

S1. Sub. Page **Course** Title No. Code No. 9 1 21ULTA11 இக்காலத்தமிழ் Basic Grammar and Translation-I 12 2 21ULAR11 3 15 Communicative English -I 21ULEN11 19 4 Differential Calculus 21UCMA11 21 5 Classical Algebra 21UCMA12 21UAST11 6 Mathematical Statistics-I 23 7 Value Education I 25 21USVE1A Value Education II 27 8 21USVE1B 9 21ULTA21 28 சமயத்தமிழ் 10 Grammar and Translation - II 32 21ULAR21 11 Communicative English - II 21ULEN21 35 12 39 Integral Calculus 21UCMA21 13 41 Analytical Geometry of 3D 21UCMA22 14 Mathematical Statistics -II 43 21UAST21 15 45 **Enviromental Science** 21UEVS21 16 பயன்பாட்டுத்தமிழ் 21ULTA31 48 17 51 Modern Prose 21ULAR31 54 18 One-Act Plays and Writing Skill 21ULEN31 19 58 Real Analysis – I 21UCMA31 20 60 Allied Physics-I 21UAPH31 21 Allied Physics Practical-I 21UAPH3P1 63 22 Fundamentals of Computing and Security 21USFC31 65 23 SWAYAM - NPTEL Online Course 67 21USOC32 24 Fourier Transforms 21USMA32 69 25 Mathematics for Competitive Examinations-I 21UNMA31 7126 Library Reading Hour _ _ 27 சங்கத்தமிழ் 21ULTA41 73 28 Classical Prose 21ULAR41 75 29 A Practical Course in Spoken English 21ULEN41 77 30 Abstract Algebra 21UCMA41 80 31 Allied Physics-II/2 21UAPH41 82 32 Allied Physics Practical-II/2P 21UAPH4P1 85

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Part		C	ourse	9		Seme	ster	Hours	Credits	Papers	Marks
I	Tamil	/ Arab	oic			I to	IV	24	12	4	400
II	Englis	h				I to	IV	24	12	4	400
	Discip + Field	line Sp 1 work	pecific	Core	(DSC)	I to	VI	68	62	15+1	1600
III	Discip (DSE)	Discipline Specific E DSE) + Project			ive	III &	, VI	18	18	4	400
	Allied Theory & Practicals				ls	I to	IV	24	16	6	500
	Non-Major Elective (NME)				E)	III to	o IV	4	4	2	200
	Skill E (SEC)	Enhanc	emen	t Coui	rse	III to	o VI	12	12	6	600
IV	Ability Enhancement Compulsory Course (AECC) Social Value Education (SVE)			Ι		2	2	1	100		
	Enviro	ronmental Science (EVS)		(EVS)	II	II 2		2	1	100	
v	Exten	sion Ac	ctivitie	es		IV	7		1+1		200
	Librar	y Read	ing H	our		III &	IV	2			
					то	TAL	180	142	43	4500	
		SE	MEST	ER W	ISE DI	STRI	BUTI	ON OF	HOURS		1
Part	I	II]	II				IV		Total
SEM	T/A	ENG	DSC	FW	DSE/ PRO	AL	NMI	E SEC	VE/ EVS	LRH	
Ι	6	6	10	-	-	6	-	-	2		30
II	6	6	10	-	-	6	-	-	2		30
III	6	6	5	-	-	6	2	4	-	1	30
IV	6	6	5	-	-	6	2	4	-	1	30
v	-	-	20	-	8	-	-	2	-	-	30
VI	-	-	18	_	10	_	-	2	-		30
Total	24	24	68	-	18	24	4	12	4	2	180

B.Sc. Mathematics DISTRIBUTION OF HOURS, CREDITS, NO. OF PAPERS & MARKS (Applicable for students admitted in June 2021 and onwards)

OFM	Part	0	Title of the nemer	S Code	TT / 337	, L* T		P*	~	Marks		
SEM		Course	The of the paper	S. Code	n/w				C	Ι	E	Т
			இக்காலத்தமிழ்	21ULTA11								
	I	L-I	Basic Grammar and Translation-I	21ULAR11	6	-	-	-	3	25	75	100
	II	L-I	Communicative English –I	21ULEN11	6	-	-	-	3	25	75	100
I	III	DSC-I	Differential Calculus	21UCMA11	5	4	1	-	4	25	75	100
	III	DSC-II	Classical Algebra	21UCMA12	5	4	1	-	4	25	75	100
	III	A-I/1	Mathematical Statistics-I	21UAST11	6	4	2	-	4	25	75	100
	IV	AECC-I	Value Education I Value Education II	21USVE1A 21USVE1B	2	-	-	-	2	25	75	100
			சமயத்தமிழ்	21ULTA21				-				
	Ι	L-II	Grammar and Translation - II	21ULAR21	6	-	-		3	25	75	100
	II	L-II	Communicative English – II	21ULEN21	6	-	-	-	3	25	75	100
TT	III	DSC-III	Integral Calculus	21UCMA21	5	4	1	-	4	25	75	100
11	III	DSC-IV	Analytical Geometry of 3D	21UCMA22	5	4	1	-	4	25	75	100
	III	A-I/2	Mathematical Statistics -II	21UAST21	6	4	2	-	4	25	75	100
	IV	AECC- II	Enviromental Science	21UEVS21	2	-	-	-	2	25	75	100
	Ι	т тт	பயன்பாட்டுத்தமிழ்	21ULTA31	- 6				3	25	75	100
		L-111	Modern Prose	21ULAR31		-	_	-	3	20	15	100
	II	L-III	One-Act Plays and Writing Skill	21ULEN31	6	-	-	-	3	-	-	100
	III	DSC-V	Real Analysis – I	21UCMA31	5	5	0		4	25	75	100
	III	A-II/1	Allied Physics-I	21UAPH31	4	-	-	-	3	25	75	100
	III	A-II/1P	Allied Physics Practical-I	21UAPH3P1	2	-	-	-	1	40	60	100/2
III	IV	SEC-I	Fundamentals of Computing and Security	21USFC31	2	-	-	-	2	25	75	100
	IV	SEC-II	SWAYAM - NPTEL Online Course	21USOC32	2	-	-	-	2	25	75	100
			Fourier Transforms	21USMA32								
	IV	NME-I	Mathematics for Competitive Examinations-I	21UNMA31	2	1	1		2	25	75	100
		LRH	Library Reading Hour		1	-	-	-	-	-	-	-
		_	சங்கத்தமிழ்	21ULTA41								
	I	L-IV	Classical Prose	21ULAR41	6	-	-	-	3	25	75	100
IV	II	L-IV	A Practical Course in Spoken English	21ULEN41	6	-	-	-	3	25	75	100

COURSE Pattern CBCS Syllabus – B.Sc. Mathematics (2021-22 onwards)

	III	DSC-VI	Abstract Algebra	21UCMA41	5	5	0	-	4	25	75	100
	III	A-II/2	Allied Physics-II/2	21UAPH41	4	-	-	-	3	25	75	100
	TIT		Allied Physics		2	_	_	_	1	10	60	100/2
	111	A-11/21	Practical-II/2P	210/11/11	4				-	70	00	100/2
	IV	SEC-III	Soft Skills	21USSS41	2	-	-	-	2	25	75	100
	IV	SEC-IV	Trigonometry	21USMA42	2	-	-	-	2	25	75	100
			Mathematics for				-	_				100
	IV	NME-II	Competitive	210NMA41	2	-			2	25	75	100
			Examinations-in									100
	V	ECA	Activities		-	-	-	-	1	-	-	100
			Sadakth Outreach									100
	V	SOP	Programme		-	-	-	-	1	-	-	100
			Field	0111771444					0			100
	111	FW/I	Work/Internship	210FMA41	-	-	-	-	2	-	-	
		LRH	Library Reading Hour		1				-			
	III	DSC- VII	Linear Algebra	21UCMA51	4	4	-	-	4	25	75	100
	III	DSC- VIII	Real Analysis-II	21UCMA52	4	4	-	-	4	25	75	100
	III	DSC- IX	Differential Equations	21UCMA53	4	4	-	-	4	25	75	100
	III	DSC- X	Statics	21UCMA54	4	4	-	-	4	25	75	100
	III	DSC-XI	Number Theory	21UCMA55	4	4	-	-	4	25	75	100
v		DSE I	Combinatorial Mathematics	21UEMA51A	4				4	0-	75	100
	111		Fuzzy Mathematics	21UEMA51B		-	-	-	4	25		100
			Discrete Mathematics	21UEMA51C								
			Operation Research -	OILIEMAEDA		+						
	ттт	DOFI	1	ZIUEWA3ZA	1		_		1	25	75	100
	111	DSE II	Programming in C-I	21UEMA52B	4	-	-	-	+	25	75	100
			Astronomy	21UEMA52C								
	IV	SEC-V	Numerical Ability-I	21USMA51	2	-	-	-	2	25	75	100
	III	DSC- XII	Complex Analysis	21UCMA61	5	-	-	-	4	25	75	100
	III	DSC- XIII	Graph Theory	21UCMA62	5	-	-	-	4	25	75	100
	III	DSC- XIV	Numerical Methods	21UCMA63	4	-	-	-	4	25	75	100
VI	III	DSC- XV	Dynamics	21UCMA64	4	-	-	-	4	25	75	100
		DOF	Operation Research-II	21UEMA61A								
	III	DSE –	Programming in C –II	21UEMA61B	4	-	-	-	4	25	75	100
			Coding Theory	21UEMA61C								
	III	DSE IV	Project	21UEMA62	6	-	-	-	6	-	-	100 [•]
	IV	SEC-VI	Numerical Ability-II	21USMA61	2	-	-	-	2	25	75	100
				Total	180				142			4500

* L – Lecture hours

* T – Tutorial hours

* P – Practical hours

⁺ Project Report - 60 marks, Viva-Voce Examination - 40 marks Fieldwork Report - 60 marks, Viva-Voce Examination - 40 marks

B.SC Mathematics COURSE STRUCTURE (CBCS) (Applicable for students admitted in June 2021 and onwards)

TITLE OF THE PAPERS, CREDITS & MARKS

GROUP II COURSES (TWO -YEAR LANGUAGE COURSES)

(B.A. Arabic, B.A. Tamil, B.A. English, B.A. History, B.A. Economics, B.Sc. Mathematics, B.Sc. Physics, B.Sc. Chemistry, B.Sc. Zoology, B.Sc. Microbiology and B.Sc. Nutrition and Dietetics, B.Sc. Psychology)

SEM	Title of the paper	S. CODE	H/W	C	Ι	E	Т
	PART I - TAMI	L					
I	இக்காலத் தமிழ்	21ULTA11	6	3	25	75	100
II	சமயத் தமிழ்	21ULTA21	6	3	25	75	100
III	பயன்பாட்டுத் தமிழ்	21ULTA31	6	3	25	75	100
IV	சங்கத் தமிழ்	21ULTA41	6	3	25	75	100
	·	TOTAL	24	12			400
	PART I – ARAB	IC	1				
I	Applied Grammar and Translation – I	21ULAR11	6	3	25	75	100
II	Applied Grammar and Translation – II	21ULAR21	6	3	25	75	100
III	Applied Grammar and Translation – III	21ULAR31	6	3	25	75	100
IV	Classical Prose	21ULAR41	6	3	25	75	100
		TOTAL	24	12			400
	PART II – ENGLI	SH					
I	Prose, Poetry and Grammar-I	21ULEN11	6	3	25	75	100
II	Prose, Poetry and Grammar-II	21ULEN21	6	3	25	75	100
III	One – Act Plays and Writing Skill	21ULEN31	6	3	25	75	100
IV	A Practical Course in Spoken English	21ULEN41	6	3	25	75	100
		TOTAL	24	12			400

	DSC, DSE, Field work and Project								
SEM	COURSE		S CODE	н /w	6	N	ΙAI	RKS	
SEM	COURSE	TILLE OF THE PAPER	S. CODE	п/w	C	I	E	Т	
т	DSC1	Differential Calculus	21UCMA11	5	4	25	75	100	
•	DSC2	Classical Algebra	21UCMA12	5	4	25	75	100	
тт	DSC3	Integral Calculus	21UCMA21	5	4	25	75	100	
	DSC4	Analytical Geometry of 3D	21UCMA22	5	4	25	75	100	
III	DSC5	Real Analysis – I	21UCMA31	5	4	25	75	100	
137	DSC6	Abstract Algebra	21UCMA41	5	4	25	75	100	
	FW/I	Field Work/Internship	21UFMA41		2			100	
	DSC7	Linear Algebra	21UCMA51	4	4	25	75	100	
	DSC8	Real Analysis-II	21UCMA52	4	4	25	75	100	
	DSC9	Differential Equations	21UCMA53	4	4	25	75	100	
	DSC10	Statics	21UCMA54	4	2	25	75	100	
v	DSC11	Number Theory	21UCMA55	4	4	25	75	100	
	DSE-I	Combinatorial Mathematics	21UEMA51A						
		Fuzzy Mathematics	21UEMA51B	4	4	25	75	100	
		Discrete Mathematics	21UEMA51C						
		Operation Research -1	21UEMA52A						
	DSE-2	Programming in C-I	21UEMA52B	4	4	25	75	100	
		Astronomy	21UEMA52C						
	DSC12	Complex Analysis	21UCMA61	5	4	25	75	100	
	DSC13	Graph Theory	21UCMA62	5	4	25	75	100	
	DSC14	Numerical Methods	21UCMA63	4	4	25	75	100	
VI	DSC15	Dynamics	21UCMA64	4	4	25	75	100	
		Operation Research-II	21UEMA61A						
	DSE-III	Programming in C –II	21UEMA61B	4	4	25	75	100	
		Coding Theory	21UEMA61C						
	DSE-IV	Project	21UEMA62	6	6			100	
	•		TOTAL	86	80			2000	

PART III

		Part III – Alli	ed					
						I	MA	RKS
SEM	COURSE	TITLE OF THE PAPER	S. CODE	H/W	C	Ι	E	Т
Ι	AI-1	Mathematical Statistics-I	21UAST11	6	4	25	75	100
II	AI-2	Mathematical Statistics -II	21UAST21	6	4	25	75	100
ттт	AII-1	Allied Physics-I	21UAPH31	4	3	25	75	100
111	AII-1P	Allied Physics Practical-I	21UAPH3P1	2	1	25	75	100/2
137	AII-2	Allied Physics-II/2	21UAPH41	4	3	25	75	100
IV	AII-2P	Allied Physics Practical-II/2P	21UAPH4P1	2	1	25	75	100/2
			TOTAL	24	16			500
		Part IV – NM	[E					
III	NME1	Mathematics for Competitive Examinations-I	21UNMA31	2	2	25	75	100
IV	NME2	Mathematics for Competitive Examinations-II	21UNMA41	2	2	25	75	100
			TOTAL	4	4			200
		Part IV – SE	C					
ттт	SEC-1	Fundamentals of Computing and Security	21USFC31	2	2	25	75	100
111	SEC-2	SWAYAM - NPTEL Online Course Fourier Transforms	21USOC32 21USMA32	2	2	25	75	100
TT7	SEC-3	Soft Skills	21USSS41	2	2	25	75	100
IV	SEC-4	Trigonometry	21USMA42	2	2	25	75	100
V	SEC-5	Numerical Ability-I	21USMA51	2	2	25	75	100
	SEC-6	Numerical Ability-II	21USMA61	2	2	25	75	100
			TOTAL	12	12			600
		Part IV –Value Educa	tion & EVS					
I	VE VE	Value Education-I	21USVE1A	2	2	25	75	100
		alue Education-II	ZIUSVEIB					
II EVS Environmental Science 21UEVS21 2 2 25 75				75	100			
			TOTAL	4	4			200

PART – V – Extension Activities

SEM	Extension Activities S. CODE	S CODE	LI / XX7	0		MARKS		
SEM	(Choose any one)	S. CODE	п/ w	C	Ι	E	Т	
	NCC	21UEXNCC						
I to IV	NSS	21UEXNSS	3					
	Physical Education	21UEXPHE	E					
	Red Ribbon Club	21UEXRRC		1			100	
	Youth Red Cross	21UEXYRC						
	Youth Welfare	21UEXYWL						
	Yoga	21UEXYOG						
III to	Sadakath Outreach Programme	OTHEVSOR		1			100	
IV	(SOP)	210EASOF		T			100	
	Total		-	2			200	

Programme : B.Sc.

Programme Learning Outcomes

PLO	Upon completion of B.Sc. Degree Programme, the graduates will be able to:
	Disciplinary Knowledge
PLO 1	Acquire scientific knowledge and an understanding of major concepts and theoretical
	principles.
	Creative Thinking and Practical Skills / Problem Solving Skills
PLO 2	• Enrich skills of observation/research related skills to draw logical inferences from
	scientific experiments/ programming and skills of creative thinking to develop
	novel ideas.
	• Hone problem-solving skills in theoretical, experimental and computational areas
	and apply them in research fields and real-life situations.
	Sense of inquiry and Skilled Communicator
PLO 3	• Develop the capability to raise appropriate questions relating to the
	current/emerging issues encountered in the scientific field and plan, execute, and
	express the results of experiments / investigations through technical writings and
	oral presentations.
	 Ethical Awareness / Team Work / Environmental Conservation and Sustainability Equip them for conducting work as an individual / as a member, or as a leader in
	diverse teams upholding values such as honesty and precision and thus preventing
	unethical behaviours such as fabrication, falsification, misrepresentation of data,
PLO 4	plagiarism, etc. academic integrity.
	• Realise that environment and humans are dependent on one another and know
	about the responsible management of our ecosystem for survival and the well-
	being of the future generation.
	Usage of ICT/ Lifelong Learning / Self-Directed Learning
PLO 5	Inculcate the habit of learning continuously through the effective adoption of ICT to update knowledge in the emerging areas in Sciences for inventions/discoveries and engage in remote/independent learning.

Programme Specific Outcomes

PSO	Upon completion of B.Sc. Mathematics Degree Programme, the students will be able to:	PLOs Mapped
PSO-1	Numerically literate and recognize the importance and value of mathematical thinking, training and approach to problem-solving on a diverse variety of disciplines	1,2
PSO-2	Acquire abstract reasoning, programming skills and make ideas precise by formulating them mathematically	1,2, 5
PSO-3	Learn lifelong independently to enhance and apply mathematical knowledge and to become a skilled communicator	1,2,3,5
PSO-4	Take up a Project Work as a team for enriching team work skills and to uphold academic and professional integrity	1,2,3,4
PSO-5	Use ICT to engage themselves in remote learning/independent learning	1,2,5

SEMESTER – I

Course Title	இக்காலத் தமிழ்
	Ikkala Tamil (Modern Tamil)
Total Hrs.	90
Hrs./Week	6
Course Code	21ULTA11
Course Type	Part – I - Tamil
Credits	3
Marks	100

General Objective: To introduce literary history, the basics of grammar, and the genres such as poetry, short stories and essays.

Course Objectives:

CO	The learners will be able to:
CO-1	Understand the major literary forms such as poetry, short stories and essays and their characteristics.
CO-2	Apply their knowledge to learn the effective use of language and literature.
CO-3	Analyse the social / political / religious / economical issues dealt with in literary pieces.
CO-4	Differentiate the literary forms to know their nuances.
CO-5	Produce verses, short stories and essays.

அலகு 1 தமிழ்ச் செய்யுள்

1. தமிழ் - பாரதியார்

- 2. புதிய உலகு செய்வோம் பாரதிதாசன்
- 3. மனிதனைத் தேடி மு.மேத்தா
- 4. தொலைந்து போனவர்கள் அப்துல் ரகுமான்
- 5. ஒவ்வொரு பல்லையும் பெயர் சொல்லி அழைப்பேன் இன்குலாப்
- 6. சினேகிதனின் தாழ்வான வீடு கலாப்ரியா
- 7. இடைவெளி மனுஷ்ய புத்திரன்
- 8. சிறைச்சாலைக்காக -அறிவுமதி
- 9. விழித்தெழுக என் தேசம் இரவீந்திரநாத் தாகூர் (ஜெயபாரதன் (மொ.பெ))
- 10. மந்தி ஈரோடு தமிழன்பன்
- 11. பெண்கவிகளின் கவிதைகள்
- 12. என்மேல் பரிவுகாட்டு என் ஆத்மாவே கலீல் ஜிப்ரான்
- 13. அந்தி மனம் கல்யாண்ஜி
- 14. நகைப்பா மாமதயானை 15. பியானோ- பிரமிள்
- 16. அழிவு ஆத்மாநாம்
- 17. உள் உலகங்கள் ஞானக்கூத்தன்
- 18. கிளிக்குஞ்சு ந.பிச்சமூர்த்தி
- 19. கடைசி விருந்து சுகுமாரன்
- 20. தூர் நா.முத்துக்குமார்
- 21. ஜென் கவிதைகள்
- 22. ஹைக்கூ கவிதைகள்

நீங்கள் பயின்ற புதுக்கவிதைகளின் அடிப்படையில் நவீனப் புதுக்கவிதைகள் மற்றும் ஹைக்கூக் கவிதைகள் தருக.

அலகு - 2 சிறுகதைகள்

- 1. மனித யந்திரம் புதுமைப்பித்தன்
- 2. அனந்தசயனம் காலனி தோப்பில் முகம்மது மீரான்
- 3. மிருகம் வண்ணநிலவன்
- 4. செடிகளுக்கு வண்ணதாசன்
- 5. கனவில் உதிர்ந்த பூ நாறும்பூநாதன்
- 6. சொர்க்கக் கன்னிகை கருணாமணாளன்
- 7. நீலம் பூக்கும் திருமடம் ஜா.தீபா
- 8. குற்றமும் தண்டனையும் லியோ டால்ஸ்டாய்

சிறுகதைகள் எழுதப் பயிற்சி அளித்து மாணவரின் சிறுகதையினைக் கல்லூரி ஆண்டு மலரில் இடம்பெறச்செய்தல்.

அலகு 3 அறிவுசார் கட்டுரைகள்

- 1. தொல்லியல் நோக்கில் உலகத் தமிழர் பண்பாடு
- 2. ஒங்கி ஒலித்த பெருங்குரல்; ஆத்மாநாம் கவிதைகள்
- 3. நகுலனின் தனிமை
- 4. கவிக்கோ அப்துல் ரகுமான் கவிதைகள்
- 5. இறைவனை நினைப்போம் அன்பினை வளர்ப்போம்
- 6. சுருக்கம் தேடும் விரிந்த கவிதைகள்
- 7. இலக்கியத்தில் சுற்றுச்சூழலியல்

நீங்கள் அண்மையில் பயணித்த ஓர் இடம் குறித்து இரசனையோடு எழுதுக.

அலகு 4 இலக்கிய வரலாறு

- 1. புதுக்கவிதை தோற்றமும் வளர்ச்சியும்
- 2. நவீனத் தமிழ்க் கவிதைகளின் புதிய போக்குகள்
- 3. தமிழ்ச் சிறுகதைகளின் தோற்றமும் வளர்ச்சியும்

அலகு 5 இலக்கணம் அறிமுகம்

- 1. முதலெழுத்துகள்
- 2. சார்பெழுத்துகள்
- 3. உயிர் எழுத்தின் வகைகள்
- 4. மெய் எழுத்தின் வகைகள்
- 5. சுட்டெழுத்துகள்
- 6. வினாவெழுத்துகள்
- 7. வல்லினம் மிகும் இடங்கள்
- 8. வல்லினம் மிகா இடங்கள்
- 9. பகுபத உறுப்புகள்
- 10. இலக்கணக் குறிப்புகள்

நீங்கள் வாசிக்கும் செய்தித்தாள்களில் இடம்பெறும் எழுத்துப் பிழைகளைச் சுட்டிக் காட்டுக.

பாடநூல்கள்

 இக்காலத்தமிழ், தமிழ்த்துறை வெளியீடு, சதக்கத்துல்லாஹ் அப்பா கல்லூரி, திருநெல்வேலி.

பார்வை நூல்கள்

தமிழ் இலக்கிய வரலாறு, முனைவர் சு.ஆனந்தன், கண்மணி பதிப்பகம்,

	Course Outcomes	:	
СО	Upon completion of this course, students will be able to	PSOs Addressed	Cognitive Level
CO-1	Understand the concepts behind modern poetry, short stories, essays, literary history and grammar.	1	Understanding
CO-2	Explain the methodologies for the effective use of language and literature.	1, 2	Applying
CO-3	Apply their knowledge to analyse the socio-political / economic / religious issues presented in the literary texts.	1,2,3,4	Applying
CO-4	Categorize the major literary forms according to their origin and development.	1,2,3	Analysing
CO-5	Assess the ways and means to develop the art of writing insisting on environmental conservation, social harmony and interconnectedness regionally, nationally and globally.	1,2,4,5	Evaluating

Semester	Course Code			Title of the Course			Hou	rs	Credit		
I	21	ULTA1	.1	Ikkal	a Tami	1	90		3		
Course Outcomes		Progra Ou	mme tcom	Learnin es (PLOs		Programme Specific Outcomes (PSOs)					
(COs)	PLO 1	PLO 2	PLO	3 PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO-1	\checkmark	\checkmark	✓	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
CO-2	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			
CO-3	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		
CO-4	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark			
CO-5	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	
	Num Relat	ber of r ionship	natch 5 = Hi	les (√) = 4 i gh	43						

SEMESTER - I

Course Title	BASIC GRAMMAR AND TRANSLATION-I
Total Hrs.	90
Hrs./Week	6
Sub. Code	21ULAR11
Course Type	Part – I - Arabic
Credits	3
Marks	100

General Objective: To teach the basics of Arabic Phonetics, Grammar and Translation.

Course Objectives:

CO	The learners will be able to:
CO-1	Identify the Arabic Alphabet.
СО-2	Understand the speech sounds in Arabic.
CO-3	Explain the basic grammatical items and their uses.
CO-4	Evaluate the strategies for developing communicative competency.
CO-5	Experiment the art of speaking and writing.

Unit I: Arabic for Beginners

Lesson 1-4 (Page No. 1 to 19) The Alphabet, Vowels-Diphthong,

Nunation Doubled consonant, changing shapes of the Alphabet, Definite article

Unit II: Arabic for Beginners

Lesson-5 Parts of Speech Class room (Page No. 20,21)

Model sentences (Page No. 25)

Lesson-6 Noun-Qualified and Adjectives (Page No. 26 & 27)

Model sentences (Page No. 32,33)

Lesson-7 Gender (Page No. 34&35)

Lesson-8 Singular, Dual and Plural (Page No. 36&37)

Lesson-9 The Nominal Sentence (Page No. 38&40)

Model sentences (Page No. 44,45)

Unit III: Arabic for Beginners

Lesson-10 The possessive (Page No. 46& 47), Model sentences (Page No.51)
Lesson-11 Personal pronouns, We work (Page No. 52,53 & 54)
Model sentences (Page No.58 & 59)
Lesson-12 demonstrative and Relative pronouns, New York city (Page No. 60,61,62,& 67)
Lesson-13 Interrogatives, Conversation (Page No. 68,69 & 70)
Model sentences (Page No.74 & 75)

Unit IV: Al -Qirat -Al-Wazhiha Part -I

Lesson 1-7 from

Unit V: Al -Qirat -Al-Wazhiha Part -I

Lesson 8-14

Textbooks:

1. Syed Ali. Arabic for Beginners. UBS Publishers & Distributors Ltd. New Delhi:

(International Edition 2011)

2 Waheed Az-zaman Al-Keeranavi. Al -Qira'ath -Al-Wazhiha Part -I.

Course Outcomes:

СО	Upon completion of the course, the students	PSOs	Cognitive Level
	will be able to:	Addressed	
CO-1	Summarize the Arabic alphabet and speech sounds in Arabic.	1,2	Understanding
CO-2	Apply the basic grammar rules of Arabic in their communication.	1,2,5	Applying
CO-3	Discover the functions of Nouns, Adjectives, Personal and Demonstrative Pronouns, Prepositions, Countable and Uncountable for effective usage.	1,2,3	Applying
CO-4	Analyze the methods in order to attain communication skills.	1,2,3,5	Analyzing
CO-5	Evaluate conversational patterns and write short passages in Arabic.	1,2,4	Evaluating

Semester	Course Code			Title of the Course			Ho	ours	Credits	
Ι	210	21ULAR 11			GRAMMAR AND			90		
				TRAN	ISLATI	ON-I				
Course	Prog	gramme	Learnin	g Outco	mes	Pro	gramme	e Specif	ic Outco	mes
Outcomes			(PLOs	5)				(PSO	s)	
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1	2	3	4	5	1	2	3	4	5
CO-1	 Image: A start of the start of	✓			~	~	\checkmark			
CO-2	~	~				~	\checkmark			•
CO-3	~	\checkmark	✓	~		√	\checkmark	√		
CO-4	~	\checkmark		~		✓	√	√		√
CO-5	✓			~	√	~	√		~	
	Number of matches (\checkmark) = 30									
		Relationship = Medium								

SEMESTER – I

Course Title	COMMUNICATIVE ENGLISH - I
Total Hrs.	90
Hrs./Week	6
Course Code	21ULEN11
Course Type	Part – II - English
Credits	3
Marks	100

General Objective:

To teach the four skills viz. Listening, Speaking, Reading, and Writing to train the students the skills necessary for social and academic interactions.

Course Objectives:

СО	The learners will be able to:
CO-1	Understand the significance and the use of the four skills (LSRW).
CO-2	Apply the skills acquired to listen to English keenly, to understand the context clearly and to respond to others accordingly.
CO-3	Identify the strategies of language learning and use in real-life situations by means of reading extensively.
CO-4	Examine the correct and incorrect expressions in everyday English to take notes and write essays.
CO-5	Express their ideas without committing any grammatical errors.

Unit – I

- 1. Listening and Speaking
 - a. Introducing self and others
 - b. Listening for specific information
 - c. Pronunciation (without phonetic symbols)
 - i. Essentials of pronunciation
 - ii. American and British pronunciation
- 2. Reading and Writing
 - a. Reading short articles newspaper reports / fact based articles
 - i. Skimming and scanning
 - ii. Diction and tone
 - iii. Identifying topic sentences
 - b. Reading Aloud: Reading an article/report
 - c. Journal (Diary) Writing

 Study Skills - 1 Using dictionaries, encyclopedias, thesaurus Grammar in Context:

Naming and Describing

- Nouns & Pronouns
- Adjectives

Unit – II

1. Listening and Speaking

- **a**. Listening with a purpose:
- b. Effective Listening:
- c. Tonal Variation:
- d. Listening for information
- e. Asking for Information
- f. Giving Information:

2. Reading and Writing

- a. Strategies of Reading:
 - Skimming and Scanning
- b. Types of Reading:

Extensive and Intensive Reading

- c. Reading a prose passage
- d. Reading a poem
- e. Reading a short story

3. Paragraphs: Structure and types

- a. What is a Paragraph?
- b. Paragraph structure
- c. Topic Sentence
- d. Unity
- e. Coherence.
- f. Connections between Ideas: Using Transitional words and expressions.
- g. Types of Paragraphs

4. Study Skills II:

Using the Internet as a Resource

- a. Online search:
- b. Know the keyword:
- c. Refine your search:
- d. Guidelines for using the Resources:
- e. e-learning resources of Government of India
- f. Terms to know

5. Grammar in Context

Involving Action-I

- a. Verbs
- b. Concord

Unit – III

- 1. Listening and Speaking
 - a. Giving and following instructions
 - b. Asking for and giving directions
 - c. Continuing discussions with connecting ideas

- 2. Reading and writing
 - a. Reading feature articles (from newspapers and magazines)
 - b. Reading to identify point of view and perspective (opinion pieces, editorials etc.)
 - c. Descriptive writing writing a short descriptive essay of two to three paragraphs.
- 3. Grammar in Context:

Involving Action – II

- Verbals Gerund, Participle, Infinitive
- Modals

Unit – IV

- 1. Listening and Speaking
 - a. Giving and responding to opinions
- 2. Reading and writing
 - a. Note taking
 - b. Narrative writing writing narrative essays of two to three paragraphs
- 3. Grammar in Context:

Tense

- Present
- Past
- Future

Unit - V

- 1. Listening and Speaking
 - a. Participating in a Group Discussion
- 2. Reading and writing
 - a. Reading diagrammatic information interpretations maps, graphs and pie charts
 - b. Writing short essays using the language of comparison and contrast
- 3. Grammar in Context: Voice (showing the relationship between Tense and Voice)

Textbook:

Board of Editors. *COMMUNICATIVE ENGLISH* -1. Tamil Nadu State Council for Higher Education (TANSCHE). Chennai: 2020.

References:

- 1. Radhakrishna Pillai.G,ed.Written English for You.Chennai:Emerald Publishers, 1990 (rpt2008).
- 2. Nihamathullah.A.et al. A Course in Spoken English.Tirunelveli: MSU, 2005. (rpt 2010).

	Course Outcomes		
CO No.	Upon completion of this course, students would have learned to:	PLO Addressed	Cognitive Level
CO-1	Understand the importance of language skills in order to communicate effectively.	1,2	Understanding
CO-2	Apply the listening skill to pronounce words better and to understand contextual meaning.	1,2,3	Applying
CO-3	Develop reading skill to learn vocabulary, use it appropriately, and acquire analytical skill and the like.	1,2,3,4	Applying
CO-4	Explain the nuances of common errors in English.	3,4,5	Analyzing
CO-5	Choose to use English language consciously without any errors.	1,2,4,5	Evaluating

Semester Course Code			Title of the Course			Hou	irs	Credits		
I		21ULE	N11		Com E	imunica nglish -	90)	3	
Course Outcomes (COS)	F	rogran Out	nme Lo comes	earnii (PLO	ng s)	Progra	mme S	Specifi (PSOs	c Out s)	tcomes
()	PLO 1	PLO 2	PLO3	PLO4	PLO5	PSO 1	PSO 2	PSO 3	PSO 4	4 PSO 5
CO-1	✓	√				✓	✓			
CO-2	✓	√	√			✓	 ✓ 	✓		
CO-3	✓	√	✓	\checkmark		~	 ✓ 	✓	~	
CO-4	✓		✓	\checkmark	✓	✓		✓	~	✓
CO-5	✓	1		~	✓	✓	✓		~	~
				Numb	er of n	natches (✓) = 34	ŀ		
		Relationship = High								

SEMESTER – I

Course Title	Differential Calculus
Total Hours	75
Hours./ Week	5
Course Code	21UCMA11
Course type	DSC-I
Credits	4
Marks	100

General Objective:

To recognize the appropriate tools of calculus to solve applied problems in a variety

of settings ranging from physics and biology to business and economics

Course Objectives:

CO	The learner will be able to:
CO-1	Recall the basics of differentiation.
CO-2	Apply the differentiation concept to find the extrema of various functions.
CO-3	Evaluate the radius, centre and circle of curvature of curves.
CO-4	List out the various types of singular points lying on a curve.
CO-5	Solve the simultaneous equations using Laplace transformation.

Unit I: Differentiability-Algebra of derivatives-Derivatives of some standard function - hyperbolic function-inverse function - chain rule – substitution method – logarithmic differentiation – parametric method- implicit function – nth derivative.

Unit II: Polar curves – Pedal equation of a curve -Maxima and Minima of functions of two variables

Unit III: Curvature – radius of curvature in Cartesian, parametric and polar coordinates – Evolutes - circle and centre of curvature.

Unit IV: Multiple points-Kinds of cusps - Asymptotes (Excluding Asymptotes of Polar curve).

Unit V: Laplace transform – Inverse Laplace transform- solving linear differential equations & simultaneous equations of first order using Laplace transform.

Textbooks:

1. ArumugamS. and Isaac. *Calculus*, New Gamma Publications, Palayamkottai, Edition 2005.

2. Arumugam S. and Isaac. *Differential Equations and Applications*, New gamma Publishing House, Palayamkottai, Edition 2011.

Unit I : TB1: Part I – Chapter II : Section 2.0 – 2.12 Unit II : TB1: Part I - Chapter III : Section 3.2,3.3,3.7 Unit III : TB1:Part I - Chapter III : Section 3.4, 3.5 Unit IV: TB1: Part I – Chapter III: Section 3.10 3.11 (Excluding Asymptotes of Polar curve) Unit V : TB 2: Chapter III

Reference Books:

1. Narayanan S., Manicavachagam Pillay T.K. Calculus (Volume I), S. Viswanathan Printers

& Publishers Pvt Ltd, Chennai Edition 2014.

2. Joseph A. Mangaladoss. *Differential Equation and Vector Calculus*, Presi-Persi Publications, Tirunelveli, Edition 2012.

Course Outcomes

CO	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Find the derivatives of functions using various methods	1,3	Remembering
CO-2	Apply the concept of differentiation to find the pedal equation of a curve.	1,2,3	Applying
CO-3	Determine the centre and circle of curvature of curves.	1,3	Evaluating
CO-4	Understand the behaviour of curves using asymptotes and sketch the graphs.	1,3	Understanding
CO-5	Make use of the concept of Laplace transform and inverse Laplace transform for solving ODE.	1,3	Applying

Semester	Cou	rse Code		Title of the Course			Hours		Credit	
Ι	21 U	CMA11	I	Differential Calculus			75		4	
Course Programme Lea				rning Outcomes Prog Os)			gramme Specific Outcomes (PSOs)			
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
(003)	1	2	3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark		
CO-2	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
CO-3	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark		
CO-4	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark		
CO-5	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark		
	Numbe	er of mate	thes (\checkmark)	= 31		-		Relatior	ship = M	ledium

SEMESTER - I

Course Title	Classical Algebra
Total Hours	75
Hours./ Week	5
Course Code	21UCMA12
Course type	DSC-II
Credits	4
Marks	100

General Objective:

To provide a new and refined approach in the study of abstract mathematical relationships through the use of new symbolism

Course Objectives:

CO	The learner will be able to:
CO-1	Illustrate he formation of equations.
CO-2	Relate roots and coefficients of algebraic equations
CO-3	Evaluate the Sum of the r th powers of the roots of the given equations
CO-4	Find the Nature and Position of Roots of equations
CO-5	Evaluate an approximate solution of an equation using Newton's and Horner's
005	methods.

Unit I: Formation of Equations -Division Algorithm – Fundamental theorem of Algebra.

Unit II: Relation between roots and coefficients-Symmetric functions of roots in terms of coefficients.

Unit III: Sum of the rth powers of the roots – Newton's theorem- Reciprocal Equations.

Unit IV: Transformation of equations- Nature and Position of Roots-Descarte's rule of signs -Rolle's Theorem.(Excluding Sturm's theorem)

Unit V: Cardon's method for solution of cubic equation- Ferrari's method for solution of biquadratic equation - Approximate solutions of Numerical Equations using Newton's method and Horner's method.

Textbook:

Arumugam S. and Isaac, Algebra (Theory of equations, Theory of numbers and

Trigonometry) New Gamma Publications, Palayamkottai, Edition 2011.

Unit I : Chapter 5 Section 5.1

Unit II : Chapter 5 – Section 5.2

Unit III: Chapter 5 - Section 5.3, 5.4

Unit IV : Chapter 5 - Section 5.5, 5.7(Excluding Sturm's theorem)

Unit V : Chapter 5-Section 5.8 - 5.10

Reference Books:

1. Joseph A. Mangaladoss, Firthous FatimaS, HimayaJaleela Begum M and Syed Ali Fathima

- S. Classical Algebra, Presi-Persi Publications, Tirunelveli-Edition May 2016.
- 2. Manicavachagam Pillai T.K., and Natarajan T. and Ganabathy K. S. Algebra(Volume

I), Viswanathan Printers & Publishers Pvt Ltd, Chennai Edition 2014.

Course Outcomes

CO.NO	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Understand the fundamental concepts of algebra.	1,2	Understanding
CO-2	Find symmetric functions of roots in terms of coefficients.	1,2	Remembering
CO-3	DetermineS _r using Newton's theorem	1,2	Evaluating
CO-4	Find the nature of rootsof an algebraic equationusing the concept of Descarte's rule of signs.	1,2,3	Remembering
CO-5	Determine the solution of cubic and biquadratic equations using Cardon's and Ferrari's methods.	1,2	Evaluating

Semester	Cou	ırse Cod	e	Title of the Course			Hour	s	Credit		
Ι	21	UCMA12	2	Classica	l Algebr	ora 75 4					
Course	Pro	gramme	Learn	ing Outco	mes	Pro	Programme Specific Outcomes				
Outcomes			(PLOs)				(PSOs	3)		
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO	
	1	2	3	4	5	1	2	3	4	5	
CO-1	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark				
CO-2	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark				
CO-3	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark				
CO-4	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark			
CO-5	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark				
	Numbe	er of mate	hes (√) = 27			Rela	tionship) = Mediu	m	

SEMESTER I

Course Title	Mathematical Statistics-I
Total Hours	90
Hours./ Week	6
Course Code	21UAST11
Course type	Allied-I/1
Credits	4
Marks	100

General Objective:

To introduce various statistical tools to satisfy the need for concept personals and understand how sampling techniques are used in real-life problems.

Course Objectives:

CO	The learner will be able to::
CO-1	Recall the measures of central tendency and compute different kinds of partition
0.0-1	algebraically and graphically.
CO-2	Understand the meaning of the term correlation and the significance of its study.
CO-3	Compare variables and attributes.
CO-4	Apply sampling techniques to test the significance of large samples
CO-5	Estimate the test of significance using 't' and 'F' distribution.

Unit I: Central Tendencies: Introduction – Arithmetic Mean – Partition Values Median, Quartiles, Deciles and Percentiles - Mode - Geometrical mean and Harmonic mean -Measures of dispersion: Range- Quartile deviation- Standard deviation and Mean deviation – Coefficient of variation.

Unit II: Correlation and Regression: Karl Pearson's Coefficient of Correlation – Properties - Rank Correlation- Lines of regression - Regression coefficient and properties.

Unit III: Theory of Attributes: Introduction – Attributes - Consistency of data – Independence and Association of data – Coefficient of association.

Unit IV: Test of significance (Large Samples): Introduction – Sampling - Sampling distribution –Testing of hypothesis –Test of significance for proportion and percentage – Test of significance for means – Test of significance for standard deviation.

Unit V: Test of significance (Small samples): Introduction – Test of significance based on t– distribution – Test of significance based on F-test.

Textbook:

Arumugam S and Isaac. *Statistics*. New Gamma Publishing house, Palayamkottai, Edition July 2013.

Unit I : Chapter 2: Section 2.1 to 2.4, Chapter 3: Section 3.1

Unit II : Chapter 6: Section 6.1 - 6.3 Unit III: Chapter 8: Section 8.1 - 8.3 Unit IV: Chapter 14: Section 14.1 - 14.5 Unit V : Chapter 15: Section 15.1, 15.2

Reference Books:

1. GuptaS.C. and KapoorV.K. *Fundamentals of Mathematical Statistics*. Published by Sulthan Chand & Sons, New Delhi,11th Edition.

2. Gupta S.P. *Statistical Methods*, Published by Sulthan Chand & Sons, New Delhi 42ndEdition.

3. Pillai R.S.N. and Bagavathi, *Statistics*, Published by S. Chand & Company PVT. LTD, New Delhi, First Edition.

CO.	Upon completion of the course, the students will be able	PSOs	Cognitive
NO	to:	Addressed	Level
CO-1	Define central tendency and explain the concept of dispersion and the significance of measuring it.	1,3,4	Remembering
CO-2	Interpret important properties of correlation coefficient and regression.	1,2,4	Understanding
CO-3	Demonstrate the concept of association of attributes and obtain a qualitative measure of association between two attributes.	1,2,4	Understanding
CO-4	Make use of the various tests of significance for large samples.	1,2,4	Applying
CO-5	Test the significance of small samples using 't' and 'F' distribution.	1,2,4	Applying

COURSE OUTCOMES

Semester	Cou	rse Code]	Title of the Course			Hours		Credit	
Ι	210	JAST11		Mathematical Statistics-I			90		4	
Course Outcomes	Pro	gramme	g Outco	Programme Specific Outcomes (PSOs)						
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1	2	3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	
CO-2	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		✓	
CO-3	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		✓	
CO-4	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
CO-5	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
	Numbe	r of mate	hes (✓) =	=40	•	-	Rela	tionsh	ip = High	•

SEMESTER – I

Course Title	VALUE EDUCATION-1
Total Hrs.	30
Hrs./Week	2
Course Code	21USVE1A
Course Type	AECC-I
Credits	2
Marks	100

General Objective: To make students inculcate moral values, leading to faith and righteous action in their life.

Unit – I:Islam – Meaning – Importance – A complete Religion – The religion accepted by
God – Five Pillars of Islam – Kalima – Prayers – Fasting – Zakat – Haj. Iman – Monotheism
– Angels – Books – Prophets – Dooms Day – Life after death – Heaven and Hell.

Unit – II:Quran – The Book of Allah – Wahi – Revelation to Prophet Muhammad(sal) – Compilation – Preservance – Structure – Content – Purpose – Source of Islamic Law– SuraFathiha, Kafirun, Iqlas, Falakh and Nas.

Unit – III:Hadith – Siha Sitha – Buhari – Muslim – Tirmithi – Abu Dawood – Nasai – Ibn Maja – Collection of Hadith – Meaning of 40 Hadith.

Unit – IV:Life History of Prophet Muhammad (sal) – AiamulJahiliya – Prophet's Childhood and Marriage – Prophethood – Life at Mecca – Life at Medinah – Farewell Address – Seal of Prophethood.

Unit – V:Good character – Etiquettes – Halal and Haram – Duties towards Allah – Duties towards fellow beings – MasnoonDuas.

Textbooks:

Publication of SadakathullahAppa College

Reference Books:

- 1.V.A. Moahmed Ashrof Islamic Dimensions Reflection and Review on Quranic Themes.
- 2. The Presidency of Islamic Researchers Revised & Edited The Holy Quran.
- 3.M. ManzoorNomani Islamic Faith & Practice.
- 4. Ali Nadawi, Abul Hasan- Muhammad Rasulullah., Muassasathus Sahafawa Nashr

publication Lucknow, India, 1999.

- 5.K. Ali A Study of Islamic History.
- 6.Abdul Rahuman Abdulla
 - h Islamic Dress code for Women.
- 7.Dr. MunirAhamed Mughal Code For Believers.
- 8. Abdul Malik Mujahid Gems and Jewels.

SEMESTER - I

Course Title	VALUE EDUCATION-11
Total Hrs.	30
Hrs./Week	2
Course Code	21USVE1B
Course Type	AECC-I
Credits	2
Marks	100

UNIT I

Individual Morality – Objective of Moral life – Living in accordance with the code of Morality – the goodness of Morality – Morality and *Thirukural*- The need for faith.

UNIT II

Adherence to higher code of Morality – Fear of God – Good Moral Values – Duty to Parents – Teacher, respecting elders – Moral Etiquettes – Right-minded Principle – High Principles for Proper conduct.

UNIT III

Inculcating good attitudes – Open mindedness – Morale – analysing the pros and cons of good and bad – Service to others – Mind Power, tolerance, respecting others, showing love to others, patience – tranquility – Modesty, kindness and forgiveness.

UNIT IV

Quotations and moral Stories expressing Good characters of Great personalities – Life History of Great people: Mahatma Gandhi, Abraham Lincoln, Dr. A.P.J. Abdul Kalam.

UNIT V

Truth, the importance of uprightness, integrity, friendship – Health awareness on Alcohol and drug abuse – inculcating reading habit – reading good books – Hygiene – Dowry – Corruption.

TEXTBOOKS:

Publication of Sadakathullah Appa College.

SEMESTER – II		
Course Title	சமயத்தமிழ்	
	Religious Tamil or Tamil and Religion	
Total Hrs.	90	
Hrs./Week	6	
Course Code	21ULTA21	
Course Type	Part – I - Tamil	
Credits	3	
Marks	100	

General Objective: To expose students to the tenets of all the religions.

Course Objectives:						
CO	The learners will be able to:					
CO-1	Understand religions and their objectives by means of the literary texts prescribed.					
CO-2	Classify the tenets, concepts and rituals of various religions.					
CO-3	Choose to know about the concept of virtues necessary for society through literature of ethics.					
CO-4	Devise strategies to get through competitive exams.					
CO-5	Consider focussing on their skill development by gaining confidence.					

அலகு – 1

சைவம்

1.	அ. திருஞானசம்பந்தர்	- தோடுடைய செவியன்
		- என்ன புண்ணியம் செய்தனை (2.106.1)
		- ஊனத் திருள்நீங் கிட (1.38.3)
ஆ.	திருநாவுக்கரசா்	- மாசில் வீணையும்
		- குனித்த புருவமும் கொவ்வைச்
		- புழுவாய்ப் பிறக்கினும்
Q .	சுந்தரமூர்த்தி நாயனார்	- பித்தா பிறைசூடி
		- பொன்னார் மேனியனே
2.	மாணிக்கவாசகர்-திருவாசகம்	- வானாகி மண்ணாகி
	திருவெம்பாவை	- முன்னைப் பழம்பொருட்கும்
3.	திருமூலா்-திருமந்திரம்	- உள்ளம் பெருங்கோயில்

வைணவம்

4.	அ. பொய்கையாழ்வார் - பாலன் தனதுருவாய் ஏழுலகுண்டு
	ஆ) பூதத்தாழ்வார் - சென்ற திலங்கைமேல்
	இ) பேயாழ்வார் - அடைந்த தரவணைமேல் ஐவர்க்காய்
	ஈ) நம்மாழ்வார் - உண்ணும் சோறு
	உ) மதுரகவியாழ்வார் - கண்ணி நுண்சிறுத்
5.	ஆண்டாள்-திருப்பாவை - மார்கழித் திங்கள்
	சமணம்
6.	யசோதர காவியம் (கடவுள் வாழ்த்து) - நல்லார் வணங்கப் படுவான்
	நீலகேசி (கடவுள் வாழ்த்து)
	பௌத்தம்
7.	மணிமேகலை (பாத்திரம் பெற்ற காதை) - மாரனை வெல்லும் வீரநின் (59-72)
	கிறித்தவம்
8.	இரட்சணிய யாத்திரிகம் (கடவுள் வாழ்த்து) - 1. மூல காரண முதற்பொருள்
	- 2. ஆதி மெய்த்திரு
	- 3. வானமும், பூமியும்
	இஸ்லாம்
9.	உமறுப்புலவர் - அல்லாஹ்
10.	சதாவதானி செய்குதம்பிப் பாவலர் - மாண்டசவம் ஒன்றெடுத்து
	(நபிகள் நாயக மான்மிய மஞ்சரி) - ஒன்று தெய்வம் ஒன்று மதம்
	இரகுமான் கண்ணி
11.	குணங்குடி மஸ்தான் சாகிபு 1) ஈறும் முதலுமற்றே இயங்குகின்ற முச்சுடராய்க்
	காணிக்கை வைத்தேனென் கண்ணே நகுமானே-2
	2) ஏகப் பெருவெளியில் இருட்கடலிற் கம்பமற்ற
	காகமது வானேன் கண்ணே நகுமானே — 7
	3) வேட்டை பெரிதென்றே வெறிநாயைக் கைப்பிடித்து
	காட்டிற் புகலாமோ கண்ணே றகுமானே – 22
	4) இன்றுள்ளோர் நாளைக் கிருப்பதுபொய்
	யென்பதையான் கண்டுகொண்டேன் ஐயாவென்
	கண்ணே நகுமானே - 37
	5) எட்டிப் பிடிக்கும் இதமறிந்தா லுன்பதத்தைக்
	கட்டிப் பிடித்திடுவேன் கண்ணே றகுமானே – 49
12.	ஞானமாமேதை தக்கலை பீர்முகம்மது அப்பா - அலைகடலும் அம்புலியும்
	- பொல்லாக்குபிர்களும் வருங்

13. இறையருட்கவிமணி பேராசிரியர்
 கா.அப்துல்கபூர்
 அலகிலா அருளும் அளிவிலா..

நீதி இலக்கியம்

14.	திருக்குறள்	- உழவு (1031-1040)
15.	நாலடியார்	- கல்வி கரையில கற்பவர் நாள்சில 135
16.	நான்மணிக்கடிகை	- நாற்றம் உரைக்கும் மலர் 45

அலகு – 2

புதினம்

வாடிவாசல் - சி.சு. செல்லப்பா, காலச்சுவடு, நாகர்கோவில்

அலகு – 3

உரைநடை

(போட்டித் தேர்வுகளுக்குக் கட்டுரை எழுதும் பயிற்சி)

- 1. நபிகள் நாயகம் (ஸல்) அன்பின் தாயகம்
- 2. சதக்கத்துல்லாஹ் அப்பா அவர்களின் வாழ்வும் பணியும்
- 3. பண்பெனப்படுவது பாடறிந்து ஒழுகுதல்
- 4. நம்பிக்கையோடிருப்போம்
- 5. தமிழின் தொன்மையும் சிறப்பும்
- 6. தடம் பதித்த தமிழ் நாவலாசிரியர்கள்

அலகு – 4

இலக்கிய வரலாறு

(போட்டித் தேர்வுத் தயாரிப்பு)

- 1. சைவம், வைணவம், கிறித்தவம், இசுலாம், வளர்த்த தமிழ்
- 2. புகழ்பெற்ற தமிழ் நூல்கள், நூலாசிரியர்கள்
- 3. சாகித்ய அகாதெமி விருது பெற்ற படைப்புகள்

அலகு – 5

தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையம் நடத்தும் போட்டித் தேர்வுக்குரிய பொதுத்தமிழ் இலக்கணப் பகுதி ஓர் அறிமுகம்

- 1. வேர்ச்சொல்லைக் கண்டறிதல்
- 2. பெயரெச்சம், வினையெச்சம், முற்றெச்சம் பற்றி அறிதல்
- 3. வினைமுற்று, ஏவல் வினைமுற்று அறிதல்
- 4. வியங்கோள் வினைமுற்று, வினையாலணையும் பெயர்
- 5. வினைத்தொகை, பண்புத்தொகை அறிதல்

- 6. உவமைத்தொகை, உம்மைத் தொகை அறிதல்
- 7. வேற்றுமைத் தொகையைக் கண்டறிதல்
- 8. அன்மொழித் தொகையைக் கண்டறிதல்
- 9. இரட்டைக்கிளவி, அடுக்குத்தொடர் அறிதல்

பாடநூல்:

சமயத்தமிழ், சதக்கத்துல்லாஹ் அப்பா கல்லூரித் தமிழ்த்துறை வெளியீடு,

பார்வை நூல்

சமயம் வளர்த்த தமிழ், வேங்கடசாமி நாட்டார், பாவைப் பதிப்பகம், சென்னை

Course Outcomes:						
СО	Upon completion of this course, students will be able to	PSOs Addressed	Cognitive Level			
CO-1	Understand the doctrines, divine thoughts and virtues of the various religions.	1,3,4,5	Understanding			
CO-2	Develop impeccable spoken and written languge ability.	1,4,5	Applying			
CO-3	Choose to improve their confidence and the nuances of governance by reading the history of great personalities.	1,4	Applying			
CO-4	Explain the ancient Tamil people's life history.	3,4,5	Analyzing			
CO-5	Summarize great literary works and to get substance from them to attract employment opportunites.	1,2	Evaluating			

Semester Course Code		Title of the Course			Hours		Credit			
II	21	ULTA2	1	មាលារី	த்தமிழ்		90		3	
Course Outcomes	CourseProgrammOutcomesOutcome				g		Progra Outc	mme omes	Specifie (PSOs)	C
(COs)	PLO 1	PLO 2	PLO	3 PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	\checkmark	\checkmark	 ✓ 	✓		\checkmark		\checkmark	 ✓ 	\checkmark
CO-2	\checkmark	\checkmark	\checkmark			\checkmark			\checkmark	\checkmark
CO-3	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark	
CO-4	\checkmark	\checkmark	\checkmark					\checkmark	\checkmark	\checkmark
CO-5	\checkmark	\checkmark				\checkmark	\checkmark			
	Num Relat	ber of n ionship	natch = Me	es (√) = 3 edium	81					

SEMESTER - II

Course Title	BASIC GRAMMAR AND TRANSLATION-II
Total Hrs.	90
Hrs./Week	6
Sub. Code	21ULAR21
Course Type	Part – I - Arabic
Credits	3
Marks	100

General Objective: To make the students develop the intermediate Arabic Grammar and Translation skills.

Course Objectives:

СО	The learners will be able to:
CO-1	Understand the parts of speech of Arabic to comprehend text books in terms of the sentences given.
CO-2	Differentiate the conjugations of verbs in Arabic.
CO-3	Explain the various predicates in Arabic sentences.
CO-4	Illustrate the morphology in Arabic grammar.
CO-5	Analyze nominal sentences in Arabic.

Unit I: Arabic for Beginners

Lesson-14 Prepositions, The village (Page No. 76& 77)

Lesson-15 Verbal sentence – The past tense (Page No. 82 to 87)

Lesson-16 The Imperfect tense- The River Nile (Page No. 93 to 97)

Lesson-17 The Imperative and Negative command (Page No. 102 to 104)

Unit II: Al -Qirat –Al-Wazhiha Part –I

Lesson 15-21

Unit III: Arabic for Beginners

Lesson-20 The verbs of Incomplete predicate (Page No. 126 to 130)
Lesson-21 Inna and its categories, the banks (Page No. 136,137) Lesson-22 the Numerals, Days and months (Page No. 144 to 148) Lesson-24 اسم التفضيل (Page No. 151)

Unit IV: Al -Qirat –Al-Wazhiha Part –I

Lesson 22-28

Unit V: Al -Qirat –Al-Wazhiha Part –I

Lesson 29-35

Text and Reference books

1) Arabic for Beginners (selected topics only)

By Dr. Syed Ali (Former HOD of Arabic, The New College, Chennai.

(UBS Publishers & Distributors Ltd) 5, Ansari Road, New Delhi -110 002.

2) Al -Qirat –Al-Wazhiha Part –I, From Lesson 15 to 35 only.

by Waheed Az-zaman Al-Keeranavi.

Available at: Al-Manar Book Depot, Mannarpuram, Trichy-20.

Course Outcomes

CO	Upon completion of the course, the students	PSOs	Cognitive
	will be able to	Addressed	Level
CO-1	Understand the intermediate Arabic grammar.	1,2,3	Understanding
CO-2	Apply the functions of verbs such as the past tense, the imperfect tense etc. in sentences.	1,2,4	Applying
CO-3	Produce sentences in Arabic with the grammar rules.	1,4,5	Applying
CO-4	Categorize the different particles in Arabic.	1,2,3	Analyzing
CO-5	Find errors in Arabic sentences with the rules of grammar and translate Arabic texts.	1,4,5	Evaluating

Semester	Cour	se Code		Title of the Course					Hours		Credits	
II	21ULAR 21		B	ASIC G	RAMM	AR AN	D	90			3	
				TRAN	SLATI	ON-II						
Course	Pro	gramme	Learnin	g Outco	mes	Pro	gram	me S	Specifi	c Outco	mes	
Outcomes			(PLOs)					(1	PSOs)			
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSC		PSO	PSO	PSO	
	1	2	3	4	5	1	2		3	4	5	
CO-1	✓	\checkmark	✓	✓	✓	✓	٢		✓			
CO-2	✓	\checkmark	✓	✓		✓	v			√		
CO-3	✓	\checkmark	✓			✓				√	✓	
CO-4	<		✓	✓	✓	✓	v		✓			
CO-5		√			✓	✓				√	 ✓ 	
				Num	ber of m	atches =	= 33					
		Relationship = Medium										

SEMESTER – II

Course Title	COMMUNICATIVE ENGLISH - II
Total Hrs.	90
Hrs./Week	6
Course Code	21ULEN21
Course Type	Part – II - English
Credits	3
Marks	100

General Objective:

To teach students the four skills viz. Listening, Speaking, Reading, and Writing and to impart language skills through basic grammatical categories.

Course Objectives:

СО	The learners will be able to:
CO-1	Understand the importance of real-life situations, as responding to complaints and to use language effectively.
CO-2	Generalize the nuances and methods of giving short speeches, proposing welcome address and vote of thanks and the like.
CO-3	Associate themselves with learning to give short presentations, formal presentations and writing e-mails.
CO-4	Apply their knowledge in writing sentences with grammatical order, writing brochure and understanding texts in context.
CO-5	Develop their knowledge and skills to use clauses and collocations appropriately in spoken and written contexts.

Unit – I

Listening and Speaking

- a. Listening and Responding to Complaints (formal situation)
- b. Listening to Problems and Offering Solutions (informal)

Reading and Writing

- a. Reading Aloud (brief motivational anecdotes)
- b. Writing a Paragraph on a Proverbial Expression / Motivational Idea

Word Power / Vocabulary

a. Synonyms and Antonyms

Grammar in Context

• Adverbs

• Prepositions

Unit – II

Listening and Speaking

- a. Listening to Famous Speeches and Poems
- b. Making Short Speeches Formal:

Welcome Speech and Vote of Thanks.

Informal Occasions - Farewell Party, Graduation Speech

Reading and Writing

a. Writing Opinion Pieces (could be on travel, food, film / book reviews

or on any contemporary topic)

- b. Reading Poetry
- i. Reading Aloud: (Intonation and Voice Modulation)

ii. Identifying and using figures of speech-simile, metaphor, personification etc.

Word Power

a. Idioms and Phrases

Grammar in Context

Conjunctions and interjections

Unit – III

Listening and Speaking

- a. Listening to Ted Talks
- b. Making Short Presentations Formal Presentation with PPT,

Analytical Presentation of Graphs and Reports of Multiple Kinds

c. Interactions during and after the Presentations

Reading and Writing

- a. Writing Emails of Complaint
- b. Reading Aloud Famous Speeches

Word Power

a. One word Substitution

Grammar in Context:

• Sentence Patterns

Unit – IV

Listening and Speaking

a. Participating in a Meeting: face to face and online

b. Listening with Courtesy and adding ideas and giving opinions

during the meeting and making concluding remarks

Reading and Writing

- a. Reading Visual Texts Advertisements
- b. Writing a Brochure

Word Power

a. Denotation and Connotation

Grammar in Context:

• Sentence Types

Unit - V

Listening and Speaking

- a. Informal Interview for Feature Writing
- b. Listening and Responding to Questions at a Formal Interview

Reading and Writing

- a. Writing Letters of Application
- b. Reader's Theatre (Script Reading)

c. Dramatizing Everyday Situations / Social issues through Skits. (writing scripts and performing)

Word Power

a. Collocation

Grammar in Context:

• Working with Clause

Textbook:

COMMUNICATIVE ENGLISH-II. Tamil Nadu State Council for Higher Education (TANSCHE).2020.

References:

- 1. RadhakrishnaPillai.G,ed.Written English for You.Chennai: Emerald Publishers,1990 (rpt2008).
- 2. Nihamathullah.A.et al. A Course in Spoken English, Tirunelveli: MSU,2005. (rpt 2010).

CO No.	Upon completion of this course, students will be able to:	PLO Addressed	Cognitive Level
CO-1	Distinguish the various real life	1,2	Understanding
CO-2	Experiment giving short speeches, welcome address, vote of thanks in programmes and functions organised	1,2,3	Applying
CO-3	Write e-mails and give short presentations, formal presentations using the English language.	1,2,3,4	Applying
CO-4	Order sentences with its basic units and to prepare brochures etc.	1,2,3,4	Analyzing
CO-5	Find errors in the correct use of collocations and clauses in everyday spoken and written communication.	1,2,3,4,5	Evaluating

Course Outcomes

Semester	Cours	e Cod	e	Tit	le of t	he Cou	ırse	Ho	ours	Credits
II	21UI	EN21	C	COMMUNICATIVE ENGLISH						3
	_				-	11	_			
Course	Pro	ogram	me L	earnin	g		Progran	1me	Speci	ific
Outcomes	0	Dutco	mes (l	PLOs)			Outco	mes	(PSO	s)
(COS)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1	2	3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark				\checkmark	\checkmark			
CO-2	\checkmark	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark		
CO-3	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark		\checkmark	\checkmark	
CO-4	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark		\checkmark	\checkmark	
CO-5	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark
	Numbe	er of m	atche	es (√) =	=36					
	Relatio	nship	= Hig	gh						

SEMESTER II

Course Title	Integral Calculus
Total Hours	75
Hours./ Week	5
Course Code	21UCMA21
Course type	DSC-III
Credits	4
Marks	100

General Objective:

To impart the knowledge of integration and provide the students with the fundamental concepts, underlying principles, various mathematical techniques and methods such as Beta and Gamma functions to evaluate complicated integrals.

Course Objectives:

СО	The learners will be able to:
CO-1	Explain that sometimes integrating by parts needs to be applied more than once.
CO-2	Evaluate the solution of complicated integrals using Beta and Gamma functions.
CO-3	Identify the Inter-relationship among the line integral, double and triple integral formulations
CO-4	Evaluate integrals of functions or vector relation quantified over curve, surface, and domains in two and three-dimensional space and compute vector-valued function and gradient derivatives.
CO-5	Evaluate the line integral and surface integral

Unit I - Evaluation of definite integrals- integration by parts - Jacobian.

Unit II - Evaluation of integrals using Beta and Gamma functions.

Unit III -Double and Triple integrals – Evaluation of Double and Triple Integrals - change of variables.

Unit IV – Vector Differentiation – gradient – curl – divergent – solenoidal – irrotational – formulae involving gradient, curl and divergent.

Unit V – Vector Integration – line integral – Surface integral –Gauss, Stoke's & Green's Theorem (without proof) and Problems.

Textbooks:

- 1. Arumugam S. and Issac. Calculus.New Gamma Publications, PalaymkottaiEdition 2005.
- 2. Arumugam S. and Issac. Analytical Geometry of 3D and Vector Calculus. New Gamma

Publications, Palayamkottai Edition 2011.

Unit I : TB 1: Part II - Chapter II : Section 2.6,2.7& Part I-3.9

Unit II : TB 1: Part II - Chapter IV

Unit III: TB 1: Part II-Chapter III

Unit IV: TB 2: Part B-Chapter V

Unit V: TB 2: Part B Chapter VII

Reference Books:

1. RawatK.S.IntegralCalculus. Published by SARUP& Sons, New DelhiEdition 2008.

2. Manicavachagam Pillay T.K., Narayanan S. Calculus (Volume II), Viswanathan Printers

& Publishers Pvt Ltd, Chennai Edition October 2014.

Course Outcomes

CO.	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Evaluate definite integrals using integration by parts and the Jacobian method.	1,3	Evaluating
CO-2	Estimate the value of integrals using Beta and Gamma functions.	1,2,3	Evaluating
CO-3	Apply double and triple integral to find the length, area, volume of a curve	1,3	Applying
CO-4	Evaluate derivatives of vector value function and gradient of functions	1,3	Evaluating
CO-5	Evaluate integrals of function over curves, surfaces and domain in two dimensional and three- dimensional spaces.	1,3	Evaluating

Semester	Course Code			Title of the Course		se	Hours		Credit		
II	21UCMA21			Integral Calculus			75		4		
Course	Pro	gramme	Learni	rning Outcomes			Programme Specific Outcomes				
Outcomes			(PLOs)					(PSOs)			
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO	
	1	2	3	4	5	1	2	3	4	5	
CO-1	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark			
CO-2	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark			
CO-3	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark			
CO-4	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark			
CO-5	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark			
]	Number (of match	nes (√) =	= 31		Relation	ship = N	Medium		

SEMESTER II

Course Title	Analytical Geometry of 3D
Total Hours	75
Hours./ Week	5
Course Code	21UCMA22
Course type	DSC-IV
Credits	4
Marks	100

General Objective:

To give more knowledge of the geometrical figures through algebraic methods.

Course Objectives:

CO.	The learner will be able to::
CO-1	Outline the concept of rectangular Cartesian coordinates and evaluate the direction cosines and direction ratios of the line
CO-2	Evaluate angle between two planes
CO-3	Estimate the image of a point and image of a line
CO-4	Find the length of the shortest distance between two lines
CO-5	Determine the equations of a sphere and also find the equation of tangent plane to the sphere.

Unit I Coordinate system-Rectangular Cartesian coordinates – Distance between two points - Direction cosines - Direction ratios - Angle between two lines.

Unit II Planes – Equation of a plane- Intercepts form, Normal form, Transformation to the normal form – Angle between two planes-Angle bisectors of two planes.

Unit III Straight lines-Equation of a Straight Line- Symmetrical form - Non-Symmetrical form -Two-Point form-Image of a point-Image of a line.

Unit IV A plane and a straight line - coplanar lines-skew lines-length and equations of shortest distance between two lines.

Unit V The Sphere – Plane section of sphere – Tangent plane – Touching spheres – Intersection of spheres.

Textbook:

Arumugam S and Isaac. *Analytical Geometry 3–D & Vector Calculus*. New Gamma Publication House, Palayamkottai Edition 2011.

Unit I : Chapter I Unit II : Chapter II Unit III: Chapter III Section 3.1 Unit IV: Chapter III Section 3.2 Unit V : Chapter IV **Reference Books:**

1. Manickavachagam Pillay T.K. and Narayanan. Analytical geometry of three dimension.S.

Viswanathan Printers & Publishers, ChennaiEdition 2007.

2. Stephen John.B, *Analytical geometry of 3D and vector differentiation*, Ideal publication, Martha damaged, Edition 2008.

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Explain the concept of the angle between two lines	1,2,4	Understanding
СО-2	Determine the perpendicular length from a point to a plane and obtain the bisectors of two planes.	1,2,4	Evaluating
CO-3	Determine the equation of the shortest distance between two lines and the image of a line.	1,4,5	Evaluating
CO-4	Define the concept of Coplanar lines and Skew lines and obtain the length and equations of the shortest distance between two lines.	1,2,4	Remembering
CO-5	Explain the concept of the sphere and their properties.	1,4,5	Evaluating

Course Outcomes

Semester	Cour	se Code		Title of the Course				ours	Cred	lits
II	21UC	CMA22	A	Analytical Geometry of 3D					4	
Course	Prog	gramme	Learnin	ng Outcomes Programme Specific O				e Outcon	nes	
Outcomes		_	(PLOs)	-	(PSOs)					
(COs)	PLO	PLO PLO PLO PLO PLO				PSO	PSO	PSO	PSO	PSO
	1	1 2 3 4 5					2	3	4	5
CO-1	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
CO-2	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
CO-3	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark	\checkmark
CO-4	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
CO-5	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark	\checkmark
	Number	r of matcl	nes (√) =	= 35		F	Relations	hip = Hi	gh	

SEMESTER II

Course Title	Mathematical Statistics-II
Total Hours	90
Hours./ Week	6
Course Code	21UAST21
Course type	Allied-I/2
Credits	4
Marks	100

General Objective:

To familiarize the concept of probability and make a prediction about the probability of certain events and identify the random variables and their characteristics

Course Objectives:

СО	The learner will be able to:
CO 1	Recall the basic concepts of statistical distributions
CO 2	Compare the concept of a discrete and continuous random variable
CO 3	Understand the concept of Skewness and Kurtosis
CO 4	Compare Binomial and Poisson distribution
CO 5	Experiment with Normal distribution

Unit I: Random Experiments – Trials and Events – Mutually exclusive and exhaustive events-Probability - Definition- Conditional Probability – Multiplication theorem- Pairwise independent and Mutually independent events – Baye's theorem.

Unit II: Random variables - Discrete and Continuous - Probability Density function – Distribution function – Mathematical Expectations.

Unit III: Moments, Skewness and Kurtosis- Moment generating function and their properties - Cumulant Generating function -Characteristic function.

Unit IV: Some Special Distributions- Binomial Distribution- Poisson distribution.

Unit V: Normal Distribution - Standard normal distribution - Properties - Simple problems.

Textbook:

Arumugam S and Isaac: *Statistics*. New Gamma Publishing house, Palayamkottai Edition 2013. Unit I : Chapter 11 Unit II : Chapter 12: Section 12.0 – 12.4 Unit III : Chapter 4 and Chapter 12: Section 12.5 -12.6 Unit IV : Chapter 13: Section 13.0 – 13.2 Unit V : Chapter 13: Section 13.3

Reference Books:

- 1. Gupta S.C. and KapoorV.K. *Fundamentals of Mathematical Statistics*, Published by Sulthan Chand & Sons, New Delhi 11thEdition.
- 2. Gupta S.P. *Statistical Methods*, Published by Sulthan Chand & Sons, New Delhi 42ndEdition.
- 3. Pillai R.S.N. and Bagavathi, *Statistics*, Published by S. Chand & Company PVT. LTD, New Delhi, First Edition.

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Find the probability using the concept of conditional probability and Baye's theorem.	1,3,4	Remembering
CO-2	Determine the distribution function, probability density function and find the expected value using the random variable.	1,2,4	Evaluating
CO-3	Explain Moment generating function and their properties	1,2,4	Evaluating
CO-4	Evaluate the mean and variance of the Binomial and Poisson distributions.	1,2,4	Evaluating
CO-5	Apply standard normal probability distribution to find the probability of the continuous random variable	1,2,4	Applying

COURSE OUTCOMES

Semester	Cou Co	irse de	Title of the Course Hour					Hours	C	redit
II	21UA	ST21	Math	nematic	al Statis	stics-II		90		4
Course	Prog	ramme	Learnin (PLOs)	ig Outco	omes	Programme Specific Outcomes (PSOs)				omes
Outcomes	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
(COS)	1	2	3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	
CO-2	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
CO-3	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
CO-4	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
CO-5	$\checkmark \qquad \checkmark \qquad$				\checkmark	\checkmark	\checkmark		\checkmark	
	Numbe	er of mat	ches (√)=40				Relation	ship = l	High

Course Title	ENVIRONMENTAL SCIENCE
Total Hrs.	30
Hrs./Week	2
Course Code	21UEVS21
Course Type	AECC-II
Credits	2
Marks	100

SEMESTER – II

UNIT - I: Nature of Environmental Studies

Goals, Objectives and guiding principles of environmental studies. Towards sustainable development - Environmental segments– Atmosphere, Hydrosphere, Lithosphere, Biosphere – definition. Pollution episodes -- Hiroshima - Nagasaki, - Bhopal gas Tragedy, Fukushima. Stone leprosy in Taj Mahal, Minamata disease.

UNIT - II: Natural Resources

Renewable and Non-Renewable resources - classification.

- Forest resources: Use and over exploitation, Afforestation and deforestation.
- Water resources: Use and over utilization and conservation of surface and ground water – Rain harvesting.
- Marine Resources: Fisheries and Coral reefs.
- <u>Mineral resources</u>: Use and exploitation environmental impacts of extracting and using mineral resources.
- Food resources: Effects of modern agriculture fertilizers pesticide problem.
- Energy resources: Growing energy needs use of alternate energy source - Solar cells & wind mills.
- Land resources: Land degradation

UNIT - III: Ecosystem

- Concept of Eco-systems Tropic level, food chains, food web and Ecological pyramids, Living conditions on other planets (Brief account). Types, structure & Functions, prevention and control of pollution of the following:
- a) Aquatic ecosystem
- b) Terrestrial ecosystem Grassland, Forest and Desert ecosystem

UNIT - IV: Biodiversity & Its Conservation

Introduction - Definition: ecosystem diversity, species diversity and Genetic diversity. Hot spots of biodiversity - Western Ghats, Eastern Himalayas and Gulf of Mannar. Threats to biodiversity - Habitat Loss, Poaching of wildlife and Man - wildlife conflicts. Nature reserves. Conservation of biodiversity: In-situ and Ex-situ, Environmental movements – Green peace and Chipco movement. Biodiversity law.

UNIT - V: Environmental protection, Policies and practices

Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.

Prevention, Control of Pollution and Environmental Laws:

- > Water, Air and Noise (prevention & Control of Pollution) Act.
- Environmental Protection Act.
- Wildlife production Act, Forest Conservation Act, International agreements, Monstreal and Kyoto protocols and conservation on biological Diversity. The Chemical Weapons Convention (CWC)
- Role of Central & State Pollution Control Boards.

Field work : 5 marks

Visit to an area to document environmental assets: river/ forest / fauna.

or

Visit to a local polluted site-urban/rural/Industrial / Agricultural

or

Study of common plants, insects, birds and basic principles of identification

REFERENCE BOOKS:

- 1. Basic of Environmental Science. Vijayalakhmi, Murugesan and Sukumaran Manonmaniam Sundaranar University publications.
- 2. Environmental Studies. John de Brito, Victor, Narayanan and Patric Raja- published by St. Xavier's College, Palayamkottai, 2008.
- Environmental Science and Biotechnology. A.G. Murugesan and C. Raja Kumar - MJP Publishers.
- 4. Fundamental of Environmental pollution Krishnan Kannan Chand & Company Ltd., New Delhi, 1997.
- 5. Environmental Studies. S. Muthiah, Ramalakshmi publications, Tirunelveli.
- 6. EnRole of central and state pollution control boards. Environmental Studies. V.M. Selvaraj, Bavani Publications, Tirunelveli.

Course Title	பயன்பாட்டுத் தமிழ் (Payanpattu Tamil)
Total Hrs.	90
Hrs./Week	6
Course Code	21ULTA31
Course Type	Part – I - Tamil
Credits	3
Marks	100

SEMESTER - III

General Objective: To teach the Sangam literature.

Course Objectives:

CO	The learners will be able to:
CO-1	Understand Sangam Tamil through the texts prescribed.
CO-2	Describe the speciality of love, valour, charity in Tamil tradition.
CO-3	Choose life's rules and regulations through literature.
CO-4	Determine to increase self confidence.
CO-5	Prioritize to learn modern skills such computer operation.

அலகு 1

· · ·								
. 1.	சிலப்பதிகாரம்	- வழக்குரை காதை						
2.	மணிமேகலை	- பாத்திரம் பெற்ற காதை						
3.	சீவகசிந்தாமணி	- சீவகனுக்கு விசயை கூறிய அறிவுரை						
4.	பெரிய புராணம்	- சிறுத்தொண்டர் நாயனார் புராணம்						
5.	கம்பராமாயணம்	- கங்கை காண் படலம்						
6.	இயேசு காவியம்	- பாரச்சிலுவை						
7.	சீறாப்புராணம்	- விட மீட்ட படலாம்						
சிற்றில	க்கியங்கள்							
1.	முக்கூடற்பள்ளு	- ஆற்று வளமும் மீன் வளமும்						
2.	திருக்குற்றாலக் குறவஞ்சி	- மலை வருணனை						
இக்கா	லக் காப்பியம்							
1.	நாயகம் ஒரு காவியம்	- பாம்பின் நேசமும் தோழரின் பாசமும் மு.மேத்தா						
	•							

அலகு - 2

(இந்திய ஆட்சிப்பணிக்குத் ஆயத்தப்படுத்தும் நோக்கில் அமைந்த பயன்பாட்டுக் கட்டுரை நூல்) ஐஏஎஸ் தேர்வும் அணுகுமுறையும் இறையன்பு இ.ஆ.ப.

அலகு 3

ஊடகப் படைப்பாக்கம்

தகவல் தொடர்பு அறிமுகம் - உலகப் புகழ்பெற்ற பத்திரிகைகளும் பத்திரிகையாளர்களும் - இதழ்களுக்குச் சிறப்புக் கட்டுரைகள் எழுதுதல் - காணாமல் போன கடித இலக்கிய கட்டுரை – (இந்து தமிழ்) கலை இலக்கியப் பக்கம் -நூற்றாண்டு கடந்த இஸ்லாமியக் கர்னாடக இசை நூல் கீர்த்தனா ரஞ்சிதம் - தமிழ் இதழ்கள் பற்றிய அறிமுகம் - புகழ்பெற்ற இதழ்கள் - புகழ்பெற்ற பத்திரிகையாளர்கள் -தமிழே எங்கள் அடையாளம்

அலகு 4

தமிழ் இலக்கிய வரலாறு, ஐம்பெரும் காப்பியங்கள், ஐஞ்சிறு காப்பியங்கள்,

சிற்றிலக்கியங்கள் (உலா, தூது, பிள்ளைத் தமிழ், பரணி)

அலகு 5

தமிழ்நாடு அரசுப்பணியாளர் தேர்வாணையத்தின் பொதுத்தமிழ் தாளில் இடம்பெறும் இலக்கணப் பகுதி.

பிழைத்திருத்தம், வல்லினம் மிகும் இடங்கள், மிகா இடங்கள், ஒருமை-பன்மை திருத்தம், மரபுப்பிழைகள், வழுஉச்சொற்கள், பிறமொழிச் சொற்கள், வேர்ச்சொல் உள்ளிட்ட பகுதிகள்.

பாடநூல்

பயன்பாட்டுத் தமிழ், சதக்கத்துல்லாஹ் அப்பா கல்லூரித் தமிழ்த்துறை வெளியீடு - 2022

பார்வை நூல்கள்

- 1. தமிழ் இலக்கிய வரலாறு, முனைவர் சு.ஆனந்தன், கண்மணி பதிப்பகம், திருச்சி-620002
- இதழியல் நுணுக்கங்கள், செண்பகா பதிப்பகம், 24/28, கிருஷ்ணா பதிப்பகம், சென்னை-600 017.

			1
CO	Upon completion of the course, the students	PSOs	Cognitive
	will be able to	Addres	Level
		sed	
CO-1	Associate themselves to regulate life by means	1,2,3,5	Understanding
	of the messages from old Tamils' politics,		_
	tradition and to increase belief in God besides		
	knowing about natural resources.		
CO-2	Observe to grow characters related to	1,5,3	Understanding
	discipline, high thoughts and to develop a good		_
	personality with confidence, further knowing		
	about modern skills to develop creative skills.		
CO-3	Choose to create media persons, to enhance	1,2,4	Applying
	language skill, to inform historical news, and to		
	know news related to valour and war.		
CO-4	Explain concepts of justice and live with Nature	4,5,	Analyzing
	and animals.		
CO-5	Summarize about arts and the mixing of other	1	Evaluating
	languages.		

Course Outcomes

Semester	Cour	se Cod	E Title of the Course Hours				urs	s Credits			
III	210	JLTA31		பயன்பாட்டுத் த			9	90			
Course		Program	nme Le	earning	S		Progra	mme S	Specific	;	
Outco		Out	comes	(PLOs)	-		Outcomes (PSOs)				
mes	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
(COs)										Í	
CO-1	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
CO-2	\checkmark	\checkmark		\checkmark		\checkmark		\checkmark		\checkmark	
CO-3	\checkmark	\checkmark	\checkmark			\checkmark	\checkmark		\checkmark		
CO-4				\checkmark	\checkmark				\checkmark	\checkmark	
CO-5	\checkmark	\checkmark				\checkmark					
	Numb	Number of matches (\checkmark) = 28									
	Relati	Relationship = Medium									

SEMESTER – III

Course Title	MODERN PROSE
Total Hrs.	90
Hrs./Week	6
Course Code	21ULAR31
Course Type	Part – I - Arabic
Credits	3
Marks	100

General Objective: To teach the history of the Prophet Muhammad (PBUH).

Course	Objectives:	
Course	Objectives.	

CO No	The learners will be able to:
1	Understand the life and history of the Prophet Muhammad (Pbuh).
2	Describe the process of the Prophethood of the Prophet Muhammad (Pbuh).
2	Explain the origins of the first Muslim convert followed by the opposition to the
3	Prophet Muhammad (Pbuh).
4	Illustrate the incidents of Quraish indicted violence.
5	Summarise the migration of the Companions of the Prophet (Pbuh) to Ethiopia.

Unit I: page No. 27 to 38

Unit II: 38 to 49

Unit III: 50 to 62

Unit IV: 62 to 74

محاربة قريش لرسول الله على وتفننهم في الإيذاء – ما فعل كفار قريش بأبي بكر؟! – احتيار قريش في وصف رسول الله على – قسوة قريش في إيداء رسول الله على ومبالغتهم في ذلك – إسلام حمزة بن عبد المطلب – ما دار بين عتبة وبين رسول الله علي –

Unit V: 74 to 88

Textbook: Ali Nadawi, Abul Hasan, QasasunNabiyeen Part - V MuassasathusSahafa wa

Nashr publication Lucknow, India, 1999.

Reference Books:

1. Mohammed Mus'yid Hussain, Qasas Al Anbiya Lil Atfaal, 2010, Dar Al Kunooz, Jordan,

2010.

2. M.R.M. Abdur Raheem, NabimargalVaralaru, Universal Publishers, Chennai, 2015.

Course Outcomes

CO	Upon completion of the course, the students will	PSOs	Cognitive Level
	be able to:	Addressed	
1	Associate themselves with the art of writing simple	1,2	Understanding
	sentences.		
2	Construct sentences in Arabic using common	1,5	Applying
	words flawlessly.		
3	Interpret the history of the leader of Prophets in	1,2,3,4	Applying
	Islam.		
4	Prioritize to live a life learned from the biography	1,4,5	Analyzing
	of the Prophet Muhammad (PBUH).		
5	Summarize the style of classical prose.	1,2,3	Evaluating

			ŀ	Relations	ship Mat	trix				
Semester	Course Code Title of the Course							S	Cred	its
III	21	ULAR31	Ν	AODER	N PROS	SE	90		3	
Course	Pro	gramme	Learnin	g Outco	mes	Pro	gramm	e Specifi	ic Outco	mes
Outcomes		-	(PLO	s)			-	(PSO	s)	
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO2	PSO3	PSO4	PSO
	1	2	3	4	5	1				5
1	✓	√				✓	✓			
2	✓			✓	✓	✓				\checkmark
3	✓	√	√	✓		✓	✓	✓	✓	
4	✓	√		✓	✓	✓			✓	√
5	✓	√	✓			✓	✓	✓		
		Number of matches $= 30$								
		Relationship = Medium								

SEMESTER – III

Course Title	ONE-ACT PLAYS AND WRITING SKILL
Total Hrs.	90
Hrs./Week	6
Course Code	21ULEN31
Course Type	Part – II - English
Credits	3
Marks	100

General Objective:

To expose students the conversational patterns and help them learn written English in given practical situations.

Course Objectives:

CO	The learners will be able to:
CO 1	entify and learn the conversational patterns in written
0-1	communication.
CO-2	stinguish the patterns of writing in formal and informal
	situations.
CO-3	pserve the conversational patterns in real-life situations.
CO-4	amine various possible methods to learn the writing skill
	through the prescribed texts.
CO-5	actise writing messages, essays, and reports.

UNIT I – ONE-ACT PLAYS

1. The Bishop's Candlesticks	- Norman McKinnell
2. The Proposal	- Anton Chekov
3. The Hour of Truth	- Percival Wilde
UNIT II – ONE-ACT PLAYS	
4. Aladdin and his Magic Lamp	- Y. Sayed Mohammed
5. Tippu Sultan	- Y. Sayed Mohammed
6. Evergreen Merchant of Venice	- Y. Sayed Mohammed

UNIT III – WRITING SKILL

1. **Messages** (Pages 1-9 of *Written English for You* to be taught and the tasks given to be accomplished in the *Record of Writing*)

i) What is a message?

- ii) When do we write messages?
- iii) Why do we write messages?

iv) How do we write messages?

2. Letters – 1 (Pages 10-19 *Written English for You* to be taught and the tasks given in pages 17 and 19 should be accomplished in the *Record of Writing*)

i) Letters for Ordering Supply of Goods

- ii) Letters of Apology
- iii) Letters of Complaint
- iv Letters of Applications
 - 3. Letters 2 (Pages 36-40 of *Written English for You* to be taught and the tasks given in the pages 38 and 40 should be accomplished in the *Record of Writing*)
- i) Letters to inform your plan of visit
- ii) Letters of Request
- iii) Letters of Apology

UNIT IV – WRITING SKILL

4. **Essays** (Pages 66-79 to be taught and only the tasks 1-3 from pages 79 and 80 should be accomplished in the *Record of Writing*)

- i) What is an Essay?
- ii) Types of Essays.
- iii) The Structure of an Essay.
- iv) Introductory Paragraph.
- v) Supporting Paragraph.
- vi) What can be the length of an Essay?
- vii) Why am I writing this Essay?
- viii) Who am I writing for?
- ix) How to begin an Essay?
- x) How to organize an Essay?
- xi) What to avoid in writing an Essay?
 - 5. **Narrating** (Pages 109-116 of *Written English for You* to be taught only the tasks 1 and 2 from pages 115 to 116 to be accomplished in the *Record of Writing*)
- i) Describing events in a chronological order.
- ii) Narrating events from different points of view
- iii) Narrating events from different view point in time

UNIT V – WRITING SKILL

- 6. **Reporting** (Pages 127-136 be taught. The tasks given in pages 129-134 and 136-137 must be accomplished in the *Record of Writing*)
- i) News Reports
- ii) Reporting Events or Developments.
- iii) Reporting Interviews and Press Conferences
- iv) Reports of Meetings.
 - 7. **Summarizing** (Pages 164-172 of *Written English for You* be taught and the tasks 1-3 in pages 172-178 to be accomplished in the *Record of Writing*)
- i) What is a Summary?
- ii) How to write a Summary?
- iii) How long should a Summary be?
- iv) Should the Summary be in a Paragraph?
- v) Analysis of the Process of Summarizing.
- **NOTE:** Questions for Units III, IV and V should be framed from the tasks given in the prescribed textbook *Written English for You*.

Textbooks:

- 1. Compiled by a Board of Editors. *Plays for Pleasure*, Chennai: Paavai Publications, 2009
- 2. Sayed Mohammed.Y, ed. *Three One Act Plays*. Tirunelveli. Mohammed Taahaa Publications, 2011.
- 3. Radhakrishna Pillai. G, ed. *Written English for You* Chennai. Emerald Publishers, 1990 (rpt. 2008)

Course Outcomes:

СО	Upon completion of this course, students will be able to:	PSOs Addressed	Cognitive Level
CO-1	nderstand the nuances of English conversational patterns.	1,3,4,6	Understanding
CO-2	plain the patterns required for conversing in formal and informal situations.	1,3,4,6	Applying
CO-3	noose to write English sentences by means of applying their skills learned.	1,2,3	Applying
CO-4	cus on language activities to master the writing skill.	3	Analysing
CO-5	Immarize the uses and methods of writing messages, essays, reports and pamphlets.	1,3,4	Evaluating

Semester	Course Code		Title of the Course				•	Hours		Credits		
III	21	ULEN	131	ne-A	ne-Act Plays and Writing Skill				90)	3	
Course Outcomes	Prog	Programme Learning Outcomes (PLOs) Programme Specific Outcomes (PSOs)								mes		
(COS)	PLO	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO	PSO
	1	2	3	4	5	6	1	2	3	4	5	6
CO-1	✓	\checkmark	\checkmark				\checkmark		\checkmark	✓		\checkmark
CO-2		\checkmark	\checkmark	\checkmark			\checkmark		\checkmark	\checkmark		\checkmark
CO-3		\checkmark	\checkmark				\checkmark	\checkmark	\checkmark			\checkmark
CO-4		\checkmark	\checkmark	\checkmark			\checkmark		\checkmark	\checkmark	\checkmark	\checkmark
CO-5		\checkmark	\checkmark	\checkmark			\checkmark		\checkmark	\checkmark		\checkmark
CO-6												
		Number of matches (✓) = 35 Relationship = High										

SEMESTER –III

Course Title	Real Analysis-I
Total Hours	75
Hrs./Week	5
Course Code	21UCMA31
Course Type	DSC-V
Credits	4
Marks	100

General Objective:

To find the relation between the bounded and monotonic sequences and get knowledge about the convergence of sequence and series

Course Objectives:

СО	The learner will be able to:
CO-1	Understand the principles of behaviour of sequences.
CO-2	Testfor convergence and divergence of sequences and series
СО-3	Find the summation of series like binomial series, exponential series, and logarithmic series.
CO-4	Apply various tests for summation of series
CO-5	Determine the convergence of series using Abel's Test, Leibnitz's test and Dirichlet's Test.

UNIT I: Sequences-BoundedSequences – Monotonic –Convergent –Divergent andOscillating sequences– algebra of limits.

UNIT II: Behaviour of Monotonic Sequences - Some Theorems on Limits - Subsequences - Cauchy Sequences.

UNIT III:Series of positive terms, Convergence of Geometric, Harmonic series-Cauchy's General principles of convergence of series – Comparison test – Summation of series: Binomial Series – Exponential Series – Logarithmic Series.

UNIT IV: Kummer's test-Ratio test-Raabe's test-Cauchy'sroot test- Cauchy's condensation test (without proof)

UNIT V: Series of arbitrary terms: Alternating Series–Absolute Convergence-Tests for Convergence of series of arbitrary terms.

TEXTBOOKS:

1. Arumugam S and Isaac. *Sequences & Series*, New Gamma Publishing House, Palyamkottai Edition 2002.

2. JosephA.Mangaladoss: *Sequence sand Series and Trigonometry*, Presi-Persi Publications, Tirunelveli 2013 edition.

Unit I: TB1 Chapter III: Section 3.1 to 3.6. Unit II: TB1 Chapter III: Section 3.7 to 3.11 Unit III: TB1 Chapter IV:Section 4.1, 4.2. TB2 Chapter VI : Section 6.1 to 6.3 Unit IV: TB1Chapter IV: Section 4.3, 4.4 Unit V: TB1 Chapter V:Section 5.1, 5.2, 5.3

Reference Books:

1. Richard R. Goldberg. *Methods of Real Analysis*. Oxford and IBH Publishing Co. Pvt. Ltd., Indian Edition 1970.

2. VenkatachalapathyS.G., *Real Analysis*, Margham Publications, Chennai, Second Edition 2005

CO	Upon completion of the course, the students will	PSOs	Cognitive	
	be able to:	Addressed	Level	
CO_1	Illustrate the concepts of convergent, Divergent and	1 2 3	Understanding	
0-1	Oscillating Sequence.	1,2,5	Understanding	
CO^{2}	Analyze the necessary conditions for convergence of	1.2	Analysing	
0-2	a sequence.	1.2	Anaryshig	
CO-3	List the behaviour of a series of positive terms using	123	Remembering	
	comparison test.	1,2,5	Remembering	
CO 4	Make use of Kummer's Test, Root Test and	1 2 5	Annlying	
0-4	Comparison Test for the convergence of series.	1,2,3	Applying	
CO-5	Evaluate the limit of a series of arbitrary terms.	1,2	Evaluating	

Course Outcomes

Semester	Course Code			Title of the Course			Hours		Credit	
III	21 U	CMA3	1	Real Analysis-I			75		4	
Course	Pro	ogramn	ne Lear (PLC	ning Outco Ds)	Programme Specific Outcon (PSOs)					
(COs)	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
CO-2	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-3	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
CO-4	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			\checkmark
CO-5	\checkmark	\checkmark			~	\checkmark	\checkmark			
	Numb	er of m	atches (✓) = 30	Rel	ationship	= Medi	um		

SEMESTER –III

Course Title	ALLIED PHYSICS-I
Total Hrs.	60
Hrs./Week	4
Course Code	21UAPH31
Course Type	Allied – II/1
Credits	4
Marks	100

General Objective:

To understand the basics of properties of matter , Optics , Thermal physics and laws of thermodynamics.

Course Objectives:

СО	The learner will be able to::
CO-1	Define the basic concepts of elasticity
CO-2	Illustrate the important features of interference and diffraction.
CO-3	Study the motion of viscous fluids by applying Poiseuille's formula.
CO-4	Analyze the fundamental modes of heat transfer and its applications.
CO-5	Appraise the laws of thermodynamics and illustrate the working of heat engines such as Carnot engine.

UNIT I Elasticity

Elastic modulii – Poisson's ratio – relation between elastic constants – Expression for bending moment – cantilever – expression for depression – experiment to find young's modulus (uniform bending) – expression for elevation – experiment to find young's modulus using microscope (non uniform bending) – expression for depression – experiment to find Young's modulus using scale and telescope- Applications of Elastic property .

UNIT II Interference and Diffraction

Young's experiment – Condition for interference – Maxima and minima – Air wedge – Thickness of wire – Newtons ring –Determination of wavelength using newton's rings - Diffraction – Plane transmission grating – Theory and experiment to find wave length by normal incidence method- Difference between interference and diffraction bands.

UNIT III Viscosity

Viscosity – Viscous force – Co-efficient of viscosity – units and dimensions – Poiseuille's formula for co-efficient of viscosity of a liquid – determination of coefficient of viscosity using burette and comparison of Viscosities - Bernoulli's theorem – Statement and proof- Applications of viscous forces.

UNIT IV: Conduction, Convection and Radiation

Specific heat capacity of solids and liquids-Newton's law of cooling – Specific heat capacity of a liquid by cooling – thermal conduction – Applications of conduction process- Davey's safety lamp- coefficient of thermal conductivity by Lee's disc method- Convention process-Radiation -Black body radiation – Planck's radiation law – Stefan's law of radiation. (No derivations).

UNIT V: Thermodynamics

Zeroth and I Law of thermodynamics – II law of thermodynamics – Carnot's engine and Carnot's cycle – Efficiency of a Carnot's engine – Entropy – Change in entropy in reversible and irreversible process – change in entropy of a perfect gas – change in entropy when ice is converted into steam- Applications (Domestic refrigerator)

Books for Study and Reference:

- 1. Properties of matter Brijlal & Subrahmanyam S.Chand & Co. New Delhi.
- 2. College Physics Volume 1 A.B.Gupta Books and Allied (P) Ltd. Kolkatta 700010.
- 3. Heat and Thermodynamics, Brijlal & Subramaniyam S.Chand & Co. New Delhi.
- A Text book of Optics, Brijlal, Subrahmanyam & M.N.Avathanu S.Chand & Co. – New Delhi.

Course Outcomes

СО	Upon completion of the course, the	PSOs	Cognitive Level
	students will be able to:	Addressed	
CO-1	Recall the basic concepts of elasticity	1,2	Remembering
CO-2	Discuss the important features of interference and diffraction with experiments associated with it.	3,4	Understanding
CO-3	Illustrate the motion of viscous fluids by using Poiseuille's method	2,4	Applying
CO-4	Test the fundamental modes of heat transfer and its applications.	3,4	Analyzing
CO-5	Summarise the applications of laws of thermodynamics	2,4	Evaluating

Semester	Cou	ırse Code	•	Title of t	he Cour	se	Hours	5	Credit	
III	21UAPH31			Allied Physics-I			4		4	
Course	Pro	gramme 1	Learn	ing Outco	mes	Programme Specific Outcomes				mes
Outcomes		-	(PLO:	s)				(PSOs)	
(COs)	PLO	PLO 2	PLC) PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1		3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark	~	~	~	~	~			
CO-2	~	~	~	~				~	~	
CO-3	\checkmark	~	~				~		✓	
CO-4	\checkmark	\checkmark	~		~			~	~	
CO-5	~	~	\checkmark				~		~	
				Numbe	r of mat	ches (√) = 29			-
				Rela	tionship	= Med	lium			

SEMESTER - III

Course Title	ALLIED PHYSICS PRACTICAL-I
Total Hrs.	30
Hrs./Week	2
Course Code	21UAPH3P1
Course Type	Allied – II/1P
Credits	1
Marks	100/2

General Objective:

To understand the basics of properties of matter, Optics, Polarization and Thermal physics by doing related experiments

Course Objectives:

со	The learner will be able to:
CO-1	Understand the concept of Youngs modulus of the given material
CO-2	Determine the thickness of a wire by applying the basic principle of optics .
CO-3	Understand the way to calibrate voltmeter using potentiometer
CO-4	Understand and analyze the characteristics of Zenor diode
CO-5	Understand the function of logic gates

1. Young's modulus – Uniform bending (Pin and Microscope)

- 2. Young's modulus Non Uniform bending (scale and Telescope)
- 3. Verification of Kirchoff's law.
- 4. Verification of Newton's law of cooling
- 5. Spectrometer Grating Oblique incidence
- 6. LCR series circuit
- 7. Air wedge Thickness of wire
- 8. Calibration of Voltmeter using potentiometer
- 9. Characteristics of Zener diode
- 10. Basic logic gates OR, NOT & AND

Books for Reference:

- 1. Practical Physics Ouseph, Srinivasan & Vijayendran,
- 2. Practical Physics P. R. Sasi Kumar, PHI.
- 3. Advanced Practical Physics S. P. Singh, Pragathi Prakasam.
- 4. Practical Physics St. Joseph College, Trichy.

Course Outcomes

СО	Upon completion of the course, the	PSOs	Cognitive Level
	students will be able to:	Addressed	
CO-1	Calculate the Youngs modulus of the given material	2,3,4,5	Applying
CO-2	Calculate the thickness of thin wire using Airwedge and wave length of the spectral line using spectrometer	2,3,4,5	Applying
CO-3	Construct the circuit to calibrate voltmeter using potentiometer	2,3,4,5	Analyzing
CO-4	Analyze the characteristics of Zenor diode	2,3,4,5	Analyzing
CO-5	Construct basic logic gates usinf NAND ans NOR gates	2,3,4,5	Creating

Semester	Co	Course Code		Title of t	he Cour	se	Hours	S	Credit	
III	21UAPH3P1			Allied Physics Practicals-I			2		1	
Course Outcomes	Pro	gramme 1	ramme Learning Outcomes Programme Specific C (PLOs) (PSOs)				ic Outco	mes		
(COs)	PLO	PLO 2	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1		3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark	\checkmark	~	~		~	\checkmark	\checkmark	✓
CO-2	\checkmark	~	\checkmark	~	~		~	~	\checkmark	~
CO-3	\checkmark	~	\checkmark	~			~	~	✓	~
CO-4	~	~	\checkmark	~	~		~	~	✓	~
CO-5	\checkmark	\checkmark	\checkmark	~	~		~	\checkmark	\checkmark	~
				Numbe	er of mat	ches (√) = 40			
				Re	lationsh	ip = Hig	h			

SEMESTER – III

Course Title	Fundamentals of Computing and Security
Total Hrs.	30
Hrs./Week	2
Course Code	21USFC31
Course Type	SEC-I
Credits	2
Marks	100

General Objectives:

Introduce the fundamentals of computing devices and particularly with respect to personal use of computer hardware and software, the Internet, Cyber Crime and Cyber Security.

UNIT I Fundamental of Computers

The Role of Computers in Modern Society - Block Diagram of Digital Computer - Working Principle of Computer - Hardware-Software- Types of Software - Operating system-Definition-Single user and multi-user operating system-Time sharing-multitasking-multiprogramming-Batch Processing-on-line processing-spooling.

UNIT II Microsoft Office Package

Basics of Office Automation Tools - Microsoft Word: Create Documents – Edit and Format Documents - Microsoft Excel: Create Worksheet – Edit and Filter - Microsoft PowerPoint: Create Presentation – Edit and format Presentation – Microsoft Access: Create Database and Table – Designing database.

UNIT III Networks

Components of a Communication System - Types of Networks : Local Area Network - Metropolitan Area Network - Wide Area Network -Wireless and Wired Network - Network Topologies - World Wide Web (WWW) - Client - Server Computing.

UNIT – IV Cyber Security for ICT

Information and Communication Technology: Introduction-Basics of ICT-Ethical & Social Issues in ICT -Digital Citizenship-Elements of Digital Citizenship- Need for Cyber Security

UNIT -V Cyber Crime & Cyber Security

Cyber Crime: Introduction--Types of Cyber Crime-Security Issues: Threats-Attacks-Vulnerabilities - Cyber Space-Security Services - Cyber Security: Definition, Key Concepts, Fundamentals, Cyber Challenges and Ethics.

Textbooks:

 Cyber Crime & Cyber Security – "Unit IV and V , Dr. S. Shajun Nisha,PG and Research Department of Computer Science ".

Reference Book:

- 1. Fundamentals of Computers, by V.Rajaraman, PHI, Fifth Edition, April 2010.
- 2. Microsoft Office Complete Reference BPB Publication
- "Introduction to Data communication and networking" Behrouz Forouzan- Tata McGraw Hill 2nd Edition, 2006.

SEMESTER- III

Course Title	SWAYAM-NPTEL Online Certification Course
Total Hrs.	30
Hrs./Week	2
Course Code	21USOC32
Course Type	SEC-II
Credits	2
Marks	100

SWAYAM NPTEL ONLINE CERTIFICATION COURSES GUIDELINES AND INSTRUCTIONS

- National Programme on Technology Enhanced Learning (NPTEL) provides elearning through online web and video courses in Engineering, Science and Humanities streams through its portal https://swayam.gov.in/ncdetails/NPTEL.
- 2. Enrollment to all the courses is FREE.
- 3. Enrollment to courses and Examination Registration can be done ONLINE only. The link is available on NPTEL Website <u>http://nptel.ac.in/</u>
- 4. SWAYAM NPTEL Online Certification Courses are made optional for the students in the UG Programmes from the Academic year 2021-2022.
- 5. Any Eight Week, Two-Credit Course in any discipline be chosen by the respective Departments in the Third Semester of the Undergraduate Programmes.
- The SWAYAM-NPTEL Online Certification Courses offered during the December – April Semester be chosen by the Departments. The courses may be handled by the Department Mentor or by any teacher in the respective Departments.
- 7. Candidates must have completed Examination Registration and submitted assignments successfully within the prescribed time to receive hall tickets and to write examinations.
- 8. The allocation of marks for the online examination conducted by the respective IITs is 25:75 for each course.
- A candidate should obtain a minimum of 40 marks on 100 marks (a minimum of 10 marks for Assignment and 30 marks in the final examination) to pass the Online Courses.

- If a student fails in the Online Examination conducted by the respective IITs he/she would be permitted to write a Supplementary Examination for 75 marks by the Controller of Examinations of our College.
- 11. Those who registered for the Online Courses, obtained Assignment marks, appeared for the Online Examination and failed in the courses alone are eligible to apply for the Supplementary Examinations conducted by the College.
- 12. If a candidate fails in the Supplemenary Examinations or does not appear for the Supplemenary Examinations conducted by the College, the norms followed for taking an Arrear Examination will be adopted.
- 13. Course Completion Certificate will not be issued by the respective IITs for the candidates who clear the Online Courses through the Supplementary Examinations conducted by the College. The two credits the candidate earns, if passed in the Supplemenary Examinations would be added in the Consolidated Statement of Marks issued by the Controller of Examinations.
SEMESTER –III

Course Title	FOURIER TRANSFORMS
Total Hours	30
Hrs./Week	2
Course Code	21USMA32
Course Type	SEC-II
Credits	2
Marks	100

General Objective:

To understand the concepts of Fourier transforms, to analyse continuous time signals, define complex signals and its use in modulation.

Course Objectives:

СО	The learner will be able to:								
CO-1	Understand the basic terms and results of Fourier Transforms								
CO-2	Determine Fourier Cosine and Sine Transforms								
СО-3	Summarise the Properties of Fourier Transforms								
CO-4	Evaluate Fourier Transforms using properties								
CO-5	Explain Finite Fourier Transforms and Inversion formula								

UNIT I: Introduction – Fourier Integral Theorem- Fourier transforms – Alternative forms of Fourier Complex Integral Formula – Relationship between Fourier Transform and Laplace Transform.

UNIT II: Problems using Fourier Integral Formula -Evaluation of Fourier Cosine and Sine Transforms – Worked Examples

UNIT III: Properties of Fourier Transforms – Transform of derivatives – Derivatives of the transform- Convolution Theorem –Parseval's Identity.

UNIT IV: Evaluation of Fourier Transforms using properties - Worked Examples.

UNIT V: Finite Fourier Transforms – Inversion Formula – Finite Fourier Transforms of derivatives – Worked Examples

Textbooks:

 Veerarajan. T, : Transforms and Partial Differential Equations , Second Edition, McGraw Hill Education (India) Pvt. Ltd. Unit I : Chapter 4: Section 4.1,4.2, 4.3, 4.4, 4.5 Unit II: Chapter 4: Section 4.5 (Worked Examples) Unit III: Chapter 4: Section 4.6 Unit IV: Chapter 4: Section 4.6 (Worked Examples) Unit V: Chapter 4: Section 4.7

Reference Books:

- 1. Balaji.G,: Transforms and Partial Diferential Equations, 15th Edition, G.Balaji Publishers.
- 2. Narayanan S., Manicavachagam Pillay. T.K., and Ramanaiah. G.,: "Advanced Mathematics for Engineering Students", Vol. II & III, S. Viswanathan Publishers Pvt. Ltd, Chennai, 1998.

Course Outcomes

CO	Upon completion of the course, the students will	PSOs	Cognitive
CO	be able to:	Addressed	Level
CO-1	Relate Fourier Transforms and Laplace Transforms	1,2	Understanding
CO-2	Evaluate Fourier Transforms and Fourier Integral	1.2,3	Evaluating
CO-3	Explain Convolution Theorem – Parseval's Identity	1,2	Understanding
CO 4	Determine Fourier Cosine and Sine transforms using	1 2 3	Evoluting
0-4	Properties and solve Differential equations.	1,2,5	Evaluating
CO-5	Evaluate Finite Fourier Transforms.	1,2	Evaluating

Semester	Course Code			Title of the Course				Hours	C	edit	
III	21	USMA32		FOURI	ER TRA	NSFORM	1S	30		2	
Course Outcomes (COs)	Pro	Learni (PLOs)	ng Outco)	omes	Programme Specific Outcomes (PSOs)						
	PLO	PLO	PLO	PLO	PLO	PSO	PSC	D PSO	PSO	PSO	
	1	2	3	4	5	1	2	3	4	5	
CO-1	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark				
CO-2	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	✓			
CO-3	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark				
CO-4	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark			
CO-5	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark				
	Numbe	er of mate	hes (✓)	= 29	1	Relation	nship	= Medium			

SEMESTER – III

Course Title	Mathematics for Competitive Examination I
Total Hrs.	30
Hrs./Week	2
Course Code	21UNMA31
Course Type	NME - I
Credits	4
Marks	100

General Objective:

To help learners make appropriate and realistic career choices and career direction and attend all types of entrance examinations.

Course Objectives:

CO	The learners will be able to:
CO-1	Find the average of numbers and average speed
CO-2	Apply quantitative techniques to solve a variety of business problems
CO-3	Formulate the statement as algebraic equations and solve them
CO-4	Evaluate results on population and depreciation using the concept of percentage
CO-5	Find the odd man out in a given series

Unit I : Average Unit II: Problems on Numbers Unit III: Problems on ages Unit IV: Percentage Unit V: Odd man out and series **Textbook:**

Aggarwal R.S., *Quantitative Aptitude*. Published by S.Chand & Co., Ltd., New Delhi, Edition 2011(without data sufficiency questions).

Unit I : Chapter 6

Unit II: Chapter 7

Unit III: Chapter 8

Unit IV: Chapter 10

Unit V: Chapter 35

Reference Books:

1. Gupta R., Quantitative Aptitude. Ramesh Publishing House, Edition 2012.

2. Collins.D.C, Arithmetic in Easy Steps, Samson Publishers, Palayamkottai, Edition 2006.

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Recall the essential concepts, formulae, tricks to solve mathematical problems.	1,2	Remembering
CO-2	Take part in making reasoned decision and to solve problems.	1,2,3	Analyzing
CO-3	Solve problems on ages	1,2,3	Applying
CO-4	Solve logical reasoning questions and answer with explanations.	1,2,4	Applying
CO-5	Find the missing term in the series	1,2,4	Remembering

Course Outcomes

Semester	Cours	se Code	e '	Title of the Course			Hours		Credit					
III	21UN	MA31	Com	Mathematics for Competitive Examination I				30	2					
Course Outcomes	Programme Learning Outcomes (PLOs)					Course Programme Learning Outcomes utcomes (PLOs)				Programme Specific Outcomes (PSOs)				omes
(COS)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO				
	1	2	3	4	5	1	2	3	4	5				
CO-1	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark							
CO-2	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark						
CO-3	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark						
CO-4	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark					
CO-5	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark					
	Numb	er of ma	atches (v	() = 35				Relati	onship =	High				

SEMESTER - IV

Course Title	சங்கத்தமிழ் (Sangam Tamil)
Total Hrs.	90
Hrs./Week	6
Course Code	21ULTA41
Course Type	Part – I - Tamil
Credits	3
Marks	100

Course Objectives:

CO	The learners will be able to:							
CO-1	Distinguish Sangam Tamil from other literature and language.							
CO-2	Give examples about love, valour and charity in Tamil tradition.							
CO-3	Determine to follow life protocols through literature.							
CO-4	Focus on improving their self confidence.							
CO-5	O-5 Choose to instruct about modern skills like computer.							
அ லகு –	1 சங்கச் செய்யுள்கள்							
1. நற்றின	ண - நின்ற சொல்லர், நீடு தோன்று இனியர் (1:1-9)							
	அம்ம வாழி தோழி நன்னுதற்கு (388:1-10)							
2. குறுந்ெ	தாகை - ஆம்பற்பூவின் சாம்பலன்ன (46: 1-7)							
	- வேரல் வேலி வேர் கோட்பலவின் (18:1-5)							
3. புறநான	றாறு - ஈன்று புறந்தருதல் எந்தலைக் கடனே (312: 1-6)							
	நின் நயந்து உறைநா்க்கும் நீநயத்து உரை நற்கும் (163: 1-9)							
4. ஐங்குற	<u> 3</u> நூறு - களவன் பத்து — முள்ளிவேர்							
	அளைக் களவன் ஆட்டி (23: 1-4)							
	புலவிப் பத்து – அம்சில் ஒதி அசிநடைப் பாண்மகள் (49: 1-4)							
5. கலித்ெ	தாகை - வறியவன் இளமைபோல், வாடிய சினையவாய்ச் (10:1-23)							
6. அகநா	னூறு - நாம் நகையுடையம் நெஞ்சே! – கருந்தேறல் (121:1-15)							
7. பதிற்று	ப்பத்து - இழையர் குழையர் நறுந்தண்மாலையர் (46:1-14)							
8. பரிபாட	ல் - வைகையில் பெரு வெள்ளம்-நிறை கடல் முகந்து உராய் (1-24)							
9. முல்லை	லப்பாட்டு - முழுவதும்							
அலகு –	2							
	சுயமுன்னேற்றக் கட்டுரைகள்							
அலகு –	3							
	இணையப் பயன்பாட்டில் தமிழ்							
அ லகு –	4							
	இலக்கிய வரலாறு — சங்க இலக்கியம் ஓர் அறிமுகம் - திணைக்கோட்பாடு							
- 6	ட்டுத்தொகை நூல்கள் - நற்றிணை, குறுந்தொகை, ஐங்குறுநூறு,							
பதிற்ற	ப்பத்து, பரிபாடல், கலித்தொகை, அகநானூறு, புறநானூறு – பத்துப்பாட்டு							
நூல்க	ள் - திருமுருகாற்றுப்படை, பொருநராற்றுப்படை, சிறுபாணாற்றுப்படை,							

பெரும்பாணாற்றுப்படை, நெடுநல்வாடை, குறிஞ்சிப்பாட்டு, முல்லைப்பாட்டு, மதுரைக்காஞ்சி, பட்டினப்பாலை, மலைப்படுகடாம்

அலகு – 5

தமிழர் வாழ்வில் அகமும் புறமும் திணைக்கோட்பாடு

பாடநூல்: சங்கத் தமிழ், சதக்கத்துல்லாஹ் அப்பா கல்லூரி தமிழ்த்துறை வெளியீடு. **பார்வைநூல் :** தமிழ் இலக்கிய வரலாறு, சாகித்ய அகாதெமி வெளியீடு.

СО	Upon completion of the course, the students will be able to:	PSOs Addres sed	Cognitive Level
CO-1	Associate themselves to learn about disciplines related to internal and external lives besides knowing about the growth of Tamil by the establishment of Sangam.	1,4,5	Understanding
CO-2	Develop their knowledge about the regulated life, charity, administration and habits of Sangam Tamils.	1,4,5	Applying
CO-3	Classify kings and lords in line with the historical information.	1,2,3,4	Analyzing
CO-4	Differenitate the honest life, high thoughts, barter system and modern skills of the courtesans.	4, 5	Analyzing
CO-5	Summarize about water, air and land resources.	5	Evaluating

Course Outcomes

Semester	Cours	se Cod	e T	Title of the Course			Hou	rs	Credits		
IV	21ULTA41 சங்கத்த					þ	90)	3		
Course	P	rogram	ime L	arning Programme Specific				с			
Outcome		Outo	omes	(PLOs)		Outc	omes	(PSOs	5)	
s (COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO	
CO-1	 ✓	\checkmark	<u> </u>	<u>4</u> √	→	\checkmark	2	3	<u>4</u> √	→ →	
CO-2	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark	\checkmark	
CO-3	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark		\checkmark	\checkmark	\checkmark	
CO-4	\checkmark	\checkmark		\checkmark					\checkmark	\checkmark	
CO-5	\checkmark				\checkmark					~	
	Numb Relatio	Number of matches (\checkmark) = 32 Relationship = High									

SEMESTER - IV

Course Title	CLASSICAL PROSE
Total Hrs.	90
Hrs./Week	6
Course Code	21ULAR41
Course Type	Part –I - Arabic
Credits	3
Marks	100

General Objective: To impart moral values to students and build their personality to make them better citizens.

Course Objectives:

CO	The learners will be able to:						
1	Observe the etiquettes to be followed with the Prophet (PBUH) discussed in Surah						
	Al-Hujuraath.						
2	Associate themselves with the good characters in day today life.						
3	Illustrate the life histories of Imams of the Quran, Hadeeth and Islamic						
	jurisprudence.						
4	Examine the style of Classical Arabic i.e. the language of the Quran and Hadeeth.						
5	Explain the moral values mentioned in Hadeeth.						

Unit I: Verses from 1 to 12 from (Sura – al – Hujraat)

Unit II: Verses from 10 to 18 from (Sura-al-Hujraat) & verses from Surah Luqman (12 to 19)

Unit III: Collection and compilation of Quran and Hadeeth, History of Ibn Abbas (Ral), Imam Ibn-Khathir, History of Imam Abu Hanifa, Ash-shafi, History of Imam Bukhari, Muslim, Abu Dawood, At-Tirmidi, An-Nasaee and Ibn-Majah

Unit IV: Hadeeth 1 to 10

Unit V:- Hadeeth 11 to 20

"من الحديث " لا تمنعوا نسائكم "- إلى الحديث "حق المسلم على المسلم خمس

TEXT BOOK

- 1. A study material on "Tafseer Surah Al Hujuraath and from Suraah Luqman and Biographies of selected Islamic Scholars" prepared by Dr. J. Ubaiyathulla and Dr. S.A. Mohamed Rafeek.
- 2. Shaykh Dr. V. Abdur-Raheem, Ahadeeth Sahlah, Islaamic Foundation Trust, 1994

Course Outcomes

CO	Upon completion of the course, the students will	PSOs	Cognitive Level
	be able to	Addressed	
1	Understand the core essence of the Qur'anic	1,2	Understanding
	verses.		
2	Develop refined manners based on the clear	1,2,4	Applying
	understanding of the values as preached in the		
	Holy Qur'an.		
3	Analyze the life history of the eminent scholars	1,2,3	Analyzing
	and their remarkable contributions to the Quran		
	and Hadeeth literature.		
4	Evaluate the immaculate virtues and inspiring	1,2,3,4	Evaluating
	value systems of the Prophet.		
5	Select a healthy environment to practise abiding	1,2,3,5	Evaluating
	by the teachings of the Prophet (PBUH).		

Semester	Course Code			Title of the Course		Hours		Credits		
IV	210	ULAR41	C	LASSIC	CAL PR	OSE	90		3	
Course	Prog	gramme	Learnir	ng Outco	omes	Pro	gramme	e Specif	ic Outco	omes
Outcom		-	(PLO	s)			-	(PSO	s)	
es (COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1	2	3	4	5	1	2	3	4	5
1	✓	\checkmark				✓	✓			
2	✓	√		✓		✓	✓		✓	
3	✓	✓	✓			✓	✓	✓		
4	✓	✓	✓	✓		✓	✓	✓	✓	
5	✓	\checkmark	✓	✓	✓	✓	✓	✓		✓
	Number of matches = 33									
	Relatio	nship = 1	Medium							

SEMESTER – IV

Course Title	A PRACTICAL COURSE IN SPOKEN ENGLISH
Total Hrs.	90
Hrs./Week	6
Course Code	21ULEN41
Course Type	Part – II - English
Credits	3
Marks	100

General Objective:

To introduce students to the interactive expressions and pronunciation practice to help themselves become competent in spoken mode of communication.

Course Objectives:

СО	The learners will be able to:
CO-1	sociate themselves with the interactional and transactional modes of language.
CO-2	assify words based on the register and usage to use them contextually.
CO-3	stinguish sound patterns in English phonetically.
CO-4	ustrate sound patterns in English with relevant examples.
CO-5	actise to master competency in description, narration, argumentation and continuous speech.

UNIT I

Interactive Expressions and Pronunciation Practice: Consonants (Chapters 1 - 3 of *A Course in Spoken English*)

UNIT II

Introducing oneself / others, patterns for greeting, requesting, expressing and responding to thanks and etc., & Pronunciation Practice: Vowels (Chapters 4 – 8 of *A Course in Spoken English*)

UNIT III

Developing descriptive competency, narrative competency, arguing competency, compering competency and Pronunciation Practice: Diphthongs (Chapters 9 – 13 of *A Course in Spoken English*)

UNIT IV

Practising continuous speech, group discussion and pronunciation practice: Word Accent and Intonation (Chapters 14 – 19 of A Course in Spoken English)

UNIT V

Listening Practice : Students will listen to audio and video materials for 10 - 12 hours.

Textbooks, Workbook, Record Note:

- 1. Nihamathullah. A. et al. A Course in Spoken English, Tirunelveli: MSU, 2005. (rpt. 2010).
- 2. Board of Editors, Department of English, Sadakathullah Appa College, A Workbook for A Course in Spoken English, 2011.
- 3. Spoken English Practical Record.

Evaluation Scheme:

I Internal Oral Test	: 15 Marks	The best two of the three
II Internal Oral Test	: 15 Marks	CIA test marks will be added up
III Internal Oral Test	: 15 Marks	

Distribution of Marks

External Marks	:	60 Marks
Workbook	:	05 Marks
Record Note	:	05 Marks
External Oral Test		50 Marks
Internal Marks	:	40 Marks
Listening Test	:	05 Marks
Loud Reading	:	05 Marks
The best two of the three CIA test marks	:	30 Marks

Course Outcomes

со	Upon completion of this course, students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Understand and describe the nuances of language used in general communication.	1,2,4	Understanding
CO-2	Give examples of words with different register suiting the context.	1,2	Understanding
CO-3	Apply their knowledge of Phonetics and vocabulary to learn to speak distinctly.	1,2,3	Applying
CO-4	Prioritize learning vocabulary and pronounce them phonetically so as to help themselves attain the flow of speech.	1,2,3	Analysing
CO-5	Find errors in the usage and pronunciation of English words committed by their peers.	1,2,3,4	Evaluating

Semester	ester Course Code			ester Course Code Title of the Course			H	Hours		Credits	
IV 21ULEN41				PRACTICAL COURSE IN SPOKEN ENGLISH			ſ	90		3	
Course		Program	nme	Learning	5		Progra	mme S	specifie	C	
Outcomes		Out	come	es (PLOS)			Out	comes	(PSUs)	
(COs)	PLO 1	PLO 2	PLO	3 PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO-1	~	✓		~		✓	\checkmark		~		
CO-2	\checkmark	\checkmark				✓	\checkmark				
CO-3	~	\checkmark	\checkmark			✓	\checkmark	\checkmark			
CO-4	~	\checkmark	\checkmark			✓	\checkmark	\checkmark			
CO-5	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
	Number of matches (\checkmark) = 30										
				Relati	onship	o = Meo	lium				

SEMESTER -IV

Course Title	Abstract Algebra
Total Hours	75
Hrs./Week	5
Course Code	21UCMA41
Course Type	DSC-VI
Credits	4
Marks	100

General Objective:

To understand the basic concepts and characteristics of algebraic structures like groups and rings.

Course Objectives:

CO	The learners will be able to:
CO- 1	Understand the familiar concepts about groups
CO-2	List out whether a group is cyclic or not
CO-3	Analyse the properties of permutation groups
CO-4	Explain the concept of Rings and their properties
CO-5	Test the category of ideals in a Ring

UNIT I: Groups:Semigroups and Groups – Homomorphism - Subgroups and Cosets - Cyclic groups.

UNIT II: Permutation groups - Generators and Relations. Normal Subgroups:Normal subgroups and Quotient Groups-Isomorphism Theorems.

UNIT III: Automorphism-Conjugacy and G-sets. Permutation Groups: Cyclic decomposition - Alternating group A_n - Simplicity of A_n .

UNIT IV: Rings: Definition and Examples – Elementary properties of rings – Types of Rings – Subrings and characteristics of rings – Additional examples of rings.

UNIT V: Ideals and Homomorphism: Ideals– Homomorphism – Sum and direct sum of ideals - Maximal and prime ideals - Nilpotent and nil ideals – Zorn's Lemma. **Textbook:**

Bhattacharya P.B., Jainan S.K. and Nagpaul S.R. : *Basic Abstract Algebra*, Published by Cambridge University Press, Second Edition.

UnitI: Chapter 4: Section 4.1-4.4

UnitII: Chapter 4: Section 4.5, 4.6 and Chapter 5: Section 5.1, 5.2.

UnitIII: Chapter 5: Section 5.3, 5.4 and Chapter 7: 7.1-7.3

UnitIV: Chapter 9: Section 9.1 –9.5

UnitV: Chapter 10: Section 10.1 - 10.6

Reference Books:

1. Arumugam. S &Isaac:*ModernAlgebra*–SCITECHPublications(India)Pvt.Ltd., Chennai 2007Edition.

2. Venkatachalapathy. S. G., Modern Algebra, Margham Publications, Chennai, Second Edition 2004.

3. Joseph A. Mangaladoss. Abstract Algebra, Presi-Persi Publications, Tirunelveli, Edition 2012.

CO	Upon completion of the course, the students will	PSOs	Cognitive	
	be able to:	Addressed	Level	
CO 1	Interpret the fundamental behaviour of groups and	1 2	Understanding	
0-1	their types	1,2	Onderstanding	
CO 2	Analyse the different types of groups and their	13	Analysing	
0-2	generators	1,5	Anarysing	
CO 3	List all the non-isomorphic groups of a particular	1 3	Analysing	
0.0-3	order.	1,5	Anarysing	
CO 4	Demonstrate the ring structure and properties from	13	Understanding	
0.0-4	the group operations	1,5	Onderstanding	
CO-5	List out the maximal and prime ideal of a ring.	1,2	Analysing	

COURSE OUTCOMES

Semester	Cou	irse Cod	e	Title of the Course		se	Hours		Credit	
IV	210	UCMA41	-	Abstract Algebra			75		4	
Course	Pro	gramme	Learni	ng Outco	mes	Pro	ogramm	e Specif	ic Outco	mes
Outcomes			(PLOs))				(PSOs)	
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1	2	3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-2	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark		
CO-3	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark		
CO-4	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark		
CO-5	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
	Numbe	r of matc	hes (✓)	= 28	1	•	Relatio	onship =	Medium	l l

SEMESTER – IV

Course Title	ALLIED PHYSICS II
Total Hrs.	60
Hrs./Week	4
Course Code	21UAPH41
Course Type	Allied-II/2
Credits	4
Marks	100

General Objective:

To give an insight to the electricity, electromagnetism, electronics, atomic and nuclear physics

Course Objectives:

СО	The learners will be able to:
CO-1	Define Ohm's law and Kirchoff's law.
CO-2	Illustrate the LCR series and parallelcircuits.
CO-3	Explain the Nuclear structure, concept of Binding energy and Nuclear forces.
CO-4	Analyze the working of semiconductor diode, zener diode, transistor and their characteristics.
CO-5	Assess the working of Half adder and full adder

UNIT ICURRENT ELECTRICITY:

Ohm's law – Law of resistance in series and parallel – Specific resistance – capacitors – capacitors in serial and parallel – Kirchoff's laws – Wheatstone's network – condition for balance – Potentiometer – calibration of Voltmeter.

UNIT II ELECTROMAGNETISM:

Electromagnetic Induction – Faraday's laws – Lenz law – Self Inductance – Mutual Inductance – Coefficient of Coupling A.C. Circuits – Mean value – RMS value – Peak value – LCR in series circuit –- impedance – resonant frequency – sharpness of resonance- LCR in Parallel circuit.

UNIT III ATOMIC AND NUCLEAR PHYSICS

Bohr's atom model – radius energy – Atomic excitation – Ionization potential – Nucleus – Nuclear properties – Mass defect – Binding energy. Radio isotopes – Uses of radio isotopes – Nuclear fusion and Nuclear fission – X-rays – Production – properties –Derivation of Bragg's law – uses in industrial and medical fields

UNIT IV ANALOG ELECTRONICS: Semiconductor – PN junction diode – Bridge rectifier – Zener diode – Regulated power supply. Transistor – Working of a transistor – CE Configuration – current gain relationship between a and β – Transistor Characteristics – CE Configuration only. Applications of transistor as switch, amplifier, vibrator.

UNIT V DIGITAL ELECTRONICS

Number system – Decimal – Binary – Octal and Hexadecimal system –conversion of one number system to another number system. Logic gates – OR, AND, NOT, XOR, NAND and NOR gates – truth tables – Half adder and Full adder – Laws and theorems of Boolean's algebra – De Morgan's theorems.

Books for study and Reference:

1. Modern Physics – R. Muruges
an and Kiruthiga Sivaprasath - (15 $^{\rm th}$ edition) – S.
Chand & Co., New Delhi.

2.Electricity and Magnetism - R.Murugesan - (8th edition) – S.Chand & Co., New Delhi.

3.Introduction to Integrated Electronics, Digital and Analog - V.Vijayendran, S.Viswanathan Pvt Ltd., Chennai.

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	State Ohm's law and Kirchoff's law.	1,2	Remembering
CO-2	Discuss LCR series and parallel circuits and their applications.	1,3	Understanding
CO-3	Interpret the stability of Nucleus.	1,4	Applying
CO-4	Explain the working of semiconductor diode, zener diode, transistor and their characteristics.	1,4,5	Analyzing
CO-5	Test the working of Half adder and full adder.	1,3,5	Evaluating

Course Outcomes

Semester	Cou	Course Code		Title of the Course				Hours	s (Credits	
IV	21UAPH41			ALLIED PHYSICS II			I	60		4	
Course Outcomes	Prog	Programme Learning Outcomes Programm (PLOs)				ne Specific Outcomes (PSOs)					
(003)	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO-1	✓	\checkmark	 ✓ 	 ✓ 	\checkmark	\checkmark	\checkmark				
CO-2		\checkmark	✓	✓	\checkmark	\checkmark		✓			
CO-3	\checkmark	\checkmark		✓	\checkmark	\checkmark			\checkmark		
CO-4	\checkmark	\checkmark	 ✓ 	 ✓ 	\checkmark	\checkmark			\checkmark		
CO-5		~	 ✓ 	✓	\checkmark	\checkmark		✓		√	
		1	I	Numbe Rel	r of matationsh	tches (ip = Hi	igh	0	1		

SEMESTER – IV

Course Title	Allied Physics Practicals-II
Total Hrs.	30
Hrs./Week	2
Course Code	21UAPH4P1
Course Type	Allied Practical-II/2P
Credits	1
Marks	100/2

General Objective:

To understand the basics of properties of matter, optics, electricity and thermal physics by doing experiments

Course Objectives:

со	The learners will be able to:
CO-1	Determine the Viscosity of a liquid by capillary flow method
CO-2	Determine the wavelength of Spectral colours using spectrometer Grating by Normal incidence method
CO-3	Determine the Thermal conductivity of a bad conductor using Lee's disc.
CO-4	Construct a circuit to Calibrate a low range ammeter using Potentiometer
CO-5	Design AND, OR, NOT and XOR gates using NAND and NOR gates and verify their truth tables

- 1. Young's modulus Cantilever depression
- 2. Lee's disc Thermal Conductivity
- 3. Transistor Characteristics (CE mode)
- 4. Viscosity- capillary flow
- 5. Spectrometer Grating Normal incidence
- 6. Newton's rings Refractive Index of lens
- 7. LCR parallel circuit
- 8. AND, OR, NOT, NAND, NOR and EX-OR gates -Verification of Truth table
- 9. Half adder & Full adder Verification of Truth table
- 10. Calibration of low range Ammeter- Potentiometer

Books for Reference:

- 1. Practical Physics Ouseph, Srinivasan & Vijayendran,
- 2. Practical Physics P. R. Sasi Kumar, PHI.

- 3. Advanced Practical Physics S. P. Singh, Pragathi Prakasam.
- 4. Practical Physics St. Joseph College, Trichy.

Course Outcomes

CO	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Calculate the Viscosity of a liquid by capillary flow method	3,4,5	Applying
CO-2	Calculate the wavelength of Spectral colours using spectrometer Grating by Normal incidence method	3,4,5	Applying
CO-3	Calculate the Thermal conductivity of a bad conductor using Lee's disc.	3,4,5	Analyzing
CO-4	Construct a circuit to Calibrate a low range ammeter using Potentiometer	3,4,5	Creating
CO-5	Construct AND, OR, NOT and XOR gates using NAND and NOR gates and verify their truth tables	3,4,5	Creating

Semester	Cour	se Code	:	Title of the Course				Hou	rs Cı	redits
IV	21U	APH4P1	Al	lied Ph	ysics P	ractica	als-II	30		1
Course	Prog	ramme	Learnir	arning Outcomes P			Programme Specific Outcom			omes
Outcomes			(PLOs)					(PSOs)		
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1	2	3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark
CO-2	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark
CO-3	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark
CO-4	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark
CO-5	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark
				Number	r of mat	ches (v	() = 40			
				Rel	ationsh	ip = Hi	gh			

SEMESTER - IV

Course Title	SOFT SKILLS
Total Hrs.	30
Hrs./Week	2
Course Code	21USSS41
Course Type	SEC-III
Credits	2
Marks	100

Unit – I - Introduction to Soft skills:

Soft skills – Meaning and definition – Importance of soft skills – Soft Skills Vs Hard Skills – Components of Soft skills – Life skills, Communication Skills , Employability Skills and Corporate Skills – Ways to develop soft skills – Applications of Soft skills.

Unit – II - Life Skills:

Life Skills – Meaning and Significance – Elements of Life skills – **Attitude** – Types of Attitude – Developing positive attitude – **Self development** – self awareness – benefits – Motivation – Types – Intrinsic and Extrinsic -Self Assessment through SWOT – **Emotional Intelligence** – Need of E.I -Goleman's EQ model – Methods of EI Development.

Unit - III - Communication skills

Communication skills - Types of communication - Barriers of communication - Overcoming barriers of communication – **Listening Skills** – Process of listening – Types of listening – Barriers to effective listening – Effective listening Strategies - **Reading Skills** – Essential of Reading - Methods of Reading – **Speaking Skills** - benefits of speaking -Self development through speaking skills - **Writing skills** - purpose -Importance of styles in writing skills - **Non verbal Communication** – Importance – Types.

Unit - IV - Employability Skills:

Internet Skills – Job web portals – Roles and Significance of Job portals – Registration process in Job Portals – **Resume Building** – Resume Content – Resume designs and Layouts – Job Application letter – Format and writing Tips of Application Letter – **Interview Skills** – Types of Job Interview – Interview preparation techniques – Group Discussion – Roles to play in Group discussion.

Unit – V - Corporate Skills:

Leadership skills - Manager Vs Leader - Mintzberg's Managerial roles -Traits of Good leader - **Time Management** - Major Blocks to Time Management - Covey's Time Management Matrix - Time Management tips - **Negotiation Skills** - Approaches of Negotiation - **Avoid**, **Compete, Accommodate, Compromise and Collaborate - Stages of Negotiation - Stress Management - Causes and Consequences of stress - Stress Coping Strategies.**

REFERENCE BOOKS:

- 1. Suresh, K. E. (2010). Communication Skills and Soft Skills: An Integrated Approach (With Cd). Pearson Education India.
- S. Hariharan, S. Sundararajan and SP. Shanmughapriya, Soft skills, MJP publishers, Chennai, 2010.

SEMESTER - IV

Course Title	Trigonometry
Total Hrs.	30
Hrs./Week	2
Course Code	21USMA42
Course Type	SEC-IV
Credits	2
Marks	100

General Objective:

To provide an understanding of trigonometric expansions like sin, cos, tan and hyperbolic functions and their inverse functions

Course Objectives:

СО	The learners will be able to:
CO-1	Remember the essential trigonometric expansions
CO-2	Understand the concepts of hyperbolic functions and their relations
CO-3	Apply their basic knowledge to resolve the factors
CO-4	Evaluate the powers of sines and cosines of θ in terms of functions
CO-5	Validate the notion of inverse hyperbolic functions

Unit – **I:** Introduction: Basic formulae - Expansions: Expansions of $\cos n\theta$ and $\sin n\theta$ -Expansion of $\tan n\theta$ in powers of $\tan \theta$ -Expansion of $\tan (A+B+C+...)$.

Unit – **II:** Powers of sines and cosines of θ in terms of functions of multiples of θ -Expansion of $\cos^n \theta$ and $\sin^n \theta$ when n is positive integer.

Unit - III: Hyperbolic Functions:-Relation between hyperbolic functions.

Unit – IV: Inverse Hyperbolic functions.

Unit-V:Resolution into factors: logarithms of complex quantities, to resolve the expression $x^n - a^n$ and $x^n + a^n$ into factors.

Textbook:

Narayanan, S and Manicavachagom Pillay T.K.*Trigonometry*. S.Viswanathan Printers and Publishers Pvt. Ltd, Chennai: 2006.

Unit I : Chapter III: Sections 1,2,3 Unit II : Chapter III: Section 4: 4.0,4.1 Unit III: Chapter IV: Section 1, Section 2: 2.1, 2.2 Unit IV: Chapter IV: Section 2.3 Unit V : Chapter V: Sections 1,2,3

Reference Books:

1. Arumugam, S and ThangapandiIssac, A. *Sequences and Series and Trigonometry*.New Gamma Publishing House, Palayamkottai 2012.

2. Joseph A.Mangaladoss. *Sequences and Series and Trigonometry*. Presi-Persi Publications, Tirunelveli 2013.

CO	Upon completion of the course, the students will	PSOs	Cognitive
CO	be able to:	Addressed	Level
CO-1	Remember the expansions of sin A, cos A, tan A and tan (A+B+C+)	1,2,3	Remembering
CO-2	Understand the concepts of hyperbolic functions	1,2,3	Understanding
CO-3	Apply their knowledge in the expansions of $\cos^n \theta$ and $\sin^n \theta$.	1,2	Applying
CO-4	Evaluate the factors of expression $x^n - a^n$ and $x^n + a^n$ and find the general value of the logarithm of x+iy.	1,2,3	Evaluating
CO-5	Validate inverse hyperbolic functions and also find the relations between hyperbolic functions.	1,2	Evaluating

Course Outcomes

Semester	Course CodeTitle of the CourseHours						Credit			
IV	21	USMA42		Tri	gonome	try		30		2
Course Outcomes	Pro	gramme	Learni (PLOs)	ng Outco	omes	P	rogram	me Speci (PSO	ific Ou s)	tcomes
(COs)	PLO		PLO	PLO	PLO	PSO	PSO	PSO	PSO	
	1	PLO 2	3	4	5	1	2	3	4	PSO 5
CO-1	\checkmark	\checkmark	\checkmark		\checkmark	✓	\checkmark	\checkmark		
CO-2	\checkmark	\checkmark	\checkmark		~	✓	\checkmark	\checkmark		
CO-3	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-4	\checkmark	\checkmark	\checkmark		~	~	\checkmark	\checkmark		
CO-5	~	\checkmark			~	~	\checkmark			
	Numbe	Number of matches (\checkmark) = 31 Relationship = Medium								

SEMESTER – IV

Course Title	Mathematics for Competitive Examination II
Total Hrs.	30
Hrs./Week	2
Course Code	21UNMA41
Course Type	NME-II
Credits	2
Marks	100

General Objective:

To help learners make appropriate and realistic career choices and career direction and attend all types of entrance examinations.

Course Objectives:

CO	The learners will be able to:
CO-1	Provide trading results by ascertaining net profit or net loss of the given data
CO-2	Identify with ease all types of questions and solve problems in entrance examinations.
CO-3	Find results on population and depreciation using the concept of percentage
CO-4	Evaluate simple interest using the simple interest formula
CO-5	Estimate the compound amount by using the compound interest formula

Unit I : Profit and Loss

Unit II: Ratio and Proportion

Unit III: Time and Work

Unit IV: Simple Interest

Unit V : Compound Interest

Textbook:

Aggarwal R.S., Quantitative Aptitude published by S.Chand& Co., Ltd., New Delhi, Edition

2011(without data sufficiency questions).

Unit I : Chapter 11 Unit II: Chapter 12 Unit III: Chapter 15 Unit IV: Chapter 21 Unit V: Chapter 22

Reference Books:

1. GuptaR.. Quantitative Aptitude. Ramesh Publishing House, Edition 2012.

2. Collins.D.C, Arithmetic in Easy Steps, Samson Publishers, Palayamkottai, Edition 2006.

Upon completion of the course, the students will **PSOs** Cognitive CO be able to: Addressed Level Analyze the positions that require number sense in CO-1 1,2 Analyzing profit and loss. Apply ratios and proportions to solve real-life CO-2 1,2,3 Applying problems Find the time taken by an individual and a group of CO-3 1,2,3 Remembering individuals to complete a piece of work Explain the concept of simple and compound CO-4 interests and the concept of the time value of money, 1,2,4 Evaluating present value and future value CO-5 Evaluate compound interest. 1,2,4 Evaluating

Course Outcomes

Semester	Course Code		Course Code Title of the Course		Hours		Credit			
IV	21UNMA41		Com	Mathematics for Competitive Examination II				30		2
Course Outcome s (COS)	Pro	gramm	e Learn (PLO	earning Outcomes Programme Specific PLOs) (PSOs)				fic Outco s)	c Outcomes	
	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1	2	3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-2	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
CO-3	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark \checkmark \checkmark			
CO-4	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
CO-5	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
	Num	Number of matches (\checkmark) = 35 Relationship = High								

SEMESTER - IV

Course Title	FIELDWORK / INTERNSHIP
Course Code	21UFMA41
Course Type	FW/I
Credits	2
Marks	100

The following guidelines have been framed for the courses titled Fieldwork and Internship for all the U.G. Programmes.

- Fieldwork/Internship shall be in the fourth semester of each programme.
- A Department can opt for either Fieldwork or Internship.
- Fieldwork may be done individually or in groups not exceeding five per group.
- The minimum length of the Fieldwork report should be 15 to 20 pages in A4 size.
- Marks for the Fieldwork Report will be 100 divided as 60% for the Fieldwork and 40% for Viva-Voce Examination. 2 Credits will be awarded to the students who complete Internships and produce Internship Completion Certificate duly signed by the authority concerned.
- Fieldwork / Internship shall be allotted outside the working hours for a maximum of six days.

Scheme	of	Eva	luati	on:	

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Fieldwork	Internal	External
Word of title / Topic	5	5
Objectives / Formulation including Hypothesis	5	5
Methodology / Techniques / Procedures adopted	15	15
Chapterization of the Fieldwork Report	15	15
Summary / Findings / Summation	5	5
Works Cited / Work Consulted / References / Annexures / Footnotes	10	10
Relevance of the Fieldwork to social needs	5	5
	60	60

SEMESTER -- V

Course Title	Linear Algebra
Total Hours	60
Hrs./Week	4
Course Code	21UCMA51
Course Type	DSC-VII
Credits	4
Marks	100

General Objective:

To understand the concept of Vector Space and its subspaces and to learn the properties of inner product space

Course Objectives:

СО	The learners will be able to:
CO- 1	Familiarize with the concept of vector space, dimension and its properties
CO-2	Determine the dimension of the vector space
CO-3	Apply Rank-Nullity Theorem to calculate dimension of vector space
CO-4	Find the orthogonal complement of a set
CO-5	Know the aspects of Linear algebra which are relevant to Functional Analysis

UNIT I :VectorSpaces-Definition and examples-Subspaces-Linear Transformations.

UNIT II: Linear Span of a set -Linear dependence and independence- Basis and dimension.

UNIT III: Theorems on dimension-Rank and Nullity-Matrix of a Linear transformation.

UNIT IV:Inner product space –Definition and examples - Orthogonality – Gram-SchmidtOrthogonalisation process– Orthogonal complement.

UNIT V: Algebra of Matrices – Types of Matrices – Inverse of a matrix - Characteristic equation and Cayley Hamilton theorem- Eigen values & Eigen vectors

Textbook:

Arumugam S and Issac. *Modern Algebra*, SCITECH Publications (India) Pvt.Ltd, Chennai Edition 2012.

UnitI: ChapterV:Section 5.1, 5.2, 5.3 UnitII: ChapterV:Section 5.4, 5.5, 5.6 (uptotheorem 5.21) UnitIII: ChapterV:Section 5.6 (theorem 5.22–5.28), 5.7, 5.8 UnitIV: Chapter VI:Section 6.1,6.2,6.3 UnitV: Chapter VII:Section 7.1,7.2,7.3,7.7,7.8

Reference Books:

1. Venkatachalapathy. S. G, Modern Algebra, Margham Publications, Chennai, Second Edition 2004.

2. Gopalakrishnan. N.S, *University Algebra*, Newage International Pvt.Ltd. Publishers, New Delhi, Second Edition-2001,

CO	Upon completion of the course, the students	PSOs	Cognitive
CO	will be able to:	Addressed	Level
CO-1	Understand the extension of group as a vector space and its subspaces	1,2,3	Understanding
CO-2	Calculate the basis of a vector space	1,2	Evaluating
CO-3	To explain the matrix representation of a linear transformation	1,2,3	Analyzing
CO-4	Derive orthonormal basis of a finite-dimensional Inner product space	1,2	Understanding
CO-5	Apply Cayley's Hamilton Theorem to find out the Eigen values of a matrix.	1,2,5	Applying

Course Outcomes

Semester	Course Code			Title of the Course			Hour	S	Credit	
V	21UCMA51 Linear Algebra 60 4									
Course	Pro	gramme	Learni (PLOs)	ng Outco)	Programme Specific Outcomes (PSOs)					
(COs)	PLO	DI O 2	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
(005)	1	FLO 2	3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
CO-2	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-3	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
CO-4	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-5	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			\checkmark
	Numbe	Number of matches (\checkmark) = 30 Relationship = Medium								

SEMESTER - V

Course Title	Real Analysis-II
Total Hrs.	60
Hrs./Week	4
Course Code	21UCMA52
Course Type	DSC-VIII
Credits	4
Marks	100

General Objective:

To impart the knowledge of the basic terms of the analysis like an open set, closed set, closure in a metric space and to understand the concept of complete metric space, connected metric space and compact metric space.

Course Objectives:

СО	The learners will be able to:
CO-1	Understand the notion of countable, uncountable sets, Metric Space, Open set and
	Interior of a set.
CO-2	Determine the closure and limit points of the sets in a metric space.
CO-3	Understand the concept of continuous and uniformly continuous functions.
CO 4	Explain various types of Metric spaces like Complete, Connected and Compact metric
0-4	space
CO-5	Analyse the relationship between continuity with connectedness and compactness.

Unit I: Countable sets - Uncountable sets- Metric spaces- Bounded sets - Open Ball - Open sets – Subspaces- Interior of a set.

Unit II: Closed sets – Closure - Limit point - Dense sets - Complete metric space - Cantor's intersection theorem-Baire's category Theorem.

Unit III: Continuity of functions- Continuity of composition of functions-Equivalent conditions for continuity – Algebra of continuous functions- Homeomorphism - Uniform continuity.

Unit IV: Connectedness: Introduction – Connected metric space - Equivalent characterization of Connectedness - Connected subsets of R - Connectedness and continuity - Intermediate Value theorem.

Unit V: Compactness: Introduction - Compact Metric spaces – Compact Subsets of R - Heine Borel theorem –Compactness and Continuity.

Textbook:

Arumugam S and Thangapandi Isaac A: *Modern Analysis*, New Gamma Publishing House, Palayamkottai Edition June 2012.

Unit I : Chapter 1: Section 1.2, 1.3 Chapter 2: Section 2.1-2.6

Unit II : Chapter 2: Section 2.7 - 2.10 Chapter 3: Section 3.1, 3.2

Unit III: Chapter 4: Section 4.1 - 4.3

Unit IV: Chapter 5: Section 5.1 - 5.3

Unit V : Chapter 6: Section 6.1,6.2,6.4.

Reference Books:

1. Richard R. Goldberg: *Methods of Real Analysis*, Oxford and IBH Publishing Co. Pvt. Ltd., Indian Edition 1970.

2. Venkatachalapathy S.G., *Real Analysis*, Margham Publications, Chennai, Second Edition 2005.

Upon completion of the course, the students **PSOs** Cognitive CO will be able to: Addressed Level Explain the basic terms of the metric space, such **CO-1** 1,2 Understanding as open set, closed set, and bounded set. Prove Cantor's intersection theorem and Baire's **CO-2** 1,2 Evaluating Category Theorem Outline equivalent conditions for the function to 1,2 **CO-3** Understanding be continuous. **CO-4** Compare Continuity with various metric spaces. 1,2 Evaluating **CO-5** List the compact subsets of Real numbers. 1,2 Applying

Course Outcomes

Semester	Course	e Code	Title of the Course				Hours		Credit			
V	21UC	MA52	REAL ANALYSIS-II				60		4			
Course	Pro	gramme	Learnin	g Outco	mes	Pr	Programme Specific Outcomes					
Outcomes			(PLOs)			(PSOs)						
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO		
	1	2	3	4	5	1	2	3	4	5		
CO-1	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark					
CO-2	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark					
CO-3	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark					
CO-4	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark					
CO-5	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark					
	Numbe	r of mate	thes (\checkmark)	=25	1	•	Relation	ship =	Medium	1		

SEMESTER -V

Course Title	Differential Equations
Total Hours	60
Hrs./Week	4
Course Code	21UCMA53
Course Type	DSC-IX
Credits	4
Marks	100

General Objective:

To Recognize and solve ordinary differential equations and apply the concept of orthogonal trajectories as a curved coordinate system.

Course Objectives:

СО	The learners will be able to:
CO- 1	Classify the first-order differential equation solvable for x,y, p and clairaut's form.
CO-2	Determine the solution of the Linear differential equation with variable
	coefficients.
CO-3	Apply Lagrange- Charpit method to solve PDE.
CO-4	Utilize the concept of PDE to solve differential equations.
CO-5	Apply Exponential function to solve ODE.

Unit I: First order higher degree Differential equation – solvable for p, x and y - Clairaut's form –linear differential equation with constant coefficients –particular integrals of the form $f(x) e^{ax}$, x^n , $e^{ax}x^n$.

Unit II: Homogenous equations - Linear differential equation with variable coefficients - equations reducible to homogenous equations.

Unit III: Formation of partial Differential Equation – First order PDE-Solutions-Standard forms - Charpit's method.

Unit- IV: Partial Differential Equations of higher order-Homogenous differential Equations - Solutions.

Unit V: Applications of Differential Equations- Orthogonal Trajectories- Growth and Deccay-Continuous Compound Interest- Brachistochrone problems- Tautochronous property of the cycloid.

Textbook:

Arumugam S: *Differential Equation and Applications*, New Gamma Publications, Palayamkottai, Edition 2008.

Unit I: Chapter I (Section 1.7) & Chapter II (Section 2.3)

Unit II: Chapter II (Section 2.4,2.5)

Unit III: Chapter IV

Unit IV: Chapter V

Unit V: Chapter VI (Section 6.1-6.5)

Reference Books:

1. Joseph A. Mangaladoss: *Differential Equation and Vector Calculus*, Presi-Persi, Tirunelveli Publications 2012.

2. Narayanan S and Manichavasagom PillaiT.K. : Differential Equations and its Applications,

S. Viswanathan Printers Publishers Pvt Ltd., Chennai Edition 2014.

Course Outcomes

CO	Upon completion of the course, the students will	PSOs	Cognitive
	be able to:	Addressed	Level
CO-1	Explain the concept of first-order higher degree differential equation	1, 2,3	Understanding
CO-2	Explain the various types of homogenous equations and find the solutions	1, 2,3	Evaluating
CO-3	Apply partial derivative equation techniques to predict the behaviour of certain phenomena	1, 2,3	Applying
CO-4	Make use of specific methodologies, techniques and resources to conduct research and produce innovative results in the area of specialisation of PDE	1,2	Applying
CO-5	Determine the orthogonal trajectories of a family of curves.	1, 2	Evaluating

Semester	Cour	se Code		Title of the Course Hours C		Hours		redit			
V	21UC	CMA53	D	oifferent	ial Equ	ations		60 4			
Course	Prog	gramme	Learnir	earning Outcomes P			Programme Specific Outcomes				
Outcomes			(PLOs)				(PSOs)				
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO		
	1	2	3	4	5	1	2	3	4	5	
CO-1	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark			
CO-2	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark			
CO-3	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark			
CO-4	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark				
CO-5	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark				
	Numbe	er of mate	ches (✓)	= 31	F	Relation	ship = N	Iedium			

SEMESTER - V

Course Title	Statics
Total Hrs.	60
Hrs./Week	4
Course Code	21UCMA54
Course Type	DSC-X
Credits	4
Marks	100

General Objective:

To know the concepts of force, moment and mechanical equilibrium, apply the concepts and solve real-life problems.

Course Objectives:

CO	The learners will be able to:
CO-1	Understand the resultant of forces acting at a point and obtain the necessary conditions for equilibrium forces
CO-2	Apply extended form of parallelogram law of forces and theorem on resolved parts to solve the problems
CO-3	Analyze the resultant of parallel forces and the geometric representation of moments
CO-4	Identify points on a line of action of a resultant of a system of forces using Generalized theorem of moments
CO-5	Categorise friction and its types

Unit – **I:** Forces acting at a point- Resultant and component – simple cases of finding resultant -Parallelogram law of forces – analytical expression for the resultant of two forces acting at a point - Triangle of forces – Perpendicular triangle of forces – converse of Triangle of forces- Lami'sTheorem- Problems.

Unit – **II** : An extended form of the parallelogram law of forces - Resolution of a force – components of a force along to given directions - Theorem on resolved parts – Resultant of any number of forces acting at a point Graphical method, Analytical Methods - Problems.

Unit – III :Parallel Forces and Moments – To find the resultant of two like parallel forces – To find the resultant of two unlike and unequal parallel forces acting on a rigid body – Resultant of number of parallel forces acting on a rigid body – Center oftwoparallelforces – Moment of force -Varigon'sTheoremof Moments - Generalized theorem of moments.

Unit – **IV** :Equilibrium of three forces acting on a rigid body - Rigid body subject to any three forces - Three Coplanar ForcesTheorems – conditions of equilibrium – procedure to be

followed in solving any statical problem – Two trigonometrical theorem and Problems.

Unit – V: Friction-Introduction – Experimental result – Statical, Dynamical and limiting frictions - Laws of friction – Friction- A passive force – Coefficient of friction - Angle of friction – Cone of friction - Equilibrium of a body on arough inclined plane under a force parallel to the plane - Equilibrium of a body on arough inclined plane under any force.

Textbook:

Venkatraman, M.K. Statics. Agasthiar Publications, Sixteenth Edition, Chennai 2013.

Unit I : Chapter 2 (Section 1- 9) Unit II : Chapter 2 (Section 10-15) Unit III: Chapter 3 (Section 1-9, 12,13) Unit IV: Chapter 5(Section 1-5) Unit V : Chapter 7(Section 1-12)

Reference Books:

1. Durai Pandian, P. Mechanics, Laxmi Durai Pandian and Muthamizh Jayapragasam, S.

Chand and Company Limited, Reprint 2007.

2. Loney S.L. *The elements of statics and dynamics*: Silver line publications, Allahabad Edition 2003.

СО	Upon completion of the course, the students will	PSOs	Cognitive
	be able to:	Addressed	Level
CO-1	Understand the concept of equilibrium of forces acting at a point	1,2	Understanding
CO-2	Apply the theorems on resolved parts to solve the problems	1,2,3	Applying
CO-3	Examine the centre of parallel forces as well as determine how far it lies between them.	1,2	Analyzing
CO-4	Predict the effect of three forces acting on a rigid body	1,2	Evaluating
CO-5	Evaluate the coefficient, Angle and Cone of friction on Equilibrium of a body on a rough inclined plane	1,2,3	Evaluating

Course Outcomes

Semester	Co	urse Co	de	Title of the CourseHours		Cre	edit						
V	21	UCMA5	54		Statics	60			4				
Course	Pro	gramme	Learı	ning Out	comes	Programme Specific Outcomes							
Outcomes			(PLO	s)		(PSOs)							
(COS)	PL	PLO	PL	PLO	PLO	PSO PSO PSO			PSO	PSO			
	Ο	2	03	4	5	1	2	3	4	5			
	1												
CO-1	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark						
CO-2	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark					
CO-3	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark						
CO-4	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark						
CO-5	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark					
	Numb	er of ma	tches (✓) = 29		•	Re	elationshi	p = Medi	um			

SEMESTER - V

Course Title	Number Theory
Total Hrs.	60
Hrs./Week	4
Course Code	21UCMA55
Course Type	DSC-XI
Credits	4
Marks	100

General Objective:

To enrich students knowledge about the number system and also motivate them to find the solutions of linear congruence using well-known concepts

Course Objectives:

CO.NO	The learners will be able to:							
CO-1	Understand the concept of the number system and solve the equation using							
	algorithms							
CO-2	Solve the linear congruences using Chinese Remainder Theorem							
CO-3	Evaluate linear congruences using Wilson's Theorem, Fermat-Kraitchik and							
	Factorization Method.							
CO-4	Assess the divisors and their sum using Mobius inversion formula and Greatest							
0.0-4	Integer Function.							
CO-5	Solve linear congruences usingEuler's Phi-Function, Euler's Theorem and studies							
	their properties							

UNIT I: Divisibility Theory: Early Number theory – The Division algorithm – the Greatest Common divisor – The Euclidean Algorithm -The Diophantine Equation ax + by = c.

UNIT II: Primes and their distribution: The fundamental theorem of arithmetic – The Theory of Congruences: Carl Friedrich Gauss - Basic Properties of Congruence - Binary and Decimal Representations of Integers - Linear Congruences and the Chinese Remainder Theorem.

UNIT III: Fermat's Theorem: Pierre de Fermat - Fermat's Little Theorem and Pseudo primes - Wilson's Theorem - The Fermat-Kraitchik Factorization Method.

UNIT IV: Number-Theoretic Functions: The sum and number of divisors - The Mobius inversion formula - The Greatest Integer Function.

UNIT V: Euler's Generalization of Fermat's Theorem: Leonhard Euler - Euler's Phi-Function - Euler's Theorem - Some Properties of the Phi-Function.

Textbook :

Elements of Number Theory by David M. Burton, Seventh Edition, McGraw Hill Higher Education publications, New Delhi, Reprint 2014.

Unit I: Chapter 2

Unit II: Chapter 3-Section 3.1 & Chapter 4

Unit III: Chapter 5 Unit IV: Chapter 6 Unit V: Chapter 7 **Reference Books:**

1. Andrews George E. Andrews, *Number Theory* - Hindustan Publishing Corporation (India) 1989.

2. Malik S.B., Basic Number Theory, Vikas Publishing House Pvt., Ltd., New Delhi, Second Reprint 2009.

CO	Upon completion of the course, the students will	PSOs	Cognitive	
CO	be able to:	Addressed	Level	
	Understand the results involving divisibility and the			
CO-1	greatest common divisors and solve systems of linear	1,2	Understanding	
	congruences.			
CO-2	Apply Chinese Remainder Theorem to solve the	12	Applying	
	linear congruences	1,2	Apprying	
CO-3	Determine the solution of linear congruence using	1.2	Evaluating	
	Euler-Fermat's theorem	1,2		
CO-4	Evaluate the sum of the divisors using Mobius	12	Evaluating	
	inversion formula and Greatest Integer Function.	1,2	Dividualing	
CO-5	Apply Euler phi function to find the solutions of	125	Applying	
	linear congruence	1,2, 5		

Course Outcomes

Semester	Co	urse Co	ode Title of t Course		tle of the Course)	Hours		Credit	
V	21UCMA55			Number Theory		ory	60		4	
Course	Programme Learning Outcomes Programme Specific Outcom					tcomes				
Outcomes	(PLOs) (PSOs)									
(COS)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1	2	3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-2	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-3	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-4	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-5	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			\checkmark
	Number of matches $(\checkmark) = 26$ Relationship = Medium									
SEMESTER - V

Course Title	Combinatorial Mathematics
Total Hrs.	60
Hrs./Week	4
Course Code	21UEMA51A
Course Type	DSE-I-A
Credits	4
Marks	100

General Objective:

To impart knowledge of applications of mathematics, especially in the field of Combinations and permutations and impart knowledge about recurrence relations, generating functions incidence matrices and the inclusion-exclusion principle.

Course Objectives:

CO	The learners will be able to:
CO-1	Solve problems using permutation and combination.
CO-2	Apply their knowledge for assigning a job to a suitable person using assignment problems.
CO-3	Solve recurrence relation problems using generating functions.
CO-4	Explain the inclusion and exclusion principle.
CO-5	Evaluate the configuration of a block design.

Unit I: Selections & Binominal Coefficients – Permutations - ordered Selections - unordered selections – Binomial Theory.

Unit II: Parings Problems -Parings within a set - paring between sets – An optimal assignment problem.

Unit III: Recurrence - Fibonacci – type relation using generating functions - miscellaneous Methods.

Unit IV: The Inclusion-Exclusion Principle - The Principle - Rook polynomials.

Unit V: Block Design and Error correcting Course Codes - Block designs - Square Block Designs.

Textbook:

Ian Anderson: A first course in Combinatorial Mathematics Edition 1979 (Oxford Applied Mathematics and Computing Science Series).

Unit I : Chapter I & Chapter II Unit II : Chapter III Unit III: Chapter IV Unit IV : Chapter V Unit V: Chapter VI

Reference Books:

1. LiuC.L., Introduction to Combinatorics, McGraw-Hill Book of Company, Copyright @1968.

2. Krishnamurthy V, *Combinatorics theory and Applications*, East-West Press, New Delhi Edition 2012 Reprint.

CO	Upon completion of the course, the students will be able	PSOs	Cognitive	
	to:	Addressed	Level	
CO-1	Apply binomial theorem to prove standard results in	1,2	Applying	
CO-2	Develop fundamental knowledge of combinatorics and complexity	1,2,3	Applying	
CO-3	Develop practical skills needed in modern logic	1,2	Applying	
CO-4	Determine rook polynomial of any irregular board.	1,2,5	Evaluating	
CO-5	Explain finite projectile plane of finite order and its properties	1,2	Evaluating	

Course Outcomes

Semester	Co	urse C	ode	Title of the Course				Hours	Credit	
V	21	UEMA	51A	Combinatorial Mathematics				60	4	
Course	Prog	ramme	Learni	ng Outc	omes	Programme Specific Outcome				
Outcome			(PLOs))				(PSOs)		
s (COS)	PLO	PLO	PLO	PLO	PLO	PSO	PSO PSO PSO			PSO
	1	2	3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-2	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
CO-3	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-4	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			\checkmark
CO-5	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
	Numb	per of m	atches (✓) = 28				Relatio	onship = N	Medium

SEMESTER - V

Course Title	Fuzzy Mathematics
Total Hours	60
Hours./ Week	4
Course Code	21UEMA51B
Course type	DSE-I-B
Credits	4
Marks	100

General Objective:

The course aims to make the students understand how fuzzy mathematics is a powerful Mathematical tool for modelling and controlling uncertain systems in Industry.

Course Objectives:

со.	The learners will be able to:
CO-1	Understand the basic concepts of fuzzy sets and fuzzy mappings.
CO-2	Compare fuzzy sets with crisp sets.
CO-3	Understand the basic knowledge about fuzzy groups and fuzzy rings.
CO-4	Relate the abstraction of field theory and fuzzy field.
CO-5	Explain the fuzzy numbers using fuzzy metric space

Unit I: Fuzzy subsets and Fuzzy Mapping

Unit II: Fuzzy Relation and Fuzzy Logic

Unit III: Fuzzy Groups and Fuzzy Rings

Unit IV: Fuzzy Field and Fuzzy Linear Space

Unit V: Fuzzy Metric Space

Textbook:

Nanda S and Das N. R. *Fuzzy Mathematical Concept*, 2010 Narosa Publishing house Pvt., Ltd.,

Unit I : Chapter 1

Unit II: Chapter 2

Unit III: Chapter 3

Unit IV: Chapter 4

Unit V: Chapter 8

Reference Books:

1. Hooda D.S. and Vivek Raich. *Fuzzy set theory and fuzzy controller*, Narosa Publishing House, Pvt Ltd., 2015.

2. Barnabas Bede, Mathematics of Fuzzy Sets and Fuzzy Logic, Springer Heidelberg, NewYork Edition 2013.

CO	Upon completion of the course, the students will	PSOs	Cognitive	
	be able to:	Addressed	Level	
CO-1	Understand and apply their knowledge in fuzzy	1.2	Understanding	
00-1	logic and fuzzy inference systems.	1,2	Onderstanding	
CO-2	Categorize the significance of fuzzy linear space.	1,2	Analyzing	
CO-3	Illustrate the fuzzy logic membership function	1,2,3	Understanding	
CO-4	Relate and recall fuzzy groups	1,2	Understanding	
CO 5	Evaluate the distance between two points using	1.2	Evaluating	
0-5	fuzzy metrics	1,2		

Course Outcomes

Semester	Course Code			Title of the Course			Hours		Credit	
V	21	UEMA	51B	Fuzzy N	Iathema	tics	60		4	
Course	Pr	ogramn	ne Learr	ning Outo	comes	Pr	ogramme	e Specifi	c Outco	mes
Outcomes			(PLO	s)		(PSOs)				
(COs)	PL	PL PLO PLO PLO PLO				PSO	PSO	PSO	PSO	PSO
	0	2			5	1 1	2	3		5
	1	2	5		5	1	2	5	-	5
CO-1	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-2	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-3	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
CO-4	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-5	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
	Num	ber of m	atches (✓) = 27		-	l	Relation	ship = M	edium

SEMESTER - V

Course Title	DISCRETE MATHEMATICS
Total Hours	60
Hours./ Week	4
Course Code	21UEMA51C
Course type	DSE-IC
Credits	4
Marks	100

General Objective:

To impart the knowledge of logical operators, ordered sets and Boolean algebra

Course Objectives:

СО	The learner will be able to:
CO-1	Recall basic logical operators
CO-2	Apply recursive function to solve recurrence relation
CO-3	Construct Mathematical diagram to represent finite ordered sets
CO-4	Define and verify distributive properties of lattices
CO-5	Apply the concept of Boolean Algebra in modelling and simplifying switching circuits

Unit I

Propositions and Compound propositions, Basic Logical operators – Propositions and Truth Table – Tautologies and Contradictions – Logical Equivalence - Algebra of Propositions – Conditional and biconditional statements.

Unit II

Arguments - Propositional functions - Quantifiers - Negation of Quantified statements

Unit III

Ordered sets – Hasse diagram of partially ordered set – Supremum and infimum – Isomorphic ordered sets.

Unit IV

Well ordered sets – Lattices – Bounded Lattices – Distributive Lattices – Complements - Complemented lattices.

Unit V

Boolean algebra – Basic definitions – Duality – Logic Gates and circuits – Truth tables - Boolean functions

Text Book:

Segmour Lipschutz and Mare Lipson: Discrete Mathematics Second Edition, Tata McGraw – Hill Publications Company, Limited, New Delhi

Unit I : Chapter 4 - Sections 4.1 – 4.8 Unit II : Chapter 4 - Section 4.9 – 4.12 Unit III : Chapter 14 - Section 14.1 – 14.3 Unit IV : Chapter 14 - Section 14.3 – 14.11 Unit V : Chapter 15 - Section 15.10 & 15.11

REFERENCE BOOKS:

Trembley.J.R., Manohar.R., Discrete Mathematical Structure with Applications to computer science, Tata McGraw – Hill, Edition 1997.

Course Outcomes

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Understand the logical connectives and logical equivalence	1,2,3,5	Understanding
CO-2	Interpret the rules of inference and principles of reasoning	1,2,3,5	Understanding
CO-3	Determine the maximum and minimum elements of subsets of posets when they exist	1,2,3,5	Evaluating
CO-4	List the various types of the lattices	1,2,3,5	Analysing
CO-5	Explain Boolean functions and its properties	1,2,3,5	Evaluating

Semester	Cou	rse Code		Title of the Course			Но	urs	Credit		
V	21 U	EMA51C	!]	Discrete	Mathem	atics	6	0	4		
Course	Programme Learning Outcomes Programme (PLOs)							e Speci (PSOs	e Specific Outcomes (PSOs)		
S (COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO	
s (COS)	1	2	3	4	5	1	2	3	4	5	
CO-1	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
CO-2	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
CO-3	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
CO-4	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		~	
CO-5	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
	Num	ber of ma	atches (v	()= 45				Relati	onship =	High	

SEMESTER-V

Course Title	Operations Research - I
Total Hours	60
Hours./ Week	4
Course Code	21UEMA52A
Course type	DSE-II-A
Credits	4
Marks	100

General Objective:

To be familiar with the computational procedure of optimality.

Course Objectives:

СО	The learners will be able to:
CO-1	Understand the techniques of Linear Programming problems Using the Graphical Method.
CO-2	Apply Simplex Algorithm to solve Linear Programming problem
CO-3	Explain the various types of solutions in Linear Programming problems.
CO-4	Discuss the concept of Duality.
CO-5	Evaluate an optimum solution using the Dual simplex method

UNIT I

Linear Programming problem – Mathematical Formulation of Linear Programming problem –Illustration and simple problems (only for Product Allocation problem, Product mix problem and Production problem) - Graphical method.

UNIT II

General linear programming problem – Canonical and standard form of LPP – Simplex Method (maximization Problem) -Simplex Algorithm – Sample problems. **UNIT III**

Charnes' Penality Method - procedure for solving minimization problem by Big 'M' Method – Illustration and simple problems (Except for Two-Phase Method).

UNIT IV

Duality – General primal-Dual pair -Formulating a Dual problem –Duallity and Simplex Method.

UNIT V

Dual of a Dual is primal- Fundamental theorem for Duality- Basic and Basic Duality Theorem– Complementary Slackness Theorem– Dual Simplex method.

Textbook:

Operations Research by Kanti Swarup, P. K. Gupta, Man Mohan -Fourteenth Edition 2014 – Sultan Chand & Sons, Educational Publisher, New Delhi. (Excluding Two-Phase Method and Theorems without proof)

Unit I: Chapter 2 Section2.2-2.4 and Chapter 3Section3.2. Unit II: Chapter 3 Section3.4,3.5 and Chapter 4Section4.1,4.3. Unit III: Chapter 4 Section4.4,4.5. Unit IV:Chapter 5 Section5.2,5.3,5.7. Unit V: Chapter 5 Section5.5,5.6,5.8.

Reference books:

- 1. e-PG Pathsala
- 2. Vittal P.R., Operations Research, Margham Publications, Chennai, Edition 2013.
- 3. HamdyA.Taha., *Operations Research*, Dorling K indersely(India) Pvt Ltd, South Asia, Ninth Edition 2013.

CO	Upon completion of the course, the	PSOs	Cognitive Level
	students will be able to:	Addressed	
CO 1	Illustrate the LPP with two variables using	1234	Understanding
0-1	graphical methods.	1,2,3,4	Understanding
CO-2	Solve the LPP using Simplex method.	1,2,4,5	Applying
	Evaluate minimization problem using Big		
CO-3	'M' Method and formulate the dual problem	1,2,4	Evaluating
	from primal		
CO-4	Formulate a dual problem and solve it.	1,2,4	Creating
CO 5	Determine the solution of LPP using the	1,2,4	Evoluting
0-5	Dual Simplex method.		Lvaluating

Course Outcomes

Semester	Cour	se Code		Title of the Course					C	redit	
V	21UE	MA52A	OPE	OPERATIONS RESEARCH I						4	
Course	Prog	gramme	Learnin	earning Outcomes Progra				mme Specific Outcomes			
Outcomes			(PLOs)					(PSOs)			
(COs)	PLO	PLO	PLO	LO PLO PLO			PSO	PSO	PSO	PSO	
	1	2	3	4	5	1	2	3	4	5	
CO-1	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		
CO-2	\checkmark	\checkmark		\checkmark	\checkmark	✓	\checkmark		\checkmark	\checkmark	
CO-3	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		\checkmark		
CO-4	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		\checkmark		
CO-5	\checkmark	\checkmark		\checkmark	\checkmark	✓	\checkmark		\checkmark		
	Numbe	er of mate	ches (✓)	= 38							
	Relatio	nship		= Hig	gh						

SEMESTER - V

Course Title	PROGRAMMING IN C-I
Total Hrs.	60
Hrs./Week	4
Course Code	21UEMA52B
Course Type	DSE-II-B
Credits	4
Marks	100

General Objective:

To learn the basic programming concepts and to have an in-depth knowledge of Algorithms and Programs in C Language

Course Objectives:

CO.	The learners will be able to:
CO-1	Understand the basic terms like constants, variables, C tokens etc., in C
	Programming.
CO-2	Explain operations and their precedence.
CO-3	Apply input and output operations in C.
CO-4	Apply decision making and branching statements
CO-5	Apply decision making and looping statements

Unit I : Constants – Variables and data types: Introduction – Character set – C tokens – keywords and Identifiers – Constants – Variables – Data types – Declaration of variables.

Unit II: Operations and expressions: Introduction – Operators – Special operators – Arithmetic expressions- Evaluation of Expressions – Precedence of Arithmetic – Operator Precedence and Associativity.

Unit III: Managing input and output operations: Introduction – Reading a character – Writing a character – Formatted Input – Formatted Output

Unit IV :Decision making and Branching: Introduction – Decision Making with if statement – Switch statement – The ?: operator – The goto statement.

Unit V: Decision making and Looping: Introduction – The While statement – The do statement – The for statement – Jumps in loops.

Textbook:

BalagurusamyE: *Programming in ANSI C*, McGraw Hill Education Private, New Delhi - Sixth Edition.

Unit I : Chapter 2 Unit II : Chapter 3 Unit III : Chapter 4 Unit IV : Chapter 5 Unit V : Chapter 6

Reference books:

1. Ravichandran. D., *Programming in C*, New age international publishers, New Delhi - Edition 2011.

2. Xavier.C., *C Language and Numerical Methods.*, New age international publishers, New Delhi - Edition 1999.

CO	Upon completion of the course, the students will	PSOs	Cognitive	
	be able to:	Addressed	Level	
CO 1	Understand the basic structure of the C-	123	Understanding	
0-1	programming, constants and usage of variables.	1,2,5	Understanding	
CO-2	Develop the C-programs using operators.	1,2,4	Applying	
CO-3	Examine files concept for managing input and	1235	Analyzing	
	output operations.	1,2,3,3	Anaryzing	
CO 4	Develop a segment of a program repeatedly using	1245	Applying	
0.0-4	control statements.	1,2,7,5		
CO-5	Develop concise programs containing repetitive	123	Applying	
0.0-5	processes using methods of looping.	1,2,5		

Course Outcomes

Semester	Cou	rse Code	Ti	Title of the Course		e	Hours		Credit		
V	21UI	EMA52B	PRO	PROGRAMMING IN C- I			60		4		
Course	Progra	amme	Learnir	rning Outcomes Pro			Programme Specific Outcome				
Outcome	(PLOs)				(PSC	Js)				
s (COs)	PLO	PLO 2	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO	
	1		3	4	5	1	2	3	4	5	
CO-1	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark			
CO-2	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	 ✓ 		\checkmark		
CO-3	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
CO-4	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	
CO-5	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark			
	Nur	Number of matches (\checkmark) =39Relationship =High									

SEMESTER - V

Course Title	Astronomy
Total Hours	60
Hours./ Week	4
Course Code	21UEMA52C
Course type	DSE-IIC
Credits	4
Marks	100

General Objective:

To investigate and describe the interrelationship between the celestial bodies.

Course Objectives:

СО	The learner will be able to:
CO-1	Explain the basic terms involved in the study about celestial sphere and list the four systems of coordinates
CO-2	Outline the different zones of earth
CO-3	Discuss the effect of refraction on celestial objects.
CO-4	Make use of Kepler's law to find the mass of the planet
CO-5	Analyse the relation between Sidereal time and mean time

UNIT I: Spherical Trigonometry (only formulae) – Celestial Sphere – Four Systems of Coordinates - Diurnal motion.

UNIT II: Zones of earth – perpetual day and perpetual night – Terrestrial Latitude and Longitude – International Date Line (only definition) – Dip – Twilight – Shortest Twilight.

UNIT III: Refraction – Tangent formulae – Cassini's formula – Effects – Horizontal refraction – Geocentric Parallax.

Unit IV: Kepler's Laws - Verifications – Newton's deductions – Anomalies – planets - inferior and superior – Bode's Law – elongation – sidereal period – synodic period - phase – direct and retrograde motion – stationary points - angle subtended at the sun when two planes are stationary.

Unit V: Time – Equation of time – Seasons - Calendar – Conversion of time.

Textbook:

Kumaravelu. S and Susheela Kumaravelu,: Astronomy – Revised & Enlarged Edition 2013.

Unit I : Chapter I & Chapter II Unit II : Chapter III - Sections: 1, 2, 5 & 6. Unit III: Chapter IV & Chapter V Unit IV: Chapter VI & Chapter XIV Unit V: Chapter VII

Reference books:

- 1. Smart W.M., Textbook on Spherical Astronomy, Cambridge University Press (1999).
- 2. Barlow, Elementary Mathematical Astronomy, Barlow Prentice-Hall (1983).

Course Outcomes

CO	Upon completion of the course, the students will be	PSOs	Cognitive	
	able to:	Addressed	Level	
CO 1	Describe and explain the observed daily and long-term	1.5	Understanding	
0.0-1	motion of objects in celestial spheres	1,,5	Understanding	
	Identify the locations of sun, moon and planets to			
CO-2	assess perpetual day and night, international date line,	1,5	Understanding	
	dip and shortest twilight.			
CO-3	Interpret the concept of refraction and parallax	1,5	Understanding	
CO-4	Verify the Kepler's law and deduct Newton's law.	1,4,5	Applying	
	Determine the sidereal period, Synodic period and			
CO-5	angle subtended at the sun when two planes are	1,5	Evaluating	
	stationary.			

Semester	Cou	rse Code		Title of the Course			Hours		Credit		
V	21UEMA52C ASTRONOMY				Y	6	0	4			
Course	Programme Learning Outcomes						Programme Specific Outcomes				
Outcome	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO	
s (COS)	1	2	3	4	5	1	2	3	4	5	
CO-1	\checkmark	\checkmark			\checkmark	\checkmark				\checkmark	
CO-2	\checkmark	\checkmark			\checkmark	\checkmark				\checkmark	
CO-3	\checkmark	\checkmark			\checkmark	\checkmark				\checkmark	
CO-4	\checkmark	\checkmark			\checkmark	\checkmark			\checkmark	\checkmark	
CO-5	\checkmark	\checkmark	\checkmark				\checkmark				
	Numb	er of mate	thes (\checkmark)	= 26]	Relation	ship = M	edium	

SEMESTER - V

Course Title	Numerical Ability I
Total Hrs.	30
Hrs./Week	2
Course Code	21USMA51
Course Type	SEC-V
Credits	2
Marks	100

General Objective:

To assimilate the fundamental concepts and techniques for solving the mathematical problems and also to attend all types of entrance examinations

Course Objectives:

CO	The learners will be able to:
CO-1	
CO-2	Analyze the conditions and solve the puzzle using algebra
CO-3	Find results on population and depreciation using the concept of percentage
CO-4	Provide trading results by ascertaining net profit or net loss of the given data
CO-5	Identify with ease all types of questions and solve problems in entrance examinations.

Unit I : Average

- Unit II : Problems on Numbers
- Unit III : Percentage
- **Unit IV** : Profit and loss
- Unit V : Ratio and Proportion

Textbook:

AggarwalR.S.*Quantitative Aptitude*,S.Chand& Co., Ltd., New Delhi Edition 2010 (without data sufficiency questions).

Unit I : Chapter 6 Unit II: Chapter 7 Unit III: Chapter 10 Unit IV: Chapter 11 Unit V: Chapter 12

Reference Books:

1. Gupta. R, Quantitative Aptitude, published by Ramesh Publishing House, Edition 2012.

2. Collins.D.C, Arithmetic in Easy Steps, Samson Publishers, Palayamkottai, Edition 2006.

CO	Upon completion of the course, the students	PSOs	Cognitive
	will be able to:	Addressed	Level
CO-1	Recall the essential concepts, formulae, tricks to solve mathematical problems	1,2	Remembering
CO-2	Take part in making a reasoned decision and solving problems	1,2,3	Evaluating
CO-3	Analyze the positions that require number sense in profit and loss	1,2,3	Analysing
CO-4	Solve logical reasoning questions and answer with explanations	1,2,4	Evaluating
CO-5	Apply ratios and proportions to solve real-life problems	1,2,4	Applying

Course Outcomes

Semester	Course Code			Title of the Course			Ho	urs	Credit	
V	21USMA51 Numerical Ability					ty I	3	0	2	2
Course	Pro	gramm	e Leari	ning Out	comes	Pr	ogrami	ne Speci	fic Outco	omes
Outcome	lutcome			s)				(PSOs	5)	
s (COS)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1	2	3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark			\checkmark	✓	\checkmark			
CO-2	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
CO-3	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
CO-4	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
CO-5	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
	Numb	er of m	atches (✓) = 35		•	·	Relatio	onship = 1	High

SEMESTER-VI

Course Title	Complex Analysis
Total Hours	75
Hours/Week	5
Course Code	DSC-XII
Course Type	21UCMA61
Credits	4
Marks	100

General Objective:

To represent the complex numbers algebraically and geometrically and extend the idea of integration in the complex numbers by using residues.

Course Objectives:

СО.	The learners will be able to:
CO-1	Outline the conditions for a complex variable function to be analytic and/or harmonic
co^{2}	Identify the types of bilinear transformation and find the relation between the types of
0-2	bilinear transformation and cross-ratio.
CO-3	Apply Cauchy's integral formula to compute line integrals
CO-4	Classify the singularities and poles.
CO 5	Prove Cauchy's residues theorem and use its concept to find the value of the definite
0-5	integral.

Unit I:Differentiability- Cauchy's Riemann Equations - Analytic functions -Harmonic Functions.

Unit II:Elementary Transformations – Bilinear Transformation - Cross Ratio - Fixed Points of Bilinear Transformation-Some special Bilinear Transformations.

Unit III: Definite integral -Cauchy's theorem - Cauchy's integral Formula - Higher Derivatives.

Unit IV:Taylor's Series - Laurent's Series - Zeros of an Analytic function - Singularities.

Unit V:Residues - Cauchy's residues theorem - Evaluation of Definite integrals - Type 1 and Type 2.

Textbook:

ArumugamS, A.Thangapandi Isaac and A.Somasundaram: *Complex Analysis*, SCITECH Publications (India) Pvt Ltd., Chennai, Edition 2007.

Unit I : Chapter II : Sec 2.5 to 2.8 Unit II : Chapter III : Sec 3.1 to 3.5 Unit III : Chapter VI : Sec 6.1 to 6.4 Unit IV : Chapter VII : Sec 7.1 to 7.4 Unit V : Chapter VIII : Sec 8.1 to 8.3(Except Type 3)

Reference Book:

1. Durai PandianPand Laxmi Durai Pandian, D..: *Complex Analysis*, Muhilan, Emerald Publisher, Reprinted 2001.

2. Baidyanath Patra, Complex Variables and Special Functions, PHI Learning Private Limited, Delhi, 2014.

Course Outcomes

CO.	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Understand the significance of differentiability for complex functions, analyticity, Cauchy Riemann equations, and harmonic results.	1,2	Understanding
CO-2	Utilize the cross ratio to find the bilinear transformations	1,2,3	Applying
CO-3	Apply the concepts of Cauchy's theorem, Cauchy's integral formula and higher derivatives in complex integrations.	1,2,3	Applying
CO-4	Analyse Taylor's and Laurent's simple functions' expansions, determining the singularities' nature and calculating residues.	1,2,3	Analyzing
CO-5	Evaluate line integrals using Cauchy's residue theorem	1,2,3	Evaluating

Semester	Course Code			Course Code Title of the Course		Hours		Credit		
VI	210	UCMA61		Comp	lex Anal	ysis	7	5	4	
Course	Prog	gramme	Learn	ing Outco	omes	Pro	Programme Specific Outcomes			
Outcomes			(PLOs)				(PSOs)	
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO PSO	
	1	2	3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-2	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
CO-3	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
CO-4	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
CO-5	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
	Numbe	Number of matches $(\checkmark) = 34$ Relationship = High								

SEMESTER -- VI

Course Title	Graph Theory
Total Hours	75
Hrs./Week	5
Course Code	21UCMA62
Course Type	DSC-XII
Credits	4
Marks	100

General Objective:

The course aims to provide the students with an understanding of the Graph theory and how it is used to model any network, conceptual or physical.

Course Objectives:

CO	The learners will be able to:
CO- 1	Relate the concepts of walks, trails, paths and connectivity
CO-2	Identify whether a partition is graphical or not.
CO-3	Utilize Fluery's Algorithm to find the Eulerian trail.
CO-4	Determine the matchings in bipartite graphs and planar graphs.
CO-5	Determine the chromatic index and chromatic number of a graph

UNIT I :Graphs-Degrees-Subgraphs- Isomorphism - independent sets and coveringsintersection graph and line graph - Matrices of a graph - Operations on graphs.

UNIT II :Degreesequences-Walks, TrailsandPaths-Connectedness-Connectivity.

UNIT III: EulerianGraphs-HamiltonianGraphs-CharacterizationofTrees-Centreof a tree.

UNIT IV: Matchings-MatchingsinBipartitegraphs-Planargraphs-Properties.

UNITV:Chromaticnumber-chromaticindex-TheFiveColourtheorem-FourColourProblem.Chromatic polynomialof graphs

Textbook:

Arumugam S and Ramachandran S. *InvitationtoGraphTheory*, SCITECH, Publications(India)Ltd.,Reprint2014.

UnitI: Chapter II UnitII: Chapter III & IV UnitIII: Chapter V & VI UnitIV: Chapter VII & VIII UnitV: Chapter IX

Reference Books:

1. SureshSingh G, GraphTheory, PHIlearningPvt.Ltd, Delhi 2010.

2. Frank Harary, Graph Theory, Narosha Publishing House, New Delhi 2001 Reprint.

Course Outcomes

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Understand graph theory in acoherent and technicallyaccurate manner.	1,2	Understanding
CO-2	Construct the realization of a given partition of a graph	1,2,3	Applying
CO-3	Identify whether a graph is Eulerian/Hamiltonian or not.	1,2,3	Applying
CO-4	Determine the thickness, genus, crossing number of a graph.	1,2,3,5	Evaluating
CO-5	Determine the chromatic polynomial of the graph.	1,2,3,5	Evaluating

Semester	Course Code			Title of the Course		e	Hours		Credit	
VI	21 U	CMA62		Graph	Theory		75		4	
Course	Pro	gramme	Learnir	ng Outco	mes	Pro	gramm	e Speci	fic Outco	omes
Outcomes			(PLOs)					(PSOs	5)	
(COs)	PLO	PLO	PLO	PLO	PLO PSO PSO PSO			PSO	PSO	
	1	2	3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-2	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
CO-3	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
CO-4	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		\checkmark
CO-5	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		\checkmark
	Numbe	r of mate	hes (✓)	= 35		•	•	Relatio	nship = H	ligh

SEMESTER --VI

Course Title	Numerical Methods
Total Hours	75
Hrs./Week	5
Course Code	21UCMA63
Course Type	DSC-XIV
Credits	4
Marks	100

General Objective:

To give more knowledge about Numerical Solution of Algebraic equations, interpolation, differentiation, integration and ODEs using Mathematical skills

Course Objectives:

CO.	The learners will be able to:
CO- 1	List out various operators and their properties
CO-2	Estimate the value of the dependent variable under the given condition using the Newton Interpolation formula and Stirling's formula
CO-3	Apply the differentiation concept to find derivatives for equally spaced data.
CO-4	Evaluate the numerical integration by using the Trapezoidal rule, Simpson's one- third rule and Simpson's three eight rule
CO-5	Solve the integral values for ODE by using the predictor-corrector method

Unit – **I:** Finite Differences-Difference operators - Other Difference operators- Summation of series -Montmorts Theorem.

Unit – **II:** Interpolation-Newton's forward interpolation formula, Newton's backward interpolation formula, Newton's central interpolation formula (Stirling's formula Only)-Inverse Interpolation-Lagrange's method, Iterative method.

Unit III: Numerical derivatives –Derivatives using Newton's forward interpolation formula, Derivatives using Newton's backward interpolation formula, Derivatives using Newton's central interpolation formula (Stirling's formula Only).-Maxima and Minima of the interpolating polynomial.

Unit IV: Numerical integration – Gaussian Quadrature formula – Trapezoidal rule – Simpson's one third rule –Simpson's three eight rule

Unit V: Numerical solution of ordinary differential equations -Taylor's series method – Euler's method – Runge-Kutta methods – Predictor –Corrector method - Miline's Method.

Textbook:

Arumugam.S, Issac and Somasundaram, *Numerical Methods*, SCITECH Publication, Chennai, 2007 Reprint.

Unit I: Chapter VI- Section 6.0-6.2 and 6.4 Unit II: Chapter VII- Section: 7.0, 7.1, 7.2 ((iii) only) and 7.6 Unit III: Chapter VIII- Section : 8.0-8.4 Unit IV: Chapter VIII -Section:8.5,8.6. UnitV : Chapter X-Section: 10.0,10.1, 10.3-10.6

Reference Books:

1. Kandasamy.A, Thilagavathy.K and Gunavathi.k,*Numerical Methods*, S. Chand & Company Pvt Ltd, New Delhi, Reprint 2015.

2. Vittal.P.R., Malini.V, *Statistical and Numerical Methods*, MarghamPublications, Chennai, Edition 2011 Reprint.

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Relate to different types of operators.	1,2,4	Remembering
CO-2	Explain various types of Newton's interpolation formula and find its solution.	1,2,4	Evaluating
CO-3	Identify the various types of Newton's derivative formula and find its solution.	1,2,4	Applying
CO-4	Determine the value of definite integral using various rules.	1,2,4	Evaluating
CO-5	Discuss the concept of numerical solution of ordinary differential equations	1,2,3,4	Creating

Course Outcomes

Semester	Course Code			er Course Code Title of the Course			se	Hour	s	Credit	
V	21	UCMA63		Numerica	l Metho	ods	75		4		
Course Outcomes	Programme Learning Outcomes (PLOs) Programme Specific Outcomes (PSOs)								mes		
(COs)	PLO	PLO	PLC) PLO	PLO	PSO	PSO	PSO	PSO	PSO	
	1	2	3	4	5	1	2	3	4	5	
CO-1	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		\checkmark		
CO-2	\checkmark	\checkmark		~	\checkmark	\checkmark	\checkmark		\checkmark		
CO-3	\checkmark	\checkmark		~	\checkmark	\checkmark	\checkmark		\checkmark		
CO-4	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		\checkmark		
CO-5	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		
	Numbe	Number of matches (\checkmark) = 37 Relationship= High									

SEMESTER – VI

Course Title	Dynamics
Total Hrs.	60
Hours./ Week	4
Course Code	21UCMA64
Course type	DSC-XV
Credits	4
Marks	100

General Objective:

To have a thorough understanding of the object's motion in a geometrical sense and comprehend the use of mathematics in physics

Course Objectives:

CO	The learners will be able to:
CO-1	Understand the concept of projectiles and their characteristics
CO-2	Explain Newton's Law of Experimentation
CO-3	Examine whether the motion is simple harmonic motion.
CO-4	Construct the formulae for velocity and acceleration in polar coordinates.
CO-5	Categorize the various paths that two particles can take in simple harmonic motion.

Unit I: Projectiles – Path of a Projectile – Characteristics of the motion of a Projectile – Problems.

Unit II:Collusion of elastic bodies - Laws of Impact - Problems.

Unit III: Simple Harmonic Motion – Geometrical representation of Simple Harmonic Motion – Problems.

Unit IV: Composition of two SHM of the same period in the same straight line - Composition of two SHM of the same period in two perpendicular directions – Motion of particle suspended by a spiral spring – horizontal oscillation of a particle tied to an elastic spring.

Unit V: Motion under the action of the central force – Velocity and Acceleration in Polar Coordinates- Differential Equation of central orbit- Pedal Equation of central orbit-Problems.

Textbook:

Venkatraman, M.K. *Dynamics*, Agasthiar Publications, Trichy, Edition 2014. Unit I: Chapter VI (Sec: 6.1 to 6.8)

Unit II:Chapter VIII (Sec:8.1 to 8.4)

Unit III:Chapter X (Sec: 10.1 to 10.5)

Unit IV:Chapter X (Sec: 10.6 to 10.10)

Unit V:Chapter XI (Sec 11.1 to 11.11)

Reference Books:

1. Durai Pandian, P. Mechanics, S. Chand Limited, New Delhi, 1995.

2. Loney S.L. *The elements of statics and dynamics*: Silver line publications, Allahabad Edition 2003.

Course Outcomes

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Understand the projectile theory to know its applications in sports and games	1,3,5	Understanding
CO-2	Explain the kinetic energy of particles colliding in an elastic conjunction	1,3,5	Analyzing
CO-3	Analyze the period of oscillation and extreme position of an object in simple harmonic motion	1,3,5	Analyzing
CO-4	Determine the position of a simple pendulum and its oscillation period.	1,2	Evaluating
CO-5	Estimate the pedal equation for various curves.	1,5	Evaluating

Semester	Course Code			Title of the Course			Hour	s	Credit	
VI	21UCMA64 Dynamics						60		4	
Course	Pro	gramme	Learni	ng Outco	mes	Pro	gramm	e Specif	fic Outco	mes
Outcomes			(PLOs)					(PSOs)	
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	
	1	2	3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark		\checkmark
CO-2	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark		\checkmark
CO-3	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark		\checkmark		\checkmark
CO-4	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark			
CO-5	\checkmark	\checkmark			\checkmark	\checkmark				\checkmark
	Numbe	er of mate	hes (✓)	= 31 I	Relations	hip = N	ledium		•	

SEMESTER VI

Course Title	Operations Research II
Total Hours	60
Hours./ Week	4
Course Code	21UEMA61A
Course type	DSE-III-A
Credits	4
Marks	100

General Objective: To make the students familiar with the techniques of O.R to be apply

Course objective:

CO	The learners will be able to:							
CO-1	Explain the algorithm for Transportation Problem and find the solution of TP							
CO-2	Solve the Transportation Problem using. North-West Corner Rule							
CO-3	Evaluate optimal solution of Assignment problem using Travelling Salesman							
	Problem.							
CO-4	Demonstrate the concept of Basic Terminologies in Game Theory							
CO-5	Outline the essential components of Network							

UNITI

Transportation problem – LP formulation of Transportation problem – Transportation Table – Loops – Solution of Transportation problem – Finding an Initial Basic feasible solution-Vogel's Approximation Methods (VAM) – Test for optimality – Transposition Algorithm – Modified Distribution Method– Sample problems.

UNITII

Transportation problem – Existence of solution –Triangular Basis in a TP- Finding an Initial Basic feasible solution – North-West Corner Rule – Least Cost Method - Test for optimality – Transposition Algorithm - Stepping-Stone Method– Sample problems.

UNITIII

Assignment problem –Mathematical formulation – Solution of Assignment problem – Hungarian Method- Special Classes in Assignment problem.

UNITIV

Two Person Zero Sum Game-Some basic terms- The Maxi-Min and Mini-Max Principle - Game withoutSaddle point- Mixed Strategies - Graphical Solution of $2 \times n$ and $m \times 2$ - Simple problems.

UNITV

Network flow problem - Minimal Spanning Tree Problem-Shortest route Problems

Textbook:

Operations Research by Kanti Swarup, P. K. Gupta, Man Mohan -fourteenth edition 2014–Sultan Chand & Sons, Educational Publisher, New Delhi. (Theorems without proof)

Unit I: Chapter 10 Section10.2,10.5,10.6,10.8,10.9 (VAM only), 10.10,10.13 (MODI Method Only)
Unit II: Chapter 10 Section10.3,10.7,10.9 (North-West Corner Rule and Least Cost Method only), 10.13 (Stepping-Stone Method Only)
Unit III: Chapter 11 Section11.2-11.4
Unit IV:Chapter 17 Section17.2-17.6.
Unit V: Chapter 24 Section24.2-24.4

Reference Books:

- 1. e-PG Pathshala
- 2. VittalP. R., Operations Research, Margham Publications, Chennai, Edition 2013.
- 3. Hamdy A.Taha., *Operations Research*, Dorling Kindersley (India) Pvt Ltd, South Asia, Ninth Edition 2013

Course Outcomes

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Explain the Mathematical formulation of Transportation Problem	1,2,3,4	Understanding
CO-2	Solve the Transportation Problem using Modified Distribution Method.	1,2,3,4	Applying
CO-3	Determine the optimal solution of the Assignment problem using Hungarian Method	1,2,3,4	Evaluating
CO-4	Find the value of the game using Minimax and Maxmin Criterion.	1,2,4	Understanding
CO-5	Explain the concept of theCritical Path Method.	1,4,5	Understanding

Semester	Cour	se Code		Title of the Course					C	Credit	
VI	21UF	EMA61A	OPI	OPERATIONS RESEARCH II				60		4	
Course	Prog	gramme	Learnin	ng Outco	omes	Programme Specific Outcomes					
Outcomes			(PLOs)					(PSOs)			
(COs)	PLO	PLO	PLO	PLO	PLO	PLO PSO PSO PSO				PSO	
	1	2	3	4	5	1	2	3	4	5	
CO-1	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		
CO-2	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		
CO-3	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		
CO-4	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		\checkmark		
CO-5	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark			\checkmark	\checkmark	
	Numbe	er of mate	ches (✓)	= 41	Relation	nship	= High				

SEMESTER – VI

Course Title	Programming In C-II
Total Hrs.	60
Hrs./Week	4
Course Code	21UEMA61B
Course Type	DSE-III-B
Credits	4
Marks	100

General Objective:

To introduce the concepts of C language to write programmes using functions and pointers

Course Objectives:

СО	The learners will be able to:
CO-1	Explain the notion of arrays and apply the string handling function.
CO-2	Make use of user-defined functions to write programmes.
CO-3	Distinguish Structures and Unions in C programming.
CO-4	Understand the term Pointers and its properties.
CO-5	Develop the programmes using file management.

Unit I : Arrays: Introduction – One dimensional Arrays – Two dimensional Arrays – Dynamic Arrays . Character Arrays and Strings: Introduction – Declaring, Reading and writing strings – String Handling functions.

Unit II : User-Defined function :Definition of functions – Category of functions – Nesting of function - Recursion

Unit III :Structures and Unions: Introduction – Define a structure – Array of structures – Structures and Functions – Size of structures.

Unit IV :Pointers : Introduction – Understanding Pointers – Declaring pointer variables – Chain of Pointers – Pointers and Arrays – Pointers to functions – Pointers and Structures.

Unit V :File management in C : Introduction – Defining and Opening a file – Closing a file – I/O operations on files-Random access to files.

Textbook:

BalagurusamyE: *Programming in ANSI C*, McGraw Hill Education Private, New Delhi -Sixth Edition Unit I : Chapter 7 and Chapter 8 Unit II : Chapter 9 Unit III : Chapter 10 Unit IV : Chapter 11 Unit V : Chapter 12

Reference books:

1. Ravichandran. D., *Programming in* C, New age international publishers, New Delhi - Edition 2011.

2. Xavier.C., *C Language and Numerical Methods.*, New age international publishers, New Delhi - Edition 1999

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Understand the concept of arrays.	1,2,3	Understanding
CO-2	Develop the programs using functions	1,2,4	Applying
CO-3	Relationship between Structures and functions	1,2,3,5	Analyzing
CO-4	Outline the usage of Pointers with Arrays and Structures	1,2,4,5	Understanding
CO-5	Construct the programs using I/O operations on files	1,2,3	Applying

Course Outcomes

Semester	Course Code		Title of the Course			Hours		Credit		
VI	21UE	MA61B	PROGRAMMING IN C- II		60		4			
Course	Pro	ogramme	e Learnir	ng Outco	omes	Programme Specific Outcom				mes
Outcomes			(PLOs)					(PSOs)	
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1	2	3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
CO-2	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
CO-3	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		\checkmark
CO-4	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark
CO-5	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark		
	Nu	Number of matches (\checkmark) =39Relationship =High								

SEMESTER - VI

Course Title	CODING THEORY
Total Hours	60
Hours./ Week	4
Course Code	21UEMA61C
Course type	DSE-IIIC
Credits	4
Marks	100

General Objective: To understand the effect of error correction and deduction.

Course Objectives:

CO	The learners will be able to:
CO-1	Interpret the basic concepts of coding theory
CO-2	Develop bases for C and C+ generating matrices on coding
CO-3	Determine the distance of a linear Course Code
CO-4	List some bounds of Course Codes and classify the Course Codes.
CO-5	Explain the concept of polynomial encoding and decoding

UNIT I: Basic Assumptions - Correcting and Detecting Error Pattern – Information Rate – Effect of Error Correction and Detection – Finding the most likely Course Code word - transmitted.

UNIT II: Linear Course Codes – Two important subspaces – Independents – Basic, Dimension, Matrices – Bases for C and C+ generating matrices on coding.

UNIT III: Parity check matrices – Equivalent Course Codes – distance of a Linear Course Code – Linear Course Codes – Cosets – IMLD for Linear Course Codes – Reliability of IMLD for Linear Course Codes.

Unit IV: Some bounds for Course Codes – Perfect Course Codes – Hamming Course Codes – Extended Course Codes – The extended Golay Course Code – Decoding the extended Golay Course Code – Golay Course Code.

Unit V: Polynomials and Words – Introductions to cyclic Course Codes – Polynomial encoding and decoding – finding cyclic Course Codes – Dual cyclic Course Codes.

TEXT BOOK : D.G. Hoffman et al, Coding Theory and Cryptography – The Essentials, Marcel Dekker INC., Second Edition, (2000) (Chapters 1 to 4 except sections 3.8 and 3.9).

REFERENCE BOOKS:

1. Van Lint J.H., Introduction to Coding Theory, Springer, (1998).

2. San Ling and Chaoping Xing, Coding Theory: A first course, Cambridge University Press (2004)

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Develop systems and methods in fixing errors caused when information is transmitted through noisy channels	1,2,3,5	Applying
CO-2	Analyse the performance of linear Course Codes in terms of weight enumerator functions	1,2,3,5	Analysing
CO-3	Determine the bounds for Course Codes - Golay Course Code.	1,2,3,5	Evaluating
CO-4	Discuss linear Course Codes in terms of generator and parity-check matrices	1,2,3,5	Creating
CO-5	Explain the concept of polynomial encoding and decoding	1,2,3,5	Evaluating

Course Outcomes

Semester	Course Code			Title of the Course			Ho	urs	Cre	dit
VI	21U	EMA61C		CODING THEO			60		4	
Course	se Programme Learning Outcomes (PLOs)				Programme Specific Outcomes (PSOs)					
outcome	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
s (COS)	1	2	3	4	5	1	2	3	4	5
CO-1	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark
CO-2	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark
CO-3	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark
CO-4	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark
CO-5	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark
	Number of matches $(\checkmark) = 45$ Relationship = High									

SEMESTER - VI

Course Title	PROJECT
Total Hrs.	60
Hrs./Week	4
Course Code	21UEMA62
Course Type	DSE-IV
Credits	3
Marks	100

GUIDELINES:

- 1. The project may be done individually or in groups not exceeding five per group.
- 2. The minimum length of the project should be 30 pages in A4 size.
- 3. Marks for the project report will be 100 divided as 60% for the project and 40% for Viva-Voce Examination.

EVALUATION SCHEME:

The Project will be evaluated by both the Internal and External Examiners. Each Examiner will evaluate for 100 marks. The average mark obtained by the candidate is considered marks for the Project Report. The allocation of marks for Project is as follows:

Scheme of Evaluation:

Project	Internal	External
Word of title / Topic	5	5
Objectives / Formulation including Hypothesis	5	5
Review of Literature 10 10		10
Methodology / Techniques / Procedures adopted	15	15
Summary / Findings / Summation	10	10
Works Cited / Work Consulted / References / Annexures / Footnotes1010		10
Relevance of project to social needs	5	5
	60	60

SEMESTER - VI

Course Title	Numerical Ability II
Total Hrs.	30
Hrs./Week	2
Course Code	21USMA61
Course Type	SEC-VI
Credits	4
Marks	100

General Objective:

To enable the students to assimilate the fundamental concepts and techniques for solving the mathematical problems and also to attend all types of entrance examinations

Course Objectives:

CO	The learners will be able to:
CO-1	Identify own particular time wasters and adopt strategies for reducing
CO-2	Develop competitive skills through various types of objective tests and train them by conducting aptitude tests based on verbal and quantitative skills.
CO-3	Utilize the mathematical skills to solve any question in a competitive examination.
CO-4	Solve the logarithmic equation and alsouse logarithms to solve exponential equations.
CO-5	Determine the angle of elevation and angle of depression and find the height if the distance is given.

Unit I : Time and Work.

Unit II :Time and Distance.

Unit III: Problems on Trains.

Unit IV: Logarithms.

Unit V :Heights and Distances

Textbook:

AggarwalR.S.: *Quantitative Aptitude* published by S.Chand& Co., Ltd., Edition 2010 (without data sufficiency questions).

Unit I : Chapter 15 Unit II: Chapter 17 Unit III: Chapter 18 Unit IV: Chapter 23 Unit V: Chapter 34

Reference Books:

- 1. Gupta R, Quantitative Aptitude, Ramesh Publishing House, Edition 2012.
- 2. CollinsD.C, Arithmetic in Easy Steps, Samson Publishers, Palayamkottai, Edition 2006.

Course Outcomes

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Develop abstract, logical and critical thinking in solving problems.	1,2	Applying
CO-2	Solve the problems relating to time and distance.	1,2,3	Applying
CO-3	Solve problems on trains.	1,2,3	Applying
CO-4	Solve the problems which are related to logarithmic functions.	1,2,4	Applying
CO-5	Compute the problems using heights and distance.	1,2,4	Evaluating

Semester	Course Code		Title of the Course		irse	Hours		Credit			
VI	21USMA61		Numerical Ability II		lity	30		2			
Course	Programme Learni			ning Outcomes Pr		rogramme Specific Outcomes					
Outcomes	(PLO			s)				(PSOs	(PSOs)		
(COS)	PLO	PLO	PLO3	PLO4	PLO	PSO	PSO PSO PSO		PSO	PSO	
	1	2			5	1	2	3	4	5	
CO-1	\checkmark	\checkmark			\checkmark	\checkmark	\checkmark				
CO-2	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark			
CO-3	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark			
CO-4	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark		
CO-5	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark		
	Number of matches $(\checkmark) = 35$ Relationship = Hi						= High				

THE SCHEME OF EXAMINATIONS UNDER CHOICE BASED CREDIT SYSTEM

- The medium of instruction in all the UG and PG Programmes is English and Students shall write the CIA Tests and the Semester Examinations in English. Three CIA Tests for one hour each will be conducted. For the calculation of CIA Tests marks the average of the best two tests will be taken. The portion for each test can be 1.5 units of the unitized syllabi.
- Two assignments for the Undergraduate Programmes and one assignment and one seminar for the Postgraduate Programmes are compulsory.
- Two Practical Examinations will be conducted for CIA at the end of the semester and the average will be taken.

Distribution of Marks for the Students admitted into the UG and PG Programmes from the academic year 2021-2022

Undergraduate, Certificate, Diploma and Advanced Diploma Programmes								
	TOTAL MARKS	CIA TESTS MAX.MARKS	SEMESTER	PASSING MINIMUM				
Course Type			EXAMINATION Max. Marks	CIA	SEM. EXAM	OVERALL		
Theory	100	25	75	Nil	30	40		
Practical (2Hrs.)	50	20	30	Nil	12	20		
Practical (4Hrs.)	100	40	60	Nil	24	40		
Project	100	Nil	Report- 60 Marks Viva-Voce- 40 Marks	Nil	Nil	100		

CIA Tests and Semester Examinations

Postgraduate Programmes							
	TOTAL MARKS	CIA MARKS	SEMESTER	PASSING MINIMUM			
Course Type			EXAM	CIA	SEM. EXAM	OVERALL	
Theory	100	40	60	Nil	30	50	
Practical	50	20	30	Nil	15	25	
Practical (for PG Maths only)	100	40	60	Nil	30	50	
Project Report	150	Nil	Project Report- 90 Marks Viva-Voce Examination - 60 Marks	Nil	Nill	150	

CIA TESTS

Record Tests Seminar Assignment Total Note Components (A) **(B) (C)** (A+B+C+D) **(D)** Π I ш 20 20 20 5 25 -The Average of the Best **UG-Theory Two Tests:20** 30 30 30 **PG-Theory** The Average of the Best 5 5 **40** _ Two Tests:30 UG-15 15 Practical The Average of the 5 20 _ _ (2 hrs) Tests: 15 UG-30 30 Practical The Average of the 10 **40** _ _ (4 hrs) Tests: 30 15 15 PG-The Average of the 5 20 _ _ Practical Tests: 15 PG-30 30 Practical The Average of the 10 **40** _ _ (Maths only) Tests: 30

Distribution of Marks

Question Pattern for CIA Test (Theory)

Programme	Question Paper Pattern				
	Part-A	Part-B	Part-C		
UG	MCQs- 8x0.5=4 marks	Internal Choice (Either or type). 2x4=8 marks Answer should not exceed 250 words	Internal Choice (Either or type) 1x8=8 marks Answer should not exceed 500 words	20	
PG	MCQs- 20x0.5=10 marks	Internal Choice (Either or type) 3x4=12 marks Answer should not exceed 250 words	Internal Choice (Either or type) 1x8=8 marks Answer should not exceed 500 words	30	

End Semester Examination (ESE)

The students who have put in the required number of days of attendance are eligible to appear for the End Semester Examinations irrespective of whether they have passed in the CIA Tests or not. They have to pay the examination fees for all the current courses and the arrear courses, if any, and submit the application form before the due date specified for the purpose. For any reason, the dates will not be extended. Hall tickets will be issued only for those who have paid the fees. The question papers for the End Semester Examinations for all the theory courses of the UG and the PG Programmes will be set for 75 marks.

Programme		Total (A+B+C)		
	Part-A	Part-B	Part-C	
UG	MCQs- 30x0.5=15 marks	Internal Choice (Either or type) 5x4=20 marks Answer should not exceed 250 words	Internal Choice (Either or type) 5x8=40 marks Answer should not exceed 500 words	75
PG	MCQs- 30x0.5=15 marks	Internal Choice (Either or type) 5x4=20 marks Answer should not exceed 250 words	Internal Choice (Either or type) 5x8=40 marks Answer should not exceed 500 words	$(\frac{x}{75} \times 60)$ 60

Question Pattern for End Semester Examinations (Theory)

The Question Paper Pattern for the End Semester Examinations (Practical)

The Question Paper Pattern is designed by the respective departments.