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# **B.Sc. Physics**

# DISTRIBUTION OF HOURS, CREDITS, NO. OF PAPERS & MARKS

Part		C	Course	;		Seme	ster	Hours	Credits	Papers	Marks
I	Tamil	l / Arat	oic			I to	IV	24	12	4	400
II	Engli	sh				I to	IV	24	12	4	400
	Discij + Fiel	pline Sj d work	pecific & Pra	Core ctical	(DSC)	I to	VI	73	62	20	1700
III	Discij (DSE)	pline Sj   + Proj	pecific ect	Electi	ive	III &	, VI	16	18	4	400
	Allied	Theory	y & Pr	actica	ls	I to	IV	24	16	6	500
	Non-l	Major E	lectiv	e (NMI	E)	III to	o IV	4	4	2	200
	Skill (SEC)	Enhano	cemen	t Cou	rse	III, IV	&VI	10	10	5	500
IV	Abilit Comp Socia	y Enha oulsory 1 Value	nceme Cours Educ	ent se (AE ation	CC) (SVE)	I		2	2	1	100
	Envir	onmen	tal Sci	ience (	EVS)	II		2	2	1	100
v	Exter	nsion A	ctivitie	es		IV	7		1+1	1	200
	Libra	ry Read	ling H	our		V		1			
			тот	AL		•		180	140	48	4500
		SE	MEST	ER W	ISE D	ISTRI	BUTI	ON OF	HOURS		I
Part	I	II		J	II				IV		Total
SEM	T/A	ENG	DSC	FW	DSE/ PRO	AL	NMI	E SEC	VE/ EVS	LRH	
I	6	6	10	-	-	6	-	-	2		30
II	6	6	10	-	-	6	-	-	2		30
III	6	6	6	-	-	6	2	4	-	-	30
IV	6	6	6	-	-	6	2	4	-	-	30
v	-	-	21	-	8	-	-	-	-	1	30
VI	-	-	20	-	8	-	-	2	-		30
Total	24	24	73	-	16	24	4	10	4	1	180

# (Applicable for students admitted in June 2021 and onwards)

# **COURSE** Pattern

ODM	Dent	0		0.0.1.	TT / 337	т. 4	<b>T</b> *	•	~		Ma	rks
SEM	Part	Course	Title of the paper	S. Code	H/W	L^	1.	<b>P</b> *	C	Ι	Е	Т
			இக்காலத்தமிழ்	21ULTA11								
	I	L-I	Grammar and Translation - I	21ULAR11	6	-	-	-	3	25	75	100
	II	L-I	Communicative English -I	21ULEN11	6	-	-	-	3	25	75	100
	III	DSC-I	Mechanics and Properties of matter	21UCPH11	4	4	-	-	4	25	75	100
	III	DSC-II	Optics and Acoustics	21UCPH12	4	4	-	-	4	25	75	100
	III	P-I	Physics Practicals-I	21UCPH1P1	2	-	-	2	1	40	60	100/2
	III	A-I/1	Statistics & Calculus	21UAMA11	6	4	-	-	4	25	75	100
	IV	AECC-I	Value Education I Value Education II	21USVE1A 21USVE1B	2	2	-	-	2	25	75	100
			சமயத்தமிழ்	21ULTA21								
	I	L-II	Grammar and Translation - I	21ULAR21	6	-	-	-	3	25	75	100
	II	L-II	Communicative English II	21ULEN21	6	-	-	-	3	25	75	100
	III	DSC-III	Thermal physics and Statistical Mechanics	21UCPH21	4	4	-	-	4	25	75	100
II	III	DSC-IV	Spectroscopy and Laser Physics	21UCPH22	4	4	-	-	4	25	75	100
	III	P-II	Physics Practicals – II	21UCPH2P1	2	-	-	2	1	40	60	100/2
	III	A-I/2	Algebra and Differential Equations	21UAMA21	6	4	-	-	4	25	75	100
	IV	AECC-II	Environmental Science	21UEVS21	2	2	-	-	2	25	75	100
	I	L-III	பயன்பாட்டுத்தமிழ் Modern Prose	21ULTA31 21ULAR31	6	-	-	-	3	25	75	100
	II	L-III	One-Act Plays and Writing Skill	21ULEN31	6	-	-	-	3	25	75	100
	III	DSC-V	Electricity and Electromagnetism	21UCPH31	4	4	-	-	4	25	75	100
III	III	P-III	Physics Practicals – III	21UCPH3P1	2	-	-	2	1	40	60	100/2
	III	A-II/1	Allied Chemistry- II/1	21UACH31	4	4	-	-	3	25	75	100
	III	A-II/1P	Allied Chemistry Practicals-II/1P	21UACH3P1	2	-	-	2	1	40	60	100/2
	IV	SEC-I	Fundamentals of	21USFC31	2	2	-	-	2	25	75	100

# CBCS Syllabus – B.Sc., Physics (2021-22 onwards)

75     1       75     1       75     1       75     1       75     1       75     1       60     10       75     1       75     1	100 100 100 100 100/2 100/2
75     1       75     1       75     1       75     1       75     1       60     10       75     1       75     1	100 100 100 100 100/2 100/2
75       75       75       75       75       75       60       10       75       75	100 100 100 100 100/2 100/2
75       75       75       75       75       60       10       75       60       10       75	100 100 100 100/2 100/2
75       75       75       75       75       60       10       75       60       10       75	100 100 100 100/2 100/2
75       75       75       60       10       75       60       10       75	100 100 100/2 100/2 100/2
75       75       75       60       10       75       60       10       75       75	100 100 100/2 100/2 100/2
75	100 100/2 100/2 100/2
75         10           60         10           75         10           60         10           75         10           75         10           75         10           75         10	100/2 100/2 100
75         10           60         10           75         2           60         10           75         2           75         2           75         2	100/2 100/2 100 100/2
60         10           75         1           60         10           75         1           75         1           75         1	100/2 100 100/2
75 60 10 75	100 100/2
60 10 75 75	100/2
75	
75	100
13 .	100
75	100
-	100
-	100
75	100
75	100
75	100
75	100
60 10	100/2
60 10	100/2
75	100
75	100
-	-
	75         75         75         75         75         75         60         60         75         75         75         75         75         75         75         75         75         75         75

	III	DSC- X	Quantum Mechanics and	21UCPH61	4	4	-	-	4	25	75	100
]			Relativity									
	III	DSC-XI	Digital Electronics	21UCPH62	4	4	-	-	4	25	75	100
	III	DSC- XII	Solid State Physics	21UCPH63	4	4	-	-	4	25	75	100
	III	P-VII	Physics Practicals - VII	21UCPH6P1	4	-	-	4	2	40	60	100/2
VI	III	P-VIII	Physics Practicals - VIII	21UCPH6P2	4	-	-	4	2	40	60	100/2
			a)Communication systems	21UEPH61A								
	III	DSE III	b) Opto Electronics	21UEPH61B	4	4	-	-	4	25	75	100
			c) Microprocessor and Programming	21UEPH61C								
	III	DSE IV	Project	21UEPH62	4+4*		4	-	6	-	-	100*
	IV	SEC-V	Radiation Safety	21USPH61	2	2	-	-	2	25	75	100
					180 +4*				140			4500

\* L – Lecture hours

\* T – Tutorial hours \* P

\* P – Practical hours

\* Extra hours for Project Work outside the working hours.

\* Project Report - 60 marks, Viva-Voce Examination - 40 marks

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

## **B.Sc. Physics 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.Sc. Mathematics,

## B.Sc. Physics, B.Sc. Chemistry, B.Sc. Zoology, B.Sc. Microbiology and B.Sc. Nutrition and Dietetics)

SEM	Title of the paper	S. CODE	H/W	С	Ι	E	Т
	PART I – TAMI	Ľ	I		<u> </u>		
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
	I	TOTAL	24	12			400
	PART I – ARAB	IC	I				
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
	I	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
L							

	1	DSC, DSE, Field work and	Project					
SEM	Course	TITLE OF THE PAPER	S. CODE	H/W	С	]	MA	RKS
	course		5. 0022	,	Ŭ	Ι	E	Т
	DSC1	Mechanics and Properties of matter	21UCPH11	4	4	25	75	100
I	DSC2	Optics and Acoustics	21UCPH12	4	4	25	75	100
	P-I	Physics Practicals-I	21UCPH1P1	2	1	25	75	100/2
II	DSC3	Thermal physics and Statistical Mechanics	21UCPH21	4	4	25	75	100
	DSC4	Spectroscopy and Laser Physics	21UCPH22	4	4	25	75	100
	P-II	Physics Practicals-II	21UCPH1P1	2	1	25	75	100/2
TTT	DSC5	Electricity and Electromagnetism	21UCPH31	4	4	25	75	100
111	P-III	Physics Practicals –III	21UCPH3P1	2	1	25	75	100/2
	DSC6	Computational Physics	21UCPH41	4	4	25	75	100
IV	P-IV	Physics Practicals –IV	21UCPH4P1	2	1	25	75	100/2
	FW/I	Field Work/Internship	21UFPH41		2			100
	DSC7	Atomic and Nuclear Physics	21UCPH51	5	4	25	75	100
	DSC8	Analog Electronics	21UCPH52	4	4	25	75	100
	DSC9	Mathematical methods	21UCPH53	4	4	25	75	100
	P-V	Physics Practicals-V	21UCPH5P1	4	2	25	75	100/2
<b>x</b> 7	P-VI	Physics Practicals-VI	21UCPH5P2	4	2	25	75	100/2
v		a) Nano materials and Applications	21UEPH51A					
	DSE-I	b) Geo Physics	21UEPH51B	4	4	25	75	100
		c) Recent trends in Physics	21UEPH51C					
		a)Biomedical Instrumentation	21UEPH52A					
	DSE-2	b) Numerical Methods	21UEPH52B	4	4	25	75	100
		c) Particle Physics and Elements of Crystallography	21UEPH52C		•	20	10	100
	DSC10	Quantum Mechanics and Relativity	21UCPH61	4	4	25	75	100
	DSC11	Digital Electronics	21UCPH62	4	4	25	75	100
	DSC12	Solid State Physics	21UCPH63	4	4	25	75	100
	P-VII	Physics Practicals –VII	21UCPH6P1	4	2	25	75	100/2
VI	P-VIII	Physics Practicals –VIII	21UCPH6P2	4	2	25	75	100/2
	DOD	a)Communication systems	21UEPH61A					
	DSE-	b) Opto Electronics	21UEPH61B	4	4	25	75	5 100
	111	c) Microprocessor and Programming	21UEPH61C	1				
	DSE- IV	Project	21UEPH62	4	6			100
			TOTAL	85	78			2100

PART III

		Part III – Alli	ed					
						MA	<b>NR</b>	۲S
SEM	P	TITLE OF THE PAPER	S. CODE	H/W	С	I	E	Т
I	AI-1	Statistics & Calculus	21UAMA11	6	4	25	75	100
II	AI-2	Algebra and Differential Equations	21UAMA21	6	4	25	75	100
ттт	AII-1	Allied Chemistry-II/1	21UACH31	4	3	25	75	100
111	AII-1P	Allied Chemistry Practicals-II/1P	21UACH3P1	2	1	25	75	100/2
137	AII-2	Allied Chemistry-II/2	21UACH41	4	3	25	75	100
IV	AII-2P	Allied Chemistry Practicals-II/2P	21UACH4P1	2	1	25	75	100/2
			TOTAL	24	16			500
		Part IV – NM	[E					
III	NME1	Laser Physics	21UNPH31	2	2	25	75	100
IV	NME2	Applied Physics	21UNPH41	2	2	25	75	100
			TOTAL	4	4			200
		Part IV – SE	C					
TTT	SEC-1	Fundamentals of Computing and Security	21USFC31	2	2	25	75	100
111	SEC-2	SWAYAM - NPTEL Online Course	21USOC32	2 2	25	75	100	
		Astro Physics	21USPH32		4	20	10	100
IV	SEC-3	Soft Skills	210SSS41	2	2	25	75	100
	SEC-4	Energy Physics	21USPH42	2	2	25	75	100
V	SEC-5	Radiation Safety	21USPH61	2	2	25	75	100
			TOTAL	10	10			500
Part	IV –Va	lue Education & EVS		1	1			
т	VE	Value Education-I	21USVE1A	2	2	25	75	100
<u> </u>	• •	Value Education-II	21USVE1B	-	-	20	10	100
II	EVS	Environmental Science	21UEVS21	2	2	25	75	100
			TOTAL	4	4			200

**PART – V – Extension Activities** 

SEM	<b>Extension Activities</b>	S CODE	TT / 337	<b>^</b>	M	ARK	S
SEIM	(Choose any one)	S. CODE	п/w	C	Ι	E	Т
	NCC	21UEXNCC					
	NSS	21UEXNSS					
	Physical Education	21UEXPHE	]				
I to IV	Red Ribbon Club	21UEXRRC		1			100
	Youth Red Cross	21UEXYRC					
	Youth Welfare	21UEXYWL					
	Yoga	21UEXYOG					
III to	Sadakath Outreach Programme	OTHEXSOR		1			100
IV	(SOP)	21012/301		1			100
	Tota	1	-	2			200

PLO	Upon completion of B.Sc. Degree Programmes, the graduates will be
	able to:
PLO 1	Disciplinary Knowledge
	Acquire scientific knowledge and the understanding of major concepts
	and theoretical principles.
PLO 2	Creative Thinking and Practical Skills / Problem Solving Skills
	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 to apply them in real life situations.
PLO 3	Sense of inquiry and Skilled Communicator
	Develop the capability for raising appropriate questions relating to the
	current/emerging issues encountered in the scientific field and to plan,
	execute and express the results of experiments / investigations through
	technical writings as well as through oral presentations.
PLO 4	Ethical Awareness / Team Work / Environmental Conservation and
PLO 4	Ethical Awareness / Team Work / Environmental Conservation and Sustainability
PLO 4	Ethical Awareness / Team Work / Environmental Conservation and Sustainability Equip them for conducting work as an individual / as a member, or as
PLO 4	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
PLO 4	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,
PLO 4	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, plagiarism etc. to ensure
PLO 4	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, plagiarism etc. to ensure academic integrity.
PLO 4	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, plagiarism etc. to ensure academic integrity. Realise that environment and humans are dependent on one another and
PLO 4	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, plagiarism etc. to ensure academic integrity. Realise that environment and humans are dependent on one another and to know about the responsible management of our ecosystem for survival,
PLO 4	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, plagiarism etc. to ensure academic integrity. Realise that environment and humans are dependent on one another and to know about the responsible management of our ecosystem for survival, and for the well-being of the future generation as well.
PLO 4 PLO 5	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, plagiarism etc. to ensure academic integrity. Realise that environment and humans are dependent on one another and to know about the responsible management of our ecosystem for survival, and for the well-being of the future generation as well. Usage of ICT/ Lifelong Learning / Self-Directed Learning
PLO 4 PLO 5	<ul> <li>Ethical Awareness / Team Work / Environmental Conservation and Sustainability</li> <li>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, plagiarism etc. to ensure academic integrity.</li> <li>Realise that environment and humans are dependent on one another and to know about the responsible management of our ecosystem for survival, and for the well-being of the future generation as well.</li> <li>Usage of ICT/ Lifelong Learning / Self-Directed Learning</li> <li>Inculcate the habit of learning continuously through the effective</li> </ul>
PLO 4 PLO 5	<ul> <li>Ethical Awareness / Team Work / Environmental Conservation and Sustainability</li> <li>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, plagiarism etc. to ensure academic integrity.</li> <li>Realise that environment and humans are dependent on one another and to know about the responsible management of our ecosystem for survival, and for the well-being of the future generation as well.</li> <li>Usage of ICT/ Lifelong Learning / Self-Directed Learning</li> <li>Inculcate the habit of learning continuously through the effective adoption of ICT to update knowledge in the emerging areas in Sciences</li> </ul>
PLO 4 PLO 5	<ul> <li>Ethical Awareness / Team Work / Environmental Conservation and Sustainability</li> <li>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, plagiarism etc. to ensure academic integrity.</li> <li>Realise that environment and humans are dependent on one another and to know about the responsible management of our ecosystem for survival, and for the well-being of the future generation as well.</li> <li>Usage of ICT/ Lifelong Learning / Self-Directed Learning</li> <li>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 also to engage in remote / independent</li> </ul>

# Programme : B.Sc. Programme Learning Outcomes

# Programme Specific Outcomes

PSO No.	Upon completion of B.Sc. Physics Degree Programme, the students will be able to:	PLOs Mapped
PSO-1	Associate themselves to enhance their academic abilities, personal qualities and transferable skills to become responsible citizens byattracting opportunities.	2, 4 & 5
PSO-2	Understand the basic laws of Physics and apply the concepts in various physical phenomena.	1 & 3
PSO-3	Apply their knowledge to perform experiments in laboratories to understand the laws and concepts of Physics.	2, 3 & 4
PSO-4	Develop analytical and logical skills required for higher education with profound knowledge of the various fields of Physics.	1 & 2
PSO-5	Choose their area of interest in academic and competitive fields pertaining to the subject to lead a successful career through self-directed learning.	3 & 5

## SEMESTER – I

Course Title	இக்காலத் தமிழ்
	Ikkala Tamil (Modern Tamil)
Total Hrs.	90
Hrs./Week	6
Course Code	21ULTA11
Course Type	Part – II – 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	O-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. தமி 2. புதி 3. மன் 4. தெர 5. ஒவ் 6. சினே 7. இன 8. சின 9. விழ் 10. மந 11. பென 12. என் 13. அந் 14. நனை 15. பிய 16. அழி 17. உஎ 18. கிள 19. கண 20. தூர் 21. ஜெ	1 தமிழ்ச் செய்யுள் ழ் - பாரதியார் ய உலகு செய்வோம் - பாரதிதாசன் நிதனைத் தேடி - மு.மேத்தா எஸந்து போனவர்கள் - அப்துல் ரகுமான் வொரு புல்லையும் பெயர் சொல்லி அழைப்பேன் - இன்குலாப் னகிதனின் தாழ்வான வீடு - கலாப்ரியா நடவெளி - மனுஷிய புத்திரன் றுச்சாலைக்காக -அறிவுமதி நித்தெழுக என் தேசம் - இரவீந்திரநாத் தாகூர் (ஜெயபாரதன் (மொ.பெ)) தி - ஈரோடு தமிழன்பன் ண்கவிகளின் கவிதைகள் மேல் பரிவுகாட்டு என் ஆத்மாவே - கலீல் ஜிப்ரான் தி மனம் - கல்யாண்ஜி கப்பா - மாமதயானை ானோ- பிரமிள் வு - ஆத்மாநாம் ர் உலகங்கள் - ஞானக்கூத்தன் நிக்குஞ்சு - ந.பிச்சமூர்த்தி டீசி விருந்து - சுகுமாரன் - நா.முத்துக்குமார் ன் கவிதைகள் றக்கூ 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 21ULTA11			Title of the Course			Hours		Credit	
I				Ikkala Tamil		L	90		3	
Course Outcomes	Programme Learning Outco (PLOs)				comes	Programme Specific Outcomes (PSOs)				
(COs)	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	$\checkmark$	✓	~	✓	<ul> <li>✓</li> </ul>	~	~	✓	✓	<ul> <li>✓</li> </ul>
CO-2	$\checkmark$	~	~	✓	<ul> <li>✓</li> </ul>	$\checkmark$	~	✓		
CO-3	$\checkmark$	~	✓	✓	$\checkmark$	$\checkmark$	~	~	✓	
CO-4	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	~	$\checkmark$	$\checkmark$		
CO-5	$\checkmark$	✓	~	✓	$\checkmark$	$\checkmark$	~		✓	✓
	Number of matches ( $\checkmark$ ) = 43									
	Relationship = <b>High</b>									

### 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.
CO-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		e	Title of the Course			Ho	ours	Cred	lits	
Ι	21ULAR 11			GRAMMAR AND		9	0	3			
				TRAN	ISLATI	ON-I					
Course	Prog	gramme	Learnin	ning Outcomes Progr			gramme	amme Specific Outcomes			
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	<ul> <li>Image: A start of the start of</li></ul>	✓			~	~	$\checkmark$				
CO-2	~	~				~	$\checkmark$			~	
CO-3	~	√	~	~		~	$\checkmark$	√			
CO-4	~	~		~		~	$\checkmark$	√		√	
CO-5	~			~	√	~	√		✓		
	Number of matches ( $\checkmark$ ) = 30										
	Relationship = <b>Medium</b>										

### 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	Title of the Course			Irs	Credits
Ι		21ULEN11			Com E	munica nglish -	tive I	90	)	3
Course Outcomes (COS)	Programme Learn Outcomes (PL				ng s)	Programme Specific Outcomes (PSOs)				tcomes
(000)	PLO 1	PLO 2	PLO3	PLO4	PLO5	PSO 1	PSO 2	PSO 3	PSO 4	4 PSO 5
CO-1	<ul> <li>✓</li> </ul>	✓				<ul> <li>✓</li> </ul>	✓			
CO-2	✓	✓	✓			✓	<ul> <li>✓</li> </ul>	✓		
CO-3	✓	✓	✓	✓		✓	<ul> <li>✓</li> </ul>	✓	~	
CO-4	✓		✓	$\checkmark$	✓	✓		✓	✓	_ ✓
CO-5	-	~		~	✓	✓	✓		~	
		Number of matches ( <b>✓</b> ) = 34 Relationship = High								

### SEMESTER-I

Course Title	MECHANICS AND PROPERTIES OF MATTER
Total Hrs.	60
Hrs./Week	4
Course Code	21UCPH11
Course Type	DSC-I
Credits	4
Marks	100

### **General Objective:**

To study the basic principles and applications of Mechanics and Properties of Matter.

### **Course Objectives:**

СО	The learners will be able to:					
CO-1	Define the basic concepts of linear and angular momentum.					
CO-2	Derive expressions for Moment of Inertia of bodies with different					
	shapes.					
CO-3	Explain the concepts and theories related to modulus of elasticity.					
CO-4	Analyze the excess pressure of different surfaces using the concepts					
	of molecular forces and surface tension.					
CO-5	Illustrate the motion of viscous fluids using Poiseulle's formula.					

### Unit I Laws of Motion

Laws of conservation of energy, linear momentum and angular momentum - work energy theorem - work done by gravitational force - potential energy - conservative and non conservative forces - Collision – Elastic and inelastic collision – (Fundamental laws of impact) – Newton's law of impact – coefficient of restitution – Impact of a smooth sphere on a fixed plane – Direct impact between two smooth spheres .

### Unit II Dynamics of Rigid body

Moment of inertia – Theorems of perpendicular and parallel axes – M.I of a circular ring, disc, solid sphere, hollow sphere , Rectangular lamina , uniform elliptic lamina and cylinder about all axes – Compound pendulum – theory – equivalent simple – reversibility of centers of oscillation and suspension – determination of g and k.

### Unit III Elasticity

Elasticity -- Hooke's law - Elastic moduli - Poisson's ratio - Beams - bending of beams - Expression for bending moment -Cantilever- Theory of uniform and non uniform bending - Determination of young's modulus - Torsion of a body -Expression for couple per unit twist - Rigidity modulus of a wire (Torsional Pendulum)

## Unit IV Surface Tension

Surface tension – definition – Molecular forces – Explanation of surface tension on kinetic theory – Surface energy – work done in increasing the area of a surface – Excess pressure inside a curved liquid surface – Excess pressure inside a spherical and cylindrical drops and bubbles-drop weight method- angle of contact- Quincke's method-variation of surface tension with temperature- Jager's method.

## Unit V Viscosity

Viscosity – Coefficient of viscosity – Streamlined and turbulent motion – critical velocity – Rate of flow of liquid in a capillary tube – Poiseuille's formula –viscosity of highly viscous liquid-terminal velocity-Stoke's method-Ostwald Viscometer-viscosity of gas-Mayer's formula-Applications of viscosity- Pitots tube –Mercury venturimeter.

### **Textbooks:**

- 1. Properties of matter R. Murugesan S. Chand & Co., 2020.
- 2. Properties of matter Brijlal and Subramanian S. Chand & Co., 2006.
- 3. Dynamics Dr.M.K.Venkatraman- Agasthiar publications, 2006
- 4. Mechanics by D.S.Mathur, S.Chand& Co., 2ndEdition (2007).
- 5. Dynamics M.Narayanamurti & Nagarathinam (2008).

### **Reference Books:**

- 1. Fundamentals of General Properties of Matter by H.R.Gulati, S. Chand & Co., NewDelhi (1982).
- 2. Fundamental of Physics, D. Halliday, Resnick and J Walker, 10th Edition, Wiley, New York(2013).
- 3. Sears and Zemansky's University Physicswith Modern Physics Technology Update, H. D. Young and R. A. Freedman, 13th Edition, Pearson Education Limited, Edinburgh Gate(2014).

## **Course Outcomes**

CO	Upon completion of the course, the students	PSOs	Cognitive
	will be able to:	Addressed	Level
CO-1	Understand the impacts of elastic and inelastic collisions between objects.	2, 4	Understanding
CO-2	Apply the concepts of Moment of Inertia to determine $g$ and $k$ values.	3,4	Applying
CO-3	Determine Young's and Rigidity modulus of various materials.	1,2	Applying
CO-4	Calculate the surface tension of liquids using various methods.	2,4	Analyzing
CO-5	Estimate the viscosity of liquids using Stoke's and Poiseuille's method.	3,4	Analyzing

Semester	Cours	se Code	T	Title of the Course Hours Credits					edits	
I	210	CPH11	PRO	MECHANICS AND 60 4 PROPERTIES OF MATTER				4		
Course Outcomes	Prog	ramme I	Learnin (PLOs)	g Outco	omes	Prog	ramme	Specifi (PSOs)	c Outc	omes
(COs)	PLO	PLO 2	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1		3	4	5	1	2	3	4	5
CO-1	✓	<ul> <li>✓</li> </ul>	$\checkmark$	✓	~		$\checkmark$		$\checkmark$	
CO-2	~	$\checkmark$	$\checkmark$				$\checkmark$		$\checkmark$	
CO-3	~	$\checkmark$	$\checkmark$	~				$\checkmark$	$\checkmark$	
CO-4	~	~	$\checkmark$				$\checkmark$		$\checkmark$	
CO-5	~	~	$\checkmark$	~				~	$\checkmark$	
	Number of matches ( $\checkmark$ ) = 29									
		Relationship = Medium								

#### **SEMESTER-I**

Course Title	OPTICS AND ACOUSTICS
Total Hrs.	60
Hrs./Week	4
Course Code	21UCPH12
Course Type	DSC-II
Credits	4
Marks	100

### **General Objective:**

To understand the concepts of Physical Optics through interference, diffraction and polarization with their applications besides learning the basics of Acoustics.

### **Course Objectives:**

CO	The learners will be able to:
CO-1	Understand the basic concepts of interference and its related experiments.
CO-2	Discuss Fresnel and Fraunhofer Diffractions, and the principle of plane transmission grating.
CO-3	Discover how light is polarised using doubly refracting crystals and the functions of different devices.
CO-4	Explain the laws of transverse vibrations of a string.
CO-5	Focus on the methods of production and properties of ultrasonic waves, besides understanding the applications of acoustics.

### UNIT I: INTERFERENCE

Analytical treatment of interference - Expression for intensity - Condition for maxima and minima in terms of phase and path difference - Coherent sources, Interference in thin films – transmitted and reflected - Colour of thin films -Air wedge - Determination of diameter of thin wire - Test for optical flatness -Determination of wavelength of light using Newton's rings - Michelson's Interferometer – Theory - Applications - Determination of wavelength.

#### **UNIT II: DIFFRACTION**

Fresnel diffraction - diffraction at a narrow wire – Fraunhofer diffraction -Single slit - Double slit - (Simple theory) - Plane diffraction grating – Plane transmission grating element –Overlapping spectra - Maximum number of orders - Determination of wavelengths using grating - Normal incidence - Dispersive power of a grating - Rayleigh's criterion for resolution - Resolving power of grating - Difference between resolving power and dispersive power.

### UNIT III: POLARISATION

Double refraction - Nicol prism - Polarizer and analyser - Huygens explanation of double refraction in uni-axial crystals - Polaroids and their uses -Quarter wave plate and Half wave plate - Plane, elliptically and circularly polarized light - Production and detection - Optical Activity - Fresnel's explanation of optical activity - Specific rotatory power - Determination using Laurent's half shade polarimeter.

#### UNIT IV: SOUND

Simple Harmonic Motion –Composition of two S.H.M in a straight line-at right angles-Lissajous's figures- Free, Damped, Forced vibrations - Resonance - Fourier theorem-application-Laws of transverse vibration of strings - Sonometer-Determination of AC frequency using sonometer - Determination of frequency using Melde's apparatus-Decibels.

#### **UNIT V: ULTRASONICS AND ACOUSTICS**

Ultrasonics –Production – Piezoelectric crystal method – Magnetostriction method – Properties and Applications Acoustics of building – Reverberation-Sabine's Reverberation formula (No derivation) - Factors affecting acoustics of building- Sound distribution in an auditorium- Requisites for good acoustics.

#### **BOOKS FOR STUDY:**

- 1. Optics, AjayGhatak, Tata McGraw-Hill publishing Co. Ltd., New Delhi (2020).
- 2. A Text book of Optics, Subrahmanyam N., BrijLal and M. N. Avadhanulu, S. Chand & Co., New Delhi (2020).
- 3. Optics and Spectroscopy, R. Murugesan and KiruthigaSivaprasath, S. Chand & Co., New Delhi (2020).
- A Text Book of Sound- Brijlal and Subrahmanyam, Vikas Publishing Pvt. Ltd, New Delhi (2<sup>nd</sup> edition, 2018).

### **BOOKS FOR REFERENCE:**

1.Fundamental of Optics, Khanna D. R. & Gulati H. R., S. Chand & Co., New Delhi (2016).

2.Fundamental of optics, Jenkins & White, McGraw Hill 4th edition (2017).

# **Course Outcome**

СО	Upon completion of the course, the students	PSOs	Cognitive
	will be able to:	Addressed	Level
CO-1	Discuss the applications of interference	2, 4	Understanding
	through Airwedge, Newton's rings and		
	Michelson's interferometer experiments.		
CO-2	Determine the wavelength of spectral	2,4 & 5	Applying
	lines using grating with the concept of		
	diffraction.		
CO-3	Examine the nature of different types of	3,4	Applying
	polarised light using Nicol prism, QWP		
	and HWP.		
CO-4	Estimate the frequency by applying the	1,2,3 & 5	Analyzing
	laws of transverse vibrations of a string		
	in the Sonometer and Melde's string		
	apparatus.		
CO-5	Analyze the sound distribution in an	1, 2 & 4	Analyzing
	auditorium.		

Semester	Cou	rse Cod	e	Title of the Course				Hours	Cr	Credits	
I	21	UCPH12		OPTICS AND ACOUSTICS 60 4				4			
Course	Prog	ramme	Learni	ng Outco	mes	Prog	ramme	Specifi	c 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	✓	√	✓		~		√		√		
CO-2	✓	√	✓		✓		√		✓	✓	
CO-3	✓	√	✓	✓				✓	√		
CO-4	~	✓	✓	~	~	~	~	$\checkmark$		~	
CO-5	✓	√	✓	✓	~	✓	√		✓		
	Number of matches ( $\checkmark$ ) =36										
				Rel	lationsh	ip = Hig	h				

### SEMESTER-I

Course Title	PHYSICS PRACTICALS-I
Total Hrs.	30
Hrs./Week	2
Course Code	21UCPH1P1
Course Type	Practical – I
Credits	1
Marks	100/2

#### General Objective:

To examine the principles of properties of matter, Optics, Polarization and heat through experiments.

### **Course Objectives:**

CO	The learners will be able to:					
CO-1	Comprehend the basic ideas of measuring instruments.					
CO-2	Apply the principles of elasticity to evaluate the Young's modulus of the given material.					
CO-3	Determine the specific heat capacity of a liquid by the method of cooling.					
CO-4	Examinethe basic principles of optics through air wedge and spectrometer experiments.					
CO-5	Deduce the optical activity values of various liquids.					

- 1. Measurements of length (or diameter) using vernier caliper, screw gauge and travelling microscope.
- 2. To determine the Young's Modulus of the material of the bar by Uniform bending method (Pin and Microscope).
- 3. To determine the Young's Modulus of the material of the bar by Non-Uniform bending method (Scale and telescope).
- 4. To determine acceleration due to gravity (g) by Compound Pendulum.
- 5. To determine the Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's method).
- 6. To determine the AC frequency Sonometer
- 7. To determine the Refractive index and Dispersive power of the material of a given prism using sodium light- spectrometer.
- 8. To determine the thickness of a wire Airwedge.
- 9. To determine the specific heat capacity of a liquid-Newton's law of cooling
- 10. Optical activity- Polarimeter.

### **Books for Reference:**

1. Practical Physics, C.C. Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan (Printers & Publishers) Pvt. Ltd., (2009).

2. Practical Physics, P. R. Sasi Kumar, PHI. (2011)

3. Advanced Practical Physics ,S. P. Singh, Pragathi Prakasam (2019).

4.A Text book of Practical Physics, Indu Prakash and Ram Krishna, Kitab Mahal (2011).

5. Practical Physics – St. Joseph College, Trichy.

### **Course Outcomes**

СО	Upon completion of the course, the students	PSOs	Cognitive
	will be able to:	Addressed	Level
CO-1	Observe readings with measuring instruments such as Vernier Microscope, Telescope, Spectrometer and Polarimeter.	3,4,5	Understanding
CO-2	Determine the Young's modulus of the given material by Uniform and Non-uniform bending methods.	2,3,4,5	Applying
CO-3	Apply the Newton's law of cooling to calculate the specific heat capacity of a liquid.	1,3,4,5	Applying
CO-4	Calculate the thickness of a thin wire using airwedge and wavelength of the spectral lines using spectrometer.	3,4,5	Analyzing
CO-5	Estimate the optical activity of a liquid using polarimeter.	2,3,4,5	Analyzing

Semester	Course Code			Title of the Course			Hours		Credits		
I	21UCPH1P1 J			Physics practicals-I			30		1		
Course	Programme Learn			ning Outcomes			Programme Specific Outcomes				
Outcomes			(PLOs)			(PSOs)					
(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	✓	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		√	✓	$\checkmark$	✓	
CO-3	✓	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	✓	
CO-4	✓	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			✓	$\checkmark$	✓	
CO-5	✓	$\checkmark$	$\checkmark$	✓	$\checkmark$		√	✓	$\checkmark$	✓	
	Number of matches ( $\checkmark$ ) = 43										
	Relationship = High										

### SEMESTER - I

Course Title	STATISTICS AND CALCULUS
Total Hrs.	90
Hrs./ Week	4
Course Code	21UAMA11
Course Type	Allied – I/1
Credits	4
Marks	100

### **General Objective:**

To understand physical science by gaining knowledge of elementary calculus and introduce various statistical tools to satisfy the need of concept personals.

CO.NO	The learners will be able to:
CO-1	Recall the measures of central tendency and compute different kinds of partition algebraically and graphically
CO-2	Estimate the measures of dispersion of statistical data
CO-3	EvaluateKarl Pearson's coefficients of correlation for the given data
CO-4	Apply their knowledge in polar curves, pedal equation of a curve.
CO-5	Evaluate integrals using beta and gamma functions.

### **Course Objectives:**

**UNIT I:** Measures of Central Tendency – simple average – Mean, Median & Mode – Geometrical mean and Harmonic mean.

**UNIT II:** Measures of dispersion range-quartile deviation-standard deviation and mean deviation – coefficient of variation.

**UNIT III:** Correlation and regression: Scatter diagram – Karl Pearson's Coefficient of Correlation – properties –Rank Correlation- lines of regression - regression coefficient and properties.

**UNIT IV:** Pedal equations - Curvature – Radius of Curvature in Cartesian, parametric& polar co-ordinates – Evolute -Circle and centre of curvature.

**Unit V:** Beta and Gamma functions.

### Textbooks:

1. Arumugam. S. and Issac, *Statistics*, New Gamma Publications, Palayamkottai Edition July 2013.

2. Arumugam. S. and Issac, *Calculus*, New Gamma Publications, Palayamkottai - Edition 2005.

Unit I : TB 1: Chapter II Section 2.1 - 2.4

Unit II : TB 1: Chapter III Section 3.1

Unit III :TB 1: Chapter VI Section 6.1 – 6.3

Unit IV :TB 2 Part I Chapter III Section 3.3 – 3.5

Unit V :TB 2: Part II Chapter IV

## **Reference Books:**

- 1. Gupta S.C. and Kapoor V.K. *Fundamentals of Mathematical Statistics*. Published by Sulthan Chand & Sons, New Delhi, 11<sup>th</sup> Edition.
- 2. Narayanan S. & Manicavachagam Pillay T.K.: *Calculus Volume I & II*, S. Viswanathan Printers & Publishers Pvt Ltd, Chennai, Edition 2014.

со	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level	
CO-1	Define the basic terms of statistics, such as measures of central tendency and dispersion of the data.	1,2	Remembering	
CO-2	Evaluate standard deviation, quartile deviation and mean deviation of the given data	1,2,3	Evaluating	
CO-3	Estimate the degree of association between two variables using the concept of correlation and regression	1,2,3	Evaluating	
CO-4	Solve problems in evolutes and calculate circle and centre of curvature	1,2	Applying	
CO-5	Determinethe value of complicated integral using Beta and Gamma functions.	1,2.3	Evaluating	

## **COURSE OUTCOMES**

Semester	Cour	se Code		Title of the Course			H	ours	Credits	
I	21U	AMA11	St	atistics	and Ca	alculus		90	4	
Course Outcomes	Programme Learning Outcomes (PLOs)				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	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$	$\checkmark$			
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	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		
	Number of matches $(\checkmark) = 31$					Relationship = Medium				

### 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.

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

# SEMESTER - II

**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. திருநாவுக்கரசர்	- மாசில் வீணையும்
		- குனித்த புருவமும் கொவ்வைச்
		- புழுவாய்ப் பிறக்கினும்
	இ. சுந்தரமூர்த்தி நாயனார்	- பித்தா பிறைசூடி
		- பொன்னார் மேனியனே
2.	மாணிக்கவாசகர்-திருவாசகப்	் - வானாகி மண்ணாகி
	திருவெம்பாவை	- முன்னைப் பழம்பொருட்கும்
3.	திருமூலர்-திருமந்திரம்	- உள்ளம் பெருங்கோயில்
		ഞഖഞ്ഞഖம்

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 பெ	ற்ற காதை) - மாரனை வெல்லும் வீரநின் (59-72)
		கிறித்தவம்
8.	இரட்சணிய யாத்திரிகம் (கட	வுள் வாழ்த்து) - 1. மூல காரண முதற்பொருள்
		- 2. ஆதி மெய்த்திரு
		- 3. வானமும், பூமியும்
		இஸ்லாம்
9.	உமறுப்புலவர்	- அல்லாஹ்
10.	சதாவதானி செய்குதம்பிப் பா	வலர் - மாண்டசவம் ஒன்றெடுத்து
	(நபிகள் நாயக மான்மிய மஞ	ந்சரி) - 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 நகுமானே — 22
		4) இன்றுள்ளோர் நாளைக் கிருப்பதுபொய்
		யென்பதையான் கண்டுகொண்டேன் ஐயாவென்
		கண்ணே நகுமானே - 37
		5) எட்டிப் பிடிக்கும் இதமறிந்தா லுன்பதத்தைக்
		கட்டிப் பிடித்திடுவேன் கண்ணே றகுமானே – 49
12.	ஞானமாமேதை தக்கலை பீர்முக	ம்மது 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	r Course Code		de	Title of the Course			Hours			Credit	
II	21	ULTA2	1	சமய	த்தமிழ்		90			3	
Course Outcomes	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)					
(COs)	PLO 1	PLO 2	PLO	3 PLO 4	PLO 5	PS 1	0	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	$\checkmark$	$\checkmark$	✓	✓		$\checkmark$			$\checkmark$	$\checkmark$	$\checkmark$
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	$\checkmark$	$\checkmark$				$\checkmark$		$\checkmark$			
	Number of matches ( $\checkmark$ ) = 31										
	Relat	Relationship = Medium									

## **SEMESTER – II**

Course Title	BASIC GRAMMAR AND TRANSLATION-II
Total Hrs.	90
Hrs./Week	6
Sub. Code	21ULAR21
Course Type	Part – II – 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		C	Credits	
II	<b>21U</b>	LAR 21	BASIC GRAMMAR AND				90			3		
				TRAN	SLATI	ON-II						
Course	Pro	gramme	Learnin	g Outco	mes	Pro	gram	me S	Specifi	c Outco	mes	
Outcomes			(PLOs)					(I	<b>PSOs</b> )			
(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	<		✓	✓	✓	✓	١		✓			
CO-5		$\checkmark$			✓	✓				√	✓	
	Number of matches = 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
	situations to use language accordingly.		
CO-2	Experiment giving short speeches,	1,2,3	Applying
	welcome address, vote of thanks in		
	programmes and functions organised.		
CO-3	Write e-mails and give short	1,2,3,4	Applying
	presentations, formal presentations		
	using the English language.		
CO-4	Order sentences with its basic units	1,2,3,4	Analyzing
	and to prepare brochures etc.		
CO-5	Find errors in the correct use of	1,2,3,4,5	Evaluating
	collocations and clauses in everyday		
	spoken and written communication.		

## **Course Outcomes**

Semester	Cours	e Cod	Code		Code Title of the Course			Title of the Course				
II	21UI	LEN21	C	омми	<b>NICA</b>	rive e	NGLISI	H 9	90	3		
					-	II						
Course	Pre	ogram	me L	earnir	ıg		Program	nme	Spec	ific		
Outcomes	( C	<b>Dutco</b>	mes (	PLOs)			Outco	mes	(PSO	s)		
(COS)	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSC 4	PSO 5		
CO-1	$\checkmark$	$\checkmark$				$\checkmark$	$\checkmark$					
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	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	<ul> <li>✓</li> </ul>	$\checkmark$		
	Numbe Relatio	Number of matches $(\checkmark) =36$ Relationship = High										

### SEMESTER-II

Course Title	THERMAL PHYSICS AND STATISTICAL MECHANICS
Total Hrs.	60
Hrs./Week	04
Course Code	21UCPH21
Course Type	DSC-III
Credits	04
Marks	100

## General Objective:

To understand the modes of transmission of heat, laws of thermodynamics and their applications besides understanding the main features of statistical Mechanics.

### **Course Objectives:**

CO	The learners will be able to:
CO 1	Define basic aspects of Kinetic theory of gases and transport
00-1	phenomena
CO 2	Discuss laws of Thermodynamics and understand concepts of
0-2	Entropy
CO 3	Compare the modes of transmission of heat and learn the laws of
0-5	radiations
CO 4	Correlate the basic concepts related to common thermodynamic
0-4	applications
CO-5	Summarize various distribution laws of statistical Mechanics

## UNIT I Kinetic theory of gases

Mean free path – Expression for mean free path –Brownian motion – Degrees of freedom and the ratio of specific heat capacities of mono, di and tri atomic gases – Transport phenomena: viscosity, thermal conduction and diffusion – Real gases – Andrews' experiment on carbon dioxide – Critical constants of a gas.

# **UNIT II Laws of Thermodynamics**

Zeroth Law of thermodynamics and temperature- First law and internal energy, conversion of heat into work, Various Thermodynamical Processes- Applications of First Law:(heat capacities of gas, adiabatic equation of state)- Enthalpy - Second law -Origin of second law - Kelvin, Planck and Clausius statements - Heat engines - Carnot cycle - Carnot's theorem - Entropy changes in reversible &

irreversible processes, Entropy - temperature diagrams - Third law of thermodynamics – Un attainability of Absolute zero.

## UNIT III Transmission of heat

Types – Thermal conductivity – Lee's experiment – Convection-Applications of convection-Properties of thermal radiation – black body – absorptive and emissive power radiation in a uniform enclose – laws of radiation – Kirchoff's law – Pressure of radiation – Stefan – Boltzmann law – Distribution of energy in black body spectrum — Planck's law( No derivation) – deduction of Wein's displacement law & Rayleigh – Jean's law from Planck's law.

# UNIT IV Common thermodynamic applications

Practical applications of conduction of heat –Davy's safety lamp – applications of convection – Thermopile – Steam power plants – examples of cooling by evaporation– domestic refrigerator –ammonia ice plant – Air conditioning systems (summer and winter type)

## UNIT V Basics of Statistical mechanics

Probability – phase space – quantum states – micro states and macro states – fundamental postulates of statistical mechanics – thermodynamic probability – – Maxwell – Boltzmann statistics – Bose – Einstein statistics – Fermi – Dirac statistics – comparison of the three statistics- Kinds of ensembles- micro canonical, canonical, Grand canonical ensembles and uses.

## **Books for Study:**

1. Heat and Thermodynamics, M.W. Zemansky, Richard Dittman, 1981, McGraw-Hill.

2. Heat Thermodynamics & Statistical Physics, Brij Lal and Subramaniam, 1<sup>st</sup>Edn., 2008, S.Chand

3. Heat, Narayana Moorthy and KrishnaRao, Triveni Publishers, Madras (1969).

## **Books for Reference**

- 1. Statistical Mechanics, R.K. Pathria, Butterworth Heinemann:3<sup>rd</sup> Ed.,2011, Oxford UniversityPress.
- 2. Statistical Physics, Berkeley Physics Course, F. Reif, 2017, TataMcGraw-Hill
- 3. Thermodynamics, Kinetic Theory and Statistical Thermodynamics, Francis W. Sears and Gerhard L. Salinger, 1986, Narosa.
- 4. An Introduction to Statistical Mechanics & Thermodynamics, R.H.Swendsen, 2012, Oxford Univ.Press
- 5. Sears and Zemansky's University Physics with Modern Physics Technology Update, H. D. Young and R. A. Freedman, 13th Edition, Pearson Education Limited, Edinburgh Gate (2014).

# **Course Outcomes**

CO	Upon completion of the course,	PSOs	Cognitive
	the students will be able to:	Addressed	Level
CO-1	Describe mean free path , ratio of	2, 5	Understanding
	specific heat caps. of real gases.		
CO-2	Correlate the Laws of	2,4	Applying
	Thermodynamics in various		
	thermodynamic processes and		
	applications (Heat engine & Carnot		
	engine).		
CO-3	Illustrate the Lee's Disc experiment	2 &3	Applying
	through the knowledge of		
	conduction.		
CO-4	Analyze the thermodynamic	1 & 5	Analyzing
	principles involved in the common		
	applications such as Thermopile,		
	Refrigerator , ammonia ice plant &		
	steam plants.		
CO-5	Deduce the different distribution	1,2&4	Analyzing
	laws such as M-B , B-E & F-D.		

Semester	Course Code Title of the					he Course		Hours	Cre	Credits	
II	21UCPH21 THERMAL PHY					YSICS	AND	60		4	
				ST	<b>ATIST</b>	ICAL					
				Μ	ECHA	NICS					
Course	1	Program	nme L	earning	5		Progra	mme S	pecific		
Outcomes		Outco	omes (	PLOs)			Outc	omes (]	PSOs)		
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO	
	1	2	3	4	5	1	2	3	4	5	
CO-1	$\checkmark$		✓		$\checkmark$		$\checkmark$			✓	
CO-2	✓	$\checkmark$	✓				$\checkmark$		~		
CO-3	✓	✓	✓	✓			$\checkmark$	✓			
CO-4		$\checkmark$	✓	✓	✓	✓				<ul> <li>✓</li> </ul>	
CO-5	✓	$\checkmark$	✓	✓	✓	✓	$\checkmark$		✓		
	Number of matches ( $\checkmark$ ) =30										
	Relationship = <b>Medium</b>										
					-						

### SEMESTER-II

Course Title	SPECTROSCOPY AND LASER PHYSICS
Total Hrs.	60
Hrs./Week	4
Course Code	21UCPH22
Course Type	DSC-IV
Credits	4
Marks	100

### **General Objective:**

Understand modern spectroscopic techniques including time-resolved laser methods and to acquire in-depth knowledge of laser and its applications

#### **Course Objectives:**

СО	The learners will be able to:				
CO 1	Examine spectroscopy in microwave and their applications in				
0-1	microwave spectrometer and microwave oven.				
CO-2 Discuss IR spectroscopy, its instrumentation and applications					
CO 3	Predict the signals to be observed in the rotational, vibrational				
0-3	spectrum of various materials using IR and Raman spectroscopy.				
CO 4	Analyze the basic concepts of Laser and to apply the knowledge in				
0-4	designing optical techniques of Laser Sources.				
CO 5	Evaluate the applications of lasers and appraise the working of laser				
0-5	detectors.				

### **Unit 1: Microwave Spectroscopy**

Introduction to microwave related frequencies -Rotation of molecules – Classification of molecules – Rotation spectra of diatomic molecules – Intensities of Spectral lines – Effect of Isotopic Substitution–Polyatomic Molecules – Symmetric Top molecules – Asymmetric Top molecules-–microwave spectrometer- microwave oven

### Unit 2:I.R. Spectroscopy and its Instrumentation

I.R. Spectroscopy - Instrumentation and Techniques in Infrared spectroscopy – Sources – monochromators – Sample cells – Detectors – Single beam Infra red spectrometer – Double beam Infra red spectrometer- Fourier Transform Infrared Spectroscopy- Applications

#### **Unit 3: Raman spectroscopy**

Raman effect: Discovery – Classical theory of Raman Effect – Quantum theory of Raman effect -Pure rotational Raman Spectra- Linear molecules – Raman Spectrum of symmetric top molecules - Vibrational Raman spectra – Rotational Fine Structure – Structure determination from IR and Raman spectroscopy.

#### Unit 4: Fundamentals of LASER & Production of LASER

Spontaneous emission – Stimulated emission – Meta stable state – Population inversion – Pumping – Types of Pumping- Optical pumping- electrical discharge method-direct conversion-inelastic atom-atom collision-chemical method-Laser Characteristics- Einstein's coefficients – Ruby Laser – CO<sub>2</sub> Laser – - Dye laser -Semiconductor Laser.

#### **Unit 5: Industrial Applications of LASER**

Laser cutting – Welding – Drilling – Hologram – Recording and reconstruction of hologram - Lasers in Surgery – LIDAR- Raman LIDAR - Lasers in Air Pollution monitoring- -Lasers induced fusion reactor.

### **Book for Study:**

1. K. Thyagarajan and A.K. Ghatak, *LASER Theory and Application*, Mc Millan, India Ltd, second Edition, 2019.

2. Spectroscopy (Atomic and Molecular), Gurdeep R. Chatwal, Himalaya Publishing House, 2016.

3. Molecular structure and spectroscopy - G. Aruldhas, PHI Learning Pvt. Ltd, India, Second Edition 2007, Reprint 2008.

4. Laser and its applications- Ubald Raj & Jose Robin, Indira publications, 2003

### **Book for Reference:**

1. William T. Silfvast, *Laser fundamentals*, University Press, Published in South Asia by Foundation books, New Delhi, 1998

2. WALKER

3. N. Avadhanulu, An introduction to LASERS, S. Chand & Company, 2012.

4. Fundamentals of Molecular Spectroscopy - Colin N Banwell Elaine- M MccashFifth Edition (2012)

5. Hand book of Analytical Instruments -R.S. Khandpur, Tata MC Grow Hill Ltd

6. Lasers in Medicine - H K Kobener (Wiley)

### **Online Materials**

1. Lasers in surgery-<u>https://www.slideshare.net/adityakalya/lasers-in-surgery</u>

## 2. Laser induced fusion reactor-

http://www.gammaexplorer.com/lanlreports/lanl2\_a/lib-www/lapubs/00191043.pdf

# **Course Outcomes**

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Recognize spectroscopy in microwave and their applications in microwave spectrometer and microwave oven.	1,4,5	Remembering
CO-2	Explain IR spectroscopy, its instrumentation and applications	4,5	Understanding
CO-3	Analyze the rotational, vibrational spectrum of various materials using IR and Raman spectroscopy.	1, 4,5	Applying
CO-4	Appraise the basic concepts of Laser and to apply the knowledge in designing optical techniques of Laser Sources.	2,4,5	Analyzing
CO-5	Summarize the applications of lasers and analyze the working of laser detectors.	4,5	Evaluating

Semester	Course Code			Title of the Course				Hours	<b>C</b>	redits		
III	21	UCPH22	;	SPECTRO LASER P	OSCOP HYSIC	YAND 60				4		
Course Outcomes	Prog	Programme Learning Outcomes Progr (PLOs)						Programme Specific Outcon (PSOs)				
(COs)	PLO	PLO 2	PLC	) PLO	PLO	PSO	PSO	PSO	PSO	PSO		
	1		3	4	5	1	2	3	4	5		
CO-1	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$		
CO-2	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$				$\checkmark$	$\checkmark$		
CO-3	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$		
CO-4	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$		$\checkmark$		$\checkmark$	$\checkmark$		
CO-5	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$				$\checkmark$	$\checkmark$		
		Number of matches (✓) = 35 Relationship = High										

### SEMESTER-II

Course Title	PHYSICS PRACTICALS-II
Total Hrs.	30
Hrs./Week	2
Course Code	21UCPH2P1
Course Type	Practical-II
Credits	1
Marks	100/2

### **General Objective:**

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

### **Course Objectives:**

CO	The learners will be able to:
CO-1	Evaluate the Young's modulus and Rigidity modulus of the given
CO-2	Apply the basic principles of optics in Newton's rings and spectrometer experiments
CO-3	Evaluate the coefficient of thermal conductivity by Lee's disc apparatus
CO-4	Test the perpendicular axes theorem by Bifilar pendulum.
CO-5	Determine the coefficient of viscosity and surface tension of the given liquid

- 1. To determine the Young's Modulus of the material of the bar by Cantilever
- 2. To determine the Rigidity Modulus of a Wire by Torsional pendulum.
- 3. To verify the perpendicular axes theorem by Bifilar pendulum.
- 4. To determine the coefficient of viscosity by Stokes method.
- 5. To determine the surface tension of a liquid
- 6. To determine the frequency of a tuning fork Melde's string
- 7. To determine wavelength of sodium light using Newton's Rings.
- 8. To determine the wavelength of spectral lines of mercury spectrum-Grating normal incidence method-spectrometer.
- 9. To determine the coefficient of thermal conductivity of a bad conductor- Lee's Disc method
- 10. To determine the particle size of lycopodium powder using LASER.

## **Books for Reference:**

1.Practical Physics, C.C. Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan (Printers & Publishers) Pvt. Ltd., (2009).

2. Practical Physics, P. R. Sasi Kumar, PHI. (2011)

3. Advanced Practical Physics ,S. P. Singh, Pragathi Prakasam (2019).

4.A Text book of Practical Physics, Indu Prakash and Ram Krishna, Kitab Mahal (2011).

5.Practical Physics – St. Joseph College, Trichy.

## **Course Outcomes**

СО	Upon completion of the course, the	PSOs	Cognitive
	students will be able to:	Addressed	Level
CO-1	Determine the Young's modulus and Rigidity modulus of the given material	2,3,4,5	Applying
CO-2	Calculate the refractive index of glass material and wavelength of the spectral lines.	2,3,4,5	Analyzing
CO-3	Calculate the coefficient of thermal conductivity given bad conductor	2,3,4,5	Analyzing
CO-4	Verify the perpendicular axes theorem by Bifilar pendulum.	2,3,4,5	Applying
CO-5	Calculate the coefficient of viscosity and surface tension of the given liquid	2,3,4,5	Evaluating

Semester	Course Code Title of the C			ourse	Ho	urs	Cred	its		
II	210	СРН2Р	1	Physics	practi	cals –I	I 3	80	1	
Course	] ]	Program	nme L	earning	g	] ]	Progra	mme 🕯	Specifi	C
Outcomes		Outco	omes (	(PLOs)			Outc	omes	(PSOs)	
(COs)	PLO	PLO	PLO	PLO	PLO	PS	PSO	PSO	PSO	PSO
	1	2	3	4	5	01	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	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
CO-5	$\checkmark$	$\checkmark$	$\checkmark$	~	$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
	Number of matches ( $\checkmark$ ) = 45									
	Relationship = High									

## SEMESTER II

<b>Course Title</b>	ALGEBRA AND DIFFERENTIAL EQUATIONS
Total Hrs.	90
Hrs./ Week	6
Code	21UAMA21
Course type	Allied-I/2
Credits	4
Marks	100

# **General Objective:**

To provide a new and refined approach in studying abstract mathematical relationships through new symbolism and to solve the differential equation of higher order.

CO.NO	The learners will be able to:
CO-1	Understand the techniques for solving algebraic equations.
CO-2	Define reciprocal equations and discuss their types
CO-3	Explain the algorithm ofNewton's and Horner's method to find the approximate solutions of numerical equations
CO-4	Solve first order higher degree differential equations.
CO-5	Determine the type of linear differential equation.

## **Course Objectives:**

**UNIT I:** Theorems on theory of Equation – Relation between roots and coefficients – Symmetric functions of roots in terms of coefficients.

**UNIT II:** Transformation of Equations – Reciprocal Equations.

**UNIT III:** Approximate solutions of numerical equations using Newton's method and Horner's method.

**UNIT IV:** First order higher degree Differential equations - Solvable for p, x and y- Clairaut's form

**UNIT V:** Linear differential equation with constant coefficients- particular integrals of the form  $f(x) e^{ax}$ ,  $x^n$ .

# **Textbooks:**

Joseph A. Mangaladoss, S. Firthous Fatima, M. HimayaJaleela Begum and Dr. Syed Ali Fathima: *Classical Algebra*, Presi – Persi Publications, Tirunelveli, Edition 2016.

Arumugam S.and Issac: *Differential Equations & Applications*, New Gamma Publication, Palayamkottai, Edition 2008.

Unit I : **TB 1:** Chapter I: Section 1.1, 1.2 & Chapter II: Section 2.1.

Unit II : **TB 1:** Chapter II: Section 2.2 & Chapter IV: Section 4.1-4.4

Unit III:**TB 1:** Chapter V: Section 5.1, 5.2

Unit IV:**TB 2**: Chapter I: Section 1.7

Unit V : **TB 2:** Chapter II: Section 2.3

# **Reference Books:**

1. Arumugam. S. and Issac, *Algebra*, New Gamma Publications, Palayamkottai, Edition 2011.

2. Joseph A. Mangaldoss, *Differential Equation & Vector Calculus*, Presi – Persi Publications, Tirunelveli 2012

# **COURSE OUTCOMES**

со	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 the solution of Reciprocal equations.	1,2,3	Remembering
CO-3	Solve numerical equations using Newton's and Horner's methods.	1,2,3	Applying
CO-4	Solve differential equations that are in Clairaut's form.	1,2	Applying
CO-5	Evaluate the solution of the linear differential equation of the form $f(x) e^{ax}$ , $x^n$ .	1,2	Evaluating

Semester	Cour	se Cod	e	Title of the			e	Hou	rs	Credits
II	21U	1UAMA21 ALGEBRA		IA21 ALGEBRA AND			90		4	
			DIF	FERE	TIAL	EQUA	rions			
Course		Progra	mme I	earnin/	g		Progra	amme S	Speci	fic
Outcomes		Outc	omes	mes (PLOs)			Outo	omes (	PSOs	;)
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSC	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	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$	$\checkmark$			
CO-5	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$	$\checkmark$			
	Num	Number of matches ( $\checkmark$ ) = 29 Relationship = Medium					edium			

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

## **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.

<b>Course Title</b>	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:**

СО	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.

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**

			NC		emb m	allin				
Semester	Cour	rse Cod	e T	Title of the Course			Ho	urs	Credits	
III 21ULTA31				பயன்பாட்டுத் தமிழ்				0	3	
Course		Program	nme Lo	earning	Programme Specific Outcomes (PSOs)					
Outco		Out	comes	(PLOs)						
mes	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
(COs)										
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	per of m	atches	$(\checkmark) = 23$	8	-				
	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).

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).								
3	Explain the origins of the first Muslim convert followed by the opposition to the								
5	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 - VMuassasathusSahafa 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	<b>Cognitive Level</b>
	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

Relationship Matrix											
Semester	Cou	irse Code	e   ]	Title of the Course			Hours	s	Credits		
III	21	ULAR31	Ν	AODER	N PROS	SE	90		3		
Course	Pro	gramme	Learnin	g Outco	mes	Programme Specific Outcomes					
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	✓	√	✓			✓	✓	✓			
				Numl	ber of m	atches =	= 30				
				Rela	tionship	= Medi	um				

# 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:**

СО	The learners will be able to:
CO-1	Identify and learn the conversational patterns in written communication.
CO-2	Distinguish the patterns of writing in formal and informal situations.
CO-3	Observe the conversational patterns in real-life situations.
CO-4	Examine various possible methods to learn the writing skill through the prescribed texts.
CO-5	Practise 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	Understand the nuances of English conversational patterns.	1,3,4,6	Understanding
CO-2	Explain the patterns required for conversing in formal and informal situations.	1,3,4,6	Applying
CO-3	Choose to write English sentences by means of applying their skills learned.	1,2,3	Applying
CO-4	Focus on language activities to master the writing skill.	3	Analysing
CO-5	Summarize the uses and methods of writing messages, essays, reports and pamphlets.	1,3,4	Evaluating

Semester	Course Code			1	Title of the Course					rs	Credits						
III	III 21ULEN31			One-Act Plays and Writing Skill					90		3						
Course Outcomes	Prog	gramm	ne Lea (F	rning PLOs)	Outco	omes	Pro	gram	ne Spe (I	ecific PSOs)	Outco	mes					
(COS)	PLO	PLO PLO		PLO PLO	PLO PLO		PLO PLO PLO PSO PS				O PLO PLO PSO		PSO	PSO	PSO	PSO	PSO
	1	2	3	4	5	6	1	2	3	4	5	6					
CO-1	$\checkmark$	$\checkmark$	$\checkmark$				$\checkmark$		$\checkmark$	$\checkmark$		$\checkmark$					
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 $(\checkmark) = 35$ Relationship = High															
#### SEMESTER-III

Course Title	ELECTRICITY AND ELECTROMAGNETISM
Total Hrs.	60
Hrs./Week	4
Course Code	21UCPH31
Course Type	DSC-V
Credits	4
Marks	100

## **General Objective:**

Familiarize the students with the fundamental concepts and laws in electricity and magnetism to establish grounding in electromagnetism and analyze the interactions between time-varying electric and magnetic fields.

#### **Course Objectives:**

СО	The learners will be able to:
CO-1	Define the fundamental concepts of LCR in a.c circuits.
CO-2	Discuss the Anderson's bridge and Wheatstone's bridge methods
CO-3	Illustrate the interactions between time-varying electric and magnetic
	fields.
CO-4	Analyze the laws governing thermal and chemical effect of electric
	current
CO-5	Assess the Maxwell's equations, Continuity equations, Poynting's
	theorem and energy of electromagnetic waves

## UNIT-I AC AND DC CIRCUITS

Growth and decay of current in LC,LR and CR circuits with d.c.voltages determination of high resistance by leakage –growth and decay of charge in LCR circuit-conditions for the discharge to be oscillatory –frequency of oscillation.

Alternating Current-Resistance in an AC circuit-Inductance in an AC circuit-Capacitance in an AC circuit-AC through an inductance and resistance in seriescapacitance and resistance in series – LCR series resonance circuit -sharpness of resonance-parallel resonance circuit -power in an AC circuit-power factor.

Measurement of a.c –a.c circuit containing L, C and R - LCR circuits (series and parallel)-theory and applications – power in an a.c circuit.

#### UNIT-II CURRENT ELECTRICITY

Thevenin's and Norton's theorems- Superposition theorem- Reciprocity theorem-Maximum Power Transfer theorem- Applications to dc circuits-Wheatstone's bridge -sensitiveness of the Wheatstone's bridge -meter bridge -Carey fosters bridge-Kirchoff's law in a.c - Application of Kirchoff's law- Owen's bridge- Anderson bridge.

#### UNIT III: ELECTROMAGNETIC INDUCTION

Beer Lambert's law-Magnetic field due to a current carrying a wire- Ampere's law-Faraday's laws of electromagnetic induction-self induction –self inductance of a long solenoid –toroidal solenoid-determination of L by Anderson's and Rayleigh's methods-Owen's bridge-mutual induction-mutual inductance between two co-axial solenoids-experimental determination of mutual inductance –-co-efficient of coupling- energy stored in a coil- eddy currents-uses .

#### UNIT IV: THERMAL AND CHEMICAL EFFECT OF ELECTRIC CURRENT

Thermoelectricity- Seebeck effect- laws of thermo e.m.f-- measurement of thermo e.m.f using potentiometer-Peltier effect-demonstration—Thomson effectdemonstration - thermodynamics of thermo couple –thermo electric diagram –usesapplications-Faradays laws of electrolysis- electrical conductivity of an electrolytespecific conductivity- Kohlrausch's bridge method of determining the specific conductivity of an electrolyte -mobility of ions- Secondary cells- Gibbs –Helmholtz equation for a reversible cell

### **UNIT V: MAXWELL'S EQUATION & ELECTROMAGNETIC WAVES**

Introduction- Maxwell's equations- -Displacement current- Poynting vector-Electromagnetic waves in free space-Hertz experiment for production and detection of EM waves - Wave equations for Electric field and Magnetic field-monochromatic plane waves-EM waves in a matter-Reflection and Transmission at normal incidence and oblique incidence.

#### **Books for study:**

- 1. Electricity and Magnetism R.Murugeshan, S.Chand and Company Ltd. New Delhi (9<sup>th</sup> revised ed., 2014).
- Electricity and Magnetism- Brijlal and Subrmanian, 7<sup>th</sup> edition, S. Chand & Co, New Delhi (2016)
- 3. Ratan Prakashan Mandir Publishers, Agra
- 4. M.Narayanamurthy & N.Nagarathnam, Electricity & Magnetism, NPC pub., Revised edition.

## **Books for Reference:**

- 1. Electricity and Magnetism -D.N.Vasudeva (Twelfth revised edition)
- 2. Electricity and Magnetism K.K.Tiwari (S.Chand &Co.)

- 3. Electricity and Magnetism -E.M.Pourcel,Berkley Physics Cource, Vol.2 (Mc Grraw-Hill)
- 4. Electricity and Magnetism Tayal (Himalalaya Publishing Co.)
- 5. D.Halliday, R.Resnick and J.Walker, Fundamentals of Physics Electicity and Magnetism (2011), Wiley India, Pvt Ltd
- 6. David J. Griffith, Introduction to Electrodynamics, (2012) PHI, New Delhi of an electrolyte -Arrhenius theory of electrolytic dissociation- --mobility of ions- Secondary cells- Gibbs -Helmholtz equation for a reversible cell
- 7. Sears and Zemansky's University Physicswith Modern Physics Technology Update, H. D. Young and R. A. Freedman, 13th Edition, Pearson Education Limited, Edinburgh Gate(2014).
- 8. Electricity and Magnetism –Sehgal and Chopra, S. Chand & sons, New Delhi (5<sup>th</sup> ed.,1992).

со	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Examine the fundamental concepts of LCR in a.c circuits.	2,4	Remembering
CO-2	Explain the Anderson's bridge, Wheatstone's bridge	1,4	Understanding
CO-3	Interpret the interactions between time- varying electric and magnetic fields.	4	Applying
CO-4	Appraise the laws governing thermal and chemical effect of electric current	2,4	Analyzing
CO-5	Summarize the Maxwell's equations, Continuity equations, Poynting's theorem and energy of electromagnetic waves	4,5	Evaluating

#### **Course Outcomes**

Semester	Course Code			Title of	the Co	urse	Hou	rs	Cred	its
III	21	UCPH31	L	Electricity an			60	)	4	
	ļ			Electron	nagnet	ism				
Course	Progr	amme l	Learni	ng Outc	omes	Prog	ramme	Specif	ic Outc	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	$\checkmark$	$\checkmark$	$\checkmark$				$\checkmark$		$\checkmark$	
CO-2	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	
CO-3	√	$\checkmark$							✓	
CO-4	$\checkmark$	$\checkmark$	$\checkmark$				$\checkmark$		✓	
CO-5	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$				$\checkmark$	$\checkmark$
		Number of matches ( $\checkmark$ ) = 25								
		Relationship = Medium								
					-					

#### SEMESTER-III

Course Title	PHYSICS PRACTICALS -III
Total Hrs.	30
Hrs./Week	2
Course Code	21UCPH3P1
Course Type	Practical-III
Credits	1
Marks	100/2

## **General Objective**

Provide working knowledge for the analysis of basic DC and AC circuits used in electrical devices and explain the working principle, construction, application of DC machines, AC machines & measuring instruments

#### **Course Objectives:**

СО	The learners will be able to:
CO-1	Determine the resonant frequency of LCR series and Parallel circuits
CO 2	Measure the current sensitivity using BG, Validate Thevenin's and
0-2	Norton's theorem
CO 3	Determination of the specific resistant of the wire using Carey
0-3	Foster's bridge
CO 4	Determination of m and $B_H$ using Axial coil method and using
0-4	Magnetometer at Tan C position
	AC bridge- Estimation of the specific conductivity of an electrolyte
CO-5	using Kohlaraush's bridge and resolve the self inductance using
	Owen's bridge

- 1. To study a series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor
- 2. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor
- 3. Ballistic Galvanometer Measurement of charge and current sensitivity.
- 4. To determine a Specific resistance of the wire by Carey Foster's Bridge.
- 5. Determination of magnetic moment of a magnet- Axial Coil method.
- 6. Determination of m &  $B_{H-}$  Deflection Magnetometer Tan C Position.
- 7. Determination of  $B_H$  using Axial Coil method.
- 8. Verification of Thevenin's and Norton's theorem
- 9. Kohlraush's bridge- AC bridge- Determination of the specific conductivity of an electrolyte.
- 10. Owen's bridge- AC bridge-Determination of self inductance

## **Books for Reference:**

1.Practical Physics, C.C. Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan (Printers & Publishers) Pvt. Ltd., (2009).

2. Practical Physics, P. R. Sasi Kumar, PHI. (2011)

3. Advanced Practical Physics ,S. P. Singh, Pragathi Prakasam (2019).

4.A Text book of Practical Physics, Indu Prakash and Ram Krishna, Kitab Mahal (2011).

5. Practical Physics – St. Joseph College, Trichy.

# **Course Outcomes**

<u> </u>	Upon completion of the course, the	PSOs	Cognitive
	students will be able to:	Addressed	Level
CO-1	Verify the resonant frequency of LCR series and Parallel circuits	1,3	Evaluating
CO-2	Evaluate the Current sensitivity using BG, Verify Thevenin's and Norton's theorem	3, 4	Evaluating
CO-3	Obtain the specific resistance of the wire using Carey Foster's bridge	1,3	Applying
CO-4	Calculate m and $B_H$ using Axial coil method and using Magnetometer at Tan C position	1,3	Applying
CO-5	AC bridge- Evaluation of self inductance and specific conductivity of an electrolyte using Owen's bridge and Kohlaraush's bridge respectively	3,4	Evaluating

Semester	Course Code			Title Co	of the urse		Hour	s	Cred	lits
III	21	UCPH3P	1	PHY	SICS		30		1	
				PRACTI	CALS -I	II				
Course Outcomes	Prog	Programme Learning Outcomes (PLOs)					gramme	Speci: (PSOs	fic Outc )	omes
(COs)	PLO	PLO 2	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1		3	4	5	1	2	3	4	5
CO-1		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$		
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	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$				$\checkmark$	$\checkmark$	
		Number of matches ( $\checkmark$ ) = 30 Relationship = Medium								

#### **SEMESTER - III**

Course Title	ALLIED CHEMISTRY – I
Total Hrs.	60
Hrs./Week	4
Course Code	21UACH31
Course Type	ALLIED-II/1
Credits	3
Marks	100

# **General Objective:**

To understand the various concepts of applied chemistry namely Photochemistry, Electrochemistry, Quantitative Analysis, Polymer Chemistry and Biochemistry

#### **Course Objectives:**

CO	The learners will be able to :							
CO-1	Understand the Photochemical reaction and the various law							
	pertaining to it							
CO-2	Observe the Electrical conductivity of solutions and electrochemical							
0-2	cells							
CO-3	Correlate the principles of volumetric analysis							
CO 4	Distinguish the general properties polymers and the various							
0-4	methods of for the preparation of polymers							
CO-5	Determine the Composition of basic biomolecules							

#### **UNIT I - PHOTOCHEMISTRY**

Comparison between Thermal and Photochemical reactions - laws of photochemistry - Beer-Lambert's law - Grothus Draper law - Einstein's law - Quantum yield – Reasons for low and high quantum yield – Determination of quantum yield by actinometer – fluorescence - Phosphorescence – Thermoluminescence – Chemiluminescence and Bioluminscence - Photochemical cell - Estimation of Cu<sup>2+</sup> and Ni<sup>2+</sup> by Photo colorimeter

#### **UNIT II - ELECTROCHEMISTRY**

Conductance: specific, molar equivalent conductance pH, Buffer solution -Types: Acidic, Basic and Neutral - Henderson equation - Applications of pH and Buffer solutions.

Cells - Types - Galvanic, Daniel cell - electromotive force - Electrode potential - Standard Electrode Potential - Reference Electrodes - Standard Hydrogen Electrode - Saturated Calomel Electrode - Electrochemical Series and applications - Primary cell - Secondary Cell - Fuel cell.

#### **UNIT III - QUANTITATIVE ANALYSIS**

Methods of expressing the strength of solution - Normality, Molarity - Preparation of primary, secondary standard solutions.

Principle of volumetric analysis:Acid-Base titration - Redox Titration - Iodo/Iodimetric, Permanganometric, Dichrometric titrations - Complexometric - Precipitation titration.

Error analysis, types of errors- minimizing errors- accuracy and precision, methods of expressiong precision, mean, median, mean deviation, standard

deviation and confidence limit- curve fitting, method of least squares- significant figures.

### UNIT IV - POLYMER CHEMISTRY

General Characteristics of polymers in comparison with organic compounds - Methods of polymerization: Bulk, Suspension – Synthesis, Properties and uses of LDPE, HDPE, Polycarbonate, Polymethyl methacrylate, Poly aniline and Teflon - Biomedical applications of polymers.

## UNIT V - BIO CHEMISTRY

Carbohydrates - Classifications - synthetic sweeteners - Structure of sucralose.

Amino acids - Classification - amphoteric nature - isoelectric point.

Proteins - Classification based on composition, solubility and shape - colour reaction - biological action.

Nucleic Acids - Purine, pyrimidine, Nucleosides, Nucleotides, Structure of t-RNA and DNA -Watson Crick Model.

#### **Reference Books:**

- 1. Puri, Sharma, Pathania, *Principles of Physical Chemistry*, 46<sup>th</sup>edition; Vishal Publishers: 2012.
- 2. Arun Bahl, Bahl B.S., Tuli G.D., *Essentials of Physical Chemistry*, 28<sup>th</sup> Edition; S. Chand& Company Ltd: New Delhi, 2020.
- 3. Vogel A.I., Textbook of Quantitative Chemical Analysis, 5th Edition; Longman: New York, 1989.
- 4. Gowariker V. R., Viswanathan, Sreedhar, *Polymer Science*, New Age International Ltd.: 2000
- 5. Nayak P.L., Lenka, *Textbook of Polymer Science*, Kalyani Publishers, New Delhi: 2000.
- 6. Sathynarayana U., Charapani U., *Biochemistry*, 5<sup>th</sup> Edition; Elsevier: India, 2020.

СО	Upon completion of the course, the students	PSOs	Cognitive
	will be able to :	Addressed	Level
CO-1	Observe the Photochemical reaction and	1,2,3,5	Understanding
	the various laws pertaining to it.		
CO-2	Examine the nature of electrode and	1,2,3,5	Applying
	electrolyte in an electrochemical cell		
CO-3	Analyse the types of errors in the	1,2,3,5	Analyzing
	Quantitative analysis		
CO-4	Explain the methods of polymerization	1,2,3,5	Evaluating
	techniques		
CO-5	Explain the Composition of basic	2,3	Evaluating
	biomolecules		

#### **Course Outcomes**

Relationship Matrix											
Semester	Course Code			de Title of the Course				Hou	rs Cı	edits	
III	21UACH31			ALLIE	D CHE	MIST	RY-I	60		3	
Course	]	Prograr	nme	Learning	g	]	Progra	mme S	nme Specific		
Outcomes		Outco	omes	(PLOs)	-	Outcomes (PSOs)					
(COs)	PLO	PLO	PLC	) PLO	PLO	PSO	PSO	PSO	PSO	PSO	
	1	2	3	4	5	1	2	3	4	5	
CO-1	✓	✓	<ul> <li>✓</li> </ul>			✓	$\checkmark$		$\checkmark$		
CO-2	✓	✓	$\checkmark$	<ul> <li>✓</li> </ul>		✓	✓		✓		
CO-3	✓	✓	<ul> <li>✓</li> </ul>	✓		✓	✓	✓	✓		
CO-4	✓	✓	<ul> <li>✓</li> </ul>	✓		✓	✓	✓	✓		
CO-5	✓	✓	✓			✓	✓	✓	✓		
		Number of matches ( $\checkmark$ ) = 36									
	Relationship = High										
						-	0				

**Relationship Matrix** 

### SEMESTER – III

Course Title	VOLUMETRIC ANALYSIS
Total Hrs.	30
Hrs./Week	2
Course Code	21UACH3P1
Course Type	AIIied Practical-II/1P
Credits	1
Marks	100/2

### **General Objective:**

To visualize and observe various volumetric experiments

#### **Course Objectives:**

СО	The learners will be able to :
CO-1	Associate Volumetric principles for the determination of the strength of the solutions
CO-2	Calculate the strength of acid and base for the given solution by Acidimetric and alkali metric methods
CO-3	Examine the strength of KMNO <sub>4</sub> solution by Permanganometric method
CO-4	Figure out the amount of Calcium and Zinc in the given solution by complexometric method
CO-5	Determine the Calibration of glass apparatus used in the volumetric analysis

## Acidimetry/Alkalimetry Titration

- 1. Estimation of NaOH
- 2. Estimation of Na<sub>2</sub>CO<sub>3</sub>
- 3. Estimation of Sulphuric Acid

#### **Permanganometric Titration**

- 4. Estimation of KMnO<sub>4</sub>
- 5. Estimation of Sodium Oxalate
- 6. Estimation of FAS

## **Complexometric Titration**

- 7 Estimation of Calcium
- 8. Estimation of Zinc

# **Course Work**

- 1. Calibration of Balance, Burette and Pipette
- 2. Estimation of Acetic acid in Commercial Vinegar
- 3. Estimation of Carbonate in Washing Soda

## **REFERENCE BOOKS :**

- Vogel A.I., Textbook of Quantitative Chemical Analysis, 5th Edition; Longman: New York, 1989.
- Mukhopadhyay R., Chatterjee P., Advanced Practical Chemistry, 4<sup>th</sup> Edition; Books &Allied (P) Ltd.: Kolkata, 2007
- 3. Vishnoi N. K., *Advanced Practical Chemistry*, Vikas Publishing House: New Delhi,2005.
- 4. Ghoshal, Mahapatra, Nad, *Advanced Course in Practical Chemistry*, New Central Book Agency (P) Ltd: Kolkata,2000.
- 5. Bajpai D. N., Pandey O. P., GiriS., *Practical Chemistry*, S Chand & Co Ltd: New Delhi, 2013.

СО	Upon completion of the course, the students	PSOs	Cognitive
	will be able to :	Addressed	Level
CO-1	Associate Volumetric principles for the	1,2,4,5	Understanding
	determination of the strength of the		
	solutions		
CO-2	Investigate the strength of acid and	1,2,4,5	Applying
	base for the given solution by		
	Acidimetric and alkali metric methods		
CO-3	Analyze the strength of KMNO <sub>4</sub> solution		Analyzing
	by Permanganometric method	1,2,4,5	
CO-4	Estimate the amount of Calcium and		Evaluating
	Zinc in the given solution by	1,2,4,5	
	complexometric method		
CO-5	Justify the Calibration of glass	1,2,4,5	Evaluating
	apparatus used in the volumetric		
	analysis		

#### **Course Outcomes**

Semester	Course Code			Title of the Course			Hours		Credits	
III	21UACH3P1			Volumetric Analysis			30		2	
Course	]	Prograr	nme l	Learning	g		Progra	mme	Specifi	с
Outcomes		Outco	omes	(PLOs)			Outc	omes	(PSOs)	
(COs)	PLO1	PLO2	PLO3	PLO4	PLO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO-1		✓	<ul> <li>✓</li> </ul>	✓		✓	✓		✓	✓
CO-2		✓	✓	✓		✓	✓		✓	✓
CO-3		✓	✓	✓		✓	✓		✓	✓
CO-4		✓	✓	✓		✓	✓		✓	✓
CO-5	$\checkmark \qquad \checkmark \qquad \checkmark \qquad \checkmark \qquad \checkmark \qquad \checkmark \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad$				<ul><li>✓</li></ul>	✓		✓	✓	
	Number of matches ( $\checkmark$ ) = 35									
	Relationship = High									

#### 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 Hill2<sup>nd</sup> 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	ASTRO PHYSICS
Total Hrs.	30
Hrs./Week	2
Course Code	21USPH32
Course Type	SEC-II
Credits	2
Marks	100

## General Objective:

To gain the knowledge about stellar astrophysics, our galaxy, end state of stellar collapse and artificial satellites & their applications.

## **Course Objectives:**

СО	The learners will be able to:			
CO-1	Define the basic concepts of mass length , time scale and celestial			
	coordinates			
CO-2	Discuss the various physical properties of star			
CO-3	Explain the size and shape of our galaxy.			
CO-4	Appraise the knowledge of different states of stellar collapse			
CO-5	Compare the various Indian remote sensing satellites and their			
	applications			

# **UNIT I Introduction**

Basic concept of solar system or planetary system- Kepler's laws -Mass length and time scales in astro physics – The emergence of modern astrophysics – Celestial coordinates – Applications of Physics to Astro physics- Optical Astronomy – Radio Astronomy - X ray Astronomy .

# UNIT II Stellar – Astrophysics

Physical properties of stars – luminosity, brightness, distance, surface temperature, mass, chemical composition, internal temperature, internal pressure, mass – luminosity relation – stellar evolution – formation of stars.

# **UNITIIIOur Galaxy**

The shape and size of our Galaxy – Shapley's model – Interstellar extinction and reddening –Galactic coordinates – Galactic rotation – Nearly circular orbits of stars- The epicycle theory – The solar motion.

# UNIT IV End states of stellar collapse

Introduction – Degeneracy pressure of a Fermi gas – Structure of white dwarfs- Chandrasekhar mass limit –The neutron drip- Neutron stars – Pulsars –The binary pulsar – Binary X-ray resources.

# UNIT V Satellites

Satellite motion – GPRS - Orbital velocity – time period – applications and launching of satellites –geostationary satellite — remote sensing through satellites – Indian remote sensing satellites – applications of remote sensing.

# Textbooks:

 Astrophysics for physicists- Arnab Rai choudhuri, 2010.
 College physics-Volume I and III –N.sundararajan , George Thomas and syed aziz –United publishers , Mangalore , India, 2011.

# **Reference books**

1. Physicsprinciples with applications douglas c. Giancoli 7<sup>th</sup> edition **Course Outcomes** 

СО	Upon completion of the course, the students	PSOs	Cognitive
	will be able to:	Addressed	Level
CO-1	Explain the basic concepts of mass length, time scale and celestial coordinates	2,5	Understanding
CO-2	Discuss the various physical properties of star	2,4	Understanding
CO-3	Analyze the size and shape of our galaxy.	3,4	Analyzing
CO-4	Assess the knowledge of different states of stellar collapse	2,4,5	Evaluating
CO-5	Summarize the various Indian remote sensing satellites and their applications	4,5	Evaluating

Semester	Course Code			Title of the Course			Hours		Credits	
III	21	USPH32		ASTRO	PHYSIC	s	30		2	
Course Outcomes	Prog	Programme Learning Outcomes (PLOs)				Pro	gramme	Specif (PSOs	ic Outc)	omes
(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	√	$\checkmark$	$\checkmark$				✓		$\checkmark$	
CO-3	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$				$\checkmark$	$\checkmark$	
CO-4	$\checkmark$	$\checkmark$	$\checkmark$				✓		$\checkmark$	$\checkmark$
CO-5	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$				$\checkmark$	$\checkmark$	
		Number of matches ( $\checkmark$ ) = 30								
		Relationship = Medium								

#### SEMESTER- III

Course Title	LASER PHYSICS
Total Hrs.	30
Hrs./Week	2
Course Code	21UNPH31
Course Type	NME-I
Credits	2
Marks	100

#### **General Objective:**

Understand the fundamentals of lasers and acquire in-depth knowledge of the applications of lasers in various fields.

#### **Course Objectives:**

CO	CO The learners will be able to:	
CO-1	Define the basics and fundamentals of lasers.	
CO 2	Classify the different types of lasers and their working principle	
0-2	of lasers.	
CO-3	Explain the industrial and medical applications of lasers	
CO 4	Appraise the usage of optical techniques of Laser Sources and	
0-4	detectors in environment	
CO-5	Assess the concept of optical fiber, its construction and importance	
	in communication Physics.	

#### **Unit 1: Fundamentals of LASER**

Spontaneous emission – Stimulated emission – Meta stable state –Population inversion – Pumping – Types of Pumping- Optical pumping- electrical discharge method-direct conversion-inelastic atom-atom collision-chemical method-Laser Characteristics

#### **Unit 2: Production of LASER**

Helium - Neon Laser - Ruby Laser - CO2 Laser - Semiconductor Laser - Dye laser

## **Unit 3: Industrial and Medical Applications of LASER**

Laser cutting – Welding – Drilling – Hologram – Recording and reconstruction of hologram –Lasers induced fusion reactor- Medical applications of lasers.

#### Unit 4: Lasersin environmental analysis

Air Pollution monitoring-Water Pollution Monitoring-Examination of microorganisms with SCL- Laser remote sensing LIDAR- sensing wind velocity using LASERS

# Unit 5: Lasers in Communication

Optical fibre- characterisations- types of optical fibres-optic fibre communication – Total internal reflection – Block diagram of fibre optic communication system – Advantages of fibre optic communication.

# **Books for study:**

1. Ubald Raj and Jose Robin, Laser and its Applications, Indira Publications, 2003 2. N. Avadhanulu ,An introduction to LASERS, S. Chand & Company,2001.

# **Books for References:**

1. William T. Silfvast, Laser fundamentals, University Press, Published in South Asia by Foundation books, New Delhi, 2008

2. K. Thyagarajan and A.K. Ghatak, LASER Theory and Application, Mc Millan, India Ltd, Second Edition 2010.

СО	Upon completion of the course, the students will	PSOs	Cognitive
	be able to:	Addressed	Level
CO-1	Enumerate the basics and fundamentals of lasers.	1,2	Remembering
CO-2	Compare the different types of lasers	1,4	Understanding
CO-3	Record the applications of lasers in industrial and medical fields	1,4,5	Applying
CO-4	Explain the usage of optical techniques of Laser Sources and detectors in environment	4,5	Analyzing
CO-5	Summarize the concept of optical fiber, its construction and importance in communication Physics.	1,4,5	Evaluating

## **Course Outcomes**

Semester	Course Code		le	Title	of the	Course	•	Hours		redits		
III	21	UNPH3	1	LAS	ER PH	YSICS		30		2		
Course Outcomes	Programme Learning Outcomes Program (PLOs)							me 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	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$					
CO-2	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$			
CO-3	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$		
CO-4	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$				$\checkmark$	$\checkmark$		
CO-5	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$		
	Number of matches (🗸) = 35 Relationship = 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	-3 Determine to follow life protocols through literature.							
CO-4	Focus on improving their self confidence.							
CO-5	Choose to instruct about modern skills like computer.							
<b>அ</b> 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	றூறு - ஈன்று புறந்தருதல் எந்தலைக் கடனே (312: 1-6)							
	நின் நயந்து உறைநர்க்கும் நீநயத்து உரை நற்கும் (163: 1-9)							
4. ஐங்குற	4. ஐங்குறுநூறு - 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	. பதிற்றுப்பத்து - இழையர் குழையர் நறுந்தண்மாலையர் (46:1-14)							
8. பரிபாட	ல் - வைகையில் பெரு வெள்ளம்-நிறை கடல் முகந்து உராய் (1-24)							
9. முல்னை	லப்பாட்டு - முழுவதும்							
<b>அ</b> லகு– 2								
	சுயமுன்னேற்றக் கட்டுரைகள்							
அலகு– 3								
	இணையப் பயன்பாட்டில் தமிழ்							
<b>ച്ച</b> லகு– 4								
-	இலக்கிய வரலாறு — சங்க இலக்கியம் ஒர் அறிமுகம் - திணைக்கோட்பாடு							
- 6	ாட்டுத்தொகை நூல்கள் - நற்றிணை, குறுந்தொகை, ஐங்குறுநூறு,							

– எட்டுத்தொகை நூல்கள் - நற்றிணை, குறுந்தொகை, ஐங்குறுநூறு, பதிற்றுப்பத்து, பரிபாடல், கலித்தொகை, அகநானூறு, புறநானூறு – பத்துப்பாட்டு நூல்கள் - திருமுருகாற்றுப்படை, பொருநராற்றுப்படை, சிறுபாணாற்றுப்படை, பெரும்பாணாற்றுப்படை, நெடுநல்வாடை, குறிஞ்சிப்பாட்டு, முல்லைப்பாட்டு, மதுரைக்காஞ்சி, பட்டினப்பாலை, மலைப்படுகடாம்

# அலகு– 5

தமிழர் வாழ்வில் அகமும் புறமும் திணைக்கோட்பாடு

**பாடநூல்**: சங்கத் தமிழ்

பார்வைநூல் : தமிழ் இலக்கிய வரலாறு, சாகித்ய அகாதெமி வெளியீடு.

	Course Outcomes		
СО	Upon completion of the course, the students will be able to:	PSOs Addressed	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

Semester	Cour	se Cod	e 1	Title of the Course				rs	Credits		
IV	21U	LTA41		சங்க	கத்தமிழ்	þ	90		3		
Course	Progra	Programme Learning Outcomes Programme Specific									
Outcomes			(PLO	s)			Out	comes	(PSOs)	)	
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO	
CO-1	✓ I	<u>∠</u> √	3  √	<u> </u>	<b>3</b> ✓	✓ ✓	4	3	<u> </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	$\checkmark$				$\checkmark$					$\checkmark$	
	Numbe 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	<b>Objectives:</b>

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)

" من الآية "يا أيها الذين آمنوا لا تقدموا" إلى الآية"يا أيها الذين آمنوا اجتنبوا

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

# **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).		

	Relationship Matrix									
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 Specifi	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	✓	$\checkmark$		✓		✓	✓		✓	
3	✓	$\checkmark$	✓			✓	√	✓		
4	✓	$\checkmark$	✓	✓		✓	✓	✓	✓	
5	<ul> <li>✓</li> </ul>	$\checkmark$	✓	✓	✓	✓	✓	<ul> <li>✓</li> </ul>		✓
	Number of matches = 33									
	Relatio	Relationship = Medium								

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## 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	Associate themselves with the interactional and transactional modes of language.
CO-2	Classify words based on the register and usage to use them contextually.
CO-3	Distinguish sound patterns in English phonetically.
CO-4	Illustrate sound patterns in English with relevant examples.
CO-5	Practise 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 Addresse d	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	Course Code		e	Title of the Course			I	Hours		Credits	
IV	21	ULEN41	A	A PRACTICAL COURSE IN SPOKEN ENGLISH			C H	90		3	
Course Outcom	Prog	ramme	Learnin (PLO:	ng Outco s)	omes	Prog	ramme	Specifi (PSO	ic Outc s)	omes	
es (COs)	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO-1	$\checkmark$	$\checkmark$		$\checkmark$		$\checkmark$	$\checkmark$		$\checkmark$		
CO-2	$\checkmark$	$\checkmark$				$\checkmark$	$\checkmark$				
CO-3	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$	$\checkmark$			
CO-4	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$	$\checkmark$			
CO-5	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	
	Number of matches ( $\checkmark$ ) = 30						•				
	Relationship = Medium										

#### **SEMESTER - IV**

Course Title	COMPUTATIONAL PHYSICS
Total Hrs.	60
Hrs./Week	4
Course Code	21UCPH41
Course Type	DSC-VI
Credits	4
Marks	100

#### **Objectives:**

The aim of this course is to teach computer programming and emphasize its role in solving problems in Physics.

#### **Course Objectives:**

СО	The learner will be able to
CO-1	Understand Program, Algorithms and Flowcharts
CO-2	Understand the basic data types, declaration of variables and manipulator functions.
CO-3	Understand Functions, Arrays, Classes and Objects
CO-4	Understand the concept of Constructors, Destructors and Inheritance
CO-5	Visualize GNU Plots

## UNIT I Introduction

Introduction – Characteristics of Computers -The Computer system – Applications of Computers- Importance of computers in Physics, paradigm for solving physics problems for solution. **Program**, **Algorithms and Flowcharts:** Program: Definition, Program Development Cycle, Characteristics of a Good Program, Algorithm:Definition, properties and development. Flowchart: Concept of flowchart, symbols, guidelines, types. Few Examples: algorithm for plotting (1) lissajous figures and (2) trajectory of a projectile thrown at an angle with the horizontal.

## UNIT II Basics Concepts of OOPS and C++& Control structures

Basic concepts of object – oriented programming, application of OOP, What is C++, application of C++, a simple C++ program, structure of C++ program- Keywords - Identifiers and constants – Basic data types-declaration of variables – C++ operators -

manipulator functions- if, if – else and switch statement – loop statements (do – while, while, for) – breaking control statements (break, continue and go to)

#### UNIT III Functions, Arrays, Classes and Objects

Defining a function – types of functions, actual and formal arguments and default arguments – Arrays(declaration and initialization)- Multidimensional arrays-Specifying a class, defining member functions, nesting of member functions, arrays within a class, arrays of objects.

### UNIT IV Constructors and Destructors &Inheritance

Constructors, parameterized constructors, multiple constructors in a class, constructors with default arguments, destructors- Defining derived class, types of Inheritances: single inheritance, multilevel inheritance, multiple inheritance, Hierarchical inheritance and hybrid inheritance.

## UNIT V Visualization

Introduction to graphical analysis and its limitations- Introduction to Gnuplot-Importance of visualization of computational and computational data,basic Gnuplot commands: simpleplots- plotting data from a file- saving and exporting- multiple data sets per file- physics with Gnuplot (equations, building functions- user defined variables and functions)-Understanding data with Gnuplot.

#### **Book for Study:**

- 1. Object Oriented Programming with C++ E. Balagurusamy, Tata McGraw Hill Publishing Company Ltd., New Delhi (4<sup>th</sup> ed.).
- 2. Programming with C++ D.Ravichandran Tata McGraw Hill Publishing Company Ltd., New Delhi (3<sup>rd</sup> ed.)
- 3. Computational Physics: An Introduction, R. C. Verma, etal. New Age International Publishers, New Delhi(1999)
- 4. Gnuplot in action: understanding data with graphs, Philip K Janert, (Manning 2010)

## **Books for Reference:**

1.Computational Physics, D.Walker,1<sup>st</sup> Edn., 2015, Scientific International Pvt.Ltd.

2.Object Oriented Programming in C++ – Robert Lafore –Course Sams Publishing-4<sup>th</sup> edition.

3.www.spokentutorial.org of IIT Bombay NMEICT project.

# **Course Outcomes**

СО	Upon completion of the course,	PSOs	Cognitive
	the students will be able to:	Addressed	Level
CO-1	Develop an algorithm for plotting lissajous figures and trajectory of a projectile	4,5	Understanding
CO-2	Understand the basic concepts of Object Oriented Programming System	4,5	Understanding
CO-3	Understand Functions, Arrays, Classes and Objects	4,5	Applying
CO-4	Understand the concept of Constructors, Destructors and Inheritance	4,5	Applying
CO-5	Visualise GNU Plots	4,5	Analyzing

Semester	Course Code		le	Title of the Course			Hours		Credits	
IV	21UCPH41		1	Computational Physics		al	60		4	
Course	Programme Learning						Programme Specific			
Outcomes		Outco	omes	(PLOs)			Outc	omes	(PSOs)	
(COs)	PLO1	PLO2	PLO3	PLO4	PLO5	PSO	PSO2	PSO3	PSO4	PSO5
CO-1	~	~	~		~				✓	~
CO-2	~	~	~		~				✓	~
CO-3	~	~	~		$\checkmark$				$\checkmark$	~
CO-4	~	~	~		~				$\checkmark$	~
CO-5	~	~	~		~				✓	~
	Number of matches (✓) = 30 Relationship = Medium									

#### **SEMESTER - IV**

PHYSICS PRACTICALS – IV
30
2
21UCPH4P1
PRACTICALS-IV
1
100/2

#### **Objective:**

The aim of this course is to develop C++ programs to solve Mathematical Problems and Problems in Physics.

#### **Course Objectives:**

CO	The learner will be able to					
CO-1	Develop a C++ program to determine the sum of series and to find factorial of a number.					
CO-2	Apply function declaration , arrays and define a class in C++ programs.					
CO-3	Apply constructor member and inheritance concept.					
CO-4	Develop a C++ program to find the period of a pendulum, Youngs modulus of a material and thickness of wire in an air wedge.					
CO-5	Apply Gnu plot to trace the trajectory of a projectile.					

Any TEN only

- 1) Write a C++ to find the sum of the series using **for loop**.
  - a) Sum = 1 + 3 + 5 + ..... n
  - b) Sum =  $1 + 2^2 + 4^2 + \dots n^2$
- 2) Write a C++ to find the factorial of a number by using **function declaration** with/without using the return statement.
- 3) Write a C++ to read a set numbers from a standard input device and to find out the largest number in the given **array** using **function declaration**. Also sort them in the ascending or the descending order.
- 4) Write a C++ to read the elements of the given two matrices of order m x n and to perform the matrix addition and display the transpose of the result.
- 5) Write a C++ to **define a class** to represent a bank account

## Data members

- i) Name of the depositor
- ii) Account number

- iii) Type of Account
- iv) Balance amount in the account

#### **Member functions**

- i) To assign the initial values
- ii) To deposit an amount
- iii) To withdraw an amount
- iv) To display name and balance
- 6) Write a C++ to generate a series of Fibonacci numbers using **constructor** where the constructor member function has been defined in the scope of class definition out of the definition using the scope resolution operator.
- 7) Write a C++ to read the following information from the keyboard in which basic class consists of Name, Roll No. and sex. The derived class contains the data member's height and weight. Display the contents of the class using inheritance concept.
- 8) Write a C++ to find the period of a pendulum of given length L, in a gravitational field. Accept the required values using the keyboard. Also display the results.
- 9) Develop a program in C++ to calculate the Young's modulus of a material from the data obtained from uniform bending method.
- 10) Write a C++ to calculate the thickness of a wire by air wedge method.
- 11) Toevaluate sumof finiteseries and the area under a curve,
- 12) TowriteprogramtoopenafileandgeneratedataforplottingusingGnuplot,
- 13) Plottingtrajectoryofaprojectileprojectedhorizontally,
- 14) creating an input Gnuplot file for plotting a data and saving the output for seeingonthe screen, saving it as an epsfile and as a pdffile,
- 15) numerical solution of equation of motion of simple harmonic oscillator and plotthe outputs for visualization.

#### **Books for Reference:**

1. Programming with C++ – D. Ravichandran – Tata McGraw Hill Publishing Company Ltd., New Delhi (3<sup>rd</sup> ed.)

2. Computational Physics: An Introduction, R. C. Verma, etal. New Age International Publishers, New Delhi(1999).

3. Gnuplot in action: understanding data with graphs, Philip K Janert, (Manning 2010)

	Course Outcomes										
CO	Upon completion of the course,	PSOs	Cognitive								
	the students will be able to:	Addressed	Level								
CO-1	Develop a C++ program to determine the sum of series and to find factorial of a number.	1,4,5	Applying								
CO-2	Apply function declaration, arrays and define a class in C++ programs.	1,4,5	Applying								
CO-3	Apply constructor member and inheritance concept.	1,4,5	Applying								
CO-4	Develop a C++program to find the period of a pendulum, Youngs modulus of a material and thickness of wire in an air wedge.	1,4,5	Applying								
CO-5	Apply Gnu plot to trace the trajectory of a projectile.	1,4,5	Applying								

Semester	Cou	Course Code   Title of the C					e Ho	ours	Credits			
IV	21UCPH4P1 Physics Pract					tical-I	V 3	30	2			
Course	Programme Learning						Programme Specific					
Outcomes		Outco	omes	(PLOs)			Outc	omes	(PSOs)			
(COs)	PLO1	PLO2	PLO3	PLO4	PLO5	PSO1	PSO2	PSO3	PSO4	PSO5		
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 of matches ( $\checkmark$ ) = 40											
	Relationship = High											

### **SEMESTER - IV**

Course Title	ALLIED CHEMISTRY-II
Total Hrs.	60
Hrs./Week	4
Course Code	21UACH41
Course Type	ALLIED –II/2
Credits	3
Marks	100

General Objective:

To understand the selected advanced topics in Chemistry namely Coordination Chemistry, Organic Chemistry, Solutions, Chromatography and Spectroscopy

# **Course Objectives:**

CO	The learners will be able to :										
CO-1	Compute the oxidation number of metal ion in complex										
	structure										
CO-2	Obtain the E,Z notation in the Geometrical isomers										
CO-3	Explore the concept of solution phase										
CO-4	Analyze the concept of chromatographic technique										
COF	Verify the concept of uv-visible and FT-IR spectroscopy for the										
0-5	analysis of organic molecules										

## **UNIT I- Coordination Chemistry**

Coordination Chemistry: Terminology, Calculation of Oxidation number in complexes -Classifications of ligands - Nomenclature - Werner's coordination Theory. Effective Atomic Number rule (EAN) - Pauling's Theory – Postulates - Application to Ni(CO)<sub>4</sub> and  $[Ni(CN]_4]^{2-}$ 

#### **UNIT II- ORGANIC CHEMISTRY**

Aromaticity – Huckle's rule with examples – Benzenoid and Nonbenzenoid aromatic compounds (definition and examples only).

Preparation, properties of benzene, naphthalene and anthracene.

Optical isomerism - optical activity – conditions – Chiral Centre elements of symmetry - optical rotations - optical activity of tartaric acid -Geometrical isomerization - E,Z Nomenclature

## UNIT III- SOLUTIONS

Raoult's law, Henry's law - Ideal and non - ideal solutions - vapour pressure of real solution - deviation from Raoult's law - theory of fractional distillation - benzene - toluene system, Azeotropic mixture - ethanol - water,  $HCl - H_2O$ , Immiscible liquids - theory of steam distillation - applications.

# UNIT IV- CHROMATOGRAPHY

Principle of chromatographic technique and types - stationary phase, mobile phase, Classification of solvents based on polarity.

Paper chromatography: Principle,  $R_f$ values, Factors affecting  $R_f$ values, Experimental procedures, Choice of paper and solvent systems, development of chromatogram. Detection of the spots. Ascending, Descending and Radial Paper Chromatography – Applications – separation of amino acids.

# **UNIT V- SPECTROSCOPY**

Electromagnetic Region, Types of molecular spectra. Colorimeter -Principle and Application. UV Spectroscopy - Theory - types of electronic transitions - Instrumentation - single and double beam spectrophotometer – applications. FT-IR spectroscopy - principle and applications - Hydrogen bonding - Aldehyde and Ketone.

# **REFERENCE BOOKS :**

- 1. Gopalan R., Ramalingam V., *Concise Coordination Chemistry*,1<sup>st</sup> Edition; Vikas Publication: New Delhi, 2008.
- 2. Sathyaprakash, Madan*Advanced Inorganic Chemistry vol.* 1, S. Chand Company: New Delhi, 2005
- 3. Bahl, Arun Bahl, Organic Chemistry, S. Chand Company: New Delhi, 2010
- 4. Sharma B.K., *Chromatography*, KP Goel Publishing House: New Delhi, 2014.
- 5. Kapoor K.L., *A Textbook of Physical Chemistry- Volume* 1,3<sup>rd</sup> Edition; Macmillan Publishers Ltd: New Delhi, 2001.
- 6. Chatwal G.R., Anand S.K., *Spectroscopy*, 5<sup>th</sup> Edition; Himalaya Publishing House: New Delhi, 2016.
- 7. Sharma Y.R., *Elementary of Organic Spectroscopy*, 5<sup>th</sup> Edition;S.Chand: New Delhi, 2013.

СО	Upon completion of the course, the students will be able to :	PSOs Addressed	Cognitive Level
CO-1	Estimate the oxidation number of metal ion in complex structure	1,2,3	Understanding
CO-2	Identify the E,Z notation in the Geometrical isomers	1,2,3	Understanding
CO-3	Examine the concept of solution phase	1,2,3	Applying
CO-4	Analyze the concept of chromatographic technique	1,2,3	Analyzing
CO-5	Verify the concept of uv-visible and FT-IR spectroscopy for the analysis of organic molecules	1,2,3	Evaluating

## **Course Outcomes**

Semester	Course Code			Title of the Course			e H	Hours		dits	
IV	211	JACH4	1	Allied Chemistry-II			I	60		3	
Course	] ]	Progran	nme I	earnin	g	Programme Specific					
Outcomes		Outco	omes	(PLOs)		Outcomes (PSOs)					
(COs)	PLO1	PLO2	PLO3	PLO4	PLO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO-1	✓	✓		<ul> <li>✓</li> </ul>		✓	✓	✓			
CO-2	✓	✓		✓		✓	✓	✓			
CO-3	✓	✓		<ul> <li>✓</li> </ul>		✓	✓	✓			
CO-4	✓	✓	✓	<ul> <li>✓</li> </ul>		✓	✓	✓	✓		
CO-5	✓	✓	✓	✓		✓	✓	✓	✓		
	Number of matches ( $\checkmark$ ) = 34										
	Relationship = High										
						-	-				

# SEMESTER - IV

Course Title	CHEMICAL ANALYSIS
Total Hrs.	30
Hrs./Week	2
<b>Course Code</b>	21UACH4P1
<b>Course Type</b>	Allied Practical – II/2P
Credits	3
Marks	100/2

# General Objective:

To get acquaintance of certain experiments related to the food industries, analysis of metal ion (Cu<sup>2+</sup> and Ni<sup>2+</sup>) in water sample and optical activity of organic molecules.

# **Course Objectives:**

СО	The learners will be able to :
CO-1	Identify the pH of the aerated drinks and juice
CO-2	Examine the conductivity of the solution
CO-3	Distinguish the mono and disaccharides
CO-4	Detect the Ni <sup>2+</sup> andCu <sup>2+</sup> ions in the given solutions
CO-5	Estimate the optical activity of organic compounds

# List of Experiments

- 1. Determination of pH of the given unknown solution (Aerated Drinks, Juice).
- 2. Determination of the strength of HCl using standard NaOH solution by conductometric method
- 3. Separation of pigments present in spinach leaves by ascending paper chromatography.
- 4. Separation of the mono and disaccharides [Glucose, Fructose, Sucrose] by ascending paper chromatography.
- 5. Separation and identification of amino acids by ascending paper chromatography
- 6. Determination of  $Cu^{2+}$  ion concentration by colorimeter
- 7. Determination of  $Ni^{2+}$  ion concentration by colorimeter
- 8. Determination of optical activity of given organic compounds by polarimeter

# **REFERENCE BOOKS :**

- 1. Patel H.N., College *Practical Chemistry*, Himalaya Publishing House: New Delhi, 2010.
- 2. Vogel A.I., Textbook of Quantitative Chemical Analysis, 5<sup>th</sup> Edition; Longman: New York, 1989.
- 3. BajpaiD. N., Pandey O. P., GiriS., *Practical Chemistry*, S Chand & Co Ltd: New Delhi, 2013.
- 4. VishnoiN. K., Advanced Practical Chemistry, Vikas Publishing House: New Delhi,2005.
- 5. Ghoshal, Mahapatra, Nad*Advanced Course in Practical Chemistry*, New Central Book Agency (P) Ltd: Kolkata, 2000.

# **Course Outcomes**

СО	Upon completion of the course, the students will be	PSOs Addressed	Cognitive Level
	able to :		
CO-1	Identify the pH of the aerated drinks	1,2,3,5	Understanding
	and juice		
CO-2	Estimate the conductivity of the	1,2,3	Applying
	solution		
CO-3	Distinguish the mono and	1,2,3	Analyzing
	disaccharides		
CO-4	Categorize the Ni <sup>2+</sup> andCu <sup>2+</sup> ions in	1,2	Evaluating
	the given solutions		
CO-5	Assess the optical activity of organic	2,3	Evaluating
	compounds		

Semester	Course Code			Title of the Course					Hours		Credits	
IV	210	<b>JACH4</b>	<b>P1</b>	Chemical Analysis				30	30		3	
Course	] ]	Prograr	nme	Learning	g	Programme Specific						
Outcomes		Outco	omes	s (PLOs)		Outcomes (PSOs)						
(COs)	PLO1	PLO1 PLO2 PLO3 PLO4 PLO5					PSO2	PSO3	PS	04	PSO5	
CO-1	$\checkmark$	$\checkmark$	✓	✓		✓	$\checkmark$	$\checkmark$	✓			
CO-2	$\checkmark$	$\checkmark$	$\checkmark$	✓		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			
CO-3	$\checkmark$	$\checkmark$	$\checkmark$	✓		✓	$\checkmark$	$\checkmark$	$\checkmark$			
CO-4	$\checkmark$	$\checkmark$	$\checkmark$	✓		✓	$\checkmark$	$\checkmark$				
CO-5	$\checkmark$	$\checkmark$	✓	✓		✓	$\checkmark$					
	Number of matches ( $\checkmark$ ) = 37											
	Relationship = High											
#### **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	ENERGY PHYSICS
Total Hrs.	30
Hrs./Week	2
Course Code	21USPH42
Course Type	SEC-IV
Credits	2
Marks	100

## **Objectives:**

To provide an understanding of the present energy crisis and various available energy sources

## **Course Objectives:**

CO	The learner will be able to
CO 1	Examine the conventional energy sources, their prospects and
0-1	limitations with renewable ones
CO-2	Discuss the use of solar energy and the various components
	used in the energy production.
CO-3	Classify the types of wind machines and understand the
	advantages and disadvantages of wind energy
CO-4	Analyze the concepts of Photosynthesis and biogas generation.
CO-5	Appraise the features of chemical energy.

## **UNIT I: Introduction to Energy Sources**

World's reserve of Commercial energy sources and their availability-India's production and reserves-Conventional and non-conventional sources of energy, comparison – Coal- Oil and natural gas –applications - merits and demerits.

## Unit II Solar Energy

Introduction – Solar constant –Solar radiation at the Earth's surface –Solar radiation Geometry-Altitude angle –Zenith angle – Flat plate collectors- A typical liquid collector -Applications of solar energy – Solar Heaters – Solar cooking- Crop dryers.

## **Unit III Wind Energy**

The nature of the wind – site selection considerations –Basic components of WECS- Types of Wind machines -Advantage and dis advantages of WECS-Applications of wind energy

## Unit IV Bio mass energy

Biomass energy - classification - photosynthesis - biomass conversion process - Kachara gas plants – Materials used for bio gas generation - wood gasification - ethanol from wood - advantages and disadvantages of biomass as energy source

## Unit V Chemical Energy sources

General Introduction – Design and principle of operation of a fuel cell – Classification of fuel cells – Types of fuel cells – Hydrogen – Fossil fuel – Advantage and disadvantage of fuel cell – Applications of fuel cells.

## **Books for Study:**

1. Non Conventional Energy Sources, G.D. Rai, Khanna Publishers (4th Ed., 2010).

2. Energy Technology by S. Rao and Dr. B.B. Parulekar, Khanna Publishers (2015).

# **Books for Reference:**

1.Non-conventional energy sources, B.H. Khan, McGraw Hill

2. Solar Energy by G.D. Rai, Ed. V, 1995.

# **Course Outcomes**

СО	Upon completion of the course,	PSOs	Cognitive
	the students will be able to:	Addressed	Level
CO-1	Describe the conventional energy sources, their prospects and limitations with renewable ones	1,4	Remembering
CO-2	Summarize the use of solar energy and the various components used in the energy production.	4,5	Understanding
CO-3	Explain the types of wind machines and classify the advantages and disadvantages of wind energy	4,5	Applying
CO-4	Illustrate the concepts of Photosynthesis and biogas generation.	1,2	Analyzing
CO-5	Summarise the features of chemical energy.	4,5	Evaluating

Semester	Course Code			Title of the Course			Hours			Credits	
IV	21U	SPH42	2 E	nergy	Physic	cs		30		2	
Course	Pı	rogram	ıme L	earnin	ıg			Progr	amme	Specifi	C
Outcomes		Outco	mes (	(PLOs)				Out	comes	(PSOs)	
(COs)	PLO1	PLO2	PLO3	PLO4	PLO5	PSO	)1	PSO2	PSO3	PSO4	PSO5
CO-1	$\checkmark$	~		~	~	$\checkmark$				~	
CO-2	$\checkmark$	$\checkmark$	~		√					$\checkmark$	~
CO-3	$\checkmark$	$\checkmark$	~		√					$\checkmark$	$\checkmark$
CO-4	$\checkmark$	<ul> <li>✓</li> </ul>	$\checkmark$	~	$\checkmark$	~		$\checkmark$			
CO-5	$\checkmark$	✓	~		~					✓	✓
	Number of matches ( $\checkmark$ ) = 31										
	Relationship = Medium										

#### SEMESTER- IV

Course Title	APPLIED PHYSICS
Total Hrs.	30
Hrs./Week	2
Course Code	21UNPH41
Course Type	NME-II
Credits	2
Marks	100

## **General Objective:**

To give an insight to the renewable energy sources, domestic wiring system, working of some basic electrical instruments and Bio-medical Instruments

#### **Course Objectives:**

СО	The learners will be able to:
CO-1	List out the conventional energy sources and enumeratetheir prospects and limitations.
CO-2	Discuss the working of generators, transformers and electric motor
CO-3	Explain the properties of system of domestic wiring.
CO-4	Analyze the working of electric bell, electric fan and washing machine.
CO-5	Appraise the working of Electrocardiograph, Electroencephalograph and endoscopy

#### UNIT IRENEWABLEENERGY

Soalr energy- collection- photovoltaic effect- pv cell functioning- Kinds of Energy -Mechanical Energy - Thermal Energy –Optical Energy – Sound Energy – Electrical Energy, Atomic and Nuclear Energy(Examples) - Conservation of Energy.

## UNIT II GENERATORS, TRANSFORMERS AND ELECTRIC MOTORS

DC power sources -AC/DC generators - Inductance, capacitance and impedance – Operation of transformers – Single-phase, three-phase and Dc motors – Basic design – Interfacing DC or AC sources to control heaters and motors – Speed and power of an ac motor.

## UNIT III DOMESTIC WIRING

Introduction – Types of tools – Precaution in handling tools used for wiring – Wire – Cables – System of domestic wiring – Good grounding and its need – Fuses – Switch wiring.

## UNIT IV ELECTRICAL APPLIANCES

Electric bell – Electric kettle – Electric iron – Fan connection – Washing machine – Refrigerator – Freezer – Water cooler.

## UNIT V BIOMEDICAL INSTRUMENTATION

Digital thermometer- X- ray- Electrocardiograph (ECG)-MRI-Electroencephalograph (EEG)- CT scan- Endoscopy-

## **Books for study:**

1Non-Convetional Energy sources – G.D.Rai – Khanna Publishers.

2.Applied Physics – G.Jose Robin snd S.Ubald Raj – Indira Publishers.

3.Operation and Maintenance of electrical appliances Voll & IIby B V S Rao – Asia Publishing House, 1977.

## **Books for Reference:**

1.Electronic Istrumentation - Kalsi.

2.Principles of Electronics – V.K.Mehtha , S.Chand & Co Ltd., New Delhi, Revised Edition.

## **Course Outcomes**

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Describe the conventional energy sources, their prospects and limitations	1,4,5	Remembering
CO-2	Understand the working of generators, transformers and electric motor	1,4,5	Understanding
CO-3	Employ the properties of system of domestic wiring.	1,5	Applying
CO-4	Illustrate the working of electric bell, electric fan and washing machine.	1,4,5	Analyzing
CO-5	Summarizing the working of Electrocardiograph, Electroencephalograph and endoscopy	1,4,5	Evaluating

Semester	Course Code		Tit	Title of the Course			Hours			Credits	
IV	210	NPH41	AP	APPLIED PHYSICS				30		2	
Course Outcomes	Prog	ramme I	Learnin (PLOs)	rning Outcomes Pr 2Os)			Programme Specific Outcomes (PSOs)			omes	
(003)	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PS 1	0	PSO 2	PSO 3	PSO 4	PSO 5
CO-1		$\checkmark$	$\checkmark$	~	✓	$\checkmark$				✓	$\checkmark$
CO-2	✓	$\checkmark$	$\checkmark$	~	✓	$\checkmark$				~	✓
CO-3		$\checkmark$	$\checkmark$	✓	<ul> <li>✓</li> </ul>	$\checkmark$					$\checkmark$
CO-4	✓	$\checkmark$	$\checkmark$	~	<ul> <li>✓</li> </ul>	$\checkmark$				✓	$\checkmark$
CO-5	✓	$\checkmark$	$\checkmark$	~	✓	$\checkmark$				✓	$\checkmark$
				Numbe Rel	r of mat	ip =	s (√ Hiį	′) = 38 gh	<u> </u>		1

## SEMESTER - IV

Course Title	FIELDWORK / INTERNSHIP
Course Code	21UFPH41
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.

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

## Scheme of Evaluation:

#### SEMESTER- V

Course Title	ATOMIC AND NUCLEAR PHYSICS
Total Hrs.	75
Hrs./Week	5
Course Code	21UCPH51
Course Type	DSC-VII
Credits	04
Marks	100

#### **General Objective:**

To learn the basic concepts of atomic structure, Photoelectric effect and nuclear structure besides understanding the nuclear transformations.

## **Course Objectives:**

СО	The learner will be able to:							
	Know the inadequacies of Classical Mechanics and understand the							
CO-1	structure of atom through the concepts of quantum mechanics using							
	models such as vector atom model.							
Learn Photoelectric effect & its equation and compute the work func								
	of a metal.							
CO-3	Know the properties of Nucleus through the models such as Liquid Drop							
	model & Shell model							
CO-4	Calculate the decay rates, value of energy emitted & lifetime of							
	radioactive decays such as alpha, beta and gamma							
CO-5	Analyze the ionisation and interaction of radiations when they interact							
	with matter							

#### UNIT I Atomic structure

The nuclear atom - Electron orbits – The failure of Classical Physics- Atomic spectra - The Bohr atom - Energy levels and spectra - Vector atom model - Pauli's exclusion principle - Explanation of periodic table - various quantum numbers - angular momentum and magnetic moment - Bohr magnetron – Stern and Gerlach experiments. Correspondence principle - Nuclear Motion- Atomic excitation-Frank-Hertz experiment.

#### **UNIT II Photoelectric Effect**

Richardson and Compton experiment - Laws of Photoelectric emission - Einstein

Photo Electric Equation – Stopping Potential and work function- Determination of Planck's constant using photocell- Millikan's Experiment - Verification of Photoelectric equation -Photo electric cells - Photo emissive cells - Photovoltaic cell - Photo conducting cell – Construction of Photomultiplier – Construction of Solar cell- Efficiency of Solar cell

## **UNIT III Nuclear Structure**

Composition of Nuclei – properties – Stability of nuclei - Binding energy –B.E/A curve - Liquid drop model – Semi Empirical Mass formula and various terms -Shell model – Evidence for Shell model - Concept of Nuclear forces – characteristics - Meson theory of nuclear forces.

## **UNIT IV Nuclear transformations**

Radioactive decay – Fundamental laws of radioactive decay - Half life – Mean life - Radioactive series - Alpha Decay - beta decay - Gamma decay – Radio Carbon dating - Nuclear reactions - Nuclear fission – Breeder Reactors - Nuclear fusion in stars - Fusion Reactors.

## Unit V Interaction of Nuclear Radiation with matter &Detection :

Energy loss due to ionization (Bethe- Block formula)- energy loss of electrons, Cerenkov radiation. Gamma ray interaction through matter (pair production w.ref.to photoelectric effect, Compton scattering,)- neutron interactionwithmatter. Gas detectors: estimation of electric field, mobilityof particle for ionization chamber and GM Counter- Basic principle of Scintillation Detectors -photo-multiplier tube (PMT), neutrondetector.

## **Books for study**

1. Atomic and Nuclear Physics, N Subramanian and BrijLal, S Chand & Co. (2007).

2. Atomic Physics, J. B. Rajam, S. Chand& Co, 20th Edition, NewDelhi (2004)

3. Modern Physics by R. Murugaeshan. S. ChandPublication, 2010

4. Nuclear Physics by S. N. Ghoshal, First edition, S. Chand Publication, 2010.

5.Concepts of Nuclear Physics by Bernard L Cohen, Tata McGraw Hill Publication, 2017.

6.Introductory Nuclear Physics by Kenneth S, Krane, Wiley-India Publication,2008 7.Nuclear Physics : principles and applications by John Lilley, Wiley Publication,2006.

## **Books for Reference**

1.Concepts of Modern physics, A Beiser, Tata McGraw Hill, New Delhi(1997). 2.Schaum<sup>s</sup> Outline of Modern Physics, McGraw-Hill Education, 1999

## **Course Outcomes**

CO	Upon completion of the course,	PSOs	Cognitive	
	the students will be able to:	Addressed	Level	
	Explain the structure of atom based on			
CO-1	the concepts of QM & Vector atom	1,2 & 4	Understanding	
	model			
	Interpret the concept of photoelectric			
CO-2	effect to understand the applications	1 / 8-5	Applying	
	such as Photo emissive cell, Photo	1, 4 0 5		
	Voltaic cell & Photomultipliers			
CO 3	Compute various energy terms of nuclei	08.3	Analyzing	
0-5	using the semi-empirical mass formula	2,06,0	Analyzing	
	Estimate the Nuclear Energies			
CO-4	produced by Fission and Fusion	3,4&5	Analyzing	
	reactions			
CO-5	Categorize and detect various	1 2 & 5	Analyzing	
0-5	radiations using different detectors	1, 2 0 0	7 maryzing	

Semester	Cou	rse Cod	le	Title	of the	Course	;	Hours	Cre	edits	
v	21	UCPH51	L A	ATOMIC	75		4				
Course Outcomes	Progr	amme ]	Learnir (PLOs)	ig Outc	omes	Programme Specific Out (PSOs)				comes	
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO	
	1	2	3	4	5	1	2	3	4	5	
CO-1	<ul> <li>Image: A start of the start of</li></ul>	~	✓	✓	✓	~	~		✓		
CO-2	~	~	~	~	~	~			~	~	
CO-3	~	√	~	~			~				
CO-4	~	√	~	~	~			~	~	~	
CO-5	~	√	~	~	~	~	~			~	
	Number of matches (✓) =38 Relationship = High										

## SEMESTER- V

Course Title	ANALOG ELECTRONICS
Total Hrs.	60
Hrs./Week	04
Course Code	21UCPH52
Course Type	DSC-VIII
Credits	04
Marks	100

## Objectives

To study the working principle, characteristics and applications of various semiconductor devices and the functioning and applications of transistor amplifier, oscillator and multivibrator circuits.

Course (	Objectives:
----------	-------------

CO	The learners will be able to:
CO-1	Examine the working principle, characteristics and applications of various semiconductor devices.
CO-2	Compare the functioning of different types of transistor biasing circuits and discuss the functioning of transistor amplifiers.
CO-3	Illustrate the construction, working and applications of power amplifiers.
CO-4	Analyze the construction, working and applications of oscillator and multivibrator circuits.
CO-5	Appraise the characteristics and applications of OP-AMP circuits.

## UNIT I Semiconductor diodes and Special semiconductor devices

PN junction theory – V – I characteristics of a PN junction diode-Halfwave rectifier - Bridge rectifier - Efficiency - filters - Shunt capacitor filter – pifilter – Zenerdiode – equivalent circuit – voltageregulator – LED – V characteristics –advantages – applications – photodiode – characteristics - applications – tunnel diode – tunnel diode oscillator – varactor diode – applications – Shockley diode. Field effect Transistor FET-JFET – construction, working – differences between JFET and BJT – JFET characteristics – parameters – MOSFET – D-MOSFET – E– MOSFET.MOSFET- – UJTcharacteristics-UJT relaxation oscillator.

#### UNIT II Transistor amplifier

Faithful amplification – transistor biasing – inherent variations of transistor parameters – stabilization – stability factor – methods of transistor biasing – practical circuit of a transistor amplifier – phase reversal – DC and AC equivalent circuits – load line analysis – classification of amplifiers – multistage amplifiers – important terms – RC coupled amplifier – transformer coupled amplifier – direct coupled amplifier.

#### UNIT III Transistor audio power amplifiers

Difference between voltage and power amplifier – performance quantities of power amplifiers – classification of power amplifiers – thermal runaway – heat sink – stages of a practical power amplifier – driver stage – output stage – push pull amplifier – feedback – principles of negative feedback – advantages – emitter follower – applications of emitter follower.

#### UNIT IV Oscillators

Oscillatory circuit – Positive feedback – essentials of transistor oscillator – Barkhasuen criterion – tuned collector, Hartley, Colpitt and phase shift oscillators – Wien bridge oscillator – transistor crystal oscillator – multi vibrators – astable, mono stable, bistable multi vibrators.

#### UNIT V Op-amp –characteristics and Application

Open-loop and Closed-loop Gain - Frequency Response - CMRR -Slew Rate and concept of Virtual ground. **Applications of Op-Amps:** (1) Inverting and noninverting amplifiers, (2) Adder, (3) Subtractor, (4) Differentiator, (5) Integrator, (6) Logarithmic amplifier, (7) Zero crossing detector (8) Wien's bridge oscillator.

#### **Books for Study:**

- Principles of Electronics V.K. Mehta and Rohit Mehta S. Chand & Co. Ltd., New Delhi (2020).
- 2. BasicElectronicsbyB.L.Theraja,S.Chand&Co.,(2008).
- Op-Amps and Linear Integrated Circuit, R. A. Gayakwad, (4<sup>th</sup> ed., 2000), Prentice Hall.

#### **Books for Reference:**

- Electronic principles Albert Paul Malvino and David J Bates, Tata McGraw Hill Ltd., (7th Ed,2006).
- Electronic fundamentals and applications- John D Ryder, Prentice Hall India Pvt. Ltd., New Delhi (5<sup>th</sup> ed.,2002).
- Integrated Electronics Jacob Milman and Christos C Halkias, Tata McGraw Hill Publishing Company Ltd., New Delhi (28<sup>th</sup> reprint, 2003).

## **Course outcomes**

CO No.	Upon completion of this course, the students will be able to:	PSO addressed	Cognitive level
CO-1	Enumerate the working principle, characteristics and applications of various semiconductor devices.	2,3,4	Remembering
CO-2	Describe the functioning of different types of transistor biasing circuits and the functioning of transistor amplifiers.	1,3,4	Understanding
CO-3	Explain the construction, working and applications of power amplifiers.	2,3,5	Applying
CO-4	Explain the construction, working and applications of oscillator and multivibrator circuits.	2,3,5	Analyzing
CO-5	Summarize the characteristics and applications of OP-AMP circuits.	1,2,3	Evaluating

Semester	Course Code			ester Course Code Title of the Course						e	Hour	s C:	redits
v	21	UCPH52	2	Anal	og Elec	tronic	s	60		4			
Course Outcomes	Progr	Prog	Programme Specific Outcomes (PSOs)										
(003)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO			
	1	2	3	4	5		2	3	4	5			
CO-1	~	√		~			~	~	~				
CO-2		✓	✓		~	✓		~	~				
CO-3		✓	✓	~			~	~		~			
CO-4	~	✓	~				~	~		~			
CO-5	~	✓			~	~	~	~					
	Number of matches ( $\checkmark$ ) = 30												
				Relat	ionship	o = Med	lium						

#### SEMESTER - V

Course Title	MATHEMATICAL METHODS
Total Hrs.	60
Hrs./Week	4
Course Code	21UCPH53
Course Type	DSC-IX
Credits	4
Marks	100

## **General Objective:**

To understand the various mathematical methods used in Physics.

## **Course Objectives:**

CO	The learners will be able to:
CO-1	Define Scalar, Vector, gradient, divergence and curl of vector
CO-2	Classify the line, surface and volume integral of vectors
CO-3	Determine Minors , Adjoint , Inverse , Trace and Rank of a Matrix
CO-4	Analyze differential equations of first order
CO-5	Assess the various operations in complex variables

## **UNIT I VECTOR DIFFERENTIATION:**

Vector Algebra – Addition of vectors, Multiplication of a vector by a scalar, , Product of two vectors, Product of three vectors, Differentiation of vectors' Gradient of a scalar field – Divergence of a vector - curl of a vector function.

## **UNIT II VECTOR INTEGRATION:**

Line integral, Surface integral and Volume integral – Problems on line, surface and volume integrals – Integral theorems – Verification of divergence theorem - Verification of Stoke's theorem –Verification of Green's theorem – Problems on divergence, Stoke's and Green's theorem - Applications of vectors in Physics.

## UNIT III MATRICES:

Types of Matrices – Transpose of a matrix – The conjugate of a matrix - The conjugate transpose of a matrix – Symmetric and Antisymmetric matrices, , Determinant of a matrix, Cofactors of a determinant – Minors of a matrix – Adjoint of a matrix – Inverse of a matrix – Orthogonal matrices – Unitary Matrices – Trace of a Matrix – Rank of a Matrix.

## UNIT IV DIFFERENTIAL EQUATIONS

Introduction – Order and Degree of a Differential Equation – Solution of First order Differential Equation by the method of separation of variables – Linear Differential Equation of first order and its solution - Solution of Linear Differential Equation of first order by the method of Integrating factor - Singular points of differential Equations - Application of differential equations in physics.

## UNIT V COMPLEX ANALYSIS:

Complex numbers - Review of algebraic operations of complex numbers-complex conjugate, modulus and argument of complex numbers – function of complex variable – Limit, continuity and differentiability. Analytic function - Cauchy Riemann differential equation – Laplace equation and harmonic function – Application of complex numbers in physics.

## **Books for study:**

1. Mathematical Physics, B.D.Guptha, Vikas Publishing House, (2009).

2. Mathematical Physics – Sathya Prakash – Sulthan Chand & sons - New Delhi.

## **Books for Reference:**

1.Mechanics and .Mathematical Physics- R.Murugesan – S.Chand& Co Ltd., New Delhi, Third Revised Edition(Dec2017).

2. Mathematical methods for Physicists – Arfken& Weber – 7<sup>th</sup> edition – Academic Press – 2012.

CO	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Recall Scalar, Vector, gradient, divergence and curl of vector	1,4,5	Remembering
CO-2	Estimate line , surface and volume integral of vectors	1,4,5	Understanding
CO-3	Apply Minors , Adjoint , Inverse , Trace and Rank of a Matrix	1,4,5	Applying
CO-4	Evaluate differential equations of first order	1,4,5	Analyzing
CO-5	Comparevarious operations in complex variable	1,4,5	Evaluating

## **Course Outcomes**

Semester	Course Code			Title	of the	Course	;	Hours	Cr	edits	
v	V 21UCPH53				`НЕМА' ИЕТНО	TICAL DS		60		4	
Course Outcomes	Prog	ramme	Learni (PLOs	ng Outo )	Prog	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	✓	$\checkmark$	✓	✓	$\checkmark$	$\checkmark$			$\checkmark$	<ul> <li>✓</li> </ul>	
CO-2	$\checkmark$	<ul> <li>✓</li> </ul>	✓	✓	$\checkmark$	$\checkmark$			✓	<ul> <li>✓</li> </ul>	
CO-3	$\checkmark$	$\checkmark$	✓	~	$\checkmark$	$\checkmark$			$\checkmark$	<ul> <li>✓</li> </ul>	
CO-4	$\checkmark$	$\checkmark$	✓	✓	$\checkmark$	$\checkmark$			$\checkmark$	<ul> <li>✓</li> </ul>	
CO-5	<ul> <li>✓</li> </ul>	~	✓	✓	<ul> <li>✓</li> </ul>	✓			$\checkmark$	✓	
		Number of matches (✓) = 40 Relationship = High									

## SEMESTER - V

Course Title	PHYSICS PRACTICALS – V
Total Hrs.	60
Hrs./Week	4
Sub. Code	21UCPH5P1
Course Type	Practical-V
Credits	2
Marks	100/2

## **General Objective:**

To enrich skills of observation through scientific experiments related to Optics, Magnetism, Bridge Circuits (Anderson) and Thermo EMF.

## **Course Objectives:**

CO No.	The learners will be able to:							
CO 1	Demonstrate the experiments to find the Cauchy's constants and							
00-1	refractive index of the material of the prism.							
$CO^{2}$	Apply the knowledge of diffraction to understand the method of							
0-2	determining the wavelength using Biprism.							
CO 3	Set up the B.G to find its Figure of Merit and study the induction							
0-5	properties between a pair of coils							
	Observe the variation of photocurrent with stopping potential using							
CO-4	Photodiode to estimate the planck's constant in addition to the study of							
	Bandgaps in Semiconductors.							
CO-5	Make up the voltmeter for a high range and measure the emf produced							
00-5	by a thermo-couple							

1. To determine the Cauchy Constants of a material of a prism.

- 2. Determination of refractive index i d curve.
- 3. To determine wavelength of sodium light using Fresnel Bi-prism.
- 4. Absolute capacity and figure of merit BG
- 5. Comparison of Mutual inductances BG.

6. To study the variation of thermo emf across two junctions of a thermocouple with temperature.

- 7. Determination of Bangap (Eg) using semiconductor diode
- 8. Measurement of Planck's constant using black body radiation.
- 9. Anderson's bridge AC bridge-

10. To calibrate the high range voltmeter- Potentiometer.

## **Books for Reference:**

1. Practical Physics, C.C. Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan (Printers & Publishers) Pvt. Ltd., (2009).

2. Practical Physics, P. R. Sasi Kumar, PHI. (2011)

 Advanced Practical Physics ,S. P. Singh, Pragathi Prakasam (2019).
 A Text book of Practical Physics, Indu Prakash and Ram Krishna, Kitab Mahal (2011).

5.Practical Physics – St. Joseph College, Trichy.

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Determine the cauchy's constant and refractive index of the given material of the prism.	1, 3,4	Applying
CO-2	Calculate the wavelength of light using the Fresnel Bi-Prism	2,3,5	Analyzing
CO-3	Compare the mutual inductances for the given pair of coils by determining the Figure of merit of the B.G	2,3,5	Analyzing
CO-4	Measure the Planck's constant using the black body radiations besides determining the Bandgap of a semi- conductor	1,2,3,4	Evaluating
CO-5	Estimate the range of voltmeter using the Potentiometer and variations of Thermo-Emfusing the thermo-couple.	3,4,5	Evaluating

## **Course Outcomes**

Semester	Course Code Title of the					Course		Hour	s (	Credits
v	21U	CPH5P1	L PH	IYSICS	PRAC <sub>1</sub>	<b>`ICALS</b>	- V	60		2
Course	Prog	omes	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	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$		$\checkmark$
CO-4	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	
CO-5	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$	✓
		Number of matches $(\checkmark) = 43$								
	Relationship = High									
						•	0			

## SEMESTER - V

Course Title	PHYSICS PRACTICALS - VI
Total Hrs.	60
Hrs./Week	4
Course Code	21UCPH5P2
Course Type	Practical-VI
Credits	2
Marks	100/2

## **General Objective:**

To construct electronic circuits and study the characteristics.

# **Course Objectives:**

СО	The learners will be able to:
CO-1	Analyze the characteristics of FET, Photo Voltaic cell and Photo Transistor.
CO-2	Construct and analyze the response of a Single stage amplifier- without feedback.
CO-3	Design an astable multivibrator using 555 Timer.
CO-4	Construct an Adder and Subtractor using Op-amp.
CO-5	Construct Zener regulated power supply, phase shift oscillator, half- adder and full adder using ICs.

- 1) Zener regulated power supply
- 2) Characteristics of FET
- 3) To construct and study the response of a Single stage amplifier –without feedback
- 4) Colpitt's oscillator
- 5) To design an astable multivibrator of given specifications using 555 Timer.
- 6) Verification of Adder, Subtractor using Op amp
- 7) Phase shift oscillator
- 8) Half adder & full adder using ICs
- 9) To study the characteristics of Photo Voltaic cell
- 10) To study the characteristics of Photo Transistor.

## **Books for Reference:**

- 1. Basic Electronics: A text lab manual, P.B. Zbar, A.P. Malvino, M.A. Miller, 1994, Mc-Graw Hill.
- 2. Electronics: Fundamentals and Applications, J.D. Ryder, 2004, Prentice Hall.
- 3. OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, 4th edition, 2016, Prentice Hall.

	Course Outcomes									
СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level							
CO-1	Analyze the characteristics of FET, Photo Voltaic cell and Photo Transistor.	3,4,5	Analyzing							
CO-2	Construct and analyze the response of a Single stage amplifier-without feedback.	3,4,5	Creating							
CO-3	Design an astable multivibrator using 555 Timer.	3,4,5	Creating							
CO-4	Construct an Adder and Subtractor using Op-amp.	3,4,5	Creating							
CO-5	Construct Zener regulated power supply, phase shift oscillator, half-adder and full adder using ICs.	3,4,5	Creating							

Semester	Cou	rse Cod	e	Title of the Course				Ho	ours	Credits	
v	210	CPH5P2	2	PHYSIC	CS PRA	CTICA	ls – VI	6	50	2	
Course Outcomes	e Programme Learning Outcomes Programme Specific Outcome nes (PLOs)						mes (PSOs)				
(COs)	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO-1	<b>√</b>	✓	$\checkmark$	<b>√</b>	<b>√</b>			$\checkmark$	<b>√</b>	$\checkmark$	
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	<ul> <li>✓</li> </ul>	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	<b>√</b>	$\checkmark$	
				Nu	mber of Relatio	match mship	es (√) = = High	40		·	

## SEMESTER - V

Course Title	NANOMATERIALS AND APPLICATIONS
Total Hrs.	60
Hrs./Week	4
Course Code	21UEPH51A
Course Type	DSE-IA
Credits	4
Marks	100

## **General Objective:**

To understand the synthesis, characterization and applications of Nano materials.

## **Course Objectives:**

СО	The learners will be able to:							
CO-1	Enumerate the synthesis of nanomaterials by various methods							
CO-2	Discuss the the characterization of nano materials synthesised							
CO-3	Examine the applications of nano materials							
CO-4	Categorize the applications of nanomaterials in medicine and Environment							
CO-5	Assess the knowledge of the recent developments in the field of nanotechnology							

## UNIT I Synthesis of Nanomaterials :

Top down and Bottom up approach, Ball milling, Gas phase condensation, Vacuum deposition, Physical vapour deposition(PVD), Thermal evaporation, E-beam evaporation, pulsed laser deposition, Chemical vapour deposition(CVD), Sol-Gel, Electrodeposition, Spray Pyrolysis, Hydrothermal synthesis, colloidal methods, MBE growth of quantum dots.

## UNIT II Characterisation:

Lithography techniques – electron beam lithography – Dip-pen lithography – Photo lithography – Thin film deposition- - Electrospinning - X-ray diffraction, DSC, FTIR, Scanning Electron Microscopy, Transmission Electron Microscopy, Atomic Force Microscopy.

## UNIT III Applications of Nanotechnology:

Fabrication, properties and applications of quantum dots – quantum wires – quantum well – fullerenes – Carbon nano tubes – quantum point contact – nano crystals and their applications – Nano electronics – Moore's law.

## UNIT IV Nanotechnology in Medicine and Environment:

Nano biotechnological devices – applications of Nano biotechnology – biosensors – nano biosensors – applications of nano biosensors – Water purification – water decontaminator – water desalination – Nano toxicology – Green nanotechnology – Positive and Negative aspects of N.T – Environmental implications of N.T.-- combination of gold nanoshells and lasers to destroy cancer tumors .

## UNIT V Recent trends in Nanotechnology:

Nano technology in batteries or solar cells or LED lighting - nanoscale size reduction improve energy-storage materials including batteries - enhanced cathode materials for safer and longer life Li-ion batteries - supercapacitors and hydrogen storage. carbon nanotube in automotive, aerospace, and sporting goods fields - thinner, affordable, and more durable flat panel displays; improved armor materials to protect soldiers.

## **Books for study:**

1.Nano Biotechnology - SubbiahBalaji - MJP Publishers, Chennai (2019).

2. Nano technology - S.Shunmugam- MJP Publishers, Chennai(2010).

## **Books for Reference:**

1.Nano technology – an introduction – Mark Ratner and Daniel Ratner – 3<sup>rd</sup> edition – Pearson Education – New Delhi - Nov 2002.

2.Introduction to Nano technology – Charles P PooleJr, Frank J Owens, John wiley sons Publications- Dec 2003 .

## e-resources:

http://nptel.ac.in

## **Course Outcomes**

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Select the suitable method of synthesis of nanomaterials.	1,4,5	Remembering
CO-2	Identifythe suitable methods of characterization of nano materialsynthesized	3,4,5	Understanding
CO-3	Explain the applications of nano materials	4,5	Applying
CO-4	Illustrate the applications of nanomaterials in medicine and Environment	1,4,5	Analyzing
CO-5	Summarize the recent developments in the field of nanotechnology	PSO1,4,5	Evaluating

Semester	Course Code			Title o	of the C	Course	1	Hours	Cre	edits	
v	210	JEPH51	A	NANOM APP	ATERIA LICATI	ALS AN ONS	D	60		4	
Course Outcomes	Prog	ramme	Learn (PLOs	ing Outcomes Programs s)			ramme	ime Specific Outco (PSOs)			
(COS)	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO-1	✓	$\checkmark$	~	~	<b>√</b>	$\checkmark$			$\checkmark$	<ul> <li>✓</li> </ul>	
CO-2	$\checkmark$	$\checkmark$	✓	~	$\checkmark$			$\checkmark$	$\checkmark$	<ul> <li>✓</li> </ul>	
CO-3	$\checkmark$	$\checkmark$	✓		✓				$\checkmark$	✓	
CO-4	$\checkmark$	$\checkmark$	✓	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$	
CO-5	V	~	<b>√</b>	~	V	$\checkmark$			~	<ul> <li>✓</li> </ul>	
		Number of matches ( $\checkmark$ ) = 38									
		Relationship = High									

## SEMESTER -V

Course Title	GEOPHYSICS
Total Hrs.	60
Hrs./Week	4
Course Code	21UEPH51B
Course Type	DSE-IB
Credits	04
Marks	100

## **General Objective:**

To comprehend knowledge in the fields of Geomagnetism, Geothermal Physics and Seismology by knowing the Physics of Earth

## **Course Objectives**

СО	The learners will be able to:
CO-1	Understand the different layers of atmosphere in detail
	Discuss the various Geophysical and Geochemical methods used to
0-2	study the electrical resistivity, ground water chemistry & sources of
	contamination
CO-3	Gain sufficient knowledge on the earthquakes and Tsunami warning systems
CO-4	Illustrate the origin of Earth's magnetism, Laplace and & Poisson's
	equation
CO-5	Predict radioactive dating of rocks & Identify the sources of Heat, to know
	the internal temperature of earth.

## UNIT I: PHYSICS OF THE EARTH

Introduction to Geophysics- Earth as a member of the solar system-Atmosphere-Ionosphere- Asthenosphere- Lithosphere-Hydrosphere and Biosphere-Meteorology-Oceanography and Hydrology.

## UNIT II: GEOPHYSICAL AND GEOCHEMICAL METHODS

Geophysical methods: Geo referencing using Arc GIS software-Electrical Methods-Qualitative interpretation of Vertical Electrical Sounding curves –Preparing pseudo cross section for electrical resistivity data and interpretation.

Geochemical methods: Introduction-Principles of groundwater chemistry-Sources of contamination- Ground water quality analysis using geochemical methods.

## UNIT III: INTRODUCTION TO SEISMOLOGY

The earth's interior and crust as revealed by earthquakes-Rayleigh waves and Love waves-Elastic rebound theory-Continental drift-Earthquake magnitude and intensity-Horizontal seismograph and seismograph equation-Tsunami-Causes and Impacts-Tsunami warning systems.

## UNIT IV: GEOMAGNETISM AND GRAVITY

Historical introduction –The physical origin of magnetism-Causes of the main field-Dynamo theory of earth's magnetism-Gravitational potential-Laplace's equation and Poisson's equation-Absolute and relative measurements of gravity-Worden gravimeter.

## UNIT V: GEOCHROLOGY AND GEOTHERMAL PHYSICS

Radioactivity of the earth-Radioactive dating of rocks and minerals-Geological time scale-The age of the earth-Flow of heat to the surface of the earth –Sources of heat within the earth-Process and heat transport and internal temperature of earth.

## **Books for Study:**

1. Cook, A.H, Physics of the Earth and Planets, McMillanPress, London 1973.

2. John Milsom, Field geophysics-The geophysical field guide 4<sup>th</sup> edition, Wiley publications, England (2011).

3. Krauskopf.K.B, Introduction to Geochemistry, McGraw Hill, 1994.

4. Ramachandra Rao, Outline of geophysical prospecting-a manual for geologists, University of Mysore, 1975.

## **Books for Reference:**

1. Garland, Introduction to Geophysics 11 edition, WB Saunder Company, London, 1979.

2. William Lowrie, Fundamentals of Geophysics, 11Edition, Cambridge press, UK.

3. Nils-Axel Morne, Geochronology-Methods and case studies, INTECH publications.

4. John Raferty, Geochronology –Dating and Precambrian time –The beginning of the world as we know it, Britannica Educational publishers, New York-2011.

5. Don L.Anderson, Theory of the Earth, Blackwell scientific Publications-1989, UK. 6.<u>https://ocw.mit.edu/courses/earth-atmospheric-and-planetary-sciences/12-</u>201-essentials-of-geophysics-fall-2004/lecture-notes/

# **Course Outcomes**

СО	Upon completion of the course,	PSOs	Cognitive
	the students will be able to:	Addressed	Level
CO-1	Identify the different layers of the solar system	2,4	Understanding
CO-2	Describe the Features/Parameters of Earth using Geophysical and Geochemical methods	1, 2 & 5	Understanding
CO-3	Illustrate the magnitude and intensity of Earthquakes & causes and impacts of Tsunami	1, 2 & 4	Applying
CO-4	Explain about earth's magnetism and gravitational potential	1,4&5	Analyzing
CO-5	Estimate the age of Earth and internal temperature of Earth	2,3&4	Evaluating

Semester	Course Code			Title of the Course			Hour	s	Credits	
V	210	JEPH51E	;	GEO P	HYSICS	\$	60		4	
Course Outcomes	Prog	ramme ]	Learnin (PLOs)	ig Outco	omes	Pro	gramme	Speci (PSOs	fic Outc	omes
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1	2	3	4	5	1	2	3	4	5
CO-1	~	~	~				~		~	
CO-2	✓	~	~	<b>√</b>	✓	~				✓
CO-3	~	√	~	~	~	~			~	
CO-4	~	~	~	~	~	~			~	~
CO-5	✓	✓	~	<b>√</b>			~	<b>√</b>	<b>√</b>	
			ľ	Number Rel	of matc ationshi	hes (v ip = <b>H</b>	√) =36 ligh			

#### **SEMESTER -V**

Course Title	RECENT TRENDS IN PHYSICS
Total Hrs.	60
Hrs./Week	4
Course Code	21UEPH51C
Course Type	DSE-IC
Credits	04
Marks	100

## **General Objective:**

To gain the knowledge about different types of materials and its applications.

#### **Course Objectives:**

СО	The learners will be able to:							
CO-1	O-1 Define the functional materials							
CO-2	Classify the types of ceramic materials & Metallic alloys							
CO-3	Examine the various applications in Therapeutic equipments used in							
	the medical field							
CO-4	Discuss the photonic materials and its applications							
CO-5	Classify the different types of sensor							

#### **Unit I: Functional Materials**

Functional materials- Definition. Shape memory effects-Super alloys-Memory metals/alloys- Advanced Ceramic materials: Piezoelectric, ferroelectric and Magnetoelectric&Multiferroic materials and their applications as sensors and actuators. Functional Materials for Energy Conversion and Storage- Batteries; Fuel cells; Solar Cells.

#### **Unit II: New Materials and Applications**

Ceramic Fibres - Fibre reinforced Plastics – Fibre reinforced Metal – Metallic glasses – Copper base alloys – Nickel – Titanium alloys - Relaxor- Sensors and Actuators – Polymer semiconductors – Photo conducting polymers – Liquid crystals –Bio materials – hydroxyapatite – PMMA – Silicone.

#### **UNIT-III** Therapeutic equipments

Need for cardiac Pacemaker- External Pace Makers- Implantable Pace makers- Types of Implantable Pace makers-Classification codes for Pacemakers-Ventricular Synchronous Demand Pacemaker- Programmable Pacemaker- Power sources for Implantable Pacemakers- Recent development in Implantable Pace makers- Pacing System analyser.

## UNIT- IV – Photonic Materials

Photonic crystal- Luminescence –Photorefractive materials – Properties of photonic materials – Applications of Photonic materials- - Thin film – Properties of Thin film – Deposition techniques – Pulsed Vapour Deposition –Thermal Evaporation –Pulsed laser deposition – Solution Based chemistry – Spin coating – Dip coating- Applications of thin film.

## UNIT-V- Sensors

Introduction to MEMS and NEMS, working principles, as micro sensors (acoustic wave sensor, biomedical and biosensor, chemical sensor, optical sensor, capacitive sensor, pressure sensor and thermal sensor), micro actuation (thermal actuation, piezoelectric actuation and electrostatic actuation–micro gripers, motors, valves, pumps, accelerometers), Piezoresistivity,Piezoelectricity and thermoelectricity, MEMS/NEMS design, processing, Oxidation, Sputter deposition, Evaporation, Chemical vapor deposition etc

## Text Book:

- 1. Khandpur, R.S, Hand book of Biomedical Instrumentation 3<sup>rd</sup> Edition, Tata McGraw-Hill Publishing Company Ltd (2014).
- 2. Singh N.B, Growth and characterization of non linear optical materials, Pergamon, 1990.
- 3. Photonics : An introduction "by PR Sasikumar, PHI (2012).
- 4. Hand book of thin film deposition -Krishna Seshan, William Andrew (2012).
- 5. Nano Terchnology and Nano Electronics Materials, devices and measurement Techniques by WR Fahrner Springer (2005).
- 6. Nano: The Essentials Understanding Nano Scinece and Nanotechnology by T.Pradeep; Tata Mc.Graw Hill.
- 7. Charles Kittel, "Introduction to Solid State Physics", 7th Edition, John Wiley & Sons, New York, (1996).
- 8. S.O.Pillai, "Solid State Physics", Revised 6 <sup>th</sup>Edition, New Age International Publishers, New Delhi, (2007).

## 9. Wahab. M. A, "Solid State physics", Second edition, Narosa, (2010).

## **Reference Books:-**

- 1. W. D. Callister, "Materials Science and Engineering: An Introduction", John Wiley & Sons, 2007.
- 2. K. Vijayamohanan Pillai and MeeraParthasarathi, "Functional Materials: A Chemist's Perspective", OrientBlackswan, 2013.
- 3. M.Ali Omar, "Elementary Solids State Physics", Pearson Education, New Delhi, (2002).
- 4. H.P.Myres, "Introductory Solids State Physics", 2<sup>nd</sup> Edition, Taylor and Francis Ltd, London (2001).
- 5. SurekhaTomar, CSIR- UGC/JRF/SET Physical Sciences, 3<sup>rd</sup> edition
- 6. M. S. Rogalski and S. B. Palmer, "Solid State Physics", Gordon Breach Science publishers, (2000).
- 7. N. W. Ashcroft and N. D. Mermin, "Solid State physics", Cengage Learning, (2003).

8. Jean P.Mercier, G.Zambelli and W.Kurz, "Introduction to Materials Science", Elsevier, 2002

	Course Outcome	es	
CO	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Describe the shape memory alloys , Magneto electric and multiferroic materials	2,5	Understanding
CO-2	familiarize with ceramics, composites, new materials and their important applications	4,5	Applying
CO-3	Interpret the various applications of electronics in electronics	4,5	Applying
CO-4	Analyse the use of Photonic materials and photo refractive materials in Industrial field	1,2	Analyzing
CO-5	Summarize the various types of sensors and its applications.	4,5	Evaluating

Semester	Course Code			Title of the Course			Но	urs	Credits	
IV	21UEPH51C			RECENT TRENDS			60		4	
Course	P	rogram	me Le	earnin	g		rogran	nme S	Specif:	ic
Outcomes		Outco	mes (]	PLOs)			Outco	mes (	PSOs)	l
(COs)	PLO1	PLO2	PLO3	PLO4	PLO5	PSO1	PSO2	PSO3	PSO4	PSO5
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	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			
CO-5	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$				$\checkmark$	$\checkmark$
	Number of matches $(\checkmark) = 31$									
		Relationship = Medium								

#### SEMESTER - V

Course Title	BIOMEDICAL INSTRUMENTATION
Total Hrs.	60
Hrs./Week	4
Course Code	21UEPH52A
Course Type	DSE-IIA
Credits	4
Marks	100

## **General Objective:**

To have an exposure on various diagnostic instruments used in the medical field and to study the basics of radiation and medical imaging Physics

#### **Course Objectives:**

СО	The learners will be able to:
CO-1	Identify the basic concepts of Biomedical Instrumentation
CO-2	Discuss the fundamentals of transducers as applicable to physiology
CO-3	Examine the various diagnostic instruments used in the medical field
CO-4	Correlate the use of ionizing radiation and its biological effects in the medical field.
CO-5	Appraise the basics of Medical imaging Physics

## **Unit-I Introduction to Biomedical instrumentation**

Overview of Biomedical Instrumentation system – Types of biomedical equipments – Analytical, Diagnostic, Therapeutic and Surgical equipments – calibration of medical devices and testing of biomedical equipments, Electrical classification of Biomedical Equipments

## Unit-II Bioelectric Potentials and Transducers

Transport of ions through cell membranes- Resting and acting potentialsbiopotentials- bioelectric signals and their characteristics- design of medical instruments- components of biomedical instrument system-Transducers- active transducers- strain gauge- photoelectric type resistive transducers-metallic wire transducers- capacitive transducers- piezoelectric ultrasonic transducers

## Unit-III Diagnostic Equipments:

Electrocardiography (ECG) –ECG in diagnosis –ECG Machine. Principles and applications–Vector cardiography (VCG), Magnetocardiography (MCG) – SQUIDS and Phonocardiography (PCG). Electro encephalography (EEG), EEG Machine, Artifacts, Evoked potentials – Visual, Auditory and Somatosensory EPs. Principles and applications–Magneto encephalography (MEG), Electroretinography (ERG) and Electrooculography (EOG). Principles and applications–Electromyography (EMG)– Electroneurography (ENG).

#### **Unit- IV Radiation Physics**

Principles of Radiation protection- protective materials- radiation effects-somatic, genetic stochastic and deterministic effect-External beam therapy (basicidea)- conformal radiation therapy- Image Guided Radiotherapy

## Unit-V Medical Imaging Physics

Lasers in medicine- Endoscopy- radio graphic and fluroscopic techniques-computer tomography (CT)- applications of computer tomography- Thermography- Medical applications of thermography- ultrasonic imaging systems- Magnetic Resonance Spectroscopy (MRI)- Different types of bioelemetry systems and patient monitoring.

## Books for study

1. Biomedical instrumentation- M.Arumugam, Anuradha Publications (2010)

2. Biomedical instrumentation/ Medical Electronics- R.L.Reka, C.Ravikumar, Lakshmi publications (2010)

## **Books for reference**

1. Medical Physics- J.R.Cameron and J.G.Skofronick, WileyEastern(1978)

2. Bio medical Instrumentation -Khandpur

#### Upon completion of the course, the **PSOs** Cognitive CO students will be able to: Addressed Level Enumerate the basic concepts of Biomedical CO-1 2,4 Remembering Instrumentation Illustrate the fundamentals of transducers CO-2 1,4,5 Understanding as applicable to physiology Interpret the application of Electronics in CO-3 4,5 Applying diagnostics Analyze the use of ionizing radiation in CO-4 1,4,5 Analyzing medical and industrial applications Summarize Medical Imaging techniques for CO-5 diagnosis along with other diagnostic and 1,4,5 Evaluating therapeutic devices.

## **Course Outcomes**

Semester	Course Code			Title of the Course				Hours	Cr	edits
V	21UEPH52A			BIC	OMEDIC	CAL		60		4
				INSTR	UMENT	ATION				
Course Outcomes	Prog	ramme	Learni: (PLOs)	ng Outc	omes	Prog	ramme	Specifi (PSOs)	ic Outc	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	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$
CO-3	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$				$\checkmark$	$\checkmark$
CO-4	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$
CO-5	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$
		Number of matches ( $\checkmark$ ) = 35								
		Relationship = High								

#### SEMESTER - V

Course Title	NUMERICAL METHODS
Total Hrs.	60
Hrs./Week	4
Course Code	21UEPH52B
Course Type	DSE-IIB
Credits	4
Marks	100

## **General Objective:**

To understand various approximation methods to find solution to problems which do not have exact solutions.

#### **Course Objectives:**

CO	The learners will be able to:								
CO-1	Classify numerical, algebraic and transcendental equations								
CO-2	Solve of the differential equations using Taylor series and corrector								
	methods								
CO-3	Appraise the importance of Interpolation by various methods								
CO-4	Assess the numerical solution of partial differential equations								
CO-5	Solve simultaneous linear equations by various methods Gauss								
	elimination method, Gauss Jacobi, Gauss- Seidal method, Gauss -								
	Jordan modification								

## UNIT I: Solutions of Numerical Algebraic and Transcendental equations

Bisection method – Successive approximation method – Regular falsi method – Newton Raphson method.

#### Unit II – Solutions of simultaneous linear equations

Gauss elimination method – Gauss Jordan modification – Gauss Jacobi method – Gauss seidal method.

## **UNIT III – Interpolation**

Newton's forward interpolation method – Newton's backward interpolation method – Interpolation method for unequal intervals – Lagrange's method – Inverse interpolation.

## UNIT IV – Numerical Differentiations and Integration

Newton Gregory's forward interpolation formula for derivatives – Newton Gregory's Backward interpolation formula for derivatives – Trapezoidal rule – Simpson's 1/3 rule.

## UNIT V – Numerical solutions of differential equations

Taylor series method – Runge kutta second order and fourth order method – predictor and corrector method – Milne's predictor – corrector method.

## **Books for Study:**

1. Numerical methods in science and engineering – Dr.M.K. Venketaraman, The National Publishing Company, Chennai,(1999)

## **Books for Reference:**

1. Introductory methods of numerical analysis- S.S.Sastry, Prentice Hall of India, New Delhi 5<sup>th</sup> edition - Jan 2012.

2.Numerical methods for scientific and engineering computation – M.K. Jain, S.R.K. Iyenkar, R.K.Jain 6<sup>th</sup> edition - Jan 2012.

3.Numerical Mathematical analysis, J.B.Scarborough,

#### CO Upon completion of the course, the **PSOs** Cognitive Addressed Level students will be able to: CO-1 Differentiate the numerical, algebraic and 4,5 Understanding transcendental equations CO-2 Find the solutions of differential equations 4,5 Creating adapting Taylor series, methods. CO-3 Analyze the importance of Interpolation by 1,2 Analyzing various methods CO-4 Estimate the numerical solution of partial 4 Evaluating differential equations CO-5 Predict the solutions of simultaneous linear equations by various methods Gauss elimination method, Gauss Jacobi, 4 Applying Gauss- Seidal method, Gauss -Jordan methods.

## **Course Outcomes**

Semester	Course Code 21UEPH52B			Title of the Course NUMERICAL			H	Hours 60		Credits 4	
V											
				M	ETHOD	S					
Course	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)					
Outcomes											
(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	✓	✓	<b>~</b>		~				~	<b>√</b>	
CO-3	$\checkmark$	<ul> <li>✓</li> </ul>	✓	✓	$\checkmark$	$\checkmark$	~				
CO-4	$\checkmark$	<ul> <li>✓</li> </ul>							~		
CO-5	$\checkmark$	<ul> <li>✓</li> </ul>							~		
	Number of matches ( $\checkmark$ ) = 25										
				Relat	ionship	o = Med	lium				
#### SEMESTER- V

Course Title	PARTICLE PHYSICS AND ELEMENTS OF CRYSTALLOGRAPHY
Total Hrs.	60
Hrs./Week	4
Course Code	21UEPH52C
Course Type	DSE-IIC
Credits	4
Marks	100

#### **General Objective:**

To gain knowledge about particle physics, particle accelerators and get an exposure on fundamental concepts of crystal structure, crystal defects, imperfections and methods of x- ray diffraction.

#### **Course Objectives:**

CO No.	The learners will be able to:
CO-1	Comprehend the details of particle interactions, Features and types.
CO-2	Understand the basics of particle accelerators and colliders
CO-3	Define the basic concepts of Crystal structures
CO-4	Explain the fundamental laws of x-ray diffraction
CO-5	Analyze the different types of on crystal imperfections and defects

### UNIT I Particle physics:

Particle interactions (concept of different types of forces); basic features, types of particles (leptons, hadrons) and its families. Neutrinos & antineutrinos - Conservation Laws(energy and momentum, angular momentum, parity, baryon number, Lepton number, Isospin, Strangeness) – basic ideas about quark - concept of quark model, color quantum numberand gluons – Higgs bosons

### UNIT II Particle Accelerators & Colliders

Van-de Graaff generator (Tandem accelerator), Linear accelerator, Cyclotron, Synchrotrons (Principal, construction, working, advantages anddisadvantages). Relativistic Heavy Ion colliders (RHIC) - Large Hadron Colliders

# Unit-III

Crystal lattice- Primitive and Unit cell- Seven classes of Crystals- Bravais Lattice- Miller indices- Structure of Crystals- Simple cubic, Hexagonal close packed structure, Face centered cubic structure, Body centered cubic structure, Simple cubic structure, Sodium Chloride Structure, Zinc Blende Structure, Diamond Structure.

# Unit-IV

Diffraction of x-Rays by Crystals- Bragg's Law in one Dimension-Experimental Method in x-Ray Diffraction- Laue Method, Rotating Crystal Method-Powder photograph Mehtod- von Laue's equations.

# Unit-V

Point defects- Frenkel and Schottky defects- Electronic defects-Energy foramation of a vacancy- Number of vacancies at any temperature in elemental solids- equilibrium concentration of Schottky defects in ionic crystals- equilibrium concentration of Frenkel defects in ionic crystals- Line defects- edge dislocation-Burgers vector- screw dislocation- Surface Defects- stacking faults – Twin boundary- Volume Defects- Effect of Crystal Imperfections.

# **Books for study**

- 1. Introduction to elementary particles by David J Griffiths, Wiley, 2008.
- 2. Technique for Nuclear and Particle Physics experiments by William R Leo, Springer, 1994.
- 3. Modern Physics by R. Murugaeshan. S.ChandPublication,2010
- 4. Solid state Physics- P. K. Palanisamy, Scitech Publications

# **Books for Reference**

- 1. Nuclear and Particle Physics S.L. Kakani and subra kakani
- 2. Introduction to Solid state physics, 8<sup>th</sup> ed. Charles Kittel

Course	Outcomes
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СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Describe the basics of particle interactions and features and types of fundamental particles.	1, 2 , 4	Remembering
CO-2	Illustrate the construction and working of various particle accelerators and colliders	2, 4, 5	Understanding
CO-3	Explain the basic concepts of crystal structures	2,4	Understanding
CO-4	Apply the basic concepts of crystallography to analyze the various x-ray diffraction techniques	2,4	Applying
CO-5	Illustrate the different types of crystal defects and imperfections	4,5	Analyzing

Semester	Cour	se Code		Title of the Course				Hours	Cr	edits
v	V 21UI			PARTICLE PHYSICS AN ELEMENTS OF CRYSTALLOGRAPHY				60		4
Course Outcomes	Prog	ramme l	Learnin (PLOs)	g Outco	omes	Programme Specific Outcome (PSOs)			omes	
(COS)	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	~	✓	✓	~	~	~	√		~	
CO-2	~	✓	√		~		√		√	~
CO-3	~	$\checkmark$	$\checkmark$				$\checkmark$		$\checkmark$	
CO-4	~	$\checkmark$	$\checkmark$				$\checkmark$		~	
CO-5	~	$\checkmark$	$\checkmark$		$\checkmark$				$\checkmark$	✓
	Number of matches ( $\checkmark$ ) = 31									
	Relationship = Medium									

#### SEMESTER- VI

Course Title	QUANTUM MECHANICS AND RELATIVITY
Total Hrs.	60
Hrs./Week	4
Course Code	21UCPH61
Course Type	DSC-X
Credits	4
Marks	100

#### Objectives

To understand the salient features of Quantum mechanics and relativity and to give an insight to the applications of Quantum mechanics to bound state problems.

#### **Course Objectives:**

CO	The learners will be able to:					
CO-1	Discuss the concepts of matter waves, wave function and					
	Heisenberg's uncertainty principle,					
CO-2	Solve the Schrodinger's time-dependent and time-independent wave equations applying the fundamental postulates of Quantum mechanics.					
CO-3	Deduce the various the various Quantum mechanical operators and evaluate the eigen values and eigen functions of quantum mechanical systems.					
CO-4	Explain the Schrodinger's equations for Bound state problems and evaluate the eigen values and eigen functions.					
CO-5	Estimate the time dilation, length contraction, Doppler effect, Twin paradox, mass-energy relation and variation of mass with velocity applying the Special theory of relativity.					

### **UNIT I Wave Mechanics**

Inadequacy of classical mechanics – black body radiation – Matter waves (De Broglie waves)- Expression for wave length – Davison and Germer Experiment – G.P Thomson Experiment – Wave packet and its motion – relation between group velocity and wave velocity – Heisenberg's uncertainty principle –proof – applications.

# UNIT II General formalism of QM

Wave function and its interpretation – Normalization of the wave function – symmetric and asymmetric wave functions – probability current density –

stationary states – fundamental postulates of quantum mechanics - Schrodinger's time – independent wave equation – Schrodinger's time – dependent wave equation.

# UNIT III Operators and their properties

Linear operators – identity operator – Hermition operator – Ladder operator – Laplacian operator – momentum operator – K.E operator – Hamiltonian operator – eigen values and eigen functions of operators – uncertainty principle using operators – orbital angular momentum operator.

# UNIT IV Bound state Problems

Particle in a one dimensional box – normalization of wave function – particle in a three dimensional box – degeneracy – rigid rotator – linear harmonic oscillator-Hydrogen atom.

# UNIT V Relativity

General theory of relativity- Special theory of Relativity –Lorentz transformations –addition of velocities - Time dilation - Doppler effect - Length contraction - Twin paradox - Relativity of mass –Einstein's Mass Energy relation -Mass less particles-.

### **Books for Study:**

- 1. Quantum mechanics Gupta, Kumar and Sharma Jai Prakash Nath & Co., Meerut (25<sup>th</sup> ed., 2018).
- 2. Concepts of Modern Physics, Arthur Beiser, Tata McGraw Hill (7th edition, 2017).
- Modern Physics R.Murugesan and Kiruthiga Sivaprasath S.Chand & Co., New Delhi (17<sup>th</sup> Revised Edition, 2014).

### **Books for Reference:**

- 1. Quantum Mechanics Mathews and Venkatesen, Second Edition, Tata Mc Graw Hill Educ. Pvt. Ltd., New Delhi.
- Quantum Mechanics Statistical Mechanics & Solid State Physics S.P.Kuila, First Edition, Books and Allied (P) Ltd. Kolkata.
- 3. Modern Physics A.B.Gupta, Books and Allied Pvt.Ltd., (First ed., 2006)

# **Course Outcomes**

CO No.	Upon completion of this course, the students will be able to:	PSO addressed	Cognitive level
CO-1	Discuss the concepts of matter waves, wave function and Heisenberg's uncertainty principle,	2,4,5	Understanding
CO-2	Solve the Schrodinger's time-dependent and time-independent wave equations applying the fundamental postulates of Quantum mechanics.	1,2,4	Applying
CO-3	Deduce the various the various Quantum mechanical operators and evaluate the eigen values and eigen functions of quantum mechanical systems.	2,4,5	Analyzing
CO-4	Explain the Schrodinger's equations for Bound state problems and evaluate the eigen values and eigen functions.	1,2,5	Evaluating
CO-5	Evaluate the time dilation, length contraction, Doppler effect, Twin paradox, mass-energy relation and variation of mass with velocity applying the Special theory of relativity.	1,2,3	Evaluating

Semester	Cou	Course Code		Title	Hours	5 C1	edits			
v	21	21UCPH61			QUANTUM MECHANICS & RELATIVITY					4
Course Outcomes (COs)	Programme Learning Outcomes Programm (PLOs)				Programme Learning Outcomes (PLOs) Programme Specific Outcom (PSOs)				omes	
	PLO 1	PLO 2	PLC 3	D PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	√			~		~		~	<ul> <li>✓</li> </ul>
CO-2		√	<b>√</b>	*	~	~	~		~	
CO-3		~	~	/	~		~		~	~
CO-4	~	√	~	/		~	~			~
CO-5	~	✓	-			~	~	~		
	Number of matches (✓) = 30									
	Relationship = Medium									

# SEMESTER - VI

Course Title	DIGITAL ELECTRONICS
Total Hrs.	60
Hrs./Week	4
Course Code	21UCPH62
Course Type	DSC-XI
Credits	4
Marks	100

#### **General Objective:**

To understand the number system, Boolean algebra, combinational and sequential circuits, counters, shift registers, A/D & D/A Conversion and to design the circuits.

#### **Course Objectives:**

CO	The learners will be able to:
	understand and apply the various number conversion techniques in
CO-1	number systems, codes and Boolean algebra and apply Boolean algebra to
	simplify the Boolean equations using Karnaugh map.
CO-2	acquire the knowledge about combinational and data processing circuits.
CO 2	Study the basic concepts and applications of IC 555 and functioning of
0-3	different flip flops.
CO-4	Design the counter and registers.
CO-5	understand and apply the logics to design the A/D and D/A converters

### UNIT I ELEMENTARY DIGITAL CONCEPTS AND BOOLEARN ALGEBRA

Decimal, Binary, Octal, Hexadecimal numbers – conversion from one to another – ASCII code, Excess 3 code, BCD, Gray code – binary addition – subtraction, unsigned binary numbers, overflow, signed magnitude numbers, 2's compliment method – Basic logic gates OR, AND, NOT(realization using Diodes and Transistor), NAND and NOR as universal gates – Demorgan's laws-Boolean laws and theorems-sum of product method-concept of Minterm and Maxterm-Karnaugh map – truth table to Karnaugh map (upto 4 variables)- Pairs, Quads and Octets– Don't care conditions.

#### UNIT II COMBINATIONAL LOGIC AND DATA PROCESSING CIRCUITS

Half adder, full adder, half subtractor, full subtractor. Multiplexers – demultiplexers – Decoder – BCD to decimal decoder – seven segment decoders – encoders – decimal to BCD encoder – parity generators – checkers- ROM.

# UNIT III IC 555 AND SEQUENTIAL CIRUCIT

Introduction to 555 timer – astable multivibrator – monostable multivibrator – Bistable multivibrator –flip flops – RS flip flop – implementation of RS flip flop using NOR, NAND gates – clock pulses – clocked RS, D flip flop - JK flip flop – JK master – slave flip flop – T flip flop.

# UNIT IV REGISTERS AND COUNTERS

Types of registers – Serial In – Serial Out, Serial in - Parallel out, Parallel in – Serial out, Parallel in - Parallel out, Applications of Shift registers - Ring counters – Asynchronous counters – Decoding gates- synchronous counters – up – down counters (Bi direction counters) – MOD counters – Decade Counters.

# UNIT V D/A, A/D Conversion and Memory Devices

D/A converter – variable resistor network & binary R – 2R ladder type – D/A Accuracy and resolution A/D converter – Simultaneous conversion- Counter method- Continuous A/D conversion- A/D techniques-Dual slope A/D conversion A/D Accuracy and resolution Basic memory structure – ROM -PROM – EPROM – EEPROM – EAPROM, RAM – Static and dynamic RAM – Programmable Logic Devices – Programmable Logic Array (PLA).

# **Books for Study**

- 1. Digital principles Donald P. Leach, A.P. Malvino& Goutam Saha Tata McGraw Hill Education Private Ltd., New Delhi (2015).
- Digital Fundamentals -Thomas L. Floyd, Pearson Education Inc, New Delhi, (8th ed., 2003).

### **Books for Reference:**

- Digital Design M. Morris Mano, 3rd Edition, Prentice Hall of India Pvt. Ltd., (3<sup>rd</sup> ed., 2003). / Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.
- 2. Modern Digital Electronics R.P.Jain, 4thEdition,2010,Tata McGraw Hill Publishing Company Ltd., New Delhi
- 3. S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, 3<sup>rd</sup> Edition, Vikas Publishing House Pvt. Ltd, New Delhi, 2006.
- 4. Basic Electronics: A text lab manual, P.B.Zbar, A.P.Malvino, M.A.Miller, 1994, Mc-GrawHill

# **Course Outcomes**

CO	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Identify and apply the various number conversion techniques in number systems, codes and to solve Boolean equations using Karnaugh map.	1,2,3,4	Understanding, Applying
CO-2	Design the various arithmetic, combinational and sequential circuits in digital electronics	1,2,3,4	Understanding, Applying
CO-3	Classify the different types of flip- flops based on its functioning.	1,2,4	Understanding,
CO-4	Apply the knowledge of sequential logic circuits to design the shift registers and counter	1,2,4,5	Understanding, Applying
CO-5	Design the A/D and D/A converters.	1, 4,5	Understanding, Applying

le of the Course Hours Credits	Course Code Title of the Cor				Semester	
AL ELECTRONICS 60 4	AL ELE	DIGITA	2	JCPH6	210	VI
ing Programme Specific	e Learnin	mme	Program	I	Course	
s) Outcomes (PSOs)	s)	s (PLOs)	omes	Outc		Outcom
O PLO PSO PSO PSO PSO PSO	) PLO	O PLO	PLC	PLO	PLO	es (COs)
5 1 2 3 4 5	5	<b>4</b>	3	2	1	
		· 🗸	$\checkmark$	$\checkmark$	$\checkmark$	CO-1
$\checkmark \qquad \checkmark \qquad \qquad \qquad \qquad \qquad$		· 🗸	$\checkmark$	$\checkmark$	$\checkmark$	CO-2
$\checkmark$ $\checkmark$		$\checkmark$		$\checkmark$	$\checkmark$	CO-3
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	CO-4
✓         ✓         ✓	$\checkmark$	$\checkmark$			$\checkmark$	CO-5
ber of matches ( $\checkmark$ ) = 34						
elationship = Medium						
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	ber of ma	✓ ✓ ✓ Numbe Rela				CO-3 CO-4 CO-5

### **SEMESTER - VI**

Course Title	SOLID STATE PHYSICS
Total Hrs.	60
Hrs./Week	4
Course Code	21UCPH63
Course Type	DSC-XII
Credits	4
Marks	100

#### General Objectives:

- To acquire the knowledge about the structures and diffraction of crystals and to study the imperfections in it.
- > To understand the dielctric, magnetic properties of matter and super conductivity phenomena.

#### **Course Objectives:**

СО	The learners will be able to:						
CO-1	Understand the basic knowledge of crystal structures and crystal systems.						
CO-2	Determine the band theory of solids						
CO-3	Explain the properties of dielectric materials						
CO-4	Differentiate the behaviour of Magnetic properties and its applications.						
CO-5	Investigate the superconductivity properties and its application.						

### UNIT I : CRYSTAL STRUCTURE AND CRYSTAL DIFFRACTION

Amorphous and Crystalline Materials -Crystal lattice - Unit cell and lattice parameters – Crystal systems – Bravais lattice –Structure of Crystal (Simple Cubic, Body Centered Cubic, Face Centered Cubic and Hexagonal Close Packed structure)- Other cubic structures (Diamond structure, Zinc blende structure, Sodium chloride structure and Caesium Chloride structure) -Directions, Planes and Miller indices- Crystal Diffraction–Bragg'slaw-Experimental methods-Laue method, powder method and rotating crystal method.

# UNIT II: ELEMENTARYBANDTHEORY:

Band theory of solids –classification of insulators, Semiconductors,conductors – intrinsic and extrinsic semiconductor – Carrier concentration forelectron–Mobility and conductivity in semiconductors - Hall Effect, Hall coefficient-Semiconductors of Recent Research Importance.

### **UNIT III : DIELECTRIC PROPERTIES**

Basic definitions - different types of electric polarization - frequency and temperature effects on polarization - dielectric loss – Local field - Claussius-Mosotti relation - determination of dielectric constant - dielectric breakdown - properties of dielectric materials- Ferroelectric materials.

#### **UNIT IV : MAGNETIC PROPERTIES**

Basic definitions - types of magnetic materials –Langevin's theory of diamagnetism - Langevin's theory of paramagnetism - Weiss theory of paramagnetism - quantum theory of ferromagnetism – Curie-Weiss law- Ferromagnetic domains- Explanations of hysteresis- Antiferromagnetic materials- ferrimagnetic materials.

#### UNIT V :SUPERCONDUCTIVITY

Properties of Super conductors (Critical Temperature, Critical magnetic field, Isotope effect, Meissner effect) -Type I and type II Superconductors - BCS theory -London's Equation and Penetration Depth- a c and d c Josephson effect- super conducting materials- Applications of super conducting materials.

### **Books for Study:**

- Solid State Physics, S.O.Pillai, New Age International publishers pvt ltd., (8<sup>th</sup> ed., 2018)
- 2. Solid State Physics, K.Elangovan, S.Viswanathan publishers pvt. ltd., (1<sup>st</sup> ed., 2009).
- 3. Solid State Physics, Rita John,2014, McGrawHill Education (India) Private Ltd. (second reprint 2019)

### **Books for Reference:**

- 1. Introduction to Solid State Physics, Charles Kittel, Wiley India Pvt. Ltd., (8th ed., 2019)
- 2. Solid State Physics, M.A. Wahab, Narosa Publications, (3rd ed., 2015)
- 3. Introduction to Solids, Leonid V.Azaroff, 2017, TataMc-GrawHill
- 4. Solid State Physics, N.W.Ashcroft and N.D.Mermin, 2003, Cengage Learning
- 5. Solid-state Physics, H. Ibachand H.Luth, 2009, Springer
- 6. Elementary Solid State Physics, 1/eM.AliOmar, 1999, Pearson India

#### **Course Outcomes**

СО	Course Outcomes Upon completion of the	PSOs	Cognitive
	course, the students will be able to:	Addressed	Level
CO-1	Describe the different crystal systems	2,4	Understanding
CO-2	Examine the behavior of electrons in solids including the concept of energy bands	3,4	Applying
CO-3	Explain the dielectric properties of solids	3,4	Analyzing
CO-4	Differentiate Quantum theory of diamagnetism and para magnetism.	1,5	Analyzing
CO-5	Summarize the properties and applications of superconducting materials	4,5	Evaluating

Semester	Cou	ırse Code	•	Title o	of the C	ourse	Ho	ours	Cred	its
VI	21UCPH63			SOL	ID STA	TE	e	50	4	
				P	HYSICS	S				
Course	Pro	gramme 1	Learnir	ng Outco	mes	Prog	gramme	Specif	ic Outco	omes
Outcomes			(PLOs)					(PSOs)		
(COs)	PLO	PLO 2	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1		3	4	5	1	2	3	4	5
CO-1	$\checkmark$	$\checkmark$	~	~	~		$\checkmark$		✓	
CO-2	$\checkmark$	~	$\checkmark$	~	$\checkmark$			~	✓	
CO-3	$\checkmark$	~	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	~	
CO-4		$\checkmark$	$\checkmark$	~	$\checkmark$	$\checkmark$				~
CO-5	~	$\checkmark$	~		~				✓	~
	Number of matches ( $\checkmark$ ) = 33									
	Relationship = Medium									

### SEMESTER- VI

Course Title	PHYSICS PRACTICALS- VII
Total Hrs.	60
Hrs./Week	4
Course Code	21UCPH6P1
Course Type	Practicals-VII
Credits	2
Marks	100/2

# **General Objective:**

To perform experiments related to Optics, Magnetism, Bridge circuits by applying the skills of observation

#### **Course Objectives:**

СО	Course Objectives
	Illustrate the i-i' curve for various incident angles besides
CO-1	understanding the experimental method to estimate Hartmann's
	constants.
	Study the Elliptical fringes formed using a lens and stressed glass
CO-2	plate apart from understanding the diffraction of laser light through
	single slit.
CO 2	Construct the circuit to study self inductance of a coil and observe
0-3	the High Resistance for various leakage times
CO 4	Examine the nature of Optical fibers and measure the value of
0-4	capacitance using the Desauty's Bridge.
CO-5	Plot the curve between Magnetisation and Magnetic field for a
	ferromagnetic material

- 1. Determination of Hartmann's constants.
- 2. Determination of refractive index i i' curve.
- 3. Elliptical fringes- Young's Modulus.
- 4. To determine the wavelength of Laser light using Diffraction of Single Slit.
- 5. BG- Determination of a high resistance by Leakage Method
- 6. BG- To determine the Self Inductance of a Coil by Rayleigh's Method.
- 7. Optical fibre characteristics
- 8. B-H hysteresis-CRO.
- 9. Desauty bridge Determination of capacitance.
- 10. To determine the electrochemical equivalent gases.

# **Books for Reference:**

1. Practical Physics, C.C. Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan (Printers & Publishers) Pvt. Ltd., (2009).

2. Practical Physics, P. R. Sasi Kumar, PHI. (2011)

3. Advanced Practical Physics ,S. P. Singh, Pragathi Prakasam (2019).

4.A Text book of Practical Physics, Indu Prakash and Ram Krishna, Kitab Mahal (2011).

5. 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	Determine the Hartmann's constant	1,3,4	Applying
	using spectrometer and find refractive		
CO-2	Calculate the Young's Modulus value by forming Elliptical fringes and determine the wavelength of Laser light using diffraction.	2,3,5	Analyzing
CO-3	Estimate Self inducatance of the coil using Rayleigh' method and deduce the High Resistance value by leakage method.	3,4,5	Analyzing
CO-4	Test the Characteristics of the Optical Fibre and evaluate the value of capacitance	3,4,5	Evaluating
CO-5	Formulate B-H Curve for the specimen using CRO	1,2,3,5	Creating

Semester	Cours	se Code	•	Title of the Course				Hours	cr	edits
VI	21UC	PH6P1	PH	IYSICS	PRACT	ICALS-	VII	60		2
Course	Progr	amme	Learnir	ng Outo	comes	Prog	ramme	Specifi	c Outc	omes
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	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	✓		$\checkmark$	$\checkmark$	
CO-2	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$		$\checkmark$
CO-3	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$	$\checkmark$
CO-4	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$	√
CO-5	✓	$\checkmark$	$\checkmark$	<ul> <li>✓</li> </ul>	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$
	Number of matches $(\checkmark) = 41$									
	Relationship = $High$									
						r	-0			

#### SEMESTER- VI

Course Title	PHYSICS PRACTICALS- VIII
Total Hrs.	60
Hrs./Week	4
Course Code	21UCPH6P2
Course Type	Practicals-VII
Credits	2
Marks	100/2

# **General Objective:**

To construct electronic circuits and study the characteristics.

#### **Course Objectives:**

СО	The learners will be able to:
CO-1	Study the characteristics of Op-amp, Light Emitting Diode and Light Dependent Resistance.
CO-2	Construct an emitter follower, Hartley oscillator, monostable multivibrator and Wein Bridge oscillator.
CO-3	Construct and study the response of a Single stage amplifier –with feedback
CO-4	Construct a Dual power supply and using it construct a differentiator and integrator using Op-amp
CO-5	Design AND, OR, NOT and XOR gates using NAND and NOR gates and verify their truth tables.

- 1) Emitter follower
- 2) Characteristics of Op-amp
- 3) To study the characteristics of Light Emitting Diode
- 4) To study the characteristics of Light Dependent Resistance.
- 5) To construct and study the response of a Single stage amplifier –with feedback
- 6) Hartley oscillator
- 7) To design a monostable multivibrator of given specifications using 555 Timer.
- 8) Wien's bridge oscillator Op amp

9) Construct a dual power supply and using it construct Differentiator & integrator using Op – amp

10) To verify and design AND, OR, NOT and XOR gates using NAND and NOR gate

# **Books for Reference:**

1.Basic Electronics: A text lab manual, P.B. Zbar, A.P. Malvino, M.A. Miller, 2001, Mc-Graw Hill.

2. Electronics: Fundamentals and Applications, J.D. Ryder, 2004, Prentice Hall.

3.OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, 4th edition, 2016, Prentice Hall.

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Analyze the characteristics of Op-amp, Light Emitting Diode and Light Dependent Resistance.	3,4,5	Analyzing
CO-2	Construct an emitter follower, Hartley oscillator, monostable multivibrator and Wein Bridge oscillator.	3,4,5	Creating
CO-3	Construct and study the response of a Single stage amplifier –with feedback	3,4,5	Creating
CO-4	Construct a Dual power supply and using it construct a differentiator and integrator using Op-amp	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

### **Course Outcomes**

Semester	Cour	ourse Code Title of the Course Hours Cr					s Cr	edits		
VI	21U0	CPH6P2	PH	PHYSICS PRACTICALS- VIII 60 2					2	
Course	Prog	ramme	Learnir	arning Outcomes   Programme Specific Outcomes					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 of matches $(\checkmark) = 40$									
	Relationship = High									
				101		-p 111	D			

#### **SEMESTER- VI**

Course Title	COMMUNICATION SYSTEMS
Total Hrs.	60
Hrs./Week	4
Course Code	21UEPH61A
Course Type	DSE-III-A
Credits	4
Marks	100

#### **General Objective:**

To acquire the knowledge about the different types of modulation like AM, FM and PM and to know they are applied in the fields of digital, broadband and fibre optic communications.

#### **Course Objectives:**

CO	The learners will be able to:
CO 1	Differentiate various frequency allocations for communications and link
00-1	them with related applications
CO 2	Understand the basic concepts of analog and digital modulation and
0-2	interpret their relevance in telecommunications
CO-3	Discuss the basics of satellite communications and radar Fundamentals
CO-4	Correlate different technologies involved in mobile communications
CO 5	Categorize fibres based on their characteristics and attenuation
00-5	properties

### UNIT I Electronic communication:

Introduction to communication – means and modes. Need for modulation. Block diagram of an electronic communication system- Brief idea of frequency allocation for radio communication system in India (TRAI)- Electromagnetic communication spectrum, band designations and usage-Channels and base-bandsignals. Superheterodyne receiver.

### UNIT II Modulation (Analog & Digital)

Amplitude Modulation, modulation index and frequency spectrum - Frequency Modulation (FM) and Phase Modulation (PM), modulation index and frequency spectrum - PAM, PWM modulation and detection techniques, Multiplexing (FDM only)- Need for digital transmission, Pulse Code Modulation, Digital Carrier Modulation Techniques. MODEM (Need & Functioning).

# UNIT III Radars & Satellite Communication

Radar system – Radar performance factors – Doppler effect and its application to Radar – CW radar system - Introduction, need of Geosynchronous satellite orbits, geostationary satellites & their advantages - Satellite visibility, transponders (C - Band), path loss, ground station, simplified block diagram of earth station.-Uplink and down link. Role of Indian satellites in communications.

# UNIT IV Mobile Telephony System

Basic concept of mobile communication, frequency bands used in mobile communication, concept of cell sectoring and cell splitting, SIM number, IMEI number, need for data encryption, architecture (block diagram) of mobile communication network, idea of GSM, CDMA, TDMA and FDMA technologiessimplified block diagram of mobile phone handset, 2G, 3G and 4G concepts (qualitative only)-GPS navigation system (qualitativeideaonly)

# **UNIT V Optical Communication**

Optical fibre –Basic Principle (TIR & Conditions) - Acceptance angle – Numerical aperture – characteristics of optical fibre and advantages – fibre cables & losses – Fiber optic components and systems – source (LED & Laser diode) – detector (PIN diode & APD) –Optical link – fibre testing – fusion splicing – mechanical splicing – optical connectors – optical communication receiver.

# Books for study

1. Principles of Communication - K.S. Srinivasan — Anuradha Publications (Revised edition, 2010).

2. Communication Electronics - Louis E. Frenzel, TMH, New Delhi (2017).

3.Principles of communication systems - Taub & Schilling, TMH, New Delhi (2017).

4.Principle of communication – K.Murali Babu & K.VinothBabu, Lakshmi Publications.

5.Modern Electronic Communication – Jeffrey S.Beasley, Gary M.Miller, PHI Pvt. Ltd., New Delhi (2007).

6.Optical Fibre communication – Gerd Keisser.5<sup>th</sup> edition, McGraw Hill, Singapore (2017).

# **Books for Reference**

1.Electronic Communications, D. Roddy and J. Coolen, Pearson EducationIndia (4<sup>th</sup> edition 2008).

2.Advanced Electronics Communication Systems- Tomasi, 6<sup>th</sup> edition, PrenticeHall (2015).

3.Modern Digital and Analog Communication Systems, B.P. Lathi, 4<sup>th</sup>Edition, 2011, Oxford UniversityPress.

4.Electronic Communication systems, G. Kennedy, 3<sup>rd</sup>Edn., 1999, Tata McGrawHill.

5.Principles of Electronic communication systems – Frenzel, 3rd edition, McGrawHill

6.Communication Systems, S. Haykin, 2006, WileyIndia

7.Electronic Communication system, Blake, Cengage, 5thedition.

8. Wireless communications, Andrea Goldsmith, 2015, Cambridge UniversityPress

# **Course Outcomes**

CO	Upon completion of the course, the	PSOs	Cognitive
	students will be able to:	Addressed	Level
CO-1	Classify the different bands used for	1 & 4	Understanding
	communications		
CO-2	Explain the basic concepts of AM & FM	1 & 2	Applying
	techniques		
CO-3	Illustrate the communication process	2 & 4	Applying
	through satellites & radars		
CO-4	Differenciate 2G, 3G & 4G mobile	4 & 5	Analyzing
	communications		
CO-5	Compare the fibre cables with copper	1 & 3	Evaluating
	wires and design a fibre optic		
	communication system		

Semester	Cou	irse Cod	e	Title of the Course Hours Cred			edits			
VI	210	JEPH61A	A	COMMUNICATION SYSTEMS				60 4		
Course Outcomes	Prog	ramme l	Learnin (PLOs)	g Outco	omes	Prog	ramme	Specifi (PSOs)	c Outc	omes
(COs)	PLO	PLO 2	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1		3	4	5	1	2	3	4	5
CO-1	✓	✓		✓	~	✓			~	
CO-2	~	~	~	~	~	~	$\checkmark$			
CO-3	~	~	~				~		√	
CO-4	~	~	~		~				~	~
CO-5		✓	$\checkmark$	✓	~	✓		✓		
		Number of matches ( $\checkmark$ ) =30								
				Relat	ionship	= Med	ium			

#### SEMESTER- VI

Course Title	OPTO ELECTRONICS
Total Hrs.	60
Hrs./Week	4
Course Code	21UEPH61B
Course Type	DSE-IIIB
Credits	4
Marks	100

#### **General Objective:**

To give an introductory account of the basic principles of Optoelectronic devices

#### **Course Objectives:**

CO	The learners will be able to:
CO 1	Discuss the overview of communications signals transmitted over optical
00-1	fibers and optical fiber communication devices.
CO-2	Explain the different types of losses and couplers and its function
CO-3	Classify the different types of fibre
CO-4	Justify the need for modulation with AM techniques in detail
CO-5	Design the various optoelectronic integrated circuits

### **Unit 1: Source and Detectors**

PN junction as a light source –LED materials – LED structure –Characteristics and action of LCD- Photo detector- characteristics of photo detectors– PN junction photo detector– PIN photo diode- Avalanche photo diode

#### **Unit 2: Fiber Optic Communication**

Introduction – principle of optical fibre – light transmission in a optical fibre – Acceptance angle – Numerical aperture- Fibre index profiles – Step index, graded fibre (transmission of signals) – Advantages of fibre optic communications, optical switching

#### Unit 3: Losses in optical fiber

Absorption –Material absorption losses –Extrinsic , Intrinsic loss – Absorption loss due to atomic defects – Scattering losses – Rayleigh , Mie , Nonlinear scattering loss – Fiber bend losses.

#### **Unit 4: Optoelectronic modulator**

Introduction- Analog and Digital Modulation- Electro-optic modulators, Magneto Optic Devices- Acoustoptic devices, Optical, Switching and Logic Devices.

### **Unit 5: Opto electronic Integrated circuits**

Introduction –Planar slab wave guide –Monolithic and hybrid integration – Applications of optoelectronic ICS- Beam splitter – Electro optic switch - Bragg

diffraction filter – Polarization controller Hybrid optical transmitter and Receiver-Monolithic integrated coherent optical receiver.

# Book for study:

1. Semiconductor physics and Optoelectronics – P. K. Palanisamy, SCITECH Publication, Chennai 2010.

2. Optical fibres and Fibre Optic Communication – Sabir Kumar Sarkar Revised Edition 2007.

3. Optoelectronic devices and circuits –Theory and applications – Amar .K. Ganguly –Narosa publications -2007.

# **Book for reference:**

1. Opto Electronics - Wilson & Hawker, Prentice Hall of India (1997)

2. Opto electronic devices and systems S.C Gupta –Second Edition -2015

# **Course Outcomes**

СО	Upon completion of the course, the	PSOs	Cognitive
	students will be able to:	Addressed	Level
CO-1	Explain the transmission of communications signals through optical fibers	4,5	Understanding
CO-2	Illustrate the different types of losses and understand the couplers and its function	4,5	Applying
CO-3	Distinguish the different types of fibre	4,5	Analyzing
CO-4	Summarize the need for modulation with AM techniques in detail	4	Evaluating
CO-5	Construct the various optoelectronic integrated circuits	4,5	Creating

Semester	Course Code Title of the Cour			ourse	H	ours	Cree	dits		
VI	210	JEPH61H	3	OPTO ELECTRONICS 60 4			ŀ			
Course Outcomes	Programme Learning Outcomes (PLOs)				ning Outcomes Programme Specific Outcome Os) (PSOs)				omes	
(COs)	PLO	PLO 2	PLO	PLO	PLO	PSO	PSO	PSO	PSO	PSO
	1		3	4	5	1	2	3	4	5
CO-1	<ul> <li>✓</li> </ul>	$\checkmark$	$\checkmark$		$\checkmark$				✓	$\checkmark$
CO-2	<ul><li>✓</li></ul>	$\checkmark$	$\checkmark$		$\checkmark$				✓	$\checkmark$
CO-3	√	$\checkmark$	$\checkmark$		$\checkmark$				✓	$\checkmark$
CO-4	$\checkmark$	$\checkmark$							$\checkmark$	
CO-5	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$				$\checkmark$	$\checkmark$
		Number of matches $(\checkmark) = 27$								
				Relat	lonsnip	o = mea	ium			

#### SEMESTER- VI

Course Title	MICROPROCESSOR AND PROGRAMMING
Total Hrs.	60
Hrs./Week	4
Course Code	21UEPH61C
Course Type	DSE-IIIC
Credits	4
Marks	100

#### **General Objective:**

To understand the architecture of microprocessor8085 to perform Assembly language programs and understand its interfacing.

#### **Course Objectives:**

СО	The learners will be able to:								
CO-1	Enumerate the configuration and features of 8- bit microprocessor								
CO-2	Identify the addressing modes and instruction sets of 8085 microprocessor								
CO-3	Sketch the architecture of 8085 microcontroller								
CO-4	Write assembly language programs in basic mathematical operators								
CO-5	Illustrate the scheme of interfacing								

### UNIT I

Functional block diagram of a micro computer – Development of microprocessor – Pin configuration of amicroprocessor of 8085 – Power supply – Address bus – Multiplexed address/data bus – control and status signals – interrupt signals – clock signals – handshake signals – reset signals.

### UNIT II

Architecture of microprocessor 8085 – word length – registers – ALU – Accumulator – Stack pointer – program counter – Instruction register – Instruction decoder & machine cycle encoder – timing and control unit – Flags – PSW – internal data bus – Instruction format – Mnemonics – Classification of instructions of 8085 based on their length with examples.

# UNIT III

Addressing modes of 8085 – Instruction set of 8085 - Classification of instruction set of 8085 based on their operations with examples – Data transfer operations - Arithmetic operations – Logical operations –Branching operations – Machine control operations.

# UNIT IV

Assembly language programs: Transferring a block of data – 8 bit addition – 8 bit subtraction – 8 bit multiplication – 8 bit division –Square root of a number.

# UNIT V

Interfacing: Interfacing memory to 8085 – interfacing 2k X8 ROM and RAM, Timing diagram of 8085- interfacing input and output port to8085 – Programmable peripheral interface-8255.

# Books for study:

1. Microprocessor Architecture, Programming and Applications with the 8085 – Ramesh Goankar, Penram International Publishing, (6<sup>th</sup> edition, 2013).

2. Fundamentals of Microprocessor and Microcontrollers-B.Ram, Dhanpat Rai Publications (2021).

# **Books for Reference:**

1. Introduction to Microprocessor –Aditya P.Mathur, Mc Graw Hill<br/>  $3^{\rm rd}$ edition – Jul 2017.

2.Fundamentals of Microprocessor 8085 – Architecture Programming and Interfacing – V.Vijayendran, S.Viswanathan Printers & Publishers Pvt Ltd(2009).

### **Course Outcomes**

СО	Upon completion of the course, the students will be able to:	PSOs Addressed	Cognitive Level
CO-1	Recognize the configuration and features of 8- bit microprocessor.	1,4	Remembering
CO-2	Discuss the addressing modes and instruction sets of 8085 microprocessor.	1,4,5	Understanding
CO-3	Explain the architecture of 8085 microcontroller.	1,4	Applying
CO-4	Examine assembly language programs for basic mathematical operations	3,5	Applying
CO-5	Analyze the scheme of interfacing	1,4	Analyzing

Semester	Cour	se Code	1	litle of	the Co		Hours	Cre	dits	
VI	21UI	EPH61C	MIC	ROPR	OCESS	OR AN	D	60		4
				PROG	RAMM	ING				
Course	Prog	ramme L	earnin	g Outc	omes		Prog	ramme S	Specific	;
Outcomes		(	PLOs)				Ou	tcomes (	PSOs)	
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSC	) PSO	PSO	PSO
	1	2	3	4	5	1	2	3	4	5
CO-1	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	
CO-2	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$
CO-3	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	
CO-4		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$		$\checkmark$
CO-5	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$			✓	
		Number of matches ( $\checkmark$ ) = 32								
		Relationship Medium								

	SEMESIER - VI				
Course Title	PROJECT				
Total Hrs.	60				
Hrs./Week	4+4*				
Course Code	21UEPH61				
Course Type	DSE-IV				
Credits	6				
Marks	100				

# **SEMESTER - VI**

# **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
Methodology / Techniques / Procedures adopted	15	15
Summary / Findings / Summation	10	10
Works Cited / Work Consulted / References / Annexures / Footnotes	10	10
Relevance of project to social needs	5	5
	60	60

#### **SEMESTER- VI**

Course Title	RADIATION SAFETY
Total Hrs.	30
Hrs./Week	2
Course Code	21USPH61
Course Type	SEC-V
Credits	2
Marks	100

**General Objective:** 

To familiarize themselves with the awareness and understanding of radiation hazards and safety.

#### **Course Objectives:**

CO	The learners will be able to:
CO 1	Describe the production of X-rays and understand the various
00-1	radioactive emissions
CO-2	Identify different units & doses of radioactivity
00.2	Illustrate the basic concepts of radiation detection and working
0-3	principles of various detectors
CO 4	Classify the standard protection and safety norms in radioactive wastes
0.0-4	inclusive of nuclear waste
CO-5	Distinguish nuclear techniques involved in MRI, PET, PIGC & RT

### **UNIT I Basics of Atomic and Nuclear Physics:**

Basic concept of atomic structure; X rays – Production and characteristics, concept of bremsstrahlung and auger electron- Compton scattering theory -The composition of nucleus, Unstable elements and radioactive emissions – various radioactive sources, Radiation Quantities and their units

### **UNIT IIRadiation monitoring devices :**

Basic idea of different units of activity, KERMA, exposure, absorbed dose, equivalent dose, effective dose, collective equivalent dose, Annual Limit of Intake (ALI) and derived Air Concentration (DAC).

### UNIT III Radiation detection:

Basic concept and working principle of gas detectors (Ionization Chambers, Proportional Counter, Multi-Wire Proportional Counters (MWPC) and Gieger Muller Counter), Scintillation Detectors (Inorganic and Organic Scintillators), Solid States Detectors and Neutron Detectors, Thermo luminescentDosimetry.

### UNIT IV Radiation safety management:

Radiation protection standards, International Commission on Radiological Protection (ICRP) principles, justification, optimization, limitation- introduction of safety and risk management of radiation. Nuclear waste and disposal managementManagement of radioactive waste in medical, industrial, agricultural and research establishments.

# UNIT V Application of nuclear techniques:

Application in medical science (e.g., MRI, PET, Projection Imaging Gamma Camera, radiation therapy)- Archaeology, Art, Crime detection, Mining and oil. Industrial Uses: Tracing, Gauging, Material Modification, Sterization, Foodpreservation.

# **Books for Study:**

1. Text Book of radiological Safety – K Thayalan - Jaypee Brothers, Medical Publishers Pvt. Limited (2010).

2. Basic Radiological Physics – Second Edition – Kuppusamy Thayalan - Jaypee Brothers, Medical Publishers Pvt. Limited (2017).

# **Books for Reference:**

- 1. W.E. Burcham and M. Jobes Nuclear and Particle Physics Longman (1995)
- 2. G.F.Knoll, Radiation detection and measurements (4th Edition), Wiley; (2010)
- 3. W.J. Meredith and J.B. Massey, "Fundamental Physics of Radiology". John Wright and Sons, UK, 1989.
- 4. J.R. Greening, "Fundamentals of Radiation Dosimetry", Medical Physics Hand Book Series, No.6, Adam Hilger Ltd., Bristol 1981.
- 5. Practical Applications of Radioactivity and Nuclear Radiations, G.C. Lowental and P.L. Airey, Cambridge University Press, U.K., 2001
- A. Martin and S.A. Harbisor, an Introduction to Radiation Protection, John Willey & Sons, Inc. New York, 1981.
- 7. IAEA Basic safety standards 115, 2006
- 8. AERB Radiation Protection Rules 2004

CO	Upon completion of the course, the students	PSOs	Cognitive
	will be able to:	Addressed	Level
CO-1	Classify different radioactive emissions &	1,2 & 5	Understanding
	sources		
CO-2	Illustrate Annual Limit of Intake (ALI) &	3, 4 & 5	Applying
	Derived Air Concentration (DAC)		
CO-3	Analyze various detections related to IC,	2 & 3	Analyzing
	MWPC, GM, SD & SSD		
CO-4	Explain safety standards in nuclear and	2, 3 & 4	Analyzing
	radioactive wastes in industry, agricultural		
	and other research establishments		
CO-5	Interpret the results of MRI, PIGC & RT in	1 & 5	Evaluating
	medical field and study the techniques		
	involved in various industrial uses.		

# **Course Outcomes**

Semester	Cour	Course Code			of the (	Course		Hours Credits				
VI	21USPH61			RADIA'	tion s	SAFETY	2	30		2		
Course	Programme			earning	g	Pro	gramn		fic Out	comes		
(COs)	PLO	PLO	PLO	PLO	PLO	PSO	PSO	PSO 3	PSO	PSO 5		
	1	2	3	4	5	1	2		4			
CO-1	~	~	~	~	~	~	~			√		
CO-2	~	~	~	~	~			~	~	✓		
CO-3	~	~	~	~			~	~				
CO-4	~	~	~	√	√		~	~	~			
CO-5		~	~	~	~	~				√		
		Number of matches (✓) =36 Relationship = <b>High</b>										

# Allied Papers offered by Deparment of Physics

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

#### SEMESTER- III

#### **General Objective:**

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

#### **Course Objectives:**

СО	The learners 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
0-5	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.
- 4. A Text book of Optics, Brijlal, Subrahmanyam & M.N.Avathanu S.Chand & Co. New Delhi.

5. Fundamental of Physics, D. Halliday, Resnick and J Walker, 10th Edition, Wiley, New York (2001).

6. Sears and Zemansky's University Physics with Modern Physics Technology Update, H. D. Young and R. A. Freedman, 13th Edition, Pearson Education Limited, Edinburgh Gate (2014).

СО	Upon completion of the course, the	PSOs	Cognitive
	students will be able to:	Addressed	Level
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

# **Course Outcomes**

Semester	Course Code			Title of the Course			Hours			Credits	
III	21UAI	PH31		Allied F	hysics	-I		60		4	
Course Outcomes	Progr	amme ]	Learn (PLO:	ing Outc s)	omes	Pr	Programme Specific Outcon (PSOs)				omes
(COs)	PLO	PLO	PLC	D PLO	PLO	PS	60	PSO	PSO	PSO	PSO
	1	2	3	4	5	1	L	2	3	4	5
CO-1	✓	$\checkmark$	~	✓	~	V	/	$\checkmark$			
CO-2	$\checkmark$	$\checkmark$	~	~					~	~	
CO-3	$\checkmark$	$\checkmark$	~					$\checkmark$		~	
CO-4	~	$\checkmark$	✓		~				~	~	
CO-5	~	$\checkmark$	~					~		✓	
				Number	r of mat	che	s (v	() = 29			
				Relat	ionship	) = N	/led	lium			

#### SEMESTER- III

Course Title	ALLIED PHYSICS PRACTICAL-I
Total Hrs.	30
Hrs./Week	2
Course Code	21UAPH3P1
Course Type	Allied Practical-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 learners 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, C.C. Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan (Printers & Publishers) Pvt. Ltd., (2009).

2. Practical Physics, P. R. Sasi Kumar, PHI. (2011)

3. Advanced Practical Physics ,S. P. Singh, Pragathi Prakasam (2019).

4.A Text book of Practical Physics, Indu Prakash and Ram Krishna, Kitab Mahal (2011).

5. Practical Physics – St. Joseph College, Trichy.

# **Course Outcomes**

CO	Upon completion of the course, the	PSOs	Cognitive
	students will be able to:	Addressed	Level
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	Cour	se Code	e	Title of the Course				Hours	Cr	edits
III	21U	APH3P1			ALLIED	)		2		1
			P	HYSICS	SPRAC'	<b>FICALS</b>	3-I			
Course	Progr	Programme Learning Outcomes Programme				ne Specific Outcome				
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	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
CO-3	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
CO-4	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
CO-5	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
			]	Number	r of mat	ches (v	/) = 4	0		
				Rela	ationsh	ip = Hi	gh			

#### **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  $\beta$  – 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 References:**

1.Modern Physics – R.Murugesan and Kiruthiga Sivaprasath - (18th edition) –

S.Chand & Co., New Delhi.

2.Electricity and Magnetism - R.Murugesan - (10th edition) – S.Chand & Co., New Delhi.

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

4. Fundamental of Physics, D. Halliday, Resnick and J Walker, 10th Edition, Wiley, New York (2001).

5. Sears and Zemansky's University Physics with Modern Physics Technology Update, H. D. Young and R. A. Freedman, 13th Edition, Pearson Education Limited, Edinburgh Gate (2014).

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	Course Code		le	Title of the Course			•	Hours		Credits	
IV	21UAPH41			ALLIED PHYSICS II			I	60		4	
Course Outcomes	Prog	Programme Learning Outcom (PLOs)					Programme Specific Outcom (PSOs)				
(000)	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO-1	✓	V	<b>~</b>	<b>~</b>	✓	$\checkmark$	$\checkmark$				
CO-2		✓	✓	✓	✓	$\checkmark$		√			
CO-3	<b>√</b>	$\checkmark$	1	✓	✓	$\checkmark$			$\checkmark$		
CO-4	<b>√</b>	$\checkmark$	$\checkmark$	<b>~</b>	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$	
CO-5		~	$\checkmark$	✓	$\checkmark$	$\checkmark$		~		~	
		1		Number	r of mat ationsh	tches (v tip = Hi	() = 40 .gh	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 incidencemethod
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, C.C. Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan (Printers & Publishers) Pvt. Ltd., (2009).

2. Practical Physics, P. R. Sasi Kumar, PHI. (2011)
Advanced Practical Physics ,S. P. Singh, Pragathi Prakasam (2019).
 A Text book of Practical Physics, Indu Prakash and Ram Krishna, Kitab Mahal (2011).

5.Practical Physics – St. Joseph College, Trichy.

СО	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

## **Course Outcomes**

## **Relationship Matrix**

Semester	Cour	se Code	:	Title of the Course			Hou	rs C	Credits	
IV	21UAPH4P1			ALLIED PHYSICS PRACTICALS-II				30		1
Course Outcomes	Programme Le s (F			arning Outcomes Programme			Specific Outcomes (PSOs)			
(COs)	PLO	O 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 of matches ( $\checkmark$ ) = 40 Relationship = 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								
Course Type	TOTALMARKS	CIA TESTS MAX.MARKS	SEMESTER	PASSINGMINIMUM				
			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-60Marks Viva-Voce- 40Marks	Nil	Nil	100		

# **CIA Tests and Semester Examinations**

Postgraduate Programmes								
			SEMESTER	PASSINGMINIMUM				
Course Type	TOTALMARKS	CIAMARKS	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- 90Marks Viva-Voce Examination - 60Marks	Nil	Nill	150		

#### **Distribution of Marks**

Components	Tests (A)		Assignment (B)	Seminar (C)	Record Note (D)	Total (A+B+C+D)	
	Ι	II	III				
	20	20	20	5			27
<b>UG-Theory</b>	The Av	erage of	the Best	5	-	-	25
	T	wo Tests	:20				
	30	30	30				
PG-Theory	The Average of the Best			5	5	-	40
	Two Tests:30						
UG-	15	15 15					
Practical	The Average of the			-	-	5	20
(2 hrs)		Tests: 15	5				
UG-	30		30		-	10	40
Practical	The	Average	of the				
(4 hrs)		Tests: 30	)				
DC	15	1	5				
PG- Ducation	The Average of the		-	-	5	20	
Fractical	Tests: 15						
PG-	30 30						
Practical	The Average of the		-	-	10	40	
(Maths only)	Tests: 30						

## **Question Pattern for CIA Test (Theory)**

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

### **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 feesfor all the current courses and the arrear courses, if any, and submit the application form before the due datespecified 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 beset for 75 marks.

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

**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.