A.V.V.M. Sri Pushpam College (Autonomous), Poondi – 613 503

PG & Research Department of Physics

B.Sc., Programme in Physics

OUTCOME BASED EDUCATION - CHOICE BASED CREDIT SYSTEM

SCHEME OF PROGRAMME AND SYLLABUS

(For the candidates admitted from 2023-2024 onwards)

Vision and Mission of the college

Vision

To provide quality academic programmes and value oriented higher education to the rural community, equip them to encounter current regional, national and global demands upholding moral standards and intellectual competency.

Mission

- To provide conducive environment for quality teaching-learning process and innovative research.
- To bestow substantial educational experience that is intellectually, socially, and personally transformative.
- To strive to bring out the latent potentiality and core competency of the learners
- To foster the culture of research-based learning, independent academic inquiry by encouraging the students to involve in research activities ranging from hands on training, student projects, publications etc.,
- To nurture essential skills, competent minds and compassionate hearts.
- To impart a practical, demanding and overall development of the personality generated by love, consideration and care for the society.
- To serve the society by extending needful outreach programmes to the rural populace.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

- Make the learners realise the transformative power of education.
- Acquire profound disciplinary, applied, integrative knowledge and intellectual competency and domain specific and generic skills.
- Pursue lifelong learning and generate innovative solutions for the problems at individual and social level.
- Create a collaborative and inclusive environment, and serve the betterment of the society with moral integrity.
- Motivate to become a committed professional with necessary ethics as a leader as well as a team player.

PROGRAMME OUTCOMES for B.Sc. Programmes

PO1: Disciplinary Knowledge: Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.

PO2: Critical Thinking: Capability to apply analytic thought to a body of knowledge; analyze and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.

PO3: Problem Solving: Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's earning to real life situations.

PO4: Analytical Reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples and addressing opposing viewpoints.

PO5: Scientific Reasoning: Ability to analyze, interpret and draw conclusions from quantitative / qualitative data; and critically evaluate ideas, evidence, and experiences from an open minded and reasoned perspective.

PO6: Self-directed & Lifelong Learning: Ability to work independently, identify and manage a project. Ability to acquire knowledge and skills, including "learning how to learn", through self-placed and self-directed learning aimed at personal development, meeting economic, social and cultural objectives.

PROGRAMME SPECIFIC OUTCOMES for B.Sc. Physics Programme

On successful completion of **B.Sc., Physics** programme, the learners will be able to

PSO1: gain analytical and logical skills which will accomplish with a sound knowledge of the core subjects of physics and related allied subjects.

PSO2: interpret effectively the concepts of physics in professional and everyday life.

PSO3: acquire knowledge to figure out the theoretical and experimental data in physics and can be able to arrive objective conclusions.

PSO4: develop scientific temper based on concepts in physics that would be beneficial for the society.

PSO5: enrich their skills (both theoretical and experimental) in physics to meet out the social, ethical, global and environmental needs.

PSO6: function effectively as a member or a leader of a team involving physicists.

PSO7: acquire self-sufficient and lifelong learning skills by understanding the concepts of physics to face socio technological changes.

Curriculum structure for UG Programmes (OBE-CBCS) – 2023

	Nature of Course	Total No. of Courses	Total marks	Total credits	Total credits for the Programme
Part – I	Language (Tamil / Hindi)	04	400	12	123 (CGPA)
Part – II	English	04	400	12	
Part – III	Core Courses	14	1400	62	
	Core Industry Module (CIM)	01	100	04	
	Elective Courses (Generic) - Allied	06	600	18	
	Elective Courses (Discipline Centric)	04	400	12	
Part – IV	Skill Enhancement Course - Non-Major Elective (NME)	01	100	02	17 (Non CGPA)
	Skill Enhancement Course – Discipline Specific (SEC)	02	200	04	
	Professional Competency Skill Enhancement Course (PCSE)	01	100	02	
	Gender Studies (GS)	01	100	02	
	Environmental Studies (ES)	01	100	02	
	Value Education (VE)	01	100	02	
	Internship / Industrial Activity	--	--	02	
Part – V	Extension Activity (EA)	--	--	01	
	Total	**40**	**4000**	**140**	**140**
Value Added Course (VAC)		01	100	--	--
Extra Credit Course – MOOC / Field visit / Hands on Training		--	--	Max: 4	--

***Part I, II, and Part III components will be separately taken into account for CGPA calculation and classification for the under graduate programme and the other components. IV, V has to be completed during the duration of the programme as per the norms, to be eligible for obtaining the UG degree**

Course Structure: B.Sc., Physics (2023)

S. No.	Semester	Part	Category	Course Code	Title of the Course	Maximum Marks			Minimum Marks			Hours/ Week	Credits
						CIA	EE	Total	CIA	EE	Total		
1.	I	I	Language	23U1PHT1/H1	Tamil – I / Hindi – I	25	75	100	10	30	40	6	3
2.		II	Language	23U1PHE1	English – I	25	75	100	10	30	40	6	3
3.		III	Core	23U1PHC1	Properties of Matter and Sound	25	75	100	10	30	40	7	5
4.			Core	23U1PHCP1	Major Practical - I	25	75	100	10	30	40	3	3
5.			Allied	23U1PHMAA1	Allied Mathematics I	25	75	100	10	30	40	5	3
			Allied	23U2PHMAA2	Allied Mathematics II (Non-Semester)	-	-	-	-	-	-	3	-
6.		IV	EVS	23U1PHES	Environmental Studies	-	-	100	-	-	40	SS	2
7.	II	I	Language	23U2PHT2/H2	Tamil – II / Hindi – II	25	75	100	10	30	40	6	3
8.		II	Language	23U2PHE2	English – II	25	75	100	10	30	40	6	3
9.		III	Core	23U2PHC2	Electricity and Electromagnetism	25	75	100	10	30	40	7	5
10.			Core	23U2PHCP2	Major Practical - II	25	75	100	10	30	40	3	3
11.			Allied	23U2PHMAA2	Allied Mathematics II (Non-Semester)	25	75	100	10	30	40	3	3
12.			Allied	23U2PHMAA3	Allied Mathematics III	25	75	100	10	30	40	5	3
13.		IV	VA	23U2PHVE	Value Education	-	100	100	-	-	40	SS	2
			Extra Credit	MOOC (Massive open online course)		-	-	-	-	-	-		
14.	III	I	Language	23U3PHT3/H3	Tamil – III / Hindi – III	25	75	100	10	30	40	6	3
15.		II	Language	23U3PHE3	English – III	25	75	100	10	30	40	6	3
16.		III	Core	23U3PHC3	Heat, Thermodynamics and Statistical Mechanics	25	75	100	10	30	40	7	5
17.			Core	23U3PHCP3	Major Practical - III	25	75	100	10	30	40	3	3
18.			Allied	23U3PHCHA1	Allied Chemistry - I	25	75	100	10	30	40	5	3
			Allied	23U4PHCHAP1	Allied Chemistry Practical (Non-Semester)	-	-	-	-	-	-	3	-
			Extra Credit	MOOC / Field visit / Hands on Training		-	-	-	-	-	-		

S. No.	Semester	Part	Category	Course Code	Title of the Course	Maximum Marks			Minimum Marks			Hours/ Week	Credits
						CIA	EE	Total	CIA	EE	Total		
19.	IV	I	Language	23U4PHT4/H4	Tamil – IV / Hindi – IV	25	75	100	10	30	40	6	3
20.		II	Language	23U4PHE4	English – IV	25	75	100	10	30	40	6	3
21.		III	Core	23U4PHC4	Optics and Spectroscopy	25	75	100	10	30	40	5	5
22.			Core - CIM	23U4PHCIM	Industry Module Based Practical	25	75	100	10	30	40	3	4
23.			Allied	23U4PHCHA2	Allied Chemistry – II	25	75	100	10	30	40	5	3
24.			Allied	23U4PHCHAP1	Allied Chemistry Practical (Non-Semester)	25	75	100	10	30	40	3	3
25.		IV	SEC	23U4PHSEC1	Digital Literacy in Web-Based Simulation on Physics	25	75	100	10	30	40	2	2
26.			GS	23U4PHGS	Gender Studies	-	100	100	-	-	40	SS	2
			Extra Credit	Field visit / Hands on Training		-	-	-	-	-	-	-	-
27.	V	III	Core	23U5PHC5	Atomic Physics and Wave Mechanics	25	75	100	10	30	40	5	5
28.			Core	23U5PHC6	Solid State Physics	25	75	100	10	30	40	5	5
29.			Core	23U5PHCP4	Major Practical - IV	25	75	100	10	30	40	6	4
30.			Elective	23U5PHEL1A/ 23U5PHEL1B	Mechanics, Relativity and Quantum Mechanics/ Energy Physics	25	75	100	10	30	40	4	3
31.			Elective	23U5PHEL2A/ 23U5PHEL2B	Laser and Fiber optics Information Technology	25	75	100	10	30	40	4	3
32.			NME	23U5PHNME	Non-Major Elective – Physics for Everyday life	25	75	100	10	30	40	2	2
33.			Core	23U5PHC7PR	Project with Viva Voce	25	75	100	10	30	40	4	5
		IV	Internship / Industrial Training (Carried out in II Year summer vacation – 30 hours)									-	2
34.	VI	III	Core	23U6PHC8	Nuclear and Particle Physics	25	75	100	10	30	40	5	5
35.			Core	23U6PHC9	Electronics and Microprocessor 8085	25	75	100	10	30	40	5	5
36.			Core	23U6PHCP5	Major Practical - V	25	75	100	10	30	40	6	4
37.			Elective	23U6PHEL3A/ 23U6PHEL3B	Numerical Methods and C Programming/ History of Physics	25	75	100	10	30	40	5	3
38.			Elective	23U6PHEL4A/ 23U6PHEL4B	Nanoscience and Nanotechnology/ Communication Physics	25	75	100	10	30	40	5	3
39.		IV	SEC	23U4PHSEC2	Home Electrical Installation	25	75	100	10	30	40	2	2
40.			PCSE	23U6PHPCSE	Comprehensive Knowledge	-	100	100	-	40	40	2	2
		V	**Extension Activities**		Extension Activities (Outside College hours)	-	-	-	-	-	-	-	1
					Total			**4000**					**140**
			Value Add Course		Electronic Equipment Maintenance	-	100	100	-	40	40	SS	-

Internship/ Industrial Activity:

Students must complete in-plant training in any industry or organization where a programme-related procedure is being used, and this training must be done during the summer vacation at the end of II Year. A minimum of 30 hours should be spent on training. Students must submit a report on their training together with a certificate from the relevant industry or organization authority.

MOOC:

Massive Open Online Course (MOOC) is offered in the II and III Semester as an Extra Credit Course. Students can avail any one or more of the courses available in MOOC to equip their skill and knowledge themselves. To receive the extra credit, students must provide their MOOC course completion certificate at the end of the second year.

Field visit / Hands on Training:

In order to achieve experiential learning, these programmes with a minimum of 15 hours of contact time are offered as Extra Credit Courses in the III & IV Semester.

Evaluation of visit report will be held at the end of IV Semester.

Components of Evaluation:

Internal Marks : 25
External Marks : 75
Total : 100

Skill Enhancement course (SEC) offered by the Physics Department

1. Digital Literacy in Web-Based Simulation on Physics
2. Home Electrical Installation

Non – Major Elective (NME) Course offered by the Physics Department

1. Physics for Everyday life

Value Added Course offered by the Physics Department

"Electronic Equipment Maintenance" will be conducted for III UG students as a certificate Course.

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
I	**23U1PHT1**	**பொதுத் தமிழ் – 1**	**6**	**3**

Nature of the Course

1.Employablity Oriented வேலை வாய்ப்புச் சார்ந்தது	✓	7. Addresses Professional Ethics தொழில் நெறிமுறைகளை நிறைவு செய்தல்	
2. Entrepreneurship Oriented தொழில் முனைவு சார்ந்தது		8.Relevent To Local Need உள்ளூர் தேவைகளோடு தொடர்புடையது	✓
3. Skill Development Oriented திறன்மேம்பாடு சார்ந்தது	✓	9. Relevent To Regional Need மண்டல அளவிலான தேவைகளோடு தொடர்புடையது	
4. Addresses Gender Sensitization பாலின உணர்திறன் பூர்த்தி செய்தல்		10. Relevent To National Need தேசிய அளவிலான தேவைகளோடு தொடர்புடையது	
5. Addresses Environment and Sustainablity சுற்றுச் சூழல் மற்றும் நிலைத் தன்மை நிறைவு செய்தல்		11. Relevent To Global Development Need உலக அளவிலான தேவைகளோடு தொடர்புடையது	
6. Addresses Human Values மனித மதிப்புகளை நிறைவு செய்தல்	✓		

Course Objectives

1. முதலாமாண்டுப் பட்ட வகுப்பு மாணவர்களுக்குத் தமிழ் மொழி இலக்கியங்களை அறிமுகம் செய்தல்
2. தற்கால இலக்கியப் போக்குகளையும் இலக்கணங்களையும் மாணவர் அறியுமாறு செய்தல்.
3. மாணவர்களுக்குத் தமிழ் படைப்பாற்றலைத் தூண்டுதல்.
4. தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்.

Unit	Details	Hours
Unit-I	***மரபுக் கவிதை*** *1. பெ. சுந்தரனார் - தமிழ்த் தெய்வ வணக்கம்* *2. பாரதிதாசன் - சிறுத்தையே வெளியில் வா* *3. கவிமணி - புத்தரும் சிறுவனும்* *4. முடியரசன் - மொழி உணர்ச்சி* *5. கண்ணதாசன் -ஆட்டனத்தி ஆதிமந்தி — ஆதிமந்தி புலம்பல்* *6. சுரதா - துறைமுகம் தொகுப்பிலிருந்து ஏதேனும் ஒரு கவிதை* *7. தமிழ் ஒளி - கடல்*	18 Hrs

Unit-II	***புதுக்கவிதை*** *1. அப்துல் ரகுமான் - வீட்டுக்கொரு மரம் வளர்ப்போம்* *2. ஈரோடு தமிழன்பன் - சென்ரியூ கவிதைகள் (ஏதேனும் ஐந்து கவிதைகள்)* *3. வைரமுத்து - பிற்சேர்க்கை* *4. மு.மேத்தா- வாழைமரம்* *5. அறிவுமதி -வள்ளுவம் பத்து* *6. நா முத்துக்குமார் - ஆனந்த யாழை மீட்டுகிறாய்* *7. சுகிர்தராணி - சபிக்கப்பட்ட முத்தம்* *8. இளம்பிறை -நீ எழுத மறுக்கும் எனது அழகு*	18 Hrs
Unit-III	***சிறுகதைகள்*** *1. வாய்ச் சொற்கள் - ஜெயகாந்தன் (மாலை மயக்கம் தொகுப்பு)* *2. கடிதம் - புதுமைப்பித்தன்* *3. முள்முடி - தி ஜானகிராமன்* *4. சிதறல்கள் - விழி.பா.இதயவேந்தன்* *5. காகித உறவு - சு.சமுத்திரம்* *6. வீட்டின் மூலையில் சமையல் அறை - அம்பை* *7. (மொழிபெயர்ப்புக் கதை) ஆண்டன் செக்காவ் - நாய்க்காரச் சீமாட்டி, சந்தியா*	18 Hrs
Unit-IV	*1. பாடம் சார்ந்த இலக்கிய வரலாறு* *2. இராகபாவம் — கேட்டிவி*	18 Hrs
Unit-V	***மொழித்திறன் போட்டி தேர்வு*** *1.பொருள் பொதிந்த சொற்றொடர் அமைத்தல்* *2. ஓர் எழுத்து ஒரு மொழி* *3. வேற்றுமை உருபுகள்* *4. திணை, பால், எண், இடம்* *5. கலைச்சொல்லாக்கம், மொழிபெயர்ப்பு.* *(குறிப்பு: அலகு 4, 5 ஆகியன போட்டித் தேர்வு நோக்கில் நடத்தப்பட வேண்டும்).*	18 Hrs

CO Number	CO Statement	Cognitive Level
CO1	*பாரதியார் காலந்தொட்டு தற்காலப் புதுக்கவிதைகள் வரை கவிதை இலக்கியம் அறிமுகப்படுத்தப்படுவதால் படைப்பாற்றல் திறன் பெறுதல்.*	**K2**
CO2	*புதுக்கவிதை வரலாற்றினை அறிந்து கொள்வர்.*	**K3**
CO3	*இக்கால இலக்கிய வகையினைக் கற்பதன் மூலம் படைப்பாக்கத் திறனைப் பெறுவர்.*	**K4**
CO4	*மொழியறிவோடு சிந்தனைத்திறன் அதிகரித்தல்.*	**K3**
CO5	*தமிழ்மொழியைப் பிழையின்றி எழுதவும், புதிய கலைச் சொற்களை உருவாக்கவும் அறிந்து கொள்ளுதல்.*	**K5**

Text Books

1. தமிழ் இலக்கிய வரலாறு -செம்பதிப்பு- பெ.சுபாஷ் சந்திரபோஸ்

பார்வை நூல்கள்

1. தமிழ் இலக்கிய வரலாறு - சிற்பி.பாலசுப்பிரமணியன்
2. புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு - தமிழண்ணல்
3. வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு - எஃப்.பாக்கியமேரி

Web Resource

Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc.)

1. Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org> Tamil virtual University Library-
2. www.tamilvu.org/ library
3. http://www.virtualvu.org/library Project Madurai - www.projectmadurai.org.
4. Chennai Library- www.chennailibrary.com <http://www.chennailibrary.com>.
5. Tamil Universal Digital Library- www.ulib.prg <http://www.ulib.prg>.
6. Tamil E-Books Downloads- tamale books downloads. blogspot.com
7. Tamil Books on line- books.tamil cube.com
8. Catalogue of the Tamil books in the Library of British Congress archive.org
9. Tamil novels on line - books.tamilcube.com

பொதுத் தமிழ் —1												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**
CLO1	3	2	3	3	3	2	2	2	3	2	3	2
CLO2	3	3	2	2	2	3	2	3	3	2	2	2
CLO3	3	2	3	3	2	2	2	3	2	3	3	2
CLO4	2	3	3	2	2	2	3	2	3	2	3	3
CLO5	3	3	2	2	2	3	3	2	2	2	3	3

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
I	**23U1PHE1**	**PART - II GENERAL ENGLISH**	**6**	**3**

Learning Objectives		
LO1	To enable earners to acquire self awareness and positive thinking required in Various life situations.	
LO2	To help the macquire the attribute of empathy	
LO3	To assist them in acquiring creative and critical thinking abilities	
LO4	To enable them to learn the basic grammar	
LO5	To assist the min developing LSRW skills	
Unit No.	**Unit Title &Text**	**No.of Periods for the Unit**
I	**SELF-AWARENESS(WHO) & POSITIVE THINKING (UNICEF)** **Life Story** Chapter 1 from Malala Yousafzai, I am Malala An Autobiography or The Story of My Experiments with Truth (Chapters 1, 2 & 3) M.K.Gandhi **Poem** Where the Mind is Without Fear–Gitanjali 35– Rabindranath Tagore Love Cycle– Chinua Achebe	**20**
II	**EMPATHY** **Poem** Nine Gold Medals– David Roth Alice Fellor poverty–William Words worth **Short Story** The School for Sympathy– E.V. Lucas Barn Burning – William Faulkner	**20**
III	**CRITICAL & CREATIVE THINKING** **Poem** The Things That Haven't Been Done Before– Edgar Guest Stopping by the Woods on a Snowy Evening– Robert Frost **Readers Theatre** The Magic Brocade – A Tale of China Stories on Stage–Aaron Shepard (Three Sideway Stories from Wayside School" by Louis Sachar)	**20**
IV	**Reflective Thinking** The Running Rivulets of man The Lady in the Silver Coat Mr.Applebaum at Play The Feigning Brawl of an Imposter Thy Life is my Lesson	**15**

V	**Communication Skill Part of Speech** Articles Noun Pronoun Verb Adverb Adjective Preposition	**15**

Course Outcomes		
Course Outcomes	On completion of this course, students will:	
CO1	Acquire self awareness and positive thinking required in various life situations	PO1,PO7
CO2	Acquire the attribute of empathy.	PO1,PO2,PO10
CO3	Acquire creative and critical thinking abilities.	PO4,PO6,PO9
CO4	Learn basic grammar	PO4,PO5,PO6
CO5	Development and integrate the use of four language skills i.e., listening, speaking, reading and writing.	PO3,PO8

	Textbooks (Latest Editions)
1.	Malala Yousafzai. Iam Malala, Little, Brown and Company, 2013.
2.	M.K.Gandhi. An Autobiography or The Story of My Experiments with Truth (Chapter – I), Rupa Publications, 2011.
3.	Rabindranath Tagore. "Gitanjali 35" from Gitanjali (Song Offerings): A CollectionofProseTranslationsMadebytheAuthorfromtheOriginalBengali. MacMillan, 1913.
4.	N.Krishnasamy. Modern English: A Book of Grammar, Usage and Composition Macmillan, 1975.
5.	Aaron Shepard. Storieson Stage, Shepard Publications, 2017.
6.	J.C.Nesfield. English Grammar Composition and Usage, Macmillan, 2019.
7.	Sri.KTV. Melodious Harmony, New Century Book House. 2022

Web Resources	
1	MalalaYousafzai.Iam Malala(Chapter1)https://archive.org/details/i-am-malala
2	M.KGandhi.An Auto biographyor The Story of My Experiments with Truth(Chapter-1)-RupaPublication,2011https://www.indiastudychannel.com/resources/146521-Book-Review-An-Autobiography-or-The-story-of-my-experiments-with-Truth.aspx
3	Rabindranath Tagore. "Gitanjali 35" from Gitanjali (Song Offerings)https://www.poetryfoundation.org/poems/45668/gitanjali-35
4	AaronShepard.StoriesonStage,ShepardPublications,2017 https://amzn.eu/d/9rVzlNv
5	JCNesfield. Manual of English Grammar and Composition. https://archive.org/details/in.ernet.dli.2015.44179

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3

Mapping with Programme Specific Outcomes:

CO /PO	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3
Weight age	15	15	15	15
Weighted percentage of Course Contribution to POS	3.0	3.0	3.0	3.0

3– Strong, 2 –Medium, 1-Low

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
I	**23U1PHC1**	**Properties of Matter and Sound**	**7**	**5**

Nature of the course

Employability Oriented	√	Relevant to Local need	
Entrepreneurship Oriented		Relevant to regional need	
Skill development Oriented	√	Relevant to national need	
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability			
Addresses Human Values			
Addresses Professional Ethics	√		

Course Objectives

The main objectives of this course are:

1. To indoctrinate the properties of matter
2. To empower the students to know the concepts of Sound
3. To delineate the properties of matter by various experimental techniques

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**ELASTICITY** Hooke's law – stress-strain diagram – elastic constants –Poisson's ratio – relation between elastic constants and Poisson's ratio – work done in stretching and twisting a wire – twisting couple on a cylinder – rigidity modulus by static torsion– torsional pendulum (with and without masses)	21
II	**BENDING OF BEAMS:** cantilever– expression for bending moment – expression for depression at the loaded end of the cantilever– oscillations of a cantilever – expression for time period – non-uniform bending– experiment to determine Young's modulus using pin and microscope – uniform bending – expression for elevation- experiment to determine Young's modulus using optic lever.	21

III	**FLUID DYNAMICS:** ***Surface tension***: definition – molecular forces– excess pressure over curved surface – application to spherical and cylindrical drops and bubbles – determination of surface tension by Jaegar's method–variation of surface tension with temperature ***Viscosity***: definition – streamline and turbulent flow – rate of flow of liquid in a capillary tube – Poiseuille's formula –corrections – terminal velocity and Stoke's formula– variation of viscosity with temperature	21
IV	**WAVES AND OSCILLATIONS:** Simple Harmonic Motion (SHM) – differential equation of SHM – graphical representation of SHM – composition of two SHM in a straight line and at right angles – Lissajous's figures- free, damped, forced vibrations –resonance and Sharpness of resonance. Laws of transverse vibration in strings –sonometer – determination of AC frequency using sonometer –determination of frequency using Melde's string apparatus	21
V	**ACOUSTICS OF BUILDINGS AND ULTRASONICS:** Intensity of sound – decibel – loudness of sound –reverberation – Sabine's reverberation formula – acoustic intensity – factors affecting the acoustics of buildings. ***Ultrasonic waves***: production of ultrasonic waves – Piezoelectric crystal method – magnetostriction method – applications of ultrasonic waves	21

Text Books:

1. Elements of properties of matter–D.S.Mathur–S.Chand&Co., 2008
2. Properties of matter–R.Murugesan–S.Chand&Co., 2017
3. Properties Of Matter And Acoustic -By R.Murugeshan, Kiruthiga Sivaprasath - S.Chand & Ltd, 2018
4. N.Subrahmanyam and BrijLal, A Text Book of Sound, Vikas Publishing House-Second revised edition(1995)
5. Fundamentals of General Properties of Matter by H.R.Gulati, S. Chand & Co., New Delhi (1982).

References:

1. Fundamentals of physics-Haliday and Resnik-wiley -2017
2. Theory of Elasticity and Plasticity-A Textbook of Solid Body Mechanics- by Valentin Molotnikov, Antonina Molotnikova · Springer international Publishing-2021.
3. An Introduction to Surface Tension- Jurgen Klein -Nova Science Publishers-2020
4. Physics for Scientists and Engineers Paul A. Tipler, Gene Mosca · - W.H.Freeman2004
5. A Textbook Of Sound by N.Subrahmanyam - Vikas Publishing House Ltd-1999.

Web resources

1.https://www.google.co.in/books/edition/Elements_of_Properties_of_Matter/JQobEAAAQBAJ?hl=en&gbpv=1&dq=elements+of+properties&printsec=frontcover

2.https://www.google.co.in/books/edition/Properties_of_Matter/XljzDwAAQBAJ?hl=en&sa=X&ved=2ahUKEwjMu9fex9_8AhWA8DgGHZtwAHEQiqUDegQIAxAC

3.https://www.google.co.in/books/edition/Properties_Of_Matter_And_Acoustic/dzArDAAAQBAJ?hl=en&gbpv=1&dq=Properties+of+matter+%E2%80%93+Brijlal+and+N.+Subramanian.&pg=PR7&printsec=frontco

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Acquire the knowledge of matter's properties	K2
CO2	Identify the materials' strength based on the moduli of elasticity.	K2,K4
CO3	Understand the practical applications of surface tension in real life	K2,K3
CO4	Acquire the knowledge of the flow of liquids based on their viscous nature and variation of viscosity with pressure and temperature	K2,K3
CO5	Understand the physics of sound and their implications	K2,K3

Cognitive Level : K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	2	2	2	1	2
CO2	3	2	3	3	3	2	3
CO3	2	2	2	3	2	1	2
CO4	3	3	1	2	2	2	1
CO5	3	2	2	1	2	2	2

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
I	**23U1PHCP1**	**Major Practical - I**	**3**	**3**

Nature of the course

Employability Oriented	✓	Relevant to Local need	✓
Entrepreneurship Oriented		Relevant to regional need	✓
Skill development Oriented	✓	Relevant to national need	✓
Addresses Gender Sensitization		Relevant to Global development need	✓
Addresses Environment and Sustainability		Addresses Professional Ethics	
Addresses Human Values			

Course Objectives

The main objectives of this course are to:

1. Students acquireskillsindoingexperimentsrelatedtopropertiesofmatterandsound.
2. Develop the skill to find the elastic nature of materials for suitable applications
3. Find the viscosity and surface tension of liquids by different experimental techniques

List of Experiments –Any EIGHT Experiments

1. Compound pendulum – Determination of acceleration due to gravity “g”.
2. Uniformbending (Telescope and opticlever) - Determination of Young’s Modulus.
3. Nonuniform bending (pinandmicro scope) - Determination of Young’s Modulus.
4. Cantilever depression (microscope) - Determination of Young’s Modulus.
5. Koenig’s method–Determination of Young’s Modulus.
6. Torsional pendulum–M.I and “n”.
7. Static torsion–rigidity modulus “n”.
8. Drop weight method-S.T. and Interfacial S.T.
9. Surfacetension –Capillaryrise method.
10. Stoke’s method –Coefficient of viscosity of liquid.
11. Capillary flow method-viscosity of liquid.
12. Mayer’s disc–viscosity of liquid.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Acquire the knowledge about gravity	**K2**
CO2	Identify the solid materials' strength based on various moduli	**K2,k4**
CO3	Study the tensile behavior of string materials	
CO4	Know the behavior of liquids on various aspects like viscosity, surface tension etc.,	**K2, k6**
CO5	Understand the characteristics of sound	**K2, k3**

Cognitive Level : K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	1	2	1	2	2	2
CO2	2	1	2	2	2	2	2
CO3	2	2	2	2	1	2	1
CO4	2	1	2	1	2	2	2
CO5	2	2	2	1	1	1	2

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
I	23U1PHMAA1	Allied Mathematics – I	5	3

Nature of the course

Employability Oriented	√	Relevant to Local need		Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	

Course Objectives

The main objectives of this course are:

1.To introduce the concept of binomial, exponential and logarithmic series.
2.To teach the relation between circular and hyperbolic function
3. To impart the knowledge of the methods to find radius of curvature and centre of curvature

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Algebra:** Binomial series - Application of Binomial theorem to the summation of series - Exponential series - summation of series using exponential series.	**15**
II	**Theory of Equations:** Nature of roots – Relation between the coefficients and the roots of an algebraic equation – Transformation of equations – Reciprocal Equations.	**15**
III	**Matrices:** Eigen values and eigen vectors – Diagonalisation – similar matrices – Cayley-Hamilton theorem. ***Self-study: Eigen values for symmetric matrices***	**15**
IV	**Trigonometry:** Expansion of cosnθ, sinnθ and tannθ – Powers of Sines and Cosines of θ in terms of multiples of θ – expansion of sinθ and cosθ in a series of ascending powers of θ.	**15**
V	**Differential Calculus:** Curvature – circle, radius and centre of curvature – Cartesian formula for radius of curvature – coordinates of centre of curvature.	**15**

Note:** Questions may be asked from the ***Self-study content for only CIA test (Mid and End semesters) and **NOT** for the external (Semester Examinations)

Textbook:

Ancillary Mathematics, Volume-I, *S. Narayanan, R. Hanumantha Rao, T.K.Manikavachagam Pillay, S. Viswanathan Printers Pvt. Ltd., 2013.*

Unit	Chapter	Sections
I	Chapter 1	Pages : 7 to 17, 28 to 37 Sec: 1.2, 1.3
II	Chapter 2	Pages:59 to 83 Sec : 2.1 to 2.4
III	Chapter 3	Pages: 151 to 160 Sec: 3.4 to 3.5
IV	Chapter 5	Pages : 220 to 239 Sec: 5.1 to 5.3
V	Chapter 6	Pages: 296 to 309 Sec: 6.4

References:

1. ***Allied Mathematics, Paper-I, First Semester***, P.Kandasamy and K.Thilagavathy, S.Chand& Company Pvt. Ltd., New Delhi, 2014.
2. ***Algebra Volume I***,T.K.M. Pillay, T. Natarajan and K.S.Ganapathy
3. ***Calculus Volume I***,S. Narayanan and T.K. Manikavachagam

Web Resources:

1. https://archive.nptel.ac.in/courses/111/106/111106148/
2. https://www.youtube.com/watch?v=prsgofH2EoU
3. https://www.cuemath.com/radius-of-curvature-formula/

Pedagogy: Teaching / Learning methods:

Chalk and Board, Virtual Class room, LCD projector, Video Conference, Guest Lectures, Tutorial, Assignment, Seminar. Library, Net Surfing, NPTEL Course Materials, Use of Mathematical software.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Know the different types of series and its applications	**K2,K4**
CO2	Classify the relation between the coefficients and the roots of the algebraic equations	**K3,K4**
CO3	Solve the problems using Eigen values and Eigen vectors	**K1,K3**
CO4	Evaluate the problems of power series expansions	**K2,K5**
CO5	Classify the method of finding envelopes, curvature and Cartesian formula for radius of curvature	**K3,K4**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 –**Analyze,**K5 – Evaluate,K6-Create**

Mapping of Course Outcomes with Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	2	3	1	3	3	3	1	3
CO2	3	3	2	3	1	2	3	3	2	3
CO3	3	3	2	3	2	2	2	3	3	2
CO4	3	3	2	3	1	3	3	3	2	2
CO5	3	3	2	3	2	3	3	3	1	3

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	2	3	3	3	3
CO2	2	3	2	3	3	3	1
CO3	3	3	3	3	3	2	3
CO4	2	3	3	3	1	3	2
CO5	3	1	2	3	3	2	3

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
I & II	**23U2PHMAA2**	**Allied Mathematics - II (NS)**	**3+3**	**--**

Nature of the course

Employability Oriented		Relevant to Local need		Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	

Course Objectives

Themainobjectives ofthis courseare:

1. To understand the concepts correlation and regression
2. To acquire skills in the techniques of numerical solution of differential equations
3. To learn the computational methods of double and triple integrals

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Correlation and Regression:** Karl Pearson coefficient of correlation – Regression coefficients – Properties of regression coefficients ***Self-study: Rank correlation***	**18**
II	**Interpolation:** Gregory Newton forward interpolation formula - Backward interpolation formula– Lagrange's interpolation formula – Inverse interpolation *(no proofs, simple problems only).*	**18**
III	**Numerical solution of ordinary differential equation:** Euler's method – Improved Euler's method - Modified Euler's method – Runge-Kutta method (4^{th} order only).	**18**
IV	**Multiple integral:** Double integral – Evaluation of double integral - change of order of integration – Polar coordinates - Triple integrals	**18**
V	**Beta and Gamma Functions:** Definitions – Convergence of $\Gamma(n)$ – Recurrence formula of gamma function – Properties of beta function – Relation between beta and gamma functions - Problems.	**18**

Note:** Questions may be asked from the ***Self-study content for only CIA test (Mid and End semesters) and **NOT** for the external (Semester Examinations)

Textbook:

1. ***Fundamentals of Mathematical Statistics,*** *S.C. Gupta, V. K. Kapoor, Sulthan, 2002.*
2. ***Numerical methods****, P. Kandasamy, Thilagavathi and Gunavathi*
3. ***Calculus Vol II :*** *T.K. M. Pillai, 2015*

Unit	Text Book	Chapter	Sections	Pages
I	1	X XI	Sec: 10.1 - 10.4 Sec: 11.1–11.2	10.2 – 10.12 11.2 – 11.12
II	2	VI VIII	Sec: 6.1–6.6 Sec: 8.7	209 – 225 271 – 278
III	2	XI	Sec: 11.9 – 11- 13	369 – 389
IV	3	V	Sec: 2 – 4	203 - 222
V	3	VII	Sec: 2 - 5	278 - 290

References:

1. Statistics - M. Sivathanupillai
2. Ancillary Maths - P.R.,Vittal, Margam Publications.

Web Resources:

1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC374386/#:~:text=Correlation%20quantifies%20the%20strength%20of,the%20form%20of%20an%20equation.
2. https://www.lkouniv.ac.in/site/writereaddata/siteContent/20200403225057206 8siddharth_bhatt_engg_Numerical_Solution_of_Ordinary_Differential_Equations.pdf
3. https://www.maths.tcd.ie/~richardt/2E1/2E1-ch3.pdf

Pedagogy: Teaching / Learning methods:

Chalk and Board, Virtual Class room, LCD projector, Video Conference, Guest Lectures, Tutorial, Assignment, Seminar.Library, Net Surfing, NPTEL Course Materials, Use of Mathematical software.

CourseOutcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	State definitions and relevant concepts	**K1**
CO2	Compare exact solution and numerical solution	**K2**
CO3	Solve ordinary differential equations numerically	**K3**
CO4	Compute correlation and regression coefficients	**K4**
CO5	Evaluate double and triple integrals	**K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	2	3	3	3	3	3	3	3
CO2	3	3	2	3	3	2	3	3	2	3
CO3	3	2	3	2	2	2	2	3	3	2
CO4	2	3	3	2	1	3	1	2	2	2
CO5	2	3	2	3	2	3	3	3	3	1

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	2	3	2	3	3
CO2	3	2	3	2	3	2	3
CO3	2	3	2	3	2	3	3
CO4	3	3	3	2	3	2	3
CO5	3	3	3	3	2	3	2

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
II	**23U2PHT2**	**பொதுத் தமிழ் – 2**	**6**	**3**

Nature of the Course

1.Employablity Oriented *வேலை வாய்ப்புச் சார்ந்தது*	✓	7. Addresses Professional Ethics *தொழில் நெறிமுறைகளை நிறைவு*	
2. Entrepreneurship Oriented *தொழில் முனைவு சார்ந்தது*		8.Relevent To Local Need *உள்ளூர் தேவைகளோடு தொடர்புடையது*	✓
3. Skill Development Oriented *திறன்மேம்பாடு சார்ந்தது*	✓	9. Relevent To Regional Need *மண்டல அளவிலான தேவைகளோடு தொடர்புடையது*	
4. Addresses Gender Sensitization *பாலின உணர்திறன் பூர்த்தி செய்தல்*		10. Relevent To National Need *தேசிய அளவிலான தேவைகளோடு தொடர்புடையது*	
5. Addresses Environment and Sustainablity *சுற்றுச் சூழல் மற்றும் நிலைத் தன்மை நிறைவு செய்தல்*		11. Relevent To Global Development Need *உலக அளவிலான தேவைகளோடு தொடர்புடையது*	
6. Addresses Human Values *மனித மதிப்புகளை நிறைவு செய்தல்*	✓		

Course Objectives

1. சமய இலக்கியங்களையும் சிற்றிலக்கியங்களையும் மாணவர்களுக்கு அறிமுகப்படுத்துதல்.
2. மாணவர்களுக்கு மொழித்திறனை வளர்க்கப் பயிற்சி அளித்தல்.
3. மாணவர்களுக்குச் சிறுகதை இலக்கிய வடிவத்தை உணர்த்துதல்.

Unit	Details	Hours
Unit-I	*1.திருநாவுக்கரசர் தேவாரம் - நாமார்க்கும் குடியல்லோம் எனத் தொடங்கும் பதிகம் (10 பாடல்கள்)* *2.ஆண்டாள் - திருப்பாவை (முதல் 10 பாசுரம்)*	18 Hrs
Unit-II	*1.வள்ளலார் -அருள் விளக்க மாலை (முதல் 10 பாடல்)* *2.எச்.ஏ.கிருட்டிணப்பிள்ளை - இரட்சணிய மனோகரம் - பால்ய பிரார்த்தனை* *3.குணங்குடி மஸ்தான் சாகிபு - பராபரக்கண்ணி (முதல் 10 கண்ணி)*	18 Hrs
Unit-III	*சிற்றிலக்கியங்கள்* *1.தமிழ்விடு தூது (முதல் 20 கண்ணி)* *2.திருக்குற்றாலக் குறவஞ்சி - குறத்தி மலைவளம் கூறுதல்* *3.முக்கூடல் பள்ளு - நாட்டு வளம்*	18 Hrs
Unit-IV	*1.பாடம் தழுவிய இலக்கிய வரலாறு* *2.மனோரஞ்சிதம் -கேட்டிவி*	18 Hrs

Unit-V	மொழித்திறன்/போட்டித் தேர்வுத் திறன் *1.* தொடர் வகைகள் *2.* மரபுத்தொடர், பழமொழிகள் *3.* பிறமொழிச் சொற்களைக் களைதல் *4.* வழுச்சொற்கள் நீக்குதல் *5.* இலக்கணக் குறிப்பு அறிதல்	18 Hrs

CO Number	CO Statement	Cognitive Level
CO1	பக்தி இலக்கியங்களைக் கற்பதன் மூலம் பக்தி நெறியினையும்,சமய நல்லிணக்கத்தையும் தெரிந்து பின்பற்றுவர்.	**K1, K2**
CO2	சிற்றிலக்கியங்களின்வழி இலக்கியச் சுவையினையும் பண்பாட்டு அறிவினையும் பெறுவர்.	**K2**
CO3	பட்டப் படிப்பினைப் படிக்கும் போதே பெரும்பான்மையான தமிழ் இலக்கியங்கள் குறித்த அறிவினைப் பெறுவர்.	**K4**
CO4	தமிழ்ச் சமூகப் பண்பாட்டு வரலாற்றினை இலக்கியங்கள் வாயிலாக அறிவர்.	**K3**
CO5	போட்டித் தேர்வுகளில் வெற்றி பெறுவதற்குத் தமிழ்ப் பாடத்தினைப் பயன்கொள்ளும் வகையில் ஏற்ற பயிற்சி பெறுவர்.	**K4**

Text Books

1. தமிழ் இலக்கிய வரலாறு -செம்பதிப்பு- பெ.சுபாஷ் சந்திரபோஸ்

பார்வை நூல்கள்

1. தமிழ் இலக்கிய வரலாறு - சிற்பி.பாலசுப்பிரமணியன்

2. புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு - தமிழண்ணல்

3. வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு - எஃப்.பாக்கியமேரி

Web Resource

Related Online Contents (MOOC,SWAYAM,NPTEL,Websites etc.)

1. Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org> Tamil virtual University Library-
2. www.tamilvu.org/ library
3. http://www.virtualvu.org/library Project Madurai - www.projectmadurai.org.
4. Chennai Library- www.chennailibrary.com <http://www.chennailibrary.com>.
5. Tamil Universal Digital Library- www.ulib.prg <http://www.ulib.prg>.
6. Tamil E-Books Downloads- tamilebooksdownloads. blogspot.com
7. Tamil Books on line- books.tamil cube.com
8. Catalogue of the Tamil books in the Library of British Congress archive.org
9. Tamil novels on line - books.tamilcube.com

பொதுத்தமிழ் —2												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CLO1	3	2	3	3	3	2	2	2	3	2	3	2
CLO2	3	3	2	2	2	3	2	3	3	2	2	2
CLO3	3	2	3	3	2	2	2	3	2	3	3	2
CLO4	2	3	3	2	2	2	3	2	3	2	3	3
CLO5	3	3	2	2	2	3	3	2	2	2	3	3

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
II	**23U2PHE2**	**PART - II GENERAL ENGLISH**	**6**	**3**

Learning Objectives	
LO1	To make students realize the importance of resilience
LO2	To enable them to become good decision makers
LO3	To enable them to imbibe problem-solving skills
LO4	To enable them to usetenses appropriately
LO5	To help the muse English effectively at the work place.

Unit No.	**Unit Title &Text**	**No.of Periods for the Unit**
I	**RESILIENCE** **Poem** Don't Quit – Edgar A. Guest Still Here–Langston Hughes **Short Story** Engine Trouble – R.K.Narayan RipVan Winkle– Washington Irving	**20**
II	**DECISION MAKING** **Short Story** The Scribe– Kristin Hunter The Lady or the Tiger- Frank Stockton **Poem** The Road not Taken–Robert Frost Snake – D. H Lawrence	**20**
III	**PROBLEM SOLVING** **Prose life Story** How I taught My Grandmother to Read– Sudha Murthy **Autobiography** How frog Went to Heaven–ATale of Angolo Wings of Fire(Chapters1, 2, 3) by A.P.J Abdul Kalam	**20**
IV	**Moral Values** The Stoic Penalty Nobility in Reasoning Malu, the Frivolous Freak Honesty is the Cream of Chastity A Boy in Boy's Town	**15**
V	**Tenses** Present Past Future Concord	**15**

Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	Realize the importance of resilience	PO1,PO7
CO2	Become good decision-makers	PO1,PO2,PO10
CO3	Imbibe problem-solving skills	PO4,PO6,PO9
CO4	Use tenses appropriately	PO4, PO5,PO6
CO5	Use English effectively at the work place.	PO3,PO8

Text Books (Latest Editions)	
References Books	
1	Martin Hewings. Advanced English Grammar. Cambridge University Press, 2000
2	SP Bakshi, Richa Sharma. Descriptive English. Arihant Publications (India) Ltd., 2019.
3.	Sheena Cameron, Louise Dempsey. The Reading Book: A Complete Guide to Teaching Reading. S & L. Publishing, 2019.
4	Barbara Sherman. Skimming and Scanning Techniques, Liberty University Press, 2014.
5.	Phil Chambers. Brilliant Speed Reading: What every ouneed to read, however. Pearson, 2013.
6.	Communication Skills: Practical Approach Ed.Shaikh Moula Ramendra Kumar. Stories of Resilience, Blue Rose Publications, 2020.
7.	Sri. KTV.Melodious Harmony, New Century Book House. 2022

Web Sources

1	Langst on Hughes. Still Herehttps://poetryace.com/im-still-here
2	R.K. Narayan.Engine Trouble http://www.sbioaschooltrichy.org/work/Work/images/new/8e.pdf
3	Washington Irving. Rip Van Winkle https://www.gutenberg.org/files/60976/60976-h/60976-h.htm
4	FrankStockton. TheLadyor the Tigerhttps://www.gutenberg.org/ebooks/396

Mapping with Programme Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3

3–Strong,2–Medium,1-Low

Mapping with Programme Specific Outcomes:

CO /PO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3
Weight age	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
II	**23U2PHC2**	**ELECTRICITY AND ELECTROMAGNETISM**	**7**	**5**

Nature of the course

Employability Oriented	✓	Relevant to Local need	✓
Entrepreneurship Oriented		Relevant to regional need	✓
Skill development Oriented	✓	Relevant to national need	✓
Addresses Gender Sensitization		Relevant to Global development need	✓
Addresses Environment and Sustainability		Addresses Professional Ethics	
Addresses Human Values			

Course Objectives

The main objectives of this course are:

1. To introduce the basic knowledge about Electrostatics.
2. To gain the knowledge about Magnetic, Thermal and Chemical effects ofcurrent.
3. To introduce the concepts of Electromagnetic induction and oscillations.
4. To expose the students to the applications of Electricity and Magnetism.

SYLLABUS

Unit	Content	No. of Hours
I	**Electrostatics** Coulomb's law – Gauss's law and its applications (Electric field due to a uniformly charged sphere, Electric field intensity at a point near an infinite plane charged conductor) – Electric potential – Potential at a point due to a uniformly charged conducting sphere – Potential at a point due to electric dipole – Relation between electric field and electric potential – Principle of a capacitor – Capacity of a spherical capacitors – Energy stored in a charged capacitor – Loss of energy on sharing of charges between two capacitors.	21
II	**Magnetic effect of electric current** Magnetic flux and Magnetic induction – Biot-savart law – Magnetic induction at a point due to a straight conductor carrying current – Magnetic induction at a point on the axis of a circular coil carrying current – Magnetic field inside a long solenoid – Ampere's circuital law – Lorentz force on a moving charge – Torque on a current loop in a uniform magnetic field – Moving coil Ballistic galvanometer – Theory – Experiment to find charge sensitivity and absolute capacity of a capacitor.	21
III	**Thermal and Chemical effect of electric current** Thermoelectricity – Seeback effect – Laws of thermoe.m.f – Measurement of thermoe.m.f using potentiometer – Peltier effect –	21

	Peltier coefficient – Thomson effect – Thomson coefficient – Thermoelectric diagram – Uses. Faradays laws of electrolysis – Electrical conductivity of an electrolyte – Specific conductivity – Kohlrausch's bridge method of determining the specific conductivity of an– Applications of electrolysis.	
IV	**Electromagnetic Induction** Faradays laws of electromagnetic induction – Self-induction – Self inductance of a long solenoid – Toroidal solenoid – Determination of L by Rayleigh's method – Mutual induction – mutual inductance between two coaxial solenoids – Experimental determination of mutual inductance – Co-efficient of coupling – Energy stored in a coil – Eddy currents – Uses – Earth inductor – Uses – Search coil – Induction coil and its uses.	21
V	**AC circuits** Growth and decay of current in a circuit containing L and R – Time constant – Growth and decay of charge in a circuit with C, L and R – Impedance of AC circuit containing R, L and C in series – Resonance – Q factor.	21
Self Study	DC circuits	

Text book:

1. Text book of Electricity and Magnetism – Brijlal and N. Subramanian, (RatanPrakashan Mandhir, New Delhi, 2005).
2. Electricity and Magnetism – R. Murugesan, (S.Chand & Co, New Delhi, 2008).
3. Electricity and Magnetism – M. Narayanamurthy& N. Nagarathnam, (NPC Publishers, Revised Edition).
4. Electricity and Magnetism – K.K. Tiwari, (S.Chand & Co, New Delhi, 2011).
5. Fundamentals of Electricity and Magnetism, (S.Chand & Co, New Delhi, Twelfth Revised Edition).

References:

1. Electricity and magnetism – D.L. Sehgal, K.L. Chopra and N.K. Sehgal, (S.Chand & Co, New Delhi, 1996).
2. Electricity and magnetism – A.S. Mahajan, A. A. Rangwaal
3. Electricity and magnetism – E.M. Pourcel, Berkley Physics Course, Vol.2, (Tata Mc Grraw-Hill, New Delhi).
4. Electricity and magnetism – D.C. Tayal, (Himalaya Publishing House, 2009).
5. Fundamentals of Physics - Electricity and Magnetism – D. Halliday, R. Resnick andJ. Walker, (Wiley India Pvt Ltd, 2011).

Web resources:

1. https://nptel.ac.in/courses/115106122
2. https://nptel.ac.in/courses/115104088
3. https://www.classcentral.com/course/swayam-electromagnetism-17586

Pedagogy: Teaching / Learning methods

• Lecture	• Tutorial	• Assignment	• PPT Presentation
• Quiz	• Group Discussion	• e-content Seminar	

Course Outcomes

On completion of this course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Gain knowledge on the basic concepts of electrostatics and electricity.	K2
CO2	Acquire knowledge on magnetic effect of current.	K2
CO3	Gain knowledge in thermal and chemical effects of current.	K2
CO4	Understand the basic concepts of electromagnetic induction.	K3
CO5	Understand the working of ac circuits	K6

Cognitive Level:K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	2	3	1	2
CO2	3	3	3	2	3	1	2
CO3	3	3	3	1	3	1	1
CO4	3	3	3	1	1	1	1
CO5	3	3	3	3	3	1	1

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
II	**23U2PHCP2**	**Major Practical II**	**3**	**3**

Nature of the course

Employability Oriented	✓	Relevant to Local need	✓
Entrepreneurship Oriented		Relevant to regional need	✓
Skill development Oriented	✓	Relevant to national need	✓
Addresses Gender Sensitization		Relevant to Global development need	✓
Addresses Environment and Sustainability		Addresses Professional Ethics	
Addresses Human Values			

Course Objectives

The main objectives of this course are to:

Construct circuits to learn about the concept of electricity, current, resistance in the path of current, different parameters that affect a circuit. Set up experiments, observe, analyse and assimilate the concept

Any Eight Experiments

1. Calibration of low range voltmeter using potentiometer
2. Calibration of high range voltmeter using potentiometer
3. Calibration of ammeter using potentiometer.
4. Measurement of low resistances using potentiometer.
5. Determination of field along the axis of a current carrying circular coil.
6. Determination of earth's magnetic field using field along axis of current carrying coil.
7. Determination of specific resistance of the material of the wire usingPO box.
8. Determination of resistance and specific resistance using Carey Foster's bridge.
9. Determination of figure of merit of BG or spot galvanometer.
10. Comparison of EMF of two cells using BG.

Course Outcomes
On completion of this course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Gain knowledge on the basic concepts of electricity.	K1
CO2	Do the calibrations of voltmeter and ammeter using potentiometer.	K2, K3
CO3	Determine the resistance of various materials using PO box and carey fosters bridge.	K2, K3
CO4	Determine the earth's magnetic field using current carrying coil	K2, K3
CO5	Do experiments using Ballastic galvanometer	K2

Cognitive Level:K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze;
K5 – Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	2	3	1	2
CO2	3	3	3	2	3	1	1
CO3	3	3	3	1	3	1	1
CO4	3	3	3	1	3	1	1
CO5	3	3	3	1	3	1	1

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
I & II	**23U2PHMAA2**	**Allied Mathematics - II (NS)**	**3+3**	**3**

Nature of the course

Employability Oriented		Relevant to Local need		Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	

Course Objectives

Themainobjectives ofthis courseare:

1. To understand the concepts correlation and regression
2. To acquire skills in the techniques of numerical solution of differential equations
3. To learn the computational methods of double and triple integrals

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Correlation and Regression:** Karl Pearson coefficient of correlation – Regression coefficients – Properties of regression coefficients ***Self-study: Rank correlation***	**18**
II	**Interpolation:** Gregory Newton forward interpolation formula - Backward interpolation formula– Lagrange's interpolation formula – Inverse interpolation *(no proofs, simple problems only).*	**18**
III	**Numerical solution of ordinary differential equation:** Euler's method – Improved Euler's method - Modified Euler's method – Runge-Kutta method (4^{th} order only).	**18**
IV	**Multiple integral:** Double integral – Evaluation of double integral - change of order of integration – Polar coordinates - Triple integrals	**18**
V	**Beta and Gamma Functions:** Definitions – Convergence of $\Gamma(n)$ – Recurrence formula of gamma function – Properties of beta function – Relation between beta and gamma functions - Problems.	**18**

Note:** Questions may be asked from the ***Self-study content for only CIA test (Mid and End semesters) and **NOT** for the external (Semester Examinations)

Textbook:

4. ***Fundamentals of Mathematical Statistics,*** *S.C. Gupta, V. K. Kapoor, Sulthan, 2002.*
5. ***Numerical methods****, P. Kandasamy, Thilagavathi and Gunavathi*
6. ***Calculus Vol II :*** *T.K. M. Pillai, 2015*

Unit	Text Book	Chapter	Sections	Pages
I	1	X XI	Sec: 10.1 - 10.4 Sec: 11.1–11.2	10.2 – 10.12 11.2 – 11.12
II	2	VI VIII	Sec: 6.1–6.6 Sec: 8.7	209 – 225 271 – 278
III	2	XI	Sec: 11.9 – 11- 13	369 – 389
IV	3	V	Sec: 2 – 4	203 - 222
V	3	VII	Sec: 2 - 5	278 - 290

References:

3. Statistics - M. Sivathanupillai
4. Ancillary Maths - P.R.,Vittal, Margam Publications.

Web Resources:

4. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC374386/#:~:text=Correlation%20quantifies%20the%20strength%20of,the%20form%20of%20an%20equation.
5. https://www.lkouniv.ac.in/site/writereaddata/siteContent/202004032250572068siddharth_bhatt_engg_Numerical_Solution_of_Ordinary_Differential_Equations.pdf
6. https://www.maths.tcd.ie/~richardt/2E1/2E1-ch3.pdf

Pedagogy: Teaching / Learning methods:

Chalk and Board, Virtual Class room, LCD projector, Video Conference, Guest Lectures, Tutorial, Assignment, Seminar. Library, Net Surfing, NPTEL Course Materials, Use of Mathematical software.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	State definitions and relevant concepts	**K1**
CO2	Compare exact solution and numerical solution	**K2**
CO3	Solve ordinary differential equations numerically	**K3**
CO4	Compute correlation and regression coefficients	**K4**
CO5	Evaluate double and triple integrals	**K5**

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	2	3	3	3	3	3	3	3
CO2	3	3	2	3	3	2	3	3	2	3
CO3	3	2	3	2	2	2	2	3	3	2
CO4	2	3	3	2	1	3	1	2	2	2
CO5	2	3	2	3	2	3	3	3	3	1

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	2	3	2	3	3
CO2	3	2	3	2	3	2	3
CO3	2	3	2	3	2	3	3
CO4	3	3	3	2	3	2	3
CO5	3	3	3	3	2	3	2

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
II	**23U2PHMAA3**	**Allied: MATHEMATICS – III**	**5**	**3**

Nature of the course

Employability Oriented	√	Relevant to Local need		Addresses Gender Sensitization	
Entrepreneurship Oriented		Relevant to regional need		Addresses Environment and Sustainability	
Skill development Oriented	√	Relevant to national need		Addresses Human Values	
		Relevant to Global development need	√	Addresses Professional Ethics	

Course Objectives

The main objectives of this course are:

1. To introduce various methods to solve the partial differential solution.
2. To teach the concept of curl & divergence of vector field
3. To introduce the concept of Laplace transforms and Fourier series.

SYLLABUS

Unit	Content	No. of Hours
I	**Ordinary Differential Equation:** Variable Separable – Homogeneous equations – Non – homogeneous equations of the first degree in x & y – Linear equation – Bernoulli's equation – Exact differential of equations	**15**
II	**Vector differentiation:** Vector differential operator – Gradient – Direction and magnitude of gradient – Divergence and curl– Formulae involving operator ∇.	**15**
III	**Vector integration:** Surface Integral –Guass Divergence theorem – Stoke's theorem (without proof)	**15**
IV	**Laplace Transforms**: Definition – Results and proofs: Laplace Transform of functions f(t) + g(t), cf(t), f'(t), f'' (t), e^{at}, coshat, sinhat, cosat, sinat,t^n- some general theorems – Inverse transforms relating to the above standard forms - solution of ordinary differential equation with constant coefficients.	**15**
V	**Fourier Series**:Definition – finding Fourier coefficients for the given periodic function with period 2π - Even and odd functions – Properties of odd and even functions. ***Self-study: Half range Fourier series***	**15**

Note:** Questions may be asked from the ***Self-study content for only CIA test (Mid and End semesters) and **NOT** for the external (Semester Examinations)

Textbook:

Ancillary Mathematics, Volume-II, *S. Narayanan, R. HanumanthaRao, T.K.ManicavachagomPillay, S. Viswanathan Printers Pvt. Ltd., 2015*

Unit	Chapter	Sections
I	Chapter 4	Pages : 205 to 225, Sec : 1 to 6
II	Chapter 8	Pages : 335 to 357, Sec : 16 to 21
III	Chapter 8	Pages : 377 to 389, 399 to 407, Sec. 5 to 6 & 9
IV	Chapter 7	Pages : 289 to 310, Sec: 1 to 5
V	Chapter 2	Pages : 123 to 143, Sec.1 to 4

References:

1. *Engineering Mathematics – A Singaravelu(Volume I & II)*
2. *Vector Calculus – K.Viswannathan and S.Selvaraj*
3. *Ancillary Mathematics – P.R.Vittal, Margam Publications*

Web resources:

1. **https://archive.nptel.ac.in/courses/111/106/111106148/**
2. https://www.youtube.com/watch?v=f5WNaV4nwiQ
3. https://youtu.be/rCw-FVegWJA

Pedagogy: Teaching / Learning methods:

Chalk and Board, Virtual Class room, LCD projector, Video Conference, Guest Lectures, Tutorial, Assignment, Seminar.Library, Net Surfing, NPTEL Course Materials, Use of Mathematical software.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Know the concept of homogeneous and non homogeneous equations of first degree in x and y	**K2,K4**
CO2	Classify the method of finding gradient ,divergence and curl	**K4**
CO3	Classify the method of Surface integral ,Guass Divergence and Stoke's theorems	**K4**
CO4	Solve the problems using Laplace and its inverse transforms	**K4**
CO5	Find the problems using Fourier series	**K3,K5**

Cognitive Level:K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	2	3	3	3	3	3	3	3
CO2	3	3	3	2	3	2	3	3	2	3
CO3	2	1	3	3	2	2	2	3	3	2
CO4	2	3	3	3	1	3	3	3	2	2
CO5	3	2	1	3	2	3	1	3	3	1

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	2	3	3	3	3
CO2	3	3	3	3	3	3	3
CO3	3	2	3	3	3	2	3
CO4	2	3	3	1	3	3	3
CO5	2	1	3	3	3	1	3

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
III	**23U3PHT3**	**பொதுத் தமிழ் – 3**	**6**	**3**

Nature of the Course

1.Employablity Oriented வேலை வாய்ப்புச் சார்ந்தது		7. Addresses Professional Ethics தொழில் நெறிமுறைகளை நிறைவு செய்தல்	✓
2. Entrepreneurship Oriented தொழில் முனைவு சார்ந்தது		8.Relevent To Local Need உள்ளூர் தேவைகளோடு தொடர்புடையது	✓
3. Skill Development Oriented திறன்மேம்பாடு சார்ந்தது	✓	9. Relevent To Regional Need மண்டல அளவிலான தேவைகளோடு தொடர்புடையது	
4. Addresses Gender Sensitization பாலின உணர்திறன் பூர்த்தி செய்தல்		10. Relevent To National Need தேசிய அளவிலான தேவைகளோடு தொடர்புடையது	
5. Addresses Environment and Sustainablity சுற்றுச் சூழல் மற்றும் நிலைத் தன்மை நிறைவு செய்தல்		11. Relevent To Global Development Need உலக அளவிலான தேவைகளோடு தொடர்புடையது	
6. Addresses Human Values மனித மதிப்புகளை நிறைவு செய்தல்	✓		

Course Objectives

1. இலக்கியங்களின் சிறப்பினை உணர்த்துதல்.
2 .காலந்தோறும் எழுந்த காப்பியங்களின் போக்கையும், புதினத்தின் இலக்கிய வடிவத்தை மாணவர்கள் உணருமாறு செய்தல்.
3. யாப்பு, அணி போன்ற இலக்கிய வகைகளையும் மொழி பெயர்ப்புத் திறனையும் மாணவர்கள் உணருமாறு செய்தல்.
4. தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்பக் கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்.

Unit	Details	Hours
Unit-I	பெருங்காப்பியங்கள் *1.சிலப்பதிகாரம் - வழக்குரைகாதை-இளங்கோவடிகள்* *2.மணிமேகலை ஆதிரை பிச்சையிட்ட காதை சீத்தலைச்சாத்தனார்* *3.சீவகசிந்தாமணி - பூமகள் இலம்பகம் திருத்தக்கதேவர்* *4.வளையாபதி—நாதகுத்தனார்*	**18 Hrs**
Unit-II	சமயக் காப்பியங்கள் *1.பெரியபுராணம் - பூசலார் நாயனார்புராணம்-சேக்கிழார்* *2.கம்பராமாயணம்- மந்தரை சூழ்ச்சிப் படலம்-கம்பர்* *3.வில்லிபாரதம் - மற்போர் சருக்கம்-வில்லிப்புத்தூராழ்வார்* *4.சீறாப்புராணம் - புலி வசனித்த படலம்-உமறுப்புலவர்*	**18 Hrs**

Unit-III	புதினம் *1.*வஞ்சிமாநகரம் *(*வரலாற்றுப் புதினம்*)* -நா. பார்த்தசாரதி	**18 Hrs**
Unit-IV	*1.*பாடம் தழுவிய இலக்கிய வரலாறு *2.*குரல் கொடுக்கும் வானம்பாடி - கேட்டிவி	**18 Hrs**
Unit-V	மொழித்திறன்/போட்டித் தேர்வுத் திறன் *1.* நூல் மதிப்புரை *2.* திறனாய்வு செய்தல் *3.* கடிதம் வரைதல் *4.* விண்ணப்பம் எழுதுதல்	**18 Hrs**

CO Number	CO Statement	Cognitive Level
CO1	காப்பியங்கள் அறிமுகப்படுத்தப்படுவதால் தமிழ் மொழியின் உயர்வையும் சிறப்பையும் உணர்தல்.	**K1, K2**
CO2	தமிழ்ப் புதினங்களின்வழி சமகாலப் படைப்புகளின் வாழ்வியல் சிந்தனைகளை அறிந்து கொள்வர்.	**K2**
CO3	நாவல் இலக்கியம் அறிமுகப்படுத்தப்படுவதால் சிந்தனை ஆற்றல், படைப்பாற்றல், கற்பனைத்திறன் வளர்தல்.	**K4**
CO4	யாப்பு, அணி இலக்கணங்கள், மொழிபெயர்ப்புத்திறன் ஆகியவற்றைக் கற்பதன் மூலம் போட்டித் தேர்வுகளை எதிர் கொள்ளுதல்.	**K3**
CO5	காப்பியங்கள் அறிமுகப்படுத்தப்படுவதால் தமிழ் மொழியின் உயர்வையும் சிறப்பையும் உணர்தல்.	**K4**

Text Books

1. தமிழ் இலக்கிய வரலாறு -செம்பதிப்பு- பெ.சுபாஷ் சந்திரபோஸ்

பார்வை நூல்கள்

1. தமிழ் இலக்கிய வரலாறு - சிற்பி.பாலசுப்பிரமணியன்

2. புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு - தமிழண்ணல்

3. வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு - எஃப்.பாக்கியமேரி

Web Resources

Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc.)

1. Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org> Tamil virtual University Library-
2. www.tamilvu.org/ library
3. http://www.virtualvu.org/library Project Madurai - www.projectmadurai.org.
4. Chennai Library- www.chennailibrary.com <http://www.chennailibrary.com>.
5. Tamil Universal Digital Library- www.ulib.prg <http://www.ulib.prg>.
6. Tamil E-Books Downloads- tamale books downloads. blogspot.com
7. Tamil Books on line- books. tamil cube.com
8. Catalogue of the Tamil books in the Library of British Congress archive.org
9. Tamil novels on line - books.tamilcube.com

பொதுத் தமிழ் —3												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**
CLO1	3	2	3	3	3	2	2	2	3	2	3	2
CLO2	3	3	2	2	2	3	2	3	2	3	2	2
CLO3	2	2	2	3	2	3	3	2	2	2	2	3
CLO4	3	2	2	2	3	2	3	3	2	3	3	3
CLO5	2	2	2	3	2	3	2	3	3	2	3	3

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
III	**23U3PHE3**	**PART - II GENERAL ENGLISH**	**6**	**3**

Learning Objectives	
LO1	To make students realize the importance of resilience
LO2	To enable them to become good decision makers
LO3	To enable them to imbibe problem-solving skills
LO4	To enable them to usetenses appropriately
LO5	To help the muse English effectively at the work place.

Unit No.	**Unit Title &Text**	**No.of Periods for the Unit**
I	**ACTIVE LISTENING** **Short Story** Ina Grove–Akutagawa Ryunosuke Translated from Japanese by TakashiKojima The Gift of the Magi – O' Henry **Prose** Listening – Robin Sharma Nobel Prize Acceptance Speech –Wangari Maathai	**20**
II	**INTERPERSONAL RELATIONSHIPS** **Prose** Telephone Conversation–Wole Soyinka Of Friendship – Francis Bacon **Songon (Motivational/ Narrative)** Ulysses–Alfred Lord Tennyson And Still IRise– MayaAngelou	**20**
III	**COPING WITH STRESS** **Poem** Leisure– W.H. Davies Anxiety Monster– Rhona McFerran **Readers Theatre** The Forty Fortunes: A Tale of Iran Where thereisa Will–Mahesh Dattani	**20**
IV	**Grammar** Phrasal Verb & Idioms Modals and Auxiliaries VerbPhrases–Gerund, Participle, Infinitive	**15**
V	**Composition/Writing Skills** Official Correspondence–Leave Letter, Letter of Application, Permission Letter Drafting Invitations Brochures for Programmes and Events	**15**

Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	Listen actively	PO1,PO7
CO2	Develop interpersonal relationship skills	PO1,PO2,PO10
CO3	Acquire self-confidence to cope with stress	PO4,PO6,PO9
CO4	Master grammar skills	PO4,PO5,PO6
CO5	Carryout business communication effectively	PO3,PO8

Text Books (Latest Editions)

1	Wangari Maathai–Nobel Lecture. Nobel Prize Outreach AB 2023.Jul 2023.
2	Mahesh Dattani,Where there is W ill. Penguin, 2013.
3	Martin Hewings, Advanced English Grammar, Cambridge University Press,2000
4	Essential English Grammar by Raymond Murphy

Web Resources

1	WangariMaathai–NobelLecture.NobelPrizeOutreachAB2023.Mon.17Jul 2023. https://www.nobelprize.org/prizes/peace/2004/maathai/lecture/
2	TelephoneConversation-Wole Soyinka https://www.k-state.edu/english/westmank/spring_00/SOYINKA.html
3	Anxiety Monster- RhonaMcFerran- www.poetrysoup.com

Mapping with Programme Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3

3– Strong, 2– Medium, 1 -Low

Mapping with Programme Specific Outcomes:

CO /PO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3
Weight age	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
III	**23U3PHC3**	**Heat, Thermodynamics and Statistical Mechanics**	**7**	**5**

Nature of the course

Employability Oriented		Relevant to Local need	√
Entrepreneurship Oriented		Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics			

Course Objectives

The main objectives of this course are:

1. To know the specific heat capacity of gases and to study about the liquefaction of gases.
2. To give knowledge about the construction and working of petrol and diesel engine.
3. To give a detail knowledge about the laws of thermodynamics, reversible and irreversible processes and T-S diagram
4. To acquire knowledge about the various modes of transfer of heat
5. To study the properties of macroscopic systems using different statistical mechanics.

SYLLABUS

Unit	Content	No. of Hours
I	**CALORIMETRY:** specific heat capacity – specific heat capacity of gases C_P& C_V– Meyer's relation – Joly's method for determination of C_V – Regnault's method for determination of C_P **LOW TEMPERATURE PHYSICS:** Joule-Kelvin effect – porous plug experiment – Joule-Thomson effect –Boyle temperature – temperature of inversion – liquefaction of gas by Linde's Process – liquefaction of helium-Kammerling-Onne's method - adiabatic demagnetisation.	21
II	**THERMODYNAMICS-I:** zeroth law and first law of thermodynamics – P-V diagram – heat engine – efficiency of heat engine – Carnot's engine, construction, working and efficiency of petrol engine and diesel engines – comparison of engines.	21
III	**THERMODYNAMICS-II:** second law of thermodynamics –entropy of an ideal gas – entropy change in reversible and irreversible processes – T-S diagram –thermodynamical scale of temperature – Maxwell's thermodynamical relations –Clasius-Clapeyron's equation (first latent heat equation) – third law of thermodynamics – unattainability of absolute zero – heat death.	21

IV	**HEAT TRANSFER:** Modes of heat transfer: conduction, convection and radiation. *Conduction*: thermal conductivity – determination of thermal conductivity of a good conductor by Forbe's method – determination of thermal conductivity of a bad conductor by Lee's disc method. *Radiation*: black body radiation (Ferry's method) – distribution of energy in black body radiation – Wien's law and Rayleigh Jean's law – Planck's law of radiation – Stefan's law – deduction of Newton's law of cooling from Stefan's law.	21
V	**STATISTICALMECHANICS:** definition of phase-space – micro and macro states – ensembles –different types of ensembles – classical and quantum Statistics – Maxwell-Boltzmann statistics – expression for distribution function – Bose-Einstein statistics – expression for distribution function – Fermi-Dirac statistics –expression for distribution function – comparison of three statistics.	21

Text Books

1. Brijlal& N. Subramaniam, 2000, Heat and Thermodynamics, S.Chand& Co.
2. Narayanamoorthy&KrishnaRao, 1969,Heat,Triveni Publishers, Chennai.
3. V.R.Khanna&R.S.Bedi, 1998 1st Edition, Text book of Sound, Kedharnaath Publish & Co, Meerut
4. Brijlal and N. Subramanyam, 2001, Waves and Oscillations,Vikas Publishing House, New Delhi.
5. Ghosh, 1996, Text Book of Sound, S.Chand&Co.
6. R. Murugeshan&KiruthigaSivaprasath, Thermal Physics,S. Chand & Co.

References

1. J.B.Rajam& C.L.Arora, 1976, Heat and Thermodynamics, 8th edition, S.Chand& Co. Ltd.
2. D.S.Mathur, Heat and Thermodynamics, Sultan Chand & Sons.
3. Gupta, Kumar, Sharma, 2013, Statistical Mechanics, 26th Edition, S. Chand & Co.
4. Resnick, Halliday&Walker,2010, Fundamentals of Physics, 6th Edition.

Sears, Zemansky, Hugh D. Young,Roger A. Freedman, 2021 University Physics with Modern Physics 15th Edition, Pearson.

Web Resources

1. https://youtu.be/M_5KYncYNyc
2. https://www.youtube.com/watch?v=4M72kQulGKk&vl=en

COURSE OUTCOMES:

At the end of the course, the student will be able to:

COURSE OUT COMES	**CO1**	Acquires knowledge on how to distinguish between temperature and heat. Introduce him/her to the field of thermometry and explain practical measurements of high temperature as well as low temperature physics. Student identifies the relationship between heat capacity, specific heat capacity. The study of Low temperature Physics sets the basis for the students to understand cryogenics, superconductivity, superfluidity and Condensed Matter Physics	K1,K2, K3
	CO2	Derive the efficiency of Carnot's engine. Discuss the implications of the laws of Thermodynamics in diesel and	K1,K2, K4

		petrol engines	
	CO3	Able to analyze performance of thermodynamic systems viz efficiency by problems. Gets an insight into thermodynamic properties like enthalpy, entropy	K1,K2, K4
	CO4	Study the process of thermal conductivity and apply it to good and bad conductors. Quantify different parameters related to heat, relate them with various physical parameters and analyse them	K1,K2, K3,K4
	CO5	Interpret classical statistics concepts such as phase space, ensemble, Maxwell-Boltzmann distribution law. Develop the statistical interpretation of Bose-Einstein and Fermi-Dirac. Apply to quantum particles such as photon and electron	K1,K2

Cognitive Level : K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	3	2	3
CO2	3	3	3	3	3	2	2
CO3	3	3	3	3	3	2	2
CO4	3	3	3	3	3	3	3
CO5	3	3	2	2	2	2	2

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
III	**23U3PHCP3**	**Major Practical - III**	**3**	**3**

Nature of the course

Employability Oriented		Relevant to Local need	√
Entrepreneurship Oriented	√	Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics			

Course Objectives

The main objectives of this course are to:

1. To gain knowledge on concept of heat and sound waves.
2. To give practical skill to find the thermal conductivity of a bad and good conductor.
3. To gain in-depth knowledge about resonance, frequency using sonometer and to verify theories.

Any Eight Experiments

1. Determination of specific heat by cooling – graphical method.
2. Determination of thermal conductivity of good conductor by Searle's method.
3. Determination of thermal conductivity of bad conductor by Lee's disc method.
4. Determination of specific heat of liquid by Joule's electrical heating method (applying radiation correction by Barton's correction/graphical method),
5. Determination of Latent heat of a vaporization of a liquid.
6. Determination of Stefan's constant for Black body radiation.
7. Verification of Stefan's-Boltzmans law.
8. Determination of thermal conductivity of rubber tube.
9. Velocity of sound through a wire using Sonometer.
10. Determination of velocity of sound using Kunds tube.
11. To verify the laws of transverse vibration using sonometer.
12. To verify the laws of transverse vibration using Melde's apparatus.
13. Frequency of AC by using sonometer.

Course Outcomes

On completion of this course, students will be able to

CO1	Acquire skills on carrying out experiments to find the specific heat of liquid	K1,K2,K3
CO2	Determine the thermal conductivity of bad and good conductor using different experiment.	K1,K2,K3
CO3	Determine the stefan's constant for black body radiation.	K1,K2,K3
CO4	Determine the velocity of sound	K1,K2,K3
CO5	Verify the laws of transverse vibration using sonometer	K1,K2,K3

Cognitive Level : K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
III	**23U3PHCHA1**	**Allied Chemistry –I (For physicists)**	**5**	**4**

Objective of the course	The courseaimsatgivinganoverallviewofthe 1. the concepts of atomic structure and nature of chemical bonding 2. know about the chemical kinetics and types of chemical reaction 3. about application of acids and bases 4. study the drugs and separation techniques 5. detail study of organic compound mechanism of hybridization.
Course Outline	**Unit –I** **Atomic Structure :** Atomic number and mass number – isotopes (hydrogen, oxygen , chlorine and uranium) - Orbit and orbital – shapes of s, p, d orbitals - Aufbau principle Hund's rule – electronic configuration of hydrogen carbon, nitrogen, oxygen, - stability of half filled and completely filled orbitals with the examples if Cr, Cu and Ag. **Types of chemical bonds** : Octet rule – formation of ionic, covalent , co-ordinate covalent bond with the examples of NaCl, H_2, Cl_2, HF molecules and BF_3 – NH_3 . VSEPRtheory -shapes of $BeCl_2$, BF_3, H_2O, PCl_5, XeF_6 – inter and intra molecular hydrogen bonds and their consequences.
	Unit -II **Kinetics:** Definition with suitable examples of rate, rate law, rate constants, order, molecularity, pseudo firs order and half life period - factors that influence the rate of chemical reactions – effect of temperature on rate . **Catalysis**: General characteristics of a catalyst –types (homogeneous & heterogeneous, positive & negative and enzyme) – catalytic promoter and catalytic poisoning - intermediates compound theory and adsorption theory. **Energetics:** Heat units - concept of internal energy, enthalpy, entropy – exothermic and endothermic reactions
	Unit –III **Acid – base concept**: Arrhenius, Lowry – Bronsted and Lewis concepts – strong & weak acids - pH, buffer solution – buffer action. **Colloids:** Types- properties (Tyndall effect, Brownian movement, electrophoresis , elect osmosis) – purification by dialysis and ultrafilltration. Types of emulsions and gels. **Water chemistry**: Hard water – soft water, temporary and permanent Hardness – removal of hardness by reverse osmosis and ion exchange method. **Soaps and detergents** – cleaning action of soap - -merits and demerits of soap and detergent

	Unit - IV **Separation and purification techniques:** Solvent extraction with Soxhlet apparatus - crystallization, fractional crystallization, distillation, fractional distillation, steam distillation with suitable examples. **Chromatography**: adsorption and partition principles – column (preparation of column, development and elution), paper (sampling, ascending & descending developments, $R_f$values) and TLC (preparation of plate, sampling, ascending & descending developments) chromatography.
	Unit -V **Organic compounds**: Classification - functional groups – nomenclature of simple organic compounds. **Isomerism** : Definition – types (structural & stereo) - position, chain, functional isomerism and metamersm shown by butyl alcohol - Geometrical isomerism exhibited by maleic &fumaric acids - optical activity – condition for optical activity - optical isomerism exhibited by lactic acid & tartaric acid – racemisation – resolution . **Hybridisation of carbon**: SP^3, SP^2, & SP hybridization with geometry citing examples
Recommended Text	1. Text Book of Ancillary Chemistry,**V.Veeraiyan** et al,revised edition, 1997. 2. Allied Chemistry, **R. Gopalan** and **S. Sundaram,** , S. Chand & Sons, 2nd edition, 1993.
Reference Books	1. Puri B.R. Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry, Milestone Publishers, Delhi (2008) 2. PuriB.R..,Sharma L.R., Pathania M.S., Principles of Physical Chemistry, Vishal PublishingCo., Jalandar, (2004) 3. Bahl B.S. ArunBahl, Advanced Organic Chemistry, S. Chand & Company ltd., New Delhi, (2005). 4. Usharani S., Analytical Chemistry, Macmillian India Ltd., NewDelhi (2000)
Website and e-learning source	**1.https://gascnagercoil.in/wp-content/uploads/2020/12/allied-chemistry-book.pdf** **2**https://lngovernmentcollege.com/chemistry-notes/ **3 https://chemistrynotes.com**

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	explain the electronic study of atoms and properties of bonding.	**K1**
CO2	Apply the concept of chemical kinetics and predict the rate of reaction.	**K2**
CO3	Identify the concept of acid and bases.	**K3**
CO4	find organic and function and drugs.	**K5**
CO5	the organic compound and explain the hybridization of molecule.	**K4**

Cognitive Level:K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

CO-PO Mapping (CourseArticulationMatrix)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	**S**	**S**	**S**	**S**	**M**	**S**	**S**
CO2	**M**	**S**	**S**	**S**	**S**	**M**	**S**
CO3	**S**	**S**	**M**	**S**	**S**	**S**	**S**
CO4	**M**	**S**	**S**	**S**	**S**	**M**	**S**
CO5	**M**	**S**	**M**	**S**	**S**	**M**	**S**

S– Strong M– Medium L – Low

Level of Correlation between PSO's and CO's

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
III & IV	**23U4PHCHAPL**	**Allied chemistry practical** (Non – semester)	**3+3**	**3**

Objectives of the course are to	Thecourseaimsatgivinganoverallviewofthe • acquire a practical knowledge on volumetric analysis • Students learn the techniques of organic qualitative analysis.
Course Outline	**A. Volumetric Analysis** 1. Estimation of HCl (or H_2SO_4) by NaOH using a standard oxalic acid solution 2. Estimation of NaOH by H_2SO_4 (or HCl) using a standard Na_2CO_3 solution 3. Estimation of oxalic acid by $KmnO_4$ using a standard Mohr's salt solution 4. Estimation of Ferrous sulphate by $KmnO_4$ using a standard oxalic acid solution. 5. Estimation of Mohr's salt by $KmnO_4$ using a standard oxalic acid solution. 6. Estimation of KMnO4 by thio using a standard $K_2Cr_2O_7$ solution. 7. Estimation of $K_2Cr_2O_7$ by thio using a standard $CuSO_4$ solution 8. Estimation of $CuSO_4$ by thio using a standard $K_2Cr_2O_7$ solution **B. Organic qualitative analysis** Systematic analysis of an organic compound , Preliminary tests, detection of element present, Aromatic or aliphatic, Saturated or unsaturated, nature of the functional group and exhibiting confirmatory tests for given organic compounds. **The following substance are prescribed:** Benzoic Acid , Cinnamic acid, Phenol , Cresol, Aniline ,Toludine, Urea, Benzaldehyde, Glucose
Reference Books	1. Venkateswaran V. Veerasamy R. Kulandaivelu A.R., Basic principles of Practical Chemistry, 2nd edition, Sultan Chand & sons, New Delhi, (1997)

Course Outcomes (for Mapping with POs and PSOs)

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	acquire a practical knowledge on volumetric analysis	**K1**
CO2	gain knowledge on Dichrometry titration	**K3**
CO3	the techniques of organic qualitative analysis.	**K2**
CO4	Find out the functional group	**K5**
CO5	Detect the element present in a compounds	**K6**

Cognitive Level: **K1 -** Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

CO-POMapping (CourseArticulationMatrix)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S	S	S	S	S	S	S
CO2	M	S	S	S	M	S	S
CO3	S	S	S	M	S	S	S
CO4	S	S	S	S	S	S	S

S– Strong **M– Medium** **L – Low**

Level of Correlation between PSO's and CO's

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
IV	**23U4PHT4**	**பொதுத் தமிழ் – 4**	**6**	**3**

Nature of the Course

1.Employablity Oriented *வேலை வாய்ப்புச் சார்ந்தது*		7. Addresses Professional Ethics *தொழில் நெறிமுறைகளை நிறைவு செய்தல்*	
2. Entrepreneurship Oriented *தொழில் முனைவு சார்ந்தது*		8.Relevent To Local Need *உள்ளூர் தேவைகளோடு தொடர்புடையது*	✓
3. Skill Development Oriented *திறன்மேம்பாடு சார்ந்தது*	✓	9. Relevent To Regional Need *மண்டல அளவிலான தேவைகளோடு தொடர்புடையது*	
4. Addresses Gender Sensitization *பாலின உணர்திறன் பூர்த்தி செய்தல்*		10. Relevent To National Need *தேசிய அளவிலான தேவைகளோடு தொடர்புடையது*	
5. Addresses Environment and Sustainablity *சுற்றுச் சூழல் மற்றும் நிலைத் தன்மை நிறைவு செய்தல்*	✓	11. Relevent To Global Development Need *உலக அளவிலான தேவைகளோடு தொடர்புடையது*	
6. Addresses Human Values *மனித மதிப்புகளை நிறைவு செய்தல்*	✓		

Course Objectives

1. சங்க இலக்கியத்தின் சிறப்பையும், நாடகம் என்னும் இலக்கிய வகையின் தன்மையையும் அகத்திணை, புறத்திணை இலக்கணங்களையும் மாணவர்களுக்கு அறிமுகப்படுத்துதல்.
2. தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்பக் கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்.
3.சங்க இலக்கியத்தில் காணப்பெறும் வாழ்வியல் சிந்தனைகளை அறிந்து கொள்வர்.
4.தமிழின் தொன்மையையும், செம்மொழித் தகுதியையும் அறிந்து கொள்ளுதல்.

Unit	Details	Hours
Unit-I	*எட்டுத்தொகை 1* *நற்றிணைஎ (10, 14, 16), குறுந்தொகை (16, 17, 19, 20, 25, 29, 38, 440* *கலித்தொகை (38, 51),அகநானூறு(15, 33, 55,) புறநானூறு (37, 86, 112,)* *பரிபாடல் —55*	**18 Hrs**
Unit-II	*எட்டுத்தொகை 2* *நெடுநல்வாடை-நக்கீரர்*	**18 Hrs**
Unit-III	*நாடகம் - சபாபதி-பம்மல் சம்பந்த முதலியார்*	**18 Hrs**
Unit-IV	*1.பாடம் தழுவிய இலக்கிய வரலாறு* *2.பயணங்கள் தொடரும் - கேட்டிவி*	**18 Hrs**

Unit-V	*1. மொழிபெயர்ப்பு / கலைச்சொற்கள்* *2. கொடுக்கப்பட்டுள்ள ஆங்கிலப்பகுதியைத் தமிழில் மொழிபெயர்த்தல்* *3. அலுவலகத் கடிதம் - தமிழில் மொழிபெயர்த்தல்*	**18 Hrs**

CO Number	CO Statement	Cognitive Level
CO1	*சங்க இலக்கியத்தில் காணப்பெறும் வாழ்வியல் சிந்தனைகளை அறிந்து கொள்வர்.*	**K1, K2**
CO2	*தமிழின் தொன்மையையும், செம்மொழித் தகுதியையும் அறிந்து கொள்ளுதல்.*	**K2**
CO3	*நாடக இலக்கியம் மூலம் நடிப்பாற்றலையும். கலைத்தன்மையையும், படைப்பாற்றலையும் வளர்த்தல்.*	**K4**
CO4	*தமிழிலிருந்து அலுவலகக் கடிதங்களை மொழிபெயர்க்கும் அறிவைப் பெறுவர்.*	**K3**
CO5	*மொழியறிவோடு வேலை வாய்ப்பினைப் பெறுதல்.*	**K4**

Text Books

1. தமிழ் இலக்கிய வரலாறு -செம்பதிப்பு- பெ.சுபாஷ் சந்திரபோஸ்

பார்வை நூல்கள்.

2. தமிழ் இலக்கிய வரலாறு - சிற்பி.பாலசுப்பிரமணியன்.

3. புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு - தமிழண்ணல்

4. வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு - எஃப்.பாக்கியமேரி

Web Resources

Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc.)

1. Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org> Tamil virtual University Library-
2. www.tamilvu.org/ library
3. http://www.virtualvu.org/library Project Madurai - www.projectmadurai.org.
4. Chennai Library- www.chennailibrary.com <http://www.chennailibrary.com>.
5. Tamil Universal Digital Library- www.ulib.prg <http://www.ulib.prg>.
6. Tamil E-Books Downloads- tamilebooks downloads. blogspot.com
7. Tamil Books on line- books.tamil cube.com
8. Catalogue of the Tamil books in the Library of British Congress archive.org
9. Tamil novels on line - books.tamilcube.com

பொதுத்தமிழ் —4												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CLO1	3	2	3	3	3	2	2	2	3	2	3	2
CLO2	3	3	2	2	2	3	2	3	3	2	2	2
CLO3	3	2	3	3	2	2	2	3	2	3	3	2
CLO4	2	3	3	2	2	2	3	2	3	2	3	3
CLO5	3	3	2	2	2	3	3	2	2	2	3	3

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
IV	**23U4PHE4**	**PART - II** **GENERAL ENGLISH**	**6**	**3**

Learning Objectives		
LO1	To make students realize the importance of resilience	
LO2	To enable them to become good decision makers	
LO3	To enable them to imbibe problem-solving skills	
LO4	To enable them to usetenses appropriately	
LO5	To help the muse English effectively at the work place.	
Unit No.	**Unit Title &Text**	**No.of Periods for the Unit**
I	**GOALSETTING(UNICEF)** **Life Story** From Chinese Cinderella–Adeline Yen Mah Why I Write- George Orwell **Short Essay** On Personal Mastery–Robin Sharma On the Love of Life – William Hazlitt	**20**
II	**INTEGRITY** **Short Story** The Taxi Driver – K.S. Duggal Kabuliwala -Rabindranath Tagore A Retrieved Reformation –O Henry **Extract from a play** The Quality of Mercy (Trial Scene from the Merchant of Venice - Shakespeare)	**20**
III	**COPING WITH EMOTIONS** **Poem** Pride – Dahlia Ravikovitch Phenomenal Woman – Maya Angelou **Reader's Theatre** The Giant's Wife A Tall Tale of Irel and–William Carleton The Princess and the God :A Tale of Ancient India	**20**
IV	**Language Competency Sentences** Simple Sentences Compound Sentences Complex Sentences **Direct and Indirect Speech**	**15**
V	**Report Writing** Narrative Report Newspaper Report **Drafting Speeches** Welcome Address Vote of Thanks	**15**

Course Outcomes

Course Outcomes	On completion of this course, students will;	
CO1	Determine their goals	PO1,PO7
CO2	Identify the value of integrity.	PO1,PO2,PO10
CO3	Deal with emotions.	PO4,PO6,PO9
CO4	Frame grammatically correct sentences	PO4,PO5,PO6
CO5	Write cohesive reports.	PO3,PO8

Text Books (Latest Editions)

1	Oxford Practice Grammar, John Eastwood, Oxford University Press
2	Cambridge Grammar of English, Ronald Carter and Michael McCarthy
3.	George Orwell Essays, Penguin Classics

Web Resources

1	http:/www.gradesaver.com/George-orwell-essays/study/summary
2	O' Henry. A Retrieved Reformation. https://americanenglish.state.gov/files/ae/resource_files/a-retrieved-reformation.pdf
	Maya Angelou. Phenomenal Woman. https://www.poetryfoundation.org/poems/48985/phenomenal-woman
3	The Quality of Mercy, https://poemana1ysis.com
4	https://www'.oxfordscho1ar1yeditions.coin/disp1ay/10.1093/actrade/9780199235742.book.1/actrade-9780199235742-div1-106-WilliamHazilitt

Mapping with Programme Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3

3–Strong, 2–Medium, 1–Low

Mapping with Programme Specific Outcomes:

CO /PO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3
Weight age	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
IV	**23U4PHC4**	**Optics and Spectroscopy**	**5**	**5**

Nature of the course

Employability Oriented		Relevant to Local need	√
Entrepreneurship Oriented		Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics			

Course Objectives

The main objectives of this course are:

1. To understand the concept of aberrations in lenses and prisms, Phenomenon like interference, diffraction, polarization through wave nature of light and its applications.
2. To acquire the knowledge about optical instruments.
3. To provide a good platform in the field of Optics.
4. To provide a basic knowledge on the behavior of light energy and their propagation.
5. To gain knowledge in spectroscopy.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**LENS AND PRISMS**: Postulates of geometrical optics – thick and thin lenses –Magnification, power- focal length. Lens: lens makers formula (no derivation) – aberrations: spherical aberration, coma, and astigmatism– – distortion – chromatic aberrations methods. **Prism:** Dispersion, deviation, aberrations - applications rainbows and halos. **Eyepieces:** Advantage of an eyepiece over a simple lens – Huygen's and Ramsden's eyepieces, construction and working –merits and demerits of the eyepiece. **Resolving power:** Rayleigh's criterion for resolution – limit of resolution for the eye – resolving power of, (i) Prism (ii) grating (iii) telescope.	21
II	**INTERFERENCE:** Fresnel's biprism – interference in thin films due to, (i) reflected light, (ii) transmitted light – colours of thin films applications – air wedge – Newton's rings. **Interferometers**: Michelson's interferometer – applications, (i) determination of the wavelength of a monochromatic source of light, (ii) Fabry perot interferometer.	21

III	**DIFFRACTION:** Fresnel's assumptions – zone plate – action of zone plate for an incident spherical wave front – differences between a zone plate and a convex lens –Fresnel type of diffraction – diffraction pattern due to a straight edge – positions of maximum and minimum intensities – Fraunhofer type of diffraction – Fraunhofer diffraction at a single slit – plane diffraction grating– experiment to determine wavelengths – width of principal maxima.	21
IV	**POLARISATION:** Optical activity – polarizer and analyser–double refraction – optic axis, principal plane – Huygens's explanation of double refraction in uniaxial crystals – polaroids and applications – circularly and elliptically polarized light –quarter wave plate – half wave plate – production and detection of circularly and elliptically polarized lights – Fresnel's explanation – specific rotation – Laurent half shade polarimeter – experiment to determine specific rotatory power.	21
V	**SPECTROSCOPY**:Infra-red spectroscopy near infra-red and far infra-red – properties –origin of IRspectra – IR spectrophotometer – Scattering of light – Raman effect –classical theory –quantum theory –mutual exclusion principle – Raman spectrometer- characteristics of Raman lines – applications – ultraviolet and visible spectroscopy –properties – spectrophotometer.	21
Self study	Fermat's Principle of least time- curvature of the field- determination of the wavelength and separation D_1 and D_2 lines of sodium light-determination of a thickness of a mica sheet.	

Textbook:

1. A textbook of Optics–Subramanyam and Brijlal, S. Chandandco.,25th Edition, New Delhi 2004.
2. Optics and Spectroscopy–R. Murugeshan, S. Chandandco.,6thEdition, New Delhi, 2008.
3. Elements of Spectroscopy–S.L. Gupta, V. Kumar and R.C. Sharma Pragati Prakashan,13thEdition, Meerut,1997.
4. Molecular structure and spectroscopy–G. Arul dhass, PHI Pvt Ltd, II Edition, New Delhi, 2007

References:

1. Optics – Sathya Prakash, Ratan PrakashanMandhir, VIIth Edition, New Delhi.
2. Introduction to Molecular Spectroscopy – C.N. Banewell, TMH publishing co. IV Edition, New Delhi, 2006.
3. AjoyGhatak, optics, (TMH), New Delhi, Fourth Edition, 2009.
4. Singh & Agarwal, Optics and Atomic physics, Pragati prakashan Meerut, Nineth Edition 2002.
5. Fundamentals of Physics, by D. Halliday, R. Resnick and J. Walker, Wiley, 6th Edition, New York (2001).

Web resources:

1. https://optics.byu.edu/docs/opticsbook.pdf
2. https://users.physics.ox.ac.uk/~ewart/Optics%20Lectures%202007.pdf
3. https://www.hdki.hr/_download/repository/Pavia-Introduction-to-Spectroscopy%5B1%5D.pdf

Pedagogy: Teaching / Learning methods

- Lecture
- Tutorial
- Assignment
- PPT presentation
- Quiz
- Group Discussion
- e-content Seminar

Course Outcomes

On the successful completion of the course, students will be able to

CO	CO Statement	Cognitive Level
CO1	Acquire basic understand on various aspects of geometrical and wave optics.	K1, K2
CO2	Have the knowledge of geometric optics.	K2, K3
CO3	Study the phenomena of interference, diffraction, and polarization.	K3
CO4	Analyze and apply the concepts of dispersive power, refractive index, resolving, double refraction, specific rotation and optical pumping for different materials.	K4
CO5	Have the knowledge of spectroscopy which helps to extract the dynamic information about the molecules.	K1, K2, K3

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	3	3	3	2	3
CO2	2	1	3	3	3	1	2
CO3	3	3	3	3	3	1	2
CO4	3	2	3	3	3	1	2
CO5	3	3	3	3	3	1	1

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
IV	**23U4PHCIM**	**Industry Module Based Practical**	**3**	**4**

Nature of the course

Employability Oriented		Relevant to Local need	√
Entrepreneurship Oriented		Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics			

Course Objectives

The main objectives of this course are to:

1. To give practical skill to find the refractive index of the prism.
2. To find the thickness of a thin wire using optical experiment
3. To give knowledge about the dispersive power of prism and resolving power of grating and telescope

Any Eight Experiments

1. Determination of refractive index of prism using spectrometer.
2. Determination of refractive index of liquid using hollow prism and spectrometer
3. Determination of dispersive power of a prism.
4. Determination of radius of curvature of lens by forming Newton's rings.
5. Determination of thickness of a wire using air wedge.
6. Determination of Cauchy's Constants.
7. Determination of resolving power of grating
8. Determination of resolving power of telescope
9. Determination of refractive index of a given liquid by forming liquid lens
10. Determination of resolving power of Diffraction grating using Laser

Course Outcomes

On completion of this course, students will be able to

CO1	Acquire skills on carryout experiments to find the refractive index of a solid and hollow prism	K1,K2,K3
CO2	Determine the dispersive power of a prism	K1,K2,K3
CO3	Determine the cauchy's constants	K1,K2,K3
CO4	Determine the thickness of a wire using optical experiments	K1,K2,K3
CO5	Find the refractive index of a liquid lens	K1,K2,K3

Cognitive Level : K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	2	2	2
CO2	3	3	3	3	3	2	2
CO3	3	3	3	2	2	2	2
CO4	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
IV	**23U4PHCHA2**	**Allied Chemistry –II (For physicists)**	**5**	**3**

Objective of the course	The course aims at giving an over all view of the 1. the gain knowledge of chemical calculation. 2. industrial application of fertilizer and pesticides. 3. physical properties of solid and their application. 4. Fundamental concept of organic chemistry 5. terminology and important of drugs and the mode of action.
Course Outline	**Unit – I** **Concept of mole** : Definition of mole - Avagadro number - calculation of molecular masses of Urea, Glucose, HCI, H_2SO_4, NaOH, Na_2CO_3 and sucrose - Molar volume, equivalent masses of acid and base (HCI, H_2SO_4, NaOH, Na_2CO_3) **Concentration terms**: % by weight, molarity, molality, normality, mole fraction - simple problems to prepare different normal / molar solution for the substances NaOH and Glucose - simple problems to prepare different normal / molar solution from the given strength of solutions using $V_1V_2 = V_2N_2$ formula (for the HCI, H_2SO_4, NaOH, solutions). **Co-ordination compounds**: Double salts (Mohr's salt, potash alum) and complex salt – terminology in co-ordination chemistry – Werner's theory – IUPAC names simple co-ordination compounds –structure and uses of haemoglobin and chlorophyll.
	Unit – II **Industrial chemistry:** *Fertilizers*: Essential nutrients for plants –functions N,P,K nutrients- micronutrients and their role in plant life - formulae of urea, calcium superphosphate, super phosphate of lime, potassium sulphate - mixed fertilizers - *Pesticides*: Isecticides (stomach & contact poison and fumigant), fungicides, herbicides, rodenticides and their adverse effect – alternative methods for pest control - *Fuel Gases***:** Water gas, natural gas, bio gas and producer gas (no manufacture) **Electrochemistry**: specific conductivity – equivalent conductivity – effect of dilution – conductometric titrations – PH – buffer – calculation of pH using Henderson equation. **Photochemistry:** Lambert Law, Lambert. Beer's Law,Grothus – Drapper law – Quantum yield –photo sensitization
	Unit – III **Solid state :** Elements of symmetry - crystal lattices & unit cell -seven crystal systems – cubic unit cells (sc, bcc &fcc cubes) – elementary structure of NaCl crystal – structure of metal crystals (hcp, ccp, bcc structure) – crystal defects (vacancy, interstitial and impurity) **Alloys**: General methods of preparation of alloys – role of carbon in steel - heat treatment of steel – metallic bonding (electron sea model)

	Phase rule: Definitions of phase , component and degrees of freedom – one component system(sulphur) two component system (Pb – Ag)
	Unit – IV **Fundamental concepts in organic chemistry**: Homolytic and heterolytic fissions – substitution, addition, elimination, and condensation reactions, electrophiles- nucleophiles and free radicals with suitable examples. Mechanism of chlorination of CH_4 - Electron displacement effect- inductive andmesomericeffects. **Carbohydrates** : Definition -classification –D,L notations - mutarotation – invertsurar – reducing and non reducing sugars - structure of starch and cellulose(no structural elucidation)- Gun cotton, cellulose acetate and viscose rayon.
	Unit -V **Chemotherapy** : Drugs – sulpha drugs (structures of sulphapyridine,sulphadiazine, sulphaguanidine, sulphathiozole, sulphaacetamide)– mode of action – uses –Definition of antimalarials, antipyretics , analgesics tranquilizers and sedatives , anti septics and disinfectants – structure , uses and side effects of Aspirin, PharacetamolPhenacetin - local and general anesthetics - *Antibiotics* : Definition – structure ,mode of action and side effect of Pencillin , Chloramphenicol and tetracycline. **Polymers**: Homo and co- polymers with the examples of polythene and polyester, thermoplastic and thermosetting polymers (PVC and backelite)
Recommended Text	1. Text Book of Ancillary Chemistry,**V.Veeraiyan** et al,revised edition, 1997. 2. Allied Chemistry, **R. Gopalan** and **S. Sundaram,** , S. Chand & Sons, 2nd edition, 1993.
Reference Books	1. Puri B.R. Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry, Milestone Publishers, Delhi (2008) 2. PuriB.R..,Sharma L.R., Pathania M.S., Principles of Physical Chemistry, Vishal PublishingCo., Jalandar, (2004) 3. Bahl B.S. ArunBahl, Advanced Organic Chemistry, S. Chand & Company ltd., New Delhi, (2005). 4. Jaya shreeGhosh , A text book of pharmaceutical chemistry, 3rd ed., S.Chand&Company Ltd.,NewDelhi (2008)
Website and e-learning sour	**1.https://gascnagercoil.in/wp-content/uploads/2020/12/allied-chemistry-book.pdf** **2**https://lngovernmentcollege.com/chemistry-notes/ **3 https://chemistrynotes.com**

CourseOutcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	the practices of solving problem using dimensional analysis.	**K1**
CO2	explain the importance of fertilizer and pesticides.	**eK2**
CO3	identify the various types of crystals.	**K3**
CO4	discuss the fundamental organic chemistry of compounds.	**K5**
CO5	identify the function and mode of action of drugs.	**K4**

Cognitive Level:K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

CO-POMapping (Course Articulation Matrix)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	**S**	**S**	**S**	**S**	**M**	**S**	**S**
CO2	**M**	**S**	**S**	**S**	**S**	**M**	**S**
CO3	**S**	**S**	**M**	**S**	**S**	**S**	**S**
CO4	**M**	**S**	**S**	**S**	**S**	**M**	**S**
CO5	**M**	**S**	**M**	**S**	**S**	**M**	**S**

S– Strong M– Medium L – Low

LevelofCorrelation betweenPSO'sandCO's

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
III & IV	**23U4PHCHAPL**	**Allied chemistry practical** (Non – semester)	**3+3**	**3**

Objectives of the course are to	The course aims at giving an over all view of the • acquire a practical knowledge on volumetric analysis • Students learn the techniques of organic qualitative analysis.
Course Outline	**B. Volumetric Analysis** 1. Estimation of HCl (or H_2SO_4) by NaOH using a standard oxalic acid solution 2. Estimation of NaOH by H_2SO_4 (or HCl) using a standard Na_2CO_3 solution 3. Estimation of oxalic acid by $KmnO_4$ using a standard Mohr's salt solution 4. Estimation of Ferrous sulphate by $KmnO_4$ using a standard oxalic acid solution. 5. Estimation of Mohr's salt by $KmnO_4$ using a standard oxalic acid solution. 6. Estimation of KMnO4 by thio using a standard $K_2Cr_2O_7$ solution. 7. Estimation of $K_2Cr_2O_7$ by thio using a standard $CuSO_4$ solution 8. Estimation of $CuSO_4$ by thio using a standard $K_2Cr_2O_7$ solution **C. Organic qualitative analysis** Systematic analysis of an organic compound , Preliminary tests, detection of element present, Aromatic or aliphatic, Saturated or unsaturated, nature of the functional group and exhibiting confirmatory tests for given organic compounds. **The following substance are prescribed:** Benzoic Acid , Cinnamic acid, Phenol , Cresol, Aniline ,Toludine, Urea, Benzaldehyde, Glucose
ReferenceBooks	1. Venkateswaran V. Veerasamy R. Kulandaivelu A.R., Basic principles of Practical Chemistry, 2nd edition, Sultan Chand & sons, New Delhi, (1997)

Course Outcomes (for Mapping with POs and PSOs)

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	acquire a practical knowledge on volumetric analysis	**K1**
CO2	gain knowledge on Dichrometry titration	**K3**
CO3	the techniques of organic qualitative analysis.	**K2**
CO4	Find out the functional group	**K5**
CO5	Detect the element present in a compounds	**K6**

Cognitive Level: **K1 -** Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

CO-POMapping (CourseArticulationMatrix)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S	S	S	S	S	S	S
CO2	M	S	S	S	M	S	S
CO3	S	S	S	M	S	S	S
CO4	S	S	S	S	S	S	S

S– Strong **M– Medium** **L – Low**

Level of Correlation between PSO's and CO's

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
IV	**23U4PHSEC1**	**Skill Enhancement Course – Digital Literacy in Web-Based Simulation on Physics**	**2**	**2**

Nature of the course

Employability Oriented	√	Relevant to Local need	√
Entrepreneurship Oriented	√	Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics			

CourseObjectives

Themainobjectives ofthis courseare:

1. The students will get knowledge on Microsoft office tools.
2. The students will have awareof simulation softwares.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**BASICS ON MICROSOFT OFFICE TOOLS** MS Word – Create and Manage documents – Format text, paragraphs and sections – Create tables and lists – Create and manage references – Manage document options and settings – Design advanced documents. Excel- Manage workbook options and settings – Apply custom data formats and layouts – create tables – Perform operations with formulas and function – Create charts and objects.	15
II	**BASICS ON SIMULATION SOFTWARES** Types of simulation – simulation analysis – importance of simulation softwares – Physion overview – PhET simulator – Circuit diagram maker – How to draw circuit diagrams using smart draw – Electricity circuits and symbols. Microsoft office PowerPoint – Create and manage presentations – Insert and format text, shapes and images – Insert tables, charts – Applying transitions and animations	15

Books for Study and Reference

1. Microsoft Office 365 by Tech DemystifiedKindle Edition
2. MS-Office 2010 Training Guide by Prof. Satish Jain, M. Geetha

Pedagogy: Teaching / Learning methods

• Lecture	• Tutorial	• Assignment	• PPT Presentation
• Quiz	• Group Discussion	• e-content Seminar	

Course Outcomes

On the successful completion of the course, students will be able to

CO	CO Statement	Cognitive Level
CO1	Get knowledge and skills on Microsoft office tools	K2, K3
CO2	Acquire knowledge to dosimulations for electrical circuits.	K2, K3, K6

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	3	1	3	3	1	3
CO2	2	3	1	3	3	1	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	**23U5PHC5**	**Atomic Physics and Wave Mechanics**	**5**	**5**

Nature of the course

Employability Oriented	√	Relevant to Local need	
Entrepreneurship Oriented		Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics	√		

CourseObjectives

Themainobjectives ofthis courseare:

1. To acquire the basic knowledge about nature of positive rays.
2. To provide introductory account about the atomic structure.
3. To gain the knowledge in photoelectric effect.
4. To introduce the concept of fine and hyperfine structure of spectral lines.
5. To understand the concepts of dual nature of matter.

SYLLABUS

Unit	Content	No. of Hours
I	**The Electron and Positive rays** e/m of electronby Dunnington's method – Charge of electron by Millikan's oil drop method – Properties of positive rays –e/m of positive rays by Thomson's parabola method (*problems calculation of e/m ratio of positive rays*)– Mass spectrographs and uses– Bainbridge and Dempster's mass spectrographs	15
II	**Photoelectric Effect** **P**hotoelectric emission – Leonard's experiment – Richardson and Compton experiment –laws of photoelectric emission – Einstein's photoelectric equation (*problems using Einstein's photoelectric equation*) – Experimental verification by Millikan's method – Photoelectric cell– Photo emissive cell – Photovoltaic cell – Photo conducting cell – Applications of photoelectric cells – Photomultiplier.	15

III	**Atomic structure** Sommerfield's relativistic atom model –vector atom model –various quantum numbers – L-S and J-J coupling – Pauli's exclusion principle – magnetic dipole moment of an electron due to orbital and spin motion – Bohr magneton - Stern and Gerlach experiment – Lande 'g' factor.	15
IV	**Splitting of Spectral Lines** Excitation, ionisation and critical potentials – Davis and Goucher's method – optical spectra – spectral notation and selection rules – fine structure of sodium D-line – Zeeman effect – experimental arrangement and classical theory of normal Zeeman effect – Larmor's theorem – quantum theory of normal Zeeman effect –anomalous Zeeman effect – explanation of splitting of D_1 and D_2lines of sodium – Paschen Back effect - Stark effect (Qualitative only).	15
V	**Dual Nature of Matter** DeBroglie idea of matter waves – DeBroglie wavelength – wavevelocity and group velocity – Davissonand Germer experiment – G.P. Thomson experiment for verifying de Broglie relation – Heisenberg's Uncertainty principle – Electronmicroscope – Gamma ray microscope.	15

Text Books

1. Modern Physics – R. Murugesan.
2. Modern physics by D.L. Sehgal, K.L Chopra and N.K. Sehgal. Sultan Chand & Sons Publication, 7th Edition New Delhi (1991).
3. S.N. Ghoshal - Atomics and Nuclear Physics Vol. I.S., Chand & Co.,
4. Athour Bezier- Modern Physics.
5. Atomic a and Nuclear physics by N. Subrahmanyam and Brijlal, S. Chand& Co. 5th Edition,New Delhi (2000)

ReferenceBooks:

1. B. D Duggal and C. L Copra- Modern Physics.
2. S.N. Ghoshal - Atomics and Nuclear Physics Vol. I.S., Chand & Co.
3. Modern Physics – J. B. Rajam
4. Concepts of Modern Physics byD.Halliday,R.Resnick andJ.Walker,Wiley,
5. 6_{th} Edition, New York (2001)

Web Resources:

1. http:// nptel ac.in/courses/112106277
2. http:// nptel ac.in/ courses/104106096

Pedagogy: Teaching / Learning methods

▪ Lecture	▪ Tutorial	▪ Assignment
▪ PPT presentation	▪ Quiz	▪ Group Discussion
▪ e-content Seminar		

Course Outcomes

On the successful completion of the course, students will be able to

CO	CO Statement	Cognitive Level
CO1	understand the concepts of electron theory and positive rays.	K1, K2, K3
CO2	do the problems in Einstein's Photoelectric equation	K2, K3, K4
CO3	understand the evolution of different atomic models and their merit and limitations.	K2, K5
CO4	sufficient idea about atomic and molecular spectra, spin orbit interaction, Zeeman and stark effects.	K2, K4
CO5	understand typical ideas about dual nature of matter.	K2, K4

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze;
K5 – Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	3	3	2	2	3
CO2	3	2	3	2	1	1	2
CO3	3	2	2	2	2	2	2
CO4	3	2	3	2	2	2	2
CO5	3	3	3	3	2	3	3

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	23U5PHC6	SOLID STATE PHYSICS	5	5

Nature of the course

EmployabilityOriented		Relevant to Local need	✓
Entrepreneurship Oriented		Relevant to regional need	✓
Skill development Oriented	✓	Relevant to national need	✓
Addresses Gender Sensitization		Relevant to Global development need	✓
Addresses Environment and Sustainability	✓	Addresses Professional Ethics	
Addresses Human Values			

Course Objectives

Themainobjectives ofthis courseareto:

1. To acquire the knowledge about crystal structure and crystal diffraction.
2. To understand the different types of bonding in solids.
3. To gain knowledge on the basics of magnetic and dielectric phenomena onmaterials.
4. To know the concepts of superconductivity.

SYLLABUS

Unit	Content	No. of Hours
I	**Crystal Structure and Crystal Diffraction** Basic concepts of Crystal – Lattice – Basis – Crystal structure – Unit cell – Primitive cell – Lattice parameters – Crystal systems – Bravais lattices – SC – BCC – FCC – HCP crystal structures – Number of atoms in unit cell – Atomic radius – Coordination number – Packing fraction – Crystal planes – Miller Indices. Crystal Diffraction – Bragg's law – Crystal structure analysis – Laue's photographicmethod – Powder method – Rotating crystal method – Reciprocal lattice.	12
II	**Bonding in Solids& Elementary Lattice Dynamics** Types of bonds in crystal – Primary bonds – Ionic, covalent and metallic bonds -Secondary bonds Vander Waal's and Hydrogen bonding. Lattice vibrations and phonons: Linear monoatomic and diatomic chains – Acoustical and Optical phonons – Dulong and Petit's law – Einstein and Debye theories of specific heat of solids – T^3 law (qualitative only) – Properties of metals – Classical free electron theory of metals (Drude-Lorentz) – Ohm's law – Electrical and Thermal conductivities – Widemann-Franz law.	12
III	**Magnetic Properties of Solids** Permeability, Susceptibility, relation between them – Classification of	12

	magnetic materials – Properties of dia, para, ferro, ferri and antiferromagnetism – Langevin'stheory of diamagnetism – Langevin's of paramagnetism – Curie-Weiss law – Weiss's theory of ferromagnetism –Ferromagnetic domains – Discussion of B-H curve – Hysteresis and energy loss – Soft and hard magnets.	
IV	**Dielectric Properties of Materials** Polarization and electric susceptibility – Local electric field of an atom – Dielectric constant – Frequency dependence of dielectric constant – Effect of temperature on dielectric constant – Dielectric loss – Polarization process: electronic polarization – Calculation of polarizability – Ionic, Orientational and Space charge polarization – Lorentz field(derivation) – Clausius-Mossotti relation – Dielectric breakdown and its types – Classical theory of electric polarisability.	12
V	**Ferroelectric &Superconducting Properties of Materials** Ferroelectric effect: Curie-Weiss law – Ferroelectric domains – P-E hysteresis loop. Elementary band theory– Classification of insulators, semiconductors, conductors – intrinsic and extrinsic semiconductor – Hall effect – Experimental determination of carrier concentration and mobility. General properties of superconductors – Effect of magnetic field – Meissner effect – London equations and penetration depth – Type-I & Type-II superconductors –BCS theory.	12
Self study	High Tc superconductors	

Text book:

1. Materials Science – M. Arumugam, (Anuradha Agencies Publishers, (2002).
2. Materials Science and Engineering – V. Raghavan, (Prentice Hall of India Pvt Ltd, New Delhi, 2004).
3. Solid State Physics – K. Ilangovan, (MJP Publishers, 2021).
4. Solid State Physics – R.L. Singhal, (Kedarnath Ramnath & Co, Meerut, 2003).
5. Introduction to Solid State Physics – C. Kittel, (Willey Eastern Ltd, 2003).

Reference Books:

1. Solid State Physics – S.O. Pillai, (New Age International Pvt Ltd, 2002).
2. Solid State Physics – A.J. Decker, (Macmillan India, 1985).
3. Solid State Physics – H.C. Gupta, (Vikas Publishing House, New Delhi, 2001).
4. Elementary Solid State Physics – S.L. Gupta and V. Kumar, (Pragati Prakashan, Meerut, 2020).
5. Fundamentals of Solid State Physics – B.S. Saxena, R.C. Gupta and P.N. Saxena, (Pragati Prakashan, Meerut, 1993).

Web resources:

1. https://www.classcentral.com/course/swayam-solid-state-physics-14298
2. https://nptel.ac.in/courses/115106127
3. https://www.e-booksdirectory.com/details.php?ebook=3633

Pedagogy: Teaching / Learning methods

• Lecture	• Tutorial	• Assignment	• PPT Presentation
• Quiz	• Group Discussion	• e-content Seminor	

Course Outcomes

On completion of this course, students will

CO Number	CO Statement	Cognitive Level
CO1	Gain knowledge on how crystalline materials is studied using diffraction.	K2
CO2	Know about the various types of bonds between solids.	K2
CO3	Acquire knowledge on the dielectric and magnetic properties of solid materials.	K2
CO4	Understand why materials behave the way they do.	K4, K6
CO5	Be able to understand the properties of superconducting materials.	K2

Cognitive Level:K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze;
K5 – Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	3	1	2	1	1
CO2	3	2	3	1	2	1	1
CO3	3	2	3	1	2	1	1
CO4	3	3	3	2	3	1	2
CO5	3	1	3	2	3	1	2

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	23U5PHCP4	Major Practical - IV	6	4

Nature of the course

Employability Oriented		Relevant to Local need	
Entrepreneurship Oriented		Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics			

Course Objectives

The main objectives of this course are:

1. To provide practical skills on general experiments in optics, solid state and electronics,
2. To calculate some parameters of glass materials based on spectrometer experiments (Dispersive power, minimumdeviation, Cauchy'sconstant)
3.To get the knowledge on electronics experiment.

List of Experiments – Any 15 Experiments

1. Newton'srings-Radius of curvature
2. Newton'srings-RefractiveindexofLens
3. Airwedge-Thickness of wire
4. Airwedge-Thickness of insulation of wire
5. SpectrometerGrating-NormalIncidence
6. Spectrometer-minimum Deviation
7. Spectrometer-Dispersive power.
8. Spectrometer-Cauchy's constant
9. Junction Diode characteristics
10. Full Waverectifier
11. Bridge Rectifier
12. Transist or Characteristics-CE
13. Transistor Characteristics-CB
14. Impedance and Power factor of a coil
15. RC coupled amplifier (Singlestage)-Transistor
16. Emitter Follower amplifier

17. FET Amplifier
18. FET Characteristics
19. Hartleyoscillator-Transistor
20. Lowpass, Highpass, Bandpass filters-usingR and C
21. Op-Amp–Adderand Subtractor.
22. Op-Amp–Differentiator and Integrator.
23. e/m - Thomson's method
24. Spectral response of photoconductor(LDR)
25. Rydberg's constant
26. Cauchy's constants determination

Course Outcomes

On completion of this course, students will

CO Number	CO Statement	Cognitive Level
CO1	acquire skills on general experiments in optics, electronics, etc.,	K2, K3
CO2	determine the refractive index and radius of curvature of glass by Newton's Ring's method	K2
CO3	determine the dispersive power of prism using spectrometer.	K2
CO4	Know the characteristics and applications of diode	K2
CO5	acquire skill on transistor characteristics and its applications	K2, K3

Cognitive Level:K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**	**PSO7**
CO1	3	1	1	1	1	1	1
CO2	3	3	2	1	1	1	1
CO3	3	1	1	1	1	1	1
CO4	3	2	1	1	1	1	1
CO5	3	1	1	1	1	1	1

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	**23U5PHEL1A**	**Major Elective – I Mechanics, Relativity AND Quantum Mechanics**	**4**	**3**

Nature of the course

Employability Oriented		Relevant to Local need	
Entrepreneurship Oriented		Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics			

Course Objectives

The main objectives of this course are:

1. To acquire sufficient knowledge in the concepts of dynamics
2. To gain knowledge in practical applications of friction.
3. To understand the theory of relativity, its postulates and the consequences.
4. To impart knowledge of solving some application using Schrodinger equation.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**DYNAMICS** Projectile – angle of projection – Impulse and impact – Impulsive force – Laws of impact – Impact of a smooth sphere on a smooth horizontal plane – Direct and oblique impacts. Theory of compound pendulum – equivalent simple pendulum – reversibility of centre of oscillation and suspension – Determination of g and radius of gyration of a bar pendulum.	12
II	**FRICTION** Static friction – laws of friction, sliding Friction, Angle of Friction – Cone of Friction – Acceleration down an inclined plane – Rolling friction – Friction and Stability – Simple practical applications of Friction – The Prony Brake – Lubricants.	12
III	**SPECIAL THEORY OF RELATIVITY** Michelson-Morley experiment–frames of reference – Galilean Relativity – postulates of special theory of relativity – Lorentz transformation – time dilation – length contraction–variation of mass with velocity – Einstein's mass-energy relation.	12

IV	**TRANSFORMATION RELATIONS & GENERAL THEORY OF RELATIVITY** Transformation of velocity, mass, energy and momentum – four vector – invariance under transformation – Lorentz transformation and velocity addition equations in terms of hyperbolic functions. Inertial and Gravitational mass – Principle of equivalence – Experimental evidences for General theory of Relativity.	12
V	**OPERATORS AND SCHRÖDINGER EQUATION** Postulates of quantum mechanics – Wave function and its interpretation – Schrödinger's equation – linear operators – Eigenvalue – Operators for position, linear Momentum, angular momentum components – Expectation values of position and momentum – one-dimensional problems: (i) particle in a box, (ii) linear harmonic oscillator.	12

Books for Study:

1. Text book of Mechanics. Pt.1 Dynamics – M. Narayanamurthi, National Publishing House, Madras (1959).
2. A Text book of Quantum mechanics by P.M. Mathews and S. Venkatesan, Tata McGraw - Hill, New Delhi (2005).
3. Quantum Mechanics by V.K. Thankappan, New Age International (P) Ltd. Publishers, New Delhi (2003).
4. Quantum mechanics by K.K. Chopra and G.C. Agrawal, Krishna Prakasam Media(P) Ltd., Meerut First Edition (1998).
5. Modern Physics by R. Murugeshan and KiruthigaSivaprasath, S. Chand &Co., (2008).

Books for Reference:

1. Mechanics and Relativity by Brijlal Subramanyam, S. Chand & Co., New Delhi, (1990).
2. Concepts of modern physics by A. Beiser, Tata McGraw - Hill, 5thedition, New Delhi (1997).
3. Introduction to quantum mechanics by Pauling and Wilson, McGraw – Hill.
4. Quantum mechanics by A. Ghatak and Loganathan, Macmillan India Pvt. Ltd.

Web resources:

1. https://nptel.ac.in/courses/115103115
2. https://www.khanacademy.org/science/physics/special-relativity/minkowski-spacetime/v/introduction-to-special-relativity-and-minkowski-spacetime-diagrams
3. https://swayam.gov.in/nd2_arp19_ap83/preview
4. https://swayam.gov.in/nd1_noc20_ph05/preview

Pedagogy: Teaching / Learning methods

• Lecture	• Tutorial	• Assignment	• PPT Presentation
• Quiz	• Group Discussion	• e-content Seminar	

Course Outcomes

On the successful completion of the course, students will be able to

CO	CO Statement	Cognitive Level
CO1	acquire sufficient knowledge in the concepts of dynamics	K1, K2
CO2	gain knowledge in practical applications of friction	K3, K4, K6
CO3	gain knowledge in the concepts of special and theory of relativity and relate to relativistic particles.	K1, K2,
CO4	recognize basic terms in Quantum Mechanics and different operator mechanism.	K2, K3, K4
CO5	apply Schrödinger's equation to solve the micro systems.	K2, K3, K4

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	1	3	3	1	3
CO2	2	1	3	3	3	2	3
CO3	3	3	2	3	3	1	3
CO4	3	2	2	3	3	1	3
CO5	3	3	3	3	3	2	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	**23U5PHEL1B**	**Major Elective – I Energy Physics**	**4**	**3**

Nature of the course

Employability Oriented		Relevant to Local need	
Entrepreneurship Oriented	√	Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics			

Course Objectives

The main objectives of this course are:

1. To introduce the awareness of non-conventional energy
2. To gain knowledge on different types of energy sources.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Introduction to Energy Sources** Energy Sources – primary- secondary- supplementary sources – Various forms of Energy - Coal, oil, natural gas – Availability – applications – conventional and non-conventional energy systems – comparison — merits and demerits – energy conservation- prospects of renewable energy sources.	12
II	**Solar Energy** Introduction – Solar constant – nature of Solar radiation – Solar radiation measurements – Principle of conversion of solar radiation into heat – Solar energy collectors – Types – applications and advantages – Solar Ponds – Principle of operation – applications – Thermal electric conversion – photovoltaic generation – Solar cooking – merits and demerits.	12
III	**Biomass energy and Wind energy** Biomass energy – Classification – Photosynthesis – Biomass conversion process – Biogas plants – Types – Gobar gas plants – Biogas from plant wastes– advantages and disadvantages. Wind energy – Principles of wind energy conversion – WECS – Wind machines – Types – Energy Storage – Applications.	12
IV	**Chemical energy sources** Fuel cells –design and principle of operation for H_2 and O_2 cell - types of fuel cells – molten carbonate cells – solid oxide electrolyte cell – Aluminum-oxygen cell – photochemically regenerative fuel cells – conversion efficiency of fuel cells – polarization in fuel cell - advantages and disadvantages.	12

V	**Other energy sources** Geothermal energy – Geothermal sources – Advantages and disadvantages of geothermal energy over other energy forms – Applications – Ocean thermal energy conversion (OTEC) – Power generation – Energy forms waves and tides – Hydrogen energy - methods – thermo chemical method – solar energy method – utilization of hydrogen gas.	12

Books for Study

1. Non-conventional Energy sources, G.D. Rai, 5th Edition, 2011.
2. Solar Energy, S.P. Sukhatme, Tata McGraw – Hill Publishing company, 2nd Edition 1997.

Books for Reference

1. Solar Energy, G.D. Rai, 5th Edition, 1995.
2. Energy Technology, S. Rao and Dr. B.B. Parulekar, 2nd Edition, 1997.

Web Resources

1. https://www.vssut.ac.in/lecture_notes/lecture1428910296.pdf
2. https://onlinecourses.nptel.ac.in/noc23_ph35/preview

Pedagogy: Teaching / Learning methods

• Lecture	• Tutorial	• Assignment	• PPT Presentation
• Quiz	• Group Discussion	• e-content Seminar	

Course Outcomes

On the successful completion of the course, students will

CO	CO Statement	Cognitive Level
CO1	be aware on the various renewable energy sources	K1, K2, K3
CO2	be able to assess the technical preconditions over the consequences of different energy conversion systems as well their environmental impact	K3, K4, K6
CO3	be aware on employment opportunities in utilizing the renewable energy sources	K3, K4, K6
CO4	have the potential to develop their own solar projects.	K2, K3, K6
CO5	have knowledge to install their own biomass unit at low cost.	K2, K3, K6

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	1	3	3	1	3
CO2	2	1	3	3	3	2	3
CO3	3	3	2	3	3	1	3
CO4	3	2	2	3	3	1	3
CO5	3	3	3	3	3	2	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	**23U5PHEL2A**	**Major Elective – II Laser and Fiber Optics**	**4**	**3**

Nature of the course

Employability Oriented	√	Relevant to Local need	√
Entrepreneurship Oriented		Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability			
Addresses Human Values			
Addresses Professional Ethics	√		

Course Objectives

The main objectives of this course are:

The students will learn the fundamentals, types of lasers, laser instrumentation and their applications also the interconnect between optics with lasers

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**FUNDAMENTALSOFLASER:** basic principles: spontaneous and stimulated emission – Einstein's coefficient – pumping mechanism: optical, electrical and laser pumping – population inversion – two and three level laser system – resonator configuration – quality factor – threshold condition – concept of Q-switching–Theory of mode locking– cavity dumping.	12
II	**TYPES OF LASER: s**olid state laser: Ruby laser-Principle, construction, working, characteristic of laser, Nd:YAG laser- Principle, construction, working, characteristic – Principle, construction, working, characteristic of GaAs semiconductor laser – dye laser , CO_2 Gas laser and neutral atom gas laser (He-Ne laser).	12
III	**APPLICATIONS OF LASER:** application of laser in metrology – optical communication – material processing: laser instrumentation of material processing, powder feeder, laser heating, laser welding, laser melting – medical applications – Laser instrumentation for surgeries–laser in astronomy	12
IV	**FIBEROPTICS:** basic components of optical fiber communication – principles of light propagation through fiber – total internal reflection – optical fiber – coherent bundle – numerical aperture and skew mode – attenuation during total internal reflection – types of fiber: single mode and multi-mode fiber – step index and graded index fiber – fiber optic	12

	sensors – application of fiber optics.	
V	**CHARACTERISTICS AND FABRICATION OF OPTICAL FIBER:** fiber characteristics: mechanical and transmission characteristics – absorption loss and scattering loss measurements – dispersion – connectors and splicers – fiber termination – optical time domain reflectometer(OTDR) and its uses – fiber material – fiber fabrication – fiber optic cables design	12

Textbook:

1. B.B. Laud - Laser and Non-linear Optics, New Age International Publications Third Edition, NewDelhi.
2. An Introduction to laser,theory and applications by Avadhunulu, M.N.S.,Chand&Co,NewDelhi
3. WilsonandJ.F.B. Hawkes.'Introduction to Optoelectronics', PearsonEducation, 2018.

References:

1. A.Sennaroglu,"Photonics and Laser Engineering:Principles,DevicesandApplications"McGraw-HillEducation,2010.
2. K.R.Nambiar,"Lasers:Principles,TypesandApplications",NewAgeInternational,2004.
3. Optics, AjoyGhatak, McGraw-Hill Education(India)Pvt, Ltd, 6th Edn., 2017.

Pedagogy: Teaching / Learning methods

- Lecture
- Tutorial
- Assignment
- PPT presentation
- Quiz
- Group Discussion
- e-content Seminar

CourseOutcomes

On the successful completion of the course, students will be able to

CO	CO Statement	Cognitive Level
CO1	Understand about the basics of laser and its types	K2
CO2	Analysis the basic idea about the construction of fiber and its importance for communication	K2, K4
CO3	Aquire the importance and applications laser particularly in medical field.	K4, K5
CO4	Understand the idea about the fiber optic in communication system	K2, K4
CO5	Known about the concept of optical time domain reflectometer, fiber materials,fiber optic cables design in communication.	K3, K4,

Cognitive Level : K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	3	2	2	3	3	2
CO2	3	2	3	3	3	2	2
CO3	3	3	3	2	3	2	2
CO4	2	2	3	3	3	2	2
CO5	2	3	3	3	3	2	2

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	23U5PHEL2B	Major Elective – II Information Technology	4	3

Nature of the course

Employability Oriented	√	Relevant to Local need	√
Entrepreneurship Oriented	√	Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics			

Course Objectives

The main objectives of this course are:

1. To introduce the knowledge of different types of computers.
2. To introduce the concepts of communication using computer.
3. To introduce the knowledge about Multimedia technologies and their applications

SYLLABUS

Unit	Content	No. of Hours
I	**Introduction :** Types of Computers – characteristics- microcomputers, mini, main, super, mainframe and network computers – centralprocessing unit, memoryinsidea typical computer system, memory and processor – Theperipheral devices – CISC and RISC [qualitative only] – Auxiliary storage devices – typesof input and output devices.	12
II	**Computer system software and Data Base Management :** Operating system – Utilities – compilers – interpreters – Functionsof operating system – Classificationof operating systems – Typesof High-level languages – Generalsoftware features and Trends – Dataprocessing. Introduction to database – Importanceand characteristics – Typesof database management systems [types of models] – database design.	12
III	**Telecommunications, internet and intranet :** Introduction to telecommunications – computernetworks – communicationsystems – distributedsystems. Internetand World Wide Web – Electronicmail – voicemail- teleconferencing – fax – intranets.	12
IV	**Multimedia and new technologies :** Introduction to multimedia – multimediatools – introductionvirtual reality – electroniccommerce – hypermedia – datawarehouses and data marts – data mining – online analytical processing (olap) – geo graphic information system (gis).	12
V	**Applications of information technology :** Computers in business and industry – computers in home – computers in education and educational training – computersin entertainment, science, medicine, and engineering-careers in information technology.	12

Books for study

1. Fundamentals of information technology,Alexis Leon & Mathews Leon, Leon tech world publishers, Chennai and Vikas pub pvt. Ltd., New Delhi

Web Resources

1. https://onlinecourses.swayam2.ac.in/cec22_cs12/preview

Pedagogy: Teaching / Learning methods

• Lecture	• Tutorial	• Assignment	• PPT Presentation
• Quiz	• Group Discussion	• e-content Seminar	

CourseOutcomes

On the successful completion of the course, students will

CO	CO Statement	Cognitive Level
CO1	acquire knowledge and skills on communicating through computers and multimedia technologies.	K1, K2, K3, K6
CO2	be aware on various operating systems and could equip themselves for software development.	K3, K4, K6
CO3	be able to create IT-based multimedia products such as websites, DVDs and computer games that combine text with sounds, pictures, graphics, video-clips, virtual reality and digital animation.	K3, K4, K6
CO4	have the potential to equip themselves as logo designer and graphics designer.	K2, K3, K6
CO5	acquire knowledge and skills on telecommunications	K2, K3, K6

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	1	3	3	1	3
CO2	2	1	3	3	3	2	3
CO3	3	2	2	3	3	1	3
CO4	3	2	2	3	3	1	3
CO5	3	3	3	3	3	2	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	23U5PHNME	Non- Major Elective - Physics for Everyday life	2	2

Nature of the course

Employability Oriented	√	Relevant to Local need	√
Entrepreneurship Oriented	√	Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics			

Course Objectives

The main objectives of this course are:

1. To know where all physics principles have been put to use in daily life.
2. To get knowledge on solar energy.
3. To understand the concepts of Indian scientists who have made significant contributions to Physics

Books for Study and Reference

1. The Physics in our Daily Lives, UmmeAmmara, Gugucool Publishing, Hyderabad, 2019.
2. For the love of physics, Walter Lawin, Free Press, New York, 2011.

SYLLABUS

Unit	Content	No. of Hours
I	**MECHANICAL OBJECTS: S**pring scales – bouncing balls –roller coasters – bicycles –rockets and space travel. **OPTICAL INSTRUMENTS AND LASER:** Vision corrective lenses – polaroid glasses – UV protective glass – polaroid camera – colour photography – holography and laser. **PHYSICS OF HOME APPLIANCES:**Bulb – fan – hair drier – television – air conditioners – microwave ovens – vacuum cleaners	15
II	**SOLAR ENERGY:** Solar constant – General applications of solar energy – Solar water heaters – Solar Photo – voltaic cells – General applications of solar cells. **INDIAN PHYSICIST AND THEIR CONTRIBUTIONS:** C.V.Raman, HomiJehangirBhabha, Vikram Sarabhai, Subrahmanyan Chandrasekhar, Venkatraman Ramakrishnan, Dr. APJ Abdul Kalam and their contribution to science and technology.	15

Pedagogy: Teaching / Learning methods

• Lecture	• Tutorial	• Assignment	• PPT Presentation
• Quiz	• Group Discussion	• e-content Seminar	

CourseOutcomes

On the successful completion of the course, students will be able to

CO	CO Statement	Cognitive Level
CO1	Get knowledge on the function of mechanical objects and optical instruments in day-to-day life.	K2, K3, K6
CO2	Acquire knowledge on solar energy and know the contributions of Indian scientist.	K1, K2, K3,

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	3	1	3	3	1	3
CO2	2	3	1	3	3	1	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
VI	**23U6PHC8**	**Nuclear and Particle Physics**	**5**	**5**

Nature of the course

Employability Oriented		Relevant to Local need	√
Entrepreneurship Oriented		Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics			

Course Objectives

Themainobjectives ofthis courseare:

1. To Gain knowledge about the stability of nucleus and various other properties.
2. To learn about various types of radiations and their interaction with matter.
3. To get acquainted with various types of nuclear reactions and their energetics.
4. To learn the methods to find the mass and charge of any nucleus using some instruments.
5. To introduce knowledge in Cosmic rays and elementaryparticles.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**PROPERTIES OF NUCLEUS** constituents of nucleus – isotopes, isobars, isotones – nuclear size, mass, density, charge, spin, angular momentum, magnetic dipole moment, electric quadrupole moment (qualitative) – binding energy – mass defect – packing fraction – nuclear stability – binding energy per nucleon graph – properties of nuclear force – meson theory of nuclear forces – Yukawa potential. **NUCLEAR MODELS:** liquid drop model –Weizacker's semi-empirical mass formula – shell model – magic numbers.	15
II	**RADIO ACTIVITY** Radio activity – laws of radioactivity – radioactive disintegration, decay constant, half-life, mean-life (only final formulae) **–** Unitsof radioactivity**–** successive disintegration – transient and secular equilibrium– properties of alpha, beta and gamma rays – Geiger-Nuttal law –α-ray spectra – Gamow's theory of α-decay (qualitative) –β-ray spectrum – neutrino	15

	theory of β-decay – nuclear isomerism – K-shell capture – internal conversion – non-conservation of parity in weak interactions.	
III	**PARTICLE DETECTORS AND ACCELERATORS** **DETECTORS:** gas detectors –ionization chamber – G-M counter – scintillation counter – photo multiplier tube (PMT) – semiconductor detectors – neutron detector. **ACCELERATORS:** linear accelerators – cyclotron – synchrotron – betatron– electron synchrotron – Proton synchrotron (bevatron)	15
IV	**NUCLEAR REACTIONS:** Types of nuclear reactions –conservation laws in nuclear reaction – Q-value– threshold energy – nuclear fission – energy released in fission – chain reaction – critical mass – nuclear reactor – nuclearfusion – sources of stellar energy – proton-proton cycle –Carbon-Nitrogen cycle – thermonuclear reactions – controlled thermonuclear reactions.	15
V	**COSMIC RAYS AND ELEMENTARY PARTICLES** Discovery of Cosmic rays – Latitude effect – Azimuth effect – Altitude effect – Primary and Secondary cosmic rays – cosmic ray showers – Van Allen belts – Origin of cosmic rays – **ELEMENTARY PARTICLES:** classification – Particles and antiparticles – fundamental interactions – elementary particle quantum numbers – conservation laws and symmetry.	15

Text Book:

1. Modern physics R. Murugesan - S Chand *Publishing*, 2019.
2. Nuclear Physics - D. C. Tayal- Himalaya Publishing House, 2009.

Reference Books:

1. Nuclear Physics - R.C. Sharma
2. Introductory nuclear physics - R.K. Puri and V.K. Babbar. *Narosa* Publishing house, New Delhi, 1996.
3. Modern Physics - J. B. Rajam, S. Chand & Co, 1967.
4. Nuclear and Particle Physics-B. R. Martin-John Wiley & Sons Ltd, 2006.

Web resources:

1. https://www.fisica.net/nuclear/Martin%20-%20Nuclear%20and%20Particle%20Physics%20-%20An%20Introduction.pdf
2. http://www.kaf07.mephi.ru/eduroom/Books/A_Das_T._Ferbel_Introduction_to_Nuclear.pdf

Pedagogy: Teaching / Learning methods

- Lecture
- Tutorial
- Assignment
- PPT presentation
- Quiz
- Group Discussion
- e-content Seminar

Course Outcomes

On the successful completion of the course, students will be able to

CO	CO Statement	Cognitive Level
CO1	determine the charge, mass of any nucleus by using various spectrograph.	K1, K2
CO2	calculate the size of nucleus and all its properties.	K2, K3
CO3	determine Half - life period and Mean life period of radioactivity materials.	K3
CO4	Analyse the interaction of various types of particles with matter.	K4
CO5	Identify the basic interaction between fundamental particles.	K5

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze;
K5 – Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	3	3	3	2	3
CO2	2	1	3	3	3	1	2
CO3	3	3	3	3	3	1	2
CO4	3	2	3	3	3	1	2
CO5	3	3	3	3	3	1	1

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
VI	**23U6PHC9**	**Electronics and Microprocessor 8085**	**5**	**5**

Nature of the course

Employability Oriented	√	Relevant to Local need	√
Entrepreneurship Oriented	√	Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics			

Course Objectives

Themainobjectives ofthis courseare:

1. To give need-based education in Digital Electronics of the highest quality and to understand the concept of Various Number Systems and their conversions.
2. To provide the knowledge of basic logic gate to provide theknowledge of combinational logiccircuit for computation.
3. To understand Flip Flop function, Counter and Register circuits and their application.
4. Students will be able to understand the function of Microprocessor and to provide knowledge about the various register and to develop a ALP using 8085 microprocessor.
5. To provide insight into interfacing details and various interfacing controller function.

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	Decimal, Binary, Octal, Hexadecimal numbers systems and their conversions – BCD, Gray code and Excess-3 codes ––Binary addition and binary subtraction using 1's & 2's complement methods-Complements (1's, 2's, 9's and 10's) – Boolean laws – De-Morgan's theorem —standard representation of logic functions (SOP & POS) – minimization techniques using Karnaugh map.	15
II	Basic logic gates -Universal logic gates (NAND & NOR) –Adder: Half & Full adder –Subtractors: Half & Full subtractor –parallel binary adder – magnitude comparator – Multiplexers (4:1) & Demultiplexers (1:4), Encoder (8-line-to-3- line) and Decoder (3-line-to-8-line), BCD to seven segment decoder.	15
III	Flip-Flops: S-R Flip-flop, J-K Flip-flop, T and D type flip-flops, master-slave flip-flop, truth tables, registers:-serial in serial out and parallel in and parallel	15

	out – counters asynchronous:-mod-8, mod-10, synchronous - 4-bit &ring counter – general memory operations, ROM, RAM (static and dynamic), PROM, EPROM, EEPROM, EAROM. IC – logic families: RTL, DTL, TTL logic, CMOS NAND & NOR Gates,	
IV	8085 Microprocessor: introduction to microprocessor – INTEL 8085 architecture – register organization –pin configuration of 8085, interrupts and its priority – Program Status Word (PSW) –instruction set of 8085 –addressing modes of 8085 –assembly language programming using 8085 –programmes for addition (8-Bit & 16-Bit), subtraction (8-Bit & 16-Bit), multiplication (8-Bit), division (8- Bit) – largest and smallest number in an array – BCD to ASCII and ASCII to BCD.	15
V	I/O Interfaces: serial communication interface (8251-USART) – programmable peripheral interface (8255-PPI) –programmable interval timers (8253) – keyboard and display (8279), DMA controller (8237).	15

TEXT BOOKS

1. M.Morris Mano, "Digital Design "3rd Edition, PHI, NewDelhi.
2. Ronald J. Tocci. "Digital Systems-Principles and Applications" 6/e. PHI. New Delhi. 1999.(UNITS I to IV)
3. S.Salivahana& S. Arivazhagan-Digital circuits and design
4. Microprocessor Architecture, Programming and Applications with the 8085 – Penram International Publishing, Mumbai- Ramesh S.Gaonakar
5. Microcomputer Systems the 8086/8088 family – YU-Cheng Liu and GlenSA

RERERENCES

1. Herbert Taub and Donald Schilling. "Digital Integrated Electronics". McGraw Hill. 1985.
2. S.K. Bose. "Digital Systems". 2/e. New Age International.1992.
3. D.K. Anvekar and B.S. Sonade, "Electronic Data Converters: Fundamentals &Applications". TMH.1994.
4. Malvino and Leach. "Digital Principles and Applications". TMG HillEdition
5. Microprocessors and Interfacing – Douglas V.Hall
6. Microprocessor and Digital Systems – Douglas V.Hall

Web Resources

1. https://kanchiuniv.ac.in/coursematerials/VIJAYARAGHAVAN_mp%20_mc%20notes.pdf
2. https://mrcet.com/downloads/digital_notes/ECE/III%20Year/MICROPROCESSOR%20&%2 0MICROCONTROLLER.pdf
3. https://www.iare.ac.in/sites/default/files/lecture_notes/IARE_MPID_Lectures_Notes.pdf
4. Nptel Web course on Microprocessor by Dr. Pramod Agarwal, IITRoorkee. https://nptel.ac.in/courses/108/107/108107029/

Pedagogy: Teaching / Learning methods

- Lecture
- Tutorial
- Assignment
- PPT presentation
- Quiz
- Group Discussion
- e-content Seminar

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Cognitive Level
CO1	Students to know the basic ideas on the basic number system and their conversion and Boolean laws.	**K1,K2**
CO2	Understand and classify the basic gates,combinational logic circuits and multiplexer and encoder circuits	**K1,K2**
CO3	Verifying the concepts of gates, flip flop, counter circuit and memory types	**K2**
CO4	Students to know the basic ideas on the architecture of microprocessor and usage of register, instruction set and their addressing mode. Develop assembly language programs using various instructions.	**K3,K4**
CO5	Students apply the above concepts to real world applications through various peripheral IC's with 8085 microprocessor for its various applications.	**K5**

Cognitive Level: K1 - Remember; K2 - Understanding; K3 - Apply; K4 - Analyze; K5 – Evaluate; K6 - Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	2	3	3
CO2	3	3	3	3	2	3	3
CO3	3	3	3	3	2	3	3
CO4	3	3	3	3	2	3	3
CO5	3	3	3	3	2	3	3

3 - Strongly Correlated; 2 - Moderately Correlated;

1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
V	**23U6PHCP5**	**Major Practical V**	**6**	**4**

Nature of the course

Employability Oriented		Relevant to Local need	√
Entrepreneurship Oriented		Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics			

Course Objectives

Themainobjectives ofthis courseare:

1. To provide circuit design skills using electronics components.
2. To give practical skills on IC experiments
3. To provide computer skill using C language.

List of Experiments – Any 15 Experiments

1. ZenerDiode Characteristics
2. Temperature Coefficient of a The rmistor
3. Transistor Power Amplifier
4. Zener Regulated Power Supply
5. Voltage Doubler
6. Construction of IC Regulated Power supply
7. Transistorasas witch
8. Astable Multivibrator-Transistor
9. Logicgates - Discrete components
10. DTL-NAND gate
11. RTL-NOR gate
12. Logic Gates-IC
13. Study of Universalgates- NANDand NOR
14. Halfadder and subtractor
15. Fulladder and subtractor
16. Verification of Demorgan’s theorems
17. ParallelBinary adder

18. Encoder(0to8)
19. Microprocessor-Addition and subtraction
20. Microprocessor-8bitmultiplication and division
21. Microprocessor-8bit division
22. C programming –find the biggestnumberofanarray.
23. C programming–Arrangingasetofnumbers inascending/descending order
24. C programming–matrixaddition and subtraction
25. C programming–solving quadratic equation
26. Clipping and clamping circuits using diode
27. LCR series resonance and LCR parallel resonance circuits
28. UJT characteristics
29. Construction of & Segment display

Course Outcomes

On the successful completion of the course, students will be able to

CO	CO Statement	Cognitive Level
CO1	Acquire skills on transistor-based experiments.	K1, K2
CO2	Analyze the circuit using zener diode	K2, K3
CO3	Design circuit using ICs	K3
CO4	Write computer programme using C language	K4

Cognitive Level: K1 – Remember; **K2 –** Understanding; **K3 –** Apply; **K4 –** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	1	1	1	1	1
CO2	3	1	2	2	1	2	1
CO3	3	2	1	1	2	1	1
CO4	3	2	1	1	1	1	1

3 – Strongly Correlated; 2 – Moderately Correlated; 1 – Weakly Correlated; 0 – No Correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
VI	**23U6PHEL3A**	**Major Elective – III Numerical Methods and C Programming**	**5**	**3**

Nature of the course

Employability Oriented	√	Relevant to Local need	√
Entrepreneurship Oriented	√	Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
Addresses Gender Sensitization		Relevant to Global development need	√
Addresses Environment and Sustainability			
Addresses Human Values			
Addresses Professional Ethics			

Course Objectives

The main objectives of this course are

1. To introduce the basic concepts of solving algebraic and transcendental equations.
2. To introduce the numerical techniques of differentiation, integration, interpolation in various intervals in real life situation.
3. To introduce knowledge in C programming.
4. To introduce and explain the basic structure of c programmimg, rules of compiling and execution of C programming.
5. Students acquire knowledge in C language and skills in high level programming.

SYLLABUS		
UNITS	**CONTENT**	**No of Hours**
UNIT-I	**NUMERICAL SOLUTIONS:** Determination of zeros of polynomials – roots of linear and nonlinear algebraic and transcendental equations – bisection and Newton-Raphson methods – divergence of solutions	**15**
UNIT-II	**NUMERICAL DIFFERENTIATION, INTEGRATION AND CURVE FITTING:** – Introduction-Numerical differentiation-Errors in Numerical differentiation-Maximum and Minimum values of a tabulated function– Newton's forward and backward interpolation – Lagrange's interpolation – principle of least squares – fitting a straight line and parabola– trapezoidal rule – Simpson's 1/3 and 1/8 rule	**15**

UNIT-III	**INTRODUCTION TO C:** Importance of C – basic structure of C programming – constants, variables and data types – character set, key words and identifiers – declaration of variables and data types – operators – expressions: arithmetic, relational, logical, assignment – increment and decrement – conditional – comma operators	**15**
UNIT-IV	**CONTROL STRUCTURE:** decision making with if, if-else, nested if – switch –go to – break – continue –while, do while, for statements – arrays, one dimensional and two dimensional – declaring arrays – storing arrays in memory –initializing arrays – simple programs	**15**
UNIT-V	**ALGORITHM, FLOW CHART AND PROGRAM:** development of algorithm – flow chart for solving simple problems– average of set of numbers – greatest, smallest – conversion of Fahrenheit to Celsius and Celsius to Kelvin, miles to kilometer – sorting set of numbers in ascending and descending order – square matrix, addition, subtraction and multiplication of order (2x2) using arrays.	**15**

Textbook:

1. Numerical methods, Singaravelu, Meenakshi publication,4thEdn., 1999.
2. Numerical methods P.Kandasamy, K.Thilagavathy, K. Gunavathi, S.Chand, 2016
3. Programming in C, Balagurusamy, TMG, ND, 2012
4. Numerical Analysis,M.K.Venkatraman, NPH, 2013
5. Numerical Analysis, B.D.Gupta, Konark Publishers, New Delhi, 2013.

References:

1. Schaum's outline series, Theory and Problems of programming in C, C.Byron& S. Gottfried, Tata McGraw Hill 2003
2. Numerical methods and C Programming, Veerarajan, 2015.
3. Programming in ANSI C- E. Balagurusamy - Tata McGraw- Hill
4. Numerical Methods – P. Kandasamy, K. Thilagavathi and Gunavathy S. Chand & Co.

Web resources:

1. https://optics.byu.edu/docs/opticsbook.pdf
2. https://users.physics.ox.ac.uk/~ewart/Optics%20Lectures%202007.pdf
3. https://www.hdki.hr/_download/repository/Pavia-Introduction-to-Spectroscopy%5B1%5D.pdf

Pedagogy: Teaching / Learning methods

- Lecture
- Tutorial
- Assignment
- PPT presentation
- Quiz
- Group Discussion
- e-content Seminar

Course Outcomes

On the successful completion of the course, students will be able to

	CO Statement	Cognitive Level
CO1	solve the algebraic and transcendental equations**.**	K1, K2
CO2	Acquire knowledge andproblem-solving skillsinnumericaldifferentiation, integration andinterpolation	K2, K3
CO3	have the knowledge of C-Programming.	K3
CO4	understand C-language and write simple program.	K4
CO5	gainknowledge to write the algorithm,draw flow chart and write the programs	K1, K2, K3

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	3	3	3	2	3
CO2	2	1	3	3	3	1	2
CO3	3	3	3	3	3	1	2
CO4	3	2	3	3	3	1	2
CO5	3	3	3	3	3	1	1

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
VI	23U6PHEL3B	Major Elective – III History of Physics	5	3

Nature of the course

Employability Oriented		Relevant to Local need	√
Entrepreneurship Oriented		Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics			

Course Objectives

Themainobjectives ofthis courseare:

1. To know the history of Physics.
2. To gain knowledge fundamentals on quantum mechanics.
3. To know the advancement of Physics in India.

SYLLABUS

Unit	Content	No. of Hours
I	**Ancient Greeks of Newton** Pythagoras – Democritus's theory – Aristotle and "why things happen?" – Aryabhata – Copernicus – Kepler and the elliptical orbit – Galileo's laws of motion and telescope – Newton laws of motion and gravity.	15
II	**Light, Gases, Atomic Structure and Thermodynamics** Light – Newton's Corpuscular theory – Young and double slit experiment – Fresnel and light waves – Development of Science of gases – Pascal and Boyle – Atomic theories of Daton and Bohr – The birth of Thermodynamics – Joule's measurement – The first and second laws – Maxwell's Demon.	15
III	**Electricity and Magnetism** Experiment of Galvani, Oersted, Ampere, Faraday, Coulomb, Rutherford and Benjamin Franklin – Volta and the birth of battery – Thomas Alva Edison – Maxwell and his Field – Lasers – Superconductors.	15
IV	**Quantum Mechanics and Relatively** Planck's idea – Einstein's photoelectric effect – Schrodinger and his wave equation –Heisenberg's uncertainly principle – Stern – Gerlach experiment – Einstein's special theory of relatively – Twin paradox – General theory of relatively.	15
V	**Physics in India** Why is the sea blue? – Raman effect – Bose and his statistics – Bosons and Bose condensation – Chandrasekhar, his limit and white dwarfs – Saha and his ionization formula – Homi Bhabha: Research finding – The institution builder – Birth if DAE and AEET.	15

Books for Study and Reference

1. R. Spangerrburg and D.K. Moser, The History of Science: Form the Ancient Greeks to the scientific revolution (University Press, Hyderabad, 1999).
2. R. Spangerrburg and D.K. Moser, The History of Science: in the Eighteenth century (University Press, Hyderabad, 1999).
3. R. Spangerrburg and D.K. Moser, The History of Science: in the Nineteeth century (University Press, Hyderabad, 1999).
4. R. Spangerrburg and D.K. Moser, The History of Science: From 1900 to 1945 (University Press, Hyderabad, 1999).

Pedagogy: Teaching / Learning methods

• Lecture	• Tutorial	• Assignment	• PPT Presentation
• Quiz	• Group Discussion	• e-content Seminar	

CourseOutcomes

On the successful completion of the course, students will be able to

CO	CO Statement	Cognitive Level
CO1	acquire knowledge on history of physics	K1, K2,
CO2	describe and comment thebeginning of science in western civilization with special attention to Miletus, Pythagoras, Atomic, Elestic and Peripatetic schools of philosophy	K1, K2,
CO3	Know about the scientists Oersted, Ampere, Faraday, Coulomb, Rutherford and Benjamin Franklin and their inventions.	K1, K2,
CO4	acquire knowledge on the ideas of Planck's, Einstein's photoelectric effect and Einstein's special theory of relatively	K1, K2,
CO5	Know about the Physics inventions in India	K1, K2,

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	1	2	1	3	3	1	3
CO2	2	3	3	3	3	2	3
CO3	2	3	2	3	3	1	3
CO4	2	3	2	3	3	1	3
CO5	2	3	3	3	3	2	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
VI	**23U6PHEL4A**	**Major Elective – IV Nanoscience and Nanotechnology**	**5**	**3**

Nature of the course

Employability Oriented	√	Relevant to Local need	√
Entrepreneurship Oriented		Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics			

CourseObjectives

Themainobjectives ofthis courseare:

1. To introduce basics of Nanoscience and nanotechnology
2. To introduce the synthesizing steps to prepare nanomaterials

SYLLABUS

Unit	Content	No. of Hours
I	**Introduction to Nanotechnology** Nanoscience – Nanotechnology –Definitions - History of nanotechnology – Nanomaterials: classification – zero, one and two dimensional nanomaterials – Classification based on the composition of materials (metal, semiconductor, ceramic, polymeric and carbon-based nanomaterials) - Properties of nanomaterials– Surface area to volume ratio (S.A/V) – Effect of S.A/V on the properties of materials – Quantum dots – Production of quantum dots – Applications of quantum dots – Quantum wires – properties and applications of quantum wires - Challenges in nanotechnology.	15
II	**Preparation Methods** Top-down and Bottom-up approaches – Top-down methods: Ball milling, Chemical etching photolithography and Electron beam lithography – Advantages – Limitations. Bottom-up methods: Vacuum evaporation, Sputter deposition process, Laser ablation, Hydro thermal method – Advantages – Limitations.	15
III	**Fullerenes** Fullerenes – Types of fullerenes – Bucky ball/Buckminster fullerene -	15

	Carbon nano tubes (CNTs) - Single walled CNTs – Multi walled CNTs – Differences – Properties of CNTs: mechanical, electrical and superconducting properties – Preparation of CNTs – Plasma discharge method – Chemical vapour deposition method – Applications.	
IV	**Characterization Techniques** Construction, working principle, merits and demerits of X-ray diffractometer - Scanning Electron Microscope (SEM) – Atomic Force Microscope (AFM) -– UV-Vis–NIR double beam spectro photometer – Energy dispersive X-ray analysis (EDAX) - SQUID - Raman spectroscopy.	15
V	**Applications** Nanoelectronics – Molecular electronics – Nanophotonics – Nanorobotics – Nanomechanics – Band gap engineered quantum devices - Quantum computers – Carbon nanotube FETs – Nano MOSFETs – Molecular diodes, transistors – Biomedical applications: Targeted drug delivery – targeted chemotherapy.	15

Books for Study

1. K. Ravichandran, K. Swaminathan, P.K. Praseetha, P. Kavitha, Introduction to Nanotechnology, JAZYM publications.
2. M.Ratner.et al., Nanotechnology; A Gentle intro Practices – hall ISBN 0-13-101400-5, 2003.
3. Nanotechnology; Basic Science and Emergining Technologies, CRC Press

Books for Reference

1. Charles P.Poole Jr and Frank J.Owens. "Introduction to Nanotechnology" Wiley, 2003.
2. A. S. Edelstien and R.C. Cornmarata, Nanomaterials; synthesis, Properties and Applications, 2ed, Iop (U.K), 1996.

Pedagogy: Teaching / Learning methods

• Lecture	• Tutorial	• Assignment	• PPT Presentation
• Quiz	• Group Discussion	• e-content Seminar	

CourseOutcomes

On the successful completion of the course, students will be able to

CO	CO Statement	Cognitive Level
CO1	acquire knowledge on fundamentals of nanotechnology.	K1, K2,
CO2	understand the preparation techniques and applications of nanomaterials.	K1, K2,
CO3	explain general concepts and physical phenomena of relevance within the field of nanoscience.	K1, K2,
CO4	Know about the working principles of characterization techniques	K1, K2,
CO5	acquire knowledge on applications of nanotechnology.	K1, K2,

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	1	2	1	3	3	1	3
CO2	2	3	3	3	3	2	3
CO3	2	3	2	3	3	1	3
CO4	2	3	2	3	3	1	3
CO5	2	3	3	3	3	2	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
VI	**23U6PHEL4B**	**Major Elective – IV Communication Physics**	**5**	**3**

Nature of the course

Employability Oriented	√	Relevant to Local need	√
Entrepreneurship Oriented		Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability			
Addresses Human Values			
Addresses Professional Ethics	√		

Course Objectives

Themainobjectives ofthis courseare:

1. To understand the basic ideas of Radio Transmission and Reception
2. To acquire the knowledge of the principles, classification, losses in optical fibers and advantages
3. To gain the basics of satellite and mobile communication and their importance

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**RADIO TRANSMISSION AND RECEPTION:** transmitter – modulation types of modulation – amplitude modulation – limitations of amplitude modulation – frequency modulation – comparison of FM and AM – demodulation- essentials in demodulation – receivers: AM radio receivers – types of AM radio receivers – stages of superheterodyne radio receiver, advantages – FM receiver – difference between FM and AM receivers.	15
II	**FIBER OPTIC COMMUNICATION:** introduction – basic principle of fiber optics – advantages – construction of optical fiber – classification based on the refractive index profile – classification based on the number of modes of propagation – losses in optical fibers – attenuation– advantages of fiberoptic communication	15
III	**RADAR COMMUNICATION: i**ntroduction - basic radar system –radar range – antenna scanning –pulsed radar system – search radar –tracking radar – moving target indicator Doppler effect-MTI principle – CW Doppler radar	15

IV	**SATELLITE COMMUNICATION:** introduction history of satellites – satellite communication system – satellite orbits – basic components of satellite communication system – commonly used frequency in satellite – communication –multiple access communication – satellite communication in India	15
V	**MOBILE COMMUNICATION:** introduction – concept of cell –basic cellular mobile radio system – cellphone – facsimile – important features of fax machine – application of facsimile – VSAT (very small aperture terminals) modem IPTV (internet protocol television) -Wi-Fi-4G (basic ideas)	15

Textbook:

2. V.K.Metha, Principles of Electronics, S. Chand &CoLtd., 2013
3. Anokh Singh and Chopra A.K., Principles of communication Engineering, S.Chand& Co, 2013

References:

1. J.S. Chitode, Digital Communications, 2020, Unicorn publications.

2. Senior John. M, Optical Fiber Communications: Principles and Practice, 2009, Pearson Education.

Web resources:

1. https://www.ofsoptics.com
2. https://www.isro.gov.in
3. https://www.youtube.com/watch?v=aY1VxwIbr6E
4. https://www.youtube.com/watch?v=v7J8aJMJ1so

Pedagogy: Teaching / Learning methods

- Lecture
- e-content Seminar
- Assignment
- Tools
- PPT presentation Interaction
- Quiz
- evaluavation
- Chalk

CourseOutcomes

On the successful completion of the course, students will be able to

CO	CO Statement	Cognitive Level
CO1	Understand about the basics of modulation and its types	K2
CO2	Analysis the basic idea about the construction of fiber and its importance for communication	K2, K4
CO3	Aquire the importance and applications radar system particularly in CW Doppler radar	K4, K5
CO4	Understand the idea about the satellite orbits and satellite communication system	K2, K4
CO5	Known about the concept of cellular mobile radio system, Wi-Fi and 4G mobile communication	K3, K4,

Cognitive Level : K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	3	2	2	3	3	2
CO2	3	2	3	3	3	2	2
CO3	3	3	3	2	3	2	2
CO4	2	2	3	3	3	2	2
CO5	2	3	3	3	3	2	2

3 - Strongly Correlated; 2 - Moderately Correlated;
1 - Weakly Correlated; 0 – No correlation

Semester	Course Code	Course Title	Hours of Teaching / Cycle	No. of Credits
VI	**23U6PHSEC2**	**Skill Enhancement Course – Home Electrical Installation**	**2**	**2**

Nature of the course

Employability Oriented	√	Relevant to Local need	√
Entrepreneurship Oriented	√	Relevant to regional need	√
Skill development Oriented	√	Relevant to national need	√
		Relevant to Global development need	√
Addresses Gender Sensitization			
Addresses Environment and Sustainability	√		
Addresses Human Values			
Addresses Professional Ethics			

Course Objectives

The main objectives of this course are:

1. The students will get knowledge on electrical instruments installation and servicing.
2. The students will have knowledge on domestic wiring techniques with safety precautions.

Books for Study and Reference

SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**SIMPLE ELECTRICAL CIRCUITS: C**harge, current, potential difference, resistance – simple electrical circuits – DC ammeter, voltmeter, ohmmeter – Ohm's law – difference between DC and AC – advantages of AC over DC – electromagnetic induction - transformers – inductors/chokes – capacitors/condensers – impedance – AC ammeter, voltmeter –symbols and nomenclature. **TRANSMISSION OF ELECTRICITY:** Production and transmission of electricity – concept of power grid – Series and parallel connections – transmission losses (qualitative) – roles of step-up and step-down transformers – quality of connecting wires – characteristics of single and multicore wires	15
II	**ELECTRICAL WIRING:** Different types of switches – installation of two-way switch – role of sockets, plugs, sockets - installation of meters – basic switch board – electrical bell – indicator – fixing of tube lights and fans – heavy equipment like AC, fridge, washing machine, oven, geyser. **SAFETY MEASURES:** insulation for wires – colour specification for mains, return and earth – Understanding of fuse and circuit breakers – types of fuses: kit-kat, HRC, cartridge, MCB, ELCB – purpose of earth line – lighting arrestors – short circuiting and over loading – electrical safety – tips to avoid electrical shock – first aid for electrical shock – fire safety for electric current	15

1. Wiring a House: 5th Edition by Rex Cauldwell, (2014).
2. Black & Decker Advanced Home Wiring, 5th Edition: Backup Power - Panel Upgrades - AFCI Protection - "Smart" Thermostats, by Editors of Cool Springs Press, (2018).
3. Complete Beginners Guide to Rough in Electrical Wiring: by Kevin Ryan (2022).

Pedagogy: Teaching / Learning methods

• Lecture	• Tutorial	• Assignment	• PPT Presentation
• Quiz	• Group Discussion	• e-content Seminar	

CourseOutcomes

On the successful completion of the course, students will be able to

CO	CO Statement	Cognitive Level
CO1	Get knowledge and skills on electrical instruments installation and servicing.	K2, K3
CO2	Acquire knowledge to do domestic wiring with safety measures.	K2, K3,

Cognitive Level: K1 - Remember; **K2 -** Understanding; **K3 -** Apply; **K4 -** Analyze; **K5 –** Evaluate; **K6 –** Create

Mapping of Course Outcomes with Programme Specific Outcomes

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	3	1	3	3	1	3
CO2	2	3	1	3	3	1	3

3 - Strongly Correlated; 2 - Moderately Correlated; 1 - Weakly Correlated; 0 – No correlation