Practical	3	2	2
	Core		Library	1	-	-
	Non Major Elective I	PALE201/ PALE301	Preparatory Course for NET/SET	5	4	4
	Service Learning	PCSX201/ PCAX201	Introduction To Information Technology	–	1	1
			Total	**30**	**24**	**24**
III	Core IX	PCAM312/ PCAR312	Computerized Accounting	5	4	4
	Core X	PCAM308	Java Programming	5	4	4
	Core XI	PCAM309	Visual Programming and Web Hosting	6	4	4
	Core XII	PCAM311	Operating System	5	4	4
	Core Practical V	PCAR304	Visual programming-Practical	3	2	2
	Core Practical VI	PCAR305	Java Programming-Practical	3	2	2
	Core		Library	1	-	-
	Value Education	PWSV301	Women's Studies	2	1	1
			Total	**30**	**21**	**21**
IV	Core XIII	PCAM406	Human Resource Management	4	4	4
	Core XIV	PCAM407	Cloud Computing	4	4	4
	Core XV	PCAM408	Unified modeling Techniques	4	4	4
	Core XVI	PCAM410	Web Technology	5	4	4

	Core XVII	PCAM411	Principles of Compiler Design	4	3	3
	Core Practical VII	PCAR405	UML LAB	3	2	2
	Core Practical VIII	PCAR406	Web Technology -Practical	3	2	2
	Core		Library	1	-	-
	Value education	PWSV402	Women's Studies	2	1	1
			Total	**30**	**24**	**24**
V	Core XVIII	PCAM512	Android Programming	6	5	5
	Core XIX	PCAM507	Data Mining and Warehousing	5	4	4
	Core XX	PCAM511	Digital Image Processing	5	5	5
	Core XXI	PCAM509	Operation Research	4	4	4
	Core XXII	PCAM510	Software Engineering	4	3	3
	Core Practical IX	PCAR504	Android Programming - Practical	3	2	2
	Core Practical X	PCAR505	Mini project	2	2	2
	Core		Library	1	-	-
			Total	**30**	**25**	**25**
VI	Core Project I	PCAP601	Project work	30	20	20
			Grand Total	**180**	**135**	**135**

EXTRA CREDIT EARNING PROVISION

Semester	Category	Course Code	Course Title	Contact/ Week	Credit	
					Min	Max
III	Extra Credit	PCAS301	Working Model/ Self Study Paper	-	1	1
IV	Extra Credit	PUSI401	Summer Internship	-	1	1
V	Extra Credit	PCAS501	Application Development/ Paper Presentation	-	1	1
V	Self Study	PCSS301/ PCAS502	R-Programming	2	-	2
V	Self Study	PCSS302/ PCAS503	Rich Internet Applications	2	-	2
VI	Self Study	PCSS401/ PCAS601	Silver Light Applications	2	-	2
VI	Self Study	PCSS402/ PCAS602	Extreme Programming	2	-	2

PCAM512 ANDROID PROGRAMMING

Semester	**: V**	**Credits**	**: 5**
Category	**: Core XVIII**	**Hours/week**	**: 6**
Class & Major	**: III MCA**	**Total Hours**	**: 78**

Objectives:
To enable the students

- Understand how android applications work.
- Analyze SQLite database in android applications.
- Build new Android apps.

UNIT - I INTRODUCTION TO ANDROID **18 Hrs**

Introduction – Android development environment – Android development environment for real applications – start up code, M J Android applications.

UNIT - II ANDROID APPLICATIONS **15 Hrs**

Debugging Android applications – the ApiDemos Application – Signing and Publishing Applications.

UNIT - III SQLITE DATABASE IN ANDROID **15 Hrs**

SqLite databases and connect providers – Locating and Mapping.

UNIT - IV VIEW AND WIDGET **15 Hrs**

Building a view – A widget bestiary in Android phones.

UNIT - V DRAWING & SIMPLE PHONE CALLS **15 Hrs**

Drawing 2D and 3D graphics – Simple Phone Calls.

Text Book

- R. Roger, J Lombardo, Z Mednieks and B.Meike, O'Reilly *Android – Applications Development*, Shroft Publishers & Distributors Pvt Ltd, New Delhi, 2010.

Reference Book

- Mark Lawrence Murphy, *The Busy Coder's Guide to Advanced Android Development* , Second Edition, 2010.

e-Resources

- http://www.w3schools.com/android.pdf
- https://www.tutorialspoint.com/android/android_pdf_version.htm
- https://www.tutorialspoint.com/android/android_tutorial.pdf

PCAM507 DATA MINING AND WAREHOUSING

Semester	**: V**	**Credits**	**: 4**
Category	**: Core XIX**	**Hours/Week**	**: 5**
Class & Major	**: III MCA**	**Total Hours**	**: 65**

Objectives

To enable the students

- To gain knowledge in Data Mining Techniques.
- To analyze Patterns in Data.
- To have depth knowledge in Clustering and Classification Algorithms.

UNIT– I **12 Hrs**

Data Mining Introduction – Data Processing – Descriptive Data Summarization – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

UNIT– II **13 Hrs**

Data Warehousing – Multidimensional Data Model – Architecture – Implementation – Data Warehousing to Data Mining – Methods for Data Cube Computation –Development of Data Cube and OLAP Technology.

UNIT– III **13 Hrs**

Mining Frequent Patterns, Associations and Correlations – Basic Concepts and a Road Map – Itemset Mining Methods – Various kinds of Association Rules –Association Mining to Correlation Analysis – Constraint– Based Association Mining.

UNIT– IV **15 Hrs**

Classification and Prediction – Issues – Decision Tree Induction – Bayesian – Rule– Based – Lazy Learners – Other Classification Methods – Prediction – Cluster Analysis – Types – Partition Methods – Outlier Analysis.

UNIT– V **12 Hrs**

Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial – Multimedia – Text – World Wide Web – Applications.

Text Book

- Jiawei Han and Micheline Kamber , *Data Mining Concepts and Technique*, Second Edition, Morgan Kaufmann Publishers, Elsevier,2006.

Reference Books

- Margaret H.Dunham, *Data Mining Introductory and Advance Topics*, Pearson Education, 2003.
- Arun K.Pujari, *Data Mining Techniques*, University Press (India) Pvt. Ltd., 2003.

PCAM511 DIGITAL IMAGE PROCESSING

Semester	**: V**	**Credits**	**: 5**
Category	**: Core XX**	**Hours/week**	**: 5**
Class & Major	**: III MCA**	**Total Hours**	**: 65**

Objectives:

To enable the students

- Understand the techniques for processing images in different File formats.
- Examine different image enhancement and segmentation techniques.
- Implement the role of multi resolution analysis in image processing.

UNIT - I DIGITAL IMAGE FUNDAMENTALS 14 Hrs

Introduction – Definition of Image Processing- examples of fields that uses DIP Fundamentals step in DIP. Digital image fundamentals – image sensing and acquisition, Image sampling and quantization – Basic relationship between pixels.

UNIT- II IMAGE ENHANCEMENT 13 Hrs

Spatial Domain - Gray level transformations - Histogram processing - Spatial filtering - Smoothing and sharpening - Frequency domain: Filtering in frequency domain - DFT, FFT, DCT - Smoothing and sharpening filters - Homomorphic filtering.

UNIT – III IMAGE COMPRESSION 14 Hrs

Fundamentals – Coding redundancy – Spatial and temporal redundancy – Irrelevant information. Some basic compression methods: Huffman coding – arithmetic coding – LZW coding – Run Length coding – Bit-plane coding.

UNIT - IV IMAGE SEGMENTATION AND FEATURE ANALYSIS 14 Hrs

Detection of discontinuities - Edge operators - Edge linking and boundary Detection - Thresholding - Region based segmentation - Morphological Watersheds - Motion segmentation, Feature analysis and extraction.

UNIT - V APPLICATIONS OF IMAGE PROCESSING 10 Hrs

Image classification - Image recognition - Image understanding - Video motion analysis - Image fusion - Steganography - Digital compositing - Mosaics - Color image processing.

Text Books

- Rafael C.Gonzalez and Richard E.Woods, *Digital Image Processing*, Third Edition, Pearson Education, 2009.
- S.Sridhar, *Digital Image Processing*, Oxford University Press, 2011.

Reference Books

- Milan Sonka, Vaclav Hlavac and Roger Boyle, *Image Processing, Analysis and Machine Vision*, Second Edition, Thompson Learning, 2012.
- Anil K.Jain, *Fundamentals of Digital Image Processing*, PHI, 2011.

- Sanjit K. Mitra, & Giovanni L. Sicuranza, *Non Linear Image Processing*, Elsevier, 2007. IT8072 Free and Open Source Software.

e-Resources

- http://www.w3schools.com
- http://www.youtube.com
- http://www.nptel.ac.in/courses/106105032/

PCAM510 SOFTWARE ENGINEERING

Semester	**: V**	**Credit**	**: 3**
Category	**: Core XXII**	**Hours/Week**	**: 4**
Class & Major	**: III MCA**	**Total Hours**	**: 52**

Objectives:
To enable the students

- To introduce the basic concepts of Software Engineering and the various phases in Software development.
- To Understand User Conceptual Models and Interface Design
- Specification of participatory design and interactive debugging.

UNIT– I **12 Hrs**

Introduction to Software Engineering – Software – The changing nature of the software. A Generic view of Process – Software Engineering Layered Technology – A Process Framework – The Capability Maturity Model Integration – Personal AND Team Process Models.Process Models – Waterfall – Incremental – Evolutionary – Specialized process models – Agile Process Models.

UNIT– II **10 Hrs**

Requirement Engineering – Initiating the Engineering Process – Eliciting requirements – Building Analysis Model – Data Modeling Concepts – Class Based Modeling Design Engineering – Design Concepts – Design Models –Architectural Design.

UNIT– III **10 Hrs**

Modeling Component– Level Design – Component – Designing Class– Based Components – Conducting Component– Level Design. Performing User Interface Design – Golden Rules – User Interface Analysis AND Design – Interface Analysis – Interface Design Steps – Design Evaluation.

UNIT– IV **10 Hrs**

Testing Strategies – A Strategic Approach to Software Testing – Strategic Issues – Test Strategies for Conventional AND Object Oriented Software – Validation Testing – System Testing – The Art of Debugging Testing Tactics – Software Testing Fundamentals – Black Box and White Box Testing – Basis Path Testing – Control Structure Testing.

UNIT– V **10 Hrs**

Web Engineering – Attributes of Web– Based Systems and Applications – Web Application Engineering Layers – The Web Engineering Process – Web Engineering Best Practices.Quality Management – Quality Concepts – Software Quality Assurance – Software Reviews – Software Reliability.

Text Book

- Roger S. Pressman, *A Practitioner's Approach Software Engineering* –. Sixth Edition, McGraw Hill International Edition,2009.

Reference Books

- Sommerville I, *Software Engineering*, 5th edition, Addison Wesley, 1996.
- David Gustafson, *Software Engineering*, Schaum's outlines, Tata McGraw – Hill, 2003.
- Waman S. Jawadekar. *Software Engineering: Principles and Practice*, McGraw Hill, 2004.

PCAR504 ANDROID PROGRAMMING PRACTICAL

Semester	**: V**	**Credits**	**: 2**
Category	**: Core Practical IX**	**Hours/week**	**: 3**
Class & Major	**: III MCA**	**Total Hours**	**: 39**

Objectives:

To enable the students

- Understand the android application tools and its architecture.
- Design various layouts of Android.
- Create Android apps using SQLite queries.

Lab Exercises:

1. Create an application which deals with the Android Content Providers.
2. Create application using Android Layouts, Views and Events
3. Create an application which uses Files, Preferences and Notifications
4. Create application to Create, Modify and Query an SQLite Database
5. Create an application for Querying web services and Parsing response
6. Create an application which uses the concept of Services and Background Threats
7. Creating Android Audio Video Application
8. Create an application which uses Map Activity and points the locations onto to the Map Locations
9. Create an application with One-Time, Repeating Alarms, and Long- Running Background Task as service.
10. Create an application for Simple Mobile Game.

PCSS301/PCAS502 R-PROGRAMMING

Semester : V **Credits : 2**
Category : Self Study Paper **Hours/Week : 2**
Total Hours : 26

Objectives:
To enable the students

- Explore and understand the use of R documentation.
- Understand basic non-linear functions in models.
- Understand how to link data, statistical methods, and actionable questions.

UNIT - I INTRODUCTION **07 Hrs**

Overview and History of R, Getting Help, Data Types, Sub setting, Vectorized Operations, Reading and Writing Data.

UNIT - II STRUCTURE, RULES AND TOOLS **09 Hrs**

Control Structures, Functions, lapply, tapply, split, mapply, apply, Coding Standards, Scoping Rules, Debugging Tools, Simulation, R Profiler.

UNIT - III R - PROGRAMMING BASIC, SEARCHING AND SORTING **10 Hrs**

- Basic Programming
    4. To print text on the screen.
    5. Sum of 'n' numbers
    6. Multiplication Table
- Function
    1. Return the largest element in a list.
    2. Compute the running total of a list.
    3. Palindrome Check
- Implement the following sorting algorithms:
    4. Selection sort,
    5. Insertion sort,
    6. Bubble Sort
- Implement linear search.
- Implement binary search.
- Implement matrices addition, subtraction and Multiplication

Text Book

- W. N. Venables, D. M. Smith, *An Introduction to R, R-core team*, 2015.

Reference Books

- Roger, *R Programming for Data Science*, published on 20-07-2015.
- Brenton Kenkel's, *An Introduction to R,* Jan 31, 2013.

PCSS401/PCAS503 RICH INTERNET APPLICATIONS

Semester : V **Credits : 2**
Category : Self Study Paper **Hours/Week : 2**
Total Hours : 26

Objectives:
To enable the students

- Knowledge in web services.
- Learn about Ajax.
- Build "modernizing" applications.

UNIT - I INTRODUCTION **07 Hrs**

Web 2.0 Folksonomies and Web 2.0, Software as a service. Multiple delivery channels(Voice – VOXML, and ANT (HTML) - Social Networking.

UNIT - II OVERVIEW AND SAP **09 Hrs**

Client side programming – Overview of Java Script - Objects in Java Script - Regular expressions - Overview of XML - DTD and XML Schema - DOM and SAX Parsers - CSS – XSLT, Web Services- SOA -SOAP - WSDL - REST Services. JSON Format- Ajax introduction - XML HTTP object comparison with I frames.

UNIT – III MXML AND FLEX **10 Hrs**

Building Rich Internet Application- Flash Player - Flex framework - MXML introduction - Action Script Introduction - working with Action Script - Flex Data binding - Common UI Components usingDatagrids. Tree controls - Pop up controls etc, Mashup using Flex and Ajax. Web services in Flex. Semantic web(Web 3.0).

Text Books

- Ivan Bayross, *Web Enabled Commercial Applicaton Development using HTML, DHTML, Javascript*, Perl CGI, BPB Publications, 2007.
- Colin Moock, *Essential Actionscript 3.0*, O'Reilly publications, 2007.
- Steven Holzner, *Ajax Bible,* Wiley India Edition, 2007.
- Justin Gehtland et al, *A Web 2.0 Primer Pragmatic Ajax*, SPD Publications, 2006.

PCSS402/PCAS601 - SILVERLIGHT APPLICATIONS

Semester : VI **Credits :2**
Category : Self Study Paper **Hours/Week :2P**
Total Hours :26

Objectives:
To enable the students

- Build new applications in Silverlight Applications.
- Design Framework and Deploy in Silverlight Applications.

LAB EXERCISES: (Choose any Eight)

15. Building Silverlight Business Applications
16. Consuming Data
17. Manipulating Data
18. Implementing User Controls and Navigation
19. Presenting Items, Classes, and Dependency Properties
20. Using Local Assets
21. Implementing Advanced Media Techniques in Silverlight
22. Developing Silverlight Media Framework Solutions
23. Interacting with Hardware Programmatically
24. Globalizing and Localizing Applications
25. Building Dynamic Silverlight Applications
26. Deploying Silverlight Applications
27. Implementing the MVVM Design Pattern
28. Creating a Windows Phone Application

e-Resources:

- https://www.tutorialspoint.com/silverlight/
- ftp://103.81.117.86/E BOOKS/Microsoft Silverlight/Microsoft Silverlight 4 STEP BY STEP.pdf
- https://www.microsoft.com/en-in/learning/course.aspx?cid=10554

PCSS302/PCAS602 EXTREME PROGRAMMING

Semester : VI **Credits : 2**
Category : Self Study Paper **Hours/Week : 2**
Total Hours : 26

Objectives:
To enable the students

- Study about the problems in software quality.
- Understand the methods to improve the software quality.
- Gain knowledge about the implementation of XP.

UNIT –I THE PROBLEM **06 Hrs**

Risk - The Basic Problem - A Development Episode -Economics of Software Development -Four Variables.

UNIT – II DESIGN STANDARDS **05 Hrs**

Cost of Change -Learning to Drive - Four Values Communication.

UNIT –III THE SOLUTION **05 Hrs**

A Quick Overview - Management Strategy -Facilities Strategy -Splitting Business and Technical Responsibility.

UNIT –IV STRATEGIES **05 Hrs**

Planning Strategy -Development Strategy -Design Strategy.

UNIT –V IMPLEMENTING XP **05 Hrs**

Adopting XP -Retrofitting XP -Lifecycle of an Ideal XP Project - Roles for People - 20–80 Rule - XP Hard -XP at Work.

Text Book

- Kent Beck, *Extreme Programming Explained: Embrace Change*, Addison-Wesley, September 2004.

Reference Book

- *Chromatic, Extreme Programming Pocket Guide*, O'Reilly, 2003.

III and IV Evaluation Components of CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
V	Core XVIII	PCAM512	Android Programming	Program Writing	Application Development
	Core XIX	PCAM507	Data Mining and Warehousing	Case Study	Seminar
	Core XX	PCAM511	Digital Image Processing	Problem Solving	Seminar
	Core XXII	PCAM510	Software Engineering	System Modeling	System Testing
	Core Practical IX	PCAR504	Android programming Practical	DPA	Viva-voce

Self Study Papers Evaluation Components

Semester	Category	Course Code	Course Title	Component III	Component IV
V	Self Study	PCSS301/ PCAS502	R-Programming	Problem Solving	Problem Solving
V	Self Study	PCSS302/ PCAS503	Rich Internet Applications	Assignment	Web Page Designing
VI	Self Study	PCSS401/ PCAS601	Silver Light Applications	Application Development	Application Development
VI	Self Study	PCSS402/ PCAS602	Extreme Programming	Assignment	Comparative Study

POLICY RECOMMENDATIONS OF IQAC

I. Introduction of MOOCs (NPTEL) and FOSS (Spoken Tutorial)

To promote high quality affordable education at large scale and to use as open online courses along with certification since March 2014, NPTEL offers the courses in various engineering disciplines, sciences, humanities, and management to expose the students to recent tools and technologies. NPTEL certificates can be used for credit transfer within colleges, internal assignment marks, Internship Opportunities at companies and Summer Internship.

Spoken Tutorial offer free of cost audio-video (spoken) training tutorials on various software to students. It can be considered as offline e-resource for e-guide to help students learn and master a variety of software on their own without needing their help of expert teachers which includes skill based and academic. This will help the students to improve their exam performance and get jobs.

The college has established

- Local Chapter for NPTEL courses - September 2016 &
- Nodal Resource centre for spoken tutorial - February 2017

  and got approval in the Academic Council meeting to offer on line courses with the following guidelines.

- Online courses are offered as extra credit
- a student can choose any course run by NPTEL / Spoken tutorial from any discipline according to their interest which will helpful for higher studies & career.
- Course choosen by the student should not be repeated during the course of study.
- Monitoring has to be done by the HOD through the mentor (NPTEL) / Faculty Co-Ordinator (Spoken Tutorial).
- Grade obtained will be entered in the marksheet under the heading of NPTEL / Spoken Tutorial (as extra credit)

II. Self Study Paper as Extra Credit earning provision (theory / mini project)

- All the departments have to offer self study paper as extra credit earning provision to all UG and PG programmes.
- The department can offer the courses during the below mentioned period.
  - For UG – 3rd to 6th semester.
  - For PG - 2nd to 4th semester.
- Core papers can be offered as self study paper.
- Syllabus to be framed with duration of 26 hours and 2 credits.
- Students have to register the course along with the regular course.
- Component I and II to be submitted before the regular CIA test I and CIA test II.
- Department have to depute one teacher to guide the students
- Evaluation Components (Theory/practical) by Internal.

Component	CIA
Component -I	20
Component -II	20
Comprehensive Test	50
Viva voce	10
Total	**100**

Comprehensive Test

Section A (10 X 1Marks)	-	10
Section B (5 X 2 Marks)	-	10
Section C (3 X 10 Marks)	-	30
		50

Project / Mini Project

Criteria	CIA (Valuation by faculty Guide)
Research Proposal	10
Review of literature	10
Collection of Data / Experimentation	20
Analysis of Data / Experimentation result	20
Project Report	30
Viva voce	10
Total	**100**

III.Creation of new Endowment-Prizes (2017-2018)

S.No	Name of the Endowment	Sponsor	Amount (Rs.)
1.	Luca Pacioli Endowment prize for the best student in M.Com.	Commerce students	5,600
2.	Albert Einstein Endowment prize for the best student in M.Sc	Physics students	6,000
3.	Shakuntala Devi Endowment prize for the best student in M.Phil.	Mathematics students	6,600
4.	Khorana Endowment prize for the best student in M.Sc	Biochemistry students and faculty	7,500