SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

AFFILIATED TO MADURAI KAMARAJ UNIVERSITY, MADURAI

RE-ACCREDITED WITH 'A' GRADE (THIRD CYCLE) BY NAAC WITH CGPA 3.11)

Programme Scheme, Scheme of Examination and Syllabi

(From 2023-2024 Batch onwards)

Department of Physics

UG Programme

Approved in the Academic Council – XIV held on 31/07/2023

Curriculum Design and Development Cell

Annexure M

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
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Curriculum Design and Development Cell

HOD	Dean of Pure Science	Dean of Academic Affairs	Principal

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
MEMBERS OF BOARD OF STUDIES

S.No.	Board Members	Name and Designation
1.	Chairman of the Board	**Dr. C.R. Kumaran** Head & Assistant Professor of Physics Sri Kaliswari College (Autonomous), Sivakasi.
2.	University Nominee	**Dr. K. Anitha** Assistant Professor & HOD Department of Physics School of Physics Madurai Kamaraj University Madurai -625 021
3.	Academic Expert 1.	**Dr. F. Kingslin Mary Genova M.Sc., M.Phil., Ph.D.** HOD & Associate Professor Department of Physics The Standard Fireworks Rajaratnam College for Women (Autonomous) Sivakasi.
4.	Academic Expert 2.	**Dr. R. Srinivasan** Associate Professor of Physics and Dean Thiagarajar College (Autonomous) Teppkulam Madurai -625009
5.	Industrialist	**Mr. J. Senthil Ananda Prakash** B.E. (ECE) Prakash Motors 1582, PKN road Sivakasi.
6.	Alumnus	**Mr. J.J. Premnahth** Research Scholar (Pursuing Ph.D.) Alagappa University Karaikudi – 630 003.
Members		
7.	Dr. M. Alagar	Associate Professor of Physics
8.	Dr. M. Vahini	Assistant Professor of Physics
9.	Dr. T. Jeyakumaran	Assistant Professor of Physics

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

(Affiliated to Madurai Kamaraj University, Re-accredited with A Grade (CGPA 3.11) by NAAC)

DEPARTMENT OF PHYSICS

UG Programme - B.Sc. Physics

GUIDELINES FOR OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

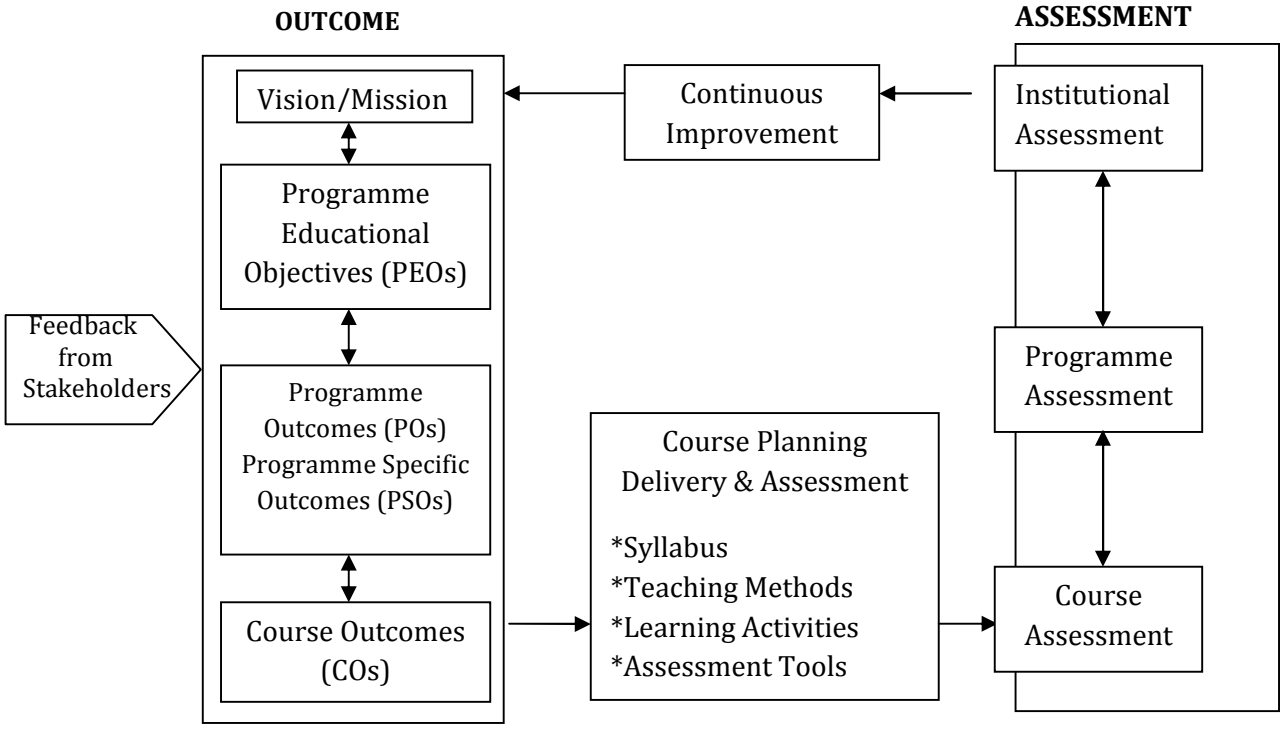
(From 2023-2024 Batch onwards)

INTRODUCTION

Sri Kaliswari College in its pursuit of imparting quality education has marked a remarkable growth in terms of academic excellence, infrastructure, student strength, ICT facilities, library and placement records since its establishment in 2000-2001.This institution constitutes an academic community that is committed to encourage the student community to experience and share knowledge, identify their potential, enhance the employability skills and enable them to pursue their goals. After the conferment of autonomous status in the year 2012, the college has so far gone for revision of the syllabi three times and is continually updating the syllabi to meet the needs and demands of the student community.

The institution in its success journey of imparting quality education has Re-Accredited with A grade with CGPA (3.11) in its third cycle of accreditation by NAAC. As an added feather to its cap, the institution has taken a giant leap to embrace the Outcome-Based Education system to enable the student community to develop their knowledge, skill and attitude simultaneously through a focussed learning and help the graduates to compete with their global counterparts and prepare them for life.

I. OUTCOME-BASED EDUCATION (OBE) FRAMEWORK



II. VISION OF THE INSTITUTION

- To impart quality higher education to produce highly talented youth capable of developing the nation

III. MISSION OF THE INSTITUTION

- Ensuring quality in all aspects of the activities
- Developing the latent skills of the rural youth
- Providing value - based education to instill courage and confidence
- Nurturing the entrepreneurial skills of the rural youth
- Creating competency to meet global challenges
- Imbibing social awareness and social responsibilities

IV. VISION OF THE DEPARTMENT

- To provide an ambient environment for teaching and research in physics with focus on achieving academic and professional excellence.

V. MISSION OF THE DEPARTMENT

- To impart knowledge in theoretical as well as experimental physics
- To provide a conducive environment for the students to develop scientific insights and practical skills and apply them to real world problems
- To bridge the gap between curriculum based learning and career readiness

VI. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

The Graduates will

PEO1: apply one's disciplinary knowledge and transferable skills to new/unfamiliar contexts, to identify and analyse problems and issues and solve complex problems with well-defined solutions.

PEO2: obtain ability to use modern instrumentation and laboratory techniques to design and perform experiments in all the fields of Physics.

PEO3: analyse complex technical information in all areas of Physics and construct logical arguments using correct technical language related to physics.

PEO4: work effectively in diverse teams in classroom, laboratory, industry and field-based situations and exhibit leadership quality in multidisciplinary learning environment with professional ethics.

PEO5: demonstrate investigative skills, including skills of independent investigation of physics-related issues and problems and engage in research and development, teaching and pursue higher education and become a lifelong learner.

VII. PROGRAMME OUTCOMES (POs)

PO1: Disciplinary Knowledge

Acquire comprehensive and scientific knowledge in the field of Science.

PO2: Critical Thinking, Problem Solving and Analytical Reasoning

Develop students' ability of critical observation and capacity to apply the principles/facts of science to identify, analyse, evaluate and solve problems in order to draw realistic conclusions.

PO3: Scientific Reasoning and Research Related Skills

Capability to involve in planning and conducting experiments, analyze the scientific research field, interpret and draw conclusions from experiments and investigate practically.

PO4: Communication Skills and Digital Literacy

Communicate effectively and articulate clearly the scientific ideas in written and oral form and make use of appropriate software for scientific computations and gain ICT skills to disseminate knowledge.

PO5: Ethics, Values and Multicultural Competence

Embrace moral and ethical values and apply it with a sense of responsibility in the workplace and community and adopt objective, unbiased and truthful actions in all aspects of work.

PO6: Team Work, Leadership and Employability Skills

Work effectively and respectfully in groups with enhanced inter-personal skills and exhibit qualities associated with leadership to build a team and achieve the vision and show proficiency in professional, employability and soft skills required for placements and higher educations.

PO7: Self-directed and Life-long Learning

Recognize the need and have the ability to engage in independent learning and be self-motivated and acquire knowledge through lifelong learning in the broadest context of technological change.

VIII. PROGRAMME SPECIFIC OUTCOMES (PSOs) – B.Sc. PHYSICS

On the successful completion of B.Sc. Physics, the students will

PSO1: identify key concepts, principles and fundamental laws that are central to the field of Physics, its different learning areas and applications, and its linkages with related disciplinary areas/subjects.

PSO2: acquire the ability to use critical thinking, analytical reasoning skills to identify and tackle Physics related problems and apply appropriate physical principles and methodologies to solve a wide range of problems associated with Physics.

PSO3: demonstrate the application of physics principles, concepts and laws in physics-related experiments or investigations, analyse and interpret information collected using appropriate methods.

PSO4: plan and execute experiments through careful observations, precise measurements, analyse interpretations and communicate effectively both in oral and written form on science topics or scientific reports and projects and use ICT in variety of learning situations.

PSO5: embrace ethical practices in all work and respond to social, environmental, and moral issues and practise tolerance and respect differences

PSO6: develop the ability to work collaboratively and effectively with others and be a team leader, respecting individual roles and responsibilities and acquire required skills for placements and higher education.

PSO7: recognize the need and have the ability to engage in independent, lifelong learning in the broadest context of technological change.

IX. PO-PSO Mapping Matrix – B.Sc. Physics

PO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
PO1	✓						
PO2		✓					
PO3			✓				
PO4				✓			
PO5					✓		
PO6						✓	
PO7							✓

X. PO-PEO Mapping Matrix – B.Sc. Physics

PO / PEO	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	✓				
PO2	✓	✓	✓		✓
PO3		✓			
PO4			✓		
PO5				✓	
PO6				✓	
PO7					✓

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
(Affiliated to Madurai Kamaraj University, Re-accredited with A Grade (CGPA 3.11) by NAAC)
DEPARTMENT OF PHYSICS
UG Programme - B.Sc. Physics

REGULATIONS

Duration of the Programme **:** Three years (equivalent to six semesters)

Eligibility

Candidate should have passed the Higher Secondary Examinations conducted by the Board of Higher Secondary Education, Government of Tamil Nadu or any other examination accepted by the Syndicate of the Madurai Kamaraj University, Madurai as its equivalent.

Medium of Instruction : English

Age Limit

Maximum age limit : 21 Years

Age Relaxation

SC/ SCA/ST/BC/BCM/MBC/DNC & Women : 3 years age relaxation
Differently-Abled Students : 5 years age relaxation

Transitory Permission

Students joined from 2023 - 2024 may be permitted to write their examinations in this pattern up to April 2031.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme - B.Sc. Physics
SCHEME OF EXAMINATION

For all the UG Programmes, the internal and external marks are distributed as follows:

For all Theory Courses (Part I, II, III): Internal Marks: 25; External Marks: 75

For Part-IV Courses : Internal Marks:25; External Marks: 50(Converted to 75)

For all Practical Courses, Project and Internship : Internal Marks: 25; External Marks: 75

Internal Mark Distribution for Theory Courses

Assessment Type	Marks	Scheme of Assessment
Internal Test	10 marks	Two Internal Tests and 1 Model Exam will be conducted and average of the best two will be considered
Written Assignment E-Assignment/ Case Studies/ Reviews/ Field Assignments/ Poster Presentations/ Portfolios	5 marks	Any two of the Assignments will be given and the average of the two will be considered
Quiz	5 marks	One Quiz Test will be conducted
Viva/ Oral Exam/ Group Discussion/ Role Play	5 marks	Test will be conducted in any one of the Oral Mode

Internal Mark Distribution for Practical Courses

Assessment Type	Marks	Scheme of Assessment
Lab work /Program Execution	10 marks	Two Internal Tests will be conducted and the average of the two will be considered
Observation/Record Notebook	10 marks	Assessment will be done during every practical class
Viva –Voce / Lab Quiz	5 marks	Two Lab Quiz Tests/viva-voce will be conducted and the average of the two will be considered

External Mark Distribution for Practical Courses

Assessment Type	Marks	Scheme of Assessment
Lab work/Program Execution	65 marks	End result of the Practical
Viva –Voce	10 marks	Oral Mode Test

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme - B.Sc. Physics
QUESTION PAPER PATTERN FOR PART- I, PART- II & PART-III COURSES

Internal Test – 30 Marks – 1 hr Duration

S.No	Type of Questions	Marks
1.	Objective type Questions: Multiple Choice – 3 questions Answer in a Word/Sentence – 3 questions	 03 03
2.	Short Answer–2 questions –either or type	2x7=14
3.	Long Answer–1 question – either or type	1x10=10

Summative Examinations – For Part- I, Part- II & Part-III Courses
75 Marks -3 hrs Duration

S.No	Type of Questions	Marks
1.	Objective type Questions: Multiple Choice – 5 questions Answer in a Word/Sentence – 5 questions	 05 05
2.	Short Answer - 5 questions – either or type	5x7=35
3.	Long Answer - 3 questions – either or type	3x10=30

QUESTION PAPER PATTERN FOR PART -IV COURSES
Internal Test- 30 Marks – 1 hr Duration

S.No	Type of Questions	Marks
1.	Objective type Questions: Multiple Choice – 5 questions	 05
2.	Short Answer - 3 questions – either or type	3x5=15
3.	Long Answer - 1 question – either or type	01x10=10

Summative Examinations – For Part-IV Courses 50 Marks (converted to 75)
-2 hrs Duration

S.No	Type of Questions	Marks
1.	Objective type Questions: Multiple Choice – 10 questions	 10
2.	Short Answer - 4 questions – either or type	4x5=20
3.	Long Answer - 2 questions – either or type	02x10=20

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme - B.Sc. Physics

Attainment of Course outcomes

Attainment of Course outcomes is computed using Direct and Indirect assessment methods. Direct Method of Assessment is based on performance of the students in the Continuous Internal Assessment Tests, Summative Examinations and supporting activities such as Seminar, Assignment, Case study, Group Discussion, Quiz, etc., and Indirect Method of Assessment is based on periodical feedback from the students at the end of each course.

Weightage of Direct and Indirect Assessment in computation of attainment of each course is 70% for Direct Assessment and 30% for Indirect Assessment.

Direct Assessment of Course outcome attainment

i) Rubrics:

Internal Assessment contributes 60% and Summative Examinations Assessment contributes 40% to the Direct Assessment of a course outcome for Theory Courses. For the Practical Courses, Internal Assessment contributes 70% and Summative Examinations Assessment contributes 30% to the Direct Assessment of a course outcome.

ii) Setting of Target:

50% of the maximum mark is set as target of Internal Assessment tools and the average mark of the class is set as target of Summative Examinations Assessment.

Formula for calculating percentage attainment of each course outcome

Based on the result of Summative Examinations and Internal Assessment tools, the number of students scoring more than the target is found out.

For each Internal Assessment Tools,

$$\text{Percentage attainment of each course outcome} = \frac{\text{No. of. Students who scored more than the target in the concerned course outcome}}{\text{Total Number of Students}} \times 100$$

Percentage attainment of each Course outcome for Internal Assessment tools = Average of percentage attainment of all Internal Assessment tools

For Summative Examinations,

Percentage attainment of each Course outcome = $\frac{\text{No. of. Students who scored more than the target in the concerned co}}{\text{Total Number of Students}} \times 100$

Formula for calculating Attainment Percentage of Course outcome of a course

Percentage Attainment of Course outcome for Internal Assessment tools	=	Average of percentage attainment of all COs
Percentage Attainment of Course outcome for Summative Examinations	=	Average of percentage attainment of all COs

Final Direct Assessment of Course outcome Attainment

For Theory Courses

Percentage Attainment of Course outcome through Direct Assessment	=	(0.6 x percentage attainment of CO for internal assessment tool) + (0.4 x percentage attainment of CO for summative examinations)

For Practical Courses

Percentage Attainment of Course outcome through Direct Assessment	=	0.7 x percentage attainment of CO for Internal Assessment tools + 0.3 x percentage attainment of CO for Summative Examinations

Indirect Assessment of CO Attainment

The course outcome feedback is conducted at the end of every semester by distributing structured feedback questionnaire to the students. The analysis of this feedback questionnaire is done on the following score. The feedback forms will be sorted with various scores and feedbacks with a score more than 5.5 are considered as satisfactory level for calculations for indirect attainment.

A : 10-8.5 **B :** 8.4-7.0 **C :** 6.9-5.5 **D :** 5.4-4.0 **E :** 3.9-0

Percentage attainment for each CO = $\frac{\text{Satisfaction Number}}{\text{Response Received}} \times 100$

Percentage Attainment of CO of a course = Average of percentage attainment of all COs

Final Assessment of CO attainment

Average course attainment = 0.7 x Direct assessment of CO attainment + 0.3 x Indirect assessment of CO attainment

Expected Level of Attainment for each of the Course Outcomes

Percentage of CO Attainment	Level of Attainment
= 70% and above	Excellent
= 60% - <70 %	Very good
= 50% -< 60 %	Good
= 40% - < 50 %	Satisfactory
Below 40%	Not Satisfactory

Assessment of PO attainment

At the end of the each programme, the Direct PO Assessment is done from the CO Attainment of all courses. The Direct PO Attainment for a particular course is determined from the attainment values obtained for each course outcome related to that PO and the CO-PO mapping values.

$$\text{Weighted contribution of the course in attainment of each PO} = \frac{\text{Weighted Percentage of contribution of the course in attainment of each PO} \times \text{average course attainment}}{100}$$

$$\text{Percentage attainment for each PO} = \frac{\text{Total weightage of all courses contributed to each PO}}{\text{Total weightage of all courses contributed to all POs}} \times 100 \times \text{weighted contribution of the course in the attainment of each PO}$$

Percentage Attainment of PO = Average of Percentage attainment of all POs

Expected Level of Attainment for each of the Programme Outcomes

Percentage of PO Attainment	Level of Attainment
= 70% and above	Excellent
= 60% - <70 %	Very good
= 50% -< 60 %	Good
= 40% - < 50 %	Satisfactory
Below 40%	Not Satisfactory

Attainment of Programme Educational Objectives (PEO)

PEOs are assessed after 3 to 4 years of graduation. Attainment is measured based on the Feedback from Stakeholders

1. Alumni
2. Parents
3. Employer

The analysis of this feedback questionnaire is done on the following score. The feedback forms will be sorted with various scores and feedbacks with a score more than 5.5 are considered as satisfactory level for calculations for Indirect Attainment.

A : 10-8.5 **B :** 8.4-7.0 **C :** 6.9-5.5 **D :** 5.4-4.0 **E :** 3.9-0

$$\text{Percentage attainment of PEOs} = \frac{\text{Satisfaction number}}{\text{Response Received}} \times 100$$

Expected Level of Attainment for each of the Programme Educational Objectives

Percentage of PEO Attainment	**Level of Attainment**
= 70% and above	Excellent
= 60% - <70 %	Very good
= 50% -< 60 %	Good
= 40% - < 50 %	Satisfactory
Below 40%	Not Satisfactory

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DEPARTMENT OF PHYSICS

UG Programme - B.Sc. Physics

CURRICULUM STRUCTURE

OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

(From 2023-2024 Batch onwards)

Part	Courses	Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	Credits
I	Tamil / Hindi	6 (3)	6 (3)	6 (3)	6 (3)	-	-	12
II	English	6 (3)	6 (3)	6 (3)	6 (3)	-	-	12
III	Core Courses	5 (5) 3P (3)	5 (5) 3P (3)	5 (5) 3P (3)	4 (4) 3P (3)	5 (4) 5 (4) 5 (3) 3P (3)	5 (4) 5 (4) 5 (3) 5P (3) 4 (4)	63
	Elective Courses Generic/ Discipline Specific	6 (5)	6 (5)	4 (3) 2P (2)	4 (3) 2P (2)	5 (3) 5 (3)	4 (3)	29
IV	Skill Enhancement Courses	2 (2) F 2 (2) NME	2(2) 2 (2) NME	1P(1) E 2 (2)	2 (2) 2P (2)	-	2 (2)	17
	Environmental Studies	-	-	1	1 (2)	-	-	02
	Value Education	-	-	-	-	2(2)		02
	Internship/ Industrial Training	-	-	-	-	(2)	-	02
V	Extension Activity	-	-	-	-	-	(1)	01
Total Hours (Per week)/ Credits		30(23)	30(23)	30(22)	30(24)	30(24)	30(24)	140 180
Self-paced Learning (Swayam Course)		-	-	-	-	-	1 Credit	1 Credit

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DEPARTMENT OF PHYSICS

UG Programme - B.Sc. Physics

CURRICULUM PATTERN

OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

(From 2023-2024 Batch onwards)

PROGRAMME CODE – UPH

Semester	Part	Course Code	Course Name	Hours	Credits	Internal Marks	External Marks
I	I	23UTAG11	Podhu Tamil / Hindi – I	6	3	25	75
	II	23UENL11	General English – I	6	3	25	75
	III	23UPHC11	**Core Course –I :** Properties of Matter and Acoustics	5	5	25	75
		23UPHC1P	**Core Course –II :** Practical: Properties of Matter	3	3	25	75
		23UPHA11	**Elective Course Generic/ Discipline Specific - I:** Mathematics - I	6	5	25	75
	IV	23UPHS11	**Skill Enhancement Course - I: Foundation Course -** Introductory Physics	2	2	25	75
		23UPHN11	**Skill Enhancement Course - II: Non Major Elective Course :** Physics for Everyday Life	2	2	25	75
			Total	**30**	**23**		
II	I	23UTAG21	Podhu Tamil / Hindi – II	6	3	25	75
	II	23UENL21	General English – II	6	3	25	75
	III	23UPHC21	**Core Course – III :** Heat, Thermodynamics and Statistical Physics	5	5	25	75
		23UPHC2P	**Core Course – IV :** Practical: Heat, Oscillations, Waves and Sound	3	3	25	75
		23UPHA21	**Elective Course Generic/ Discipline Specific - II:** Mathematics - II	6	5	25	75
	IV	23UPHS21	**Skill Enhancement Course– III**: Energy Physics	2	2	25	75
		23UPHN21	**Skill Enhancement Course - IV: Non Major Elective Course :** Astrophysics	2	2	25	75
			Total	**30**	**23**		
III	I	23UTAG31	Podhu Tamil/Hindi– III	6	3	25	75
	II	23UENL31	General English – III	6	3	25	75
	III	23UPHC31	**Core Course – V :** Electricity, Magnetism and Electromagnetism	5	5	25	75
		23UPHC3P	**Core Course – VI :** Practical: Electricity	3	3	25	75
		23UPHA31	**Elective Course Generic/ Discipline Specific - III:** Chemistry For Physical Sciences - I	4	3	25	75
		23UPHA3P	**Elective Course Generic/ Discipline**	2	2	25	75

			Specific - III: Practical: Chemistry Practical For Physical Sciences - I				
	IV	23UPHS3P	**Skill Enhancement Course– V**: **(Entrepreneurial Skill)**- Practical : Electrical Wiring	1	1	25	75
		23UPHS31	**Skill Enhancement Course – VI:** Electrical Wiring and Appliances	2	2	25	75
		-	Environmental Studies	1	-	-	-
			Total	**30**	**22**		
IV	I	23UTAG41	Podhu Tamil / Hindi – IV	6	3	25	75
	II	23UENL41	General English – IV	6	3	25	75
	III	23UPHC41	**Core Course –VII :** Optics	4	4	25	75
		23UPHC4P	**Core Course – VIII** : Practical: Light	3	3	25	75
		23UPHA41	**Elective Course Generic/ Discipline Specific - IV:** Chemistry For Physical Sciences - II	4	3	25	75
		23UPHA4P	**Elective Course Generic/ Discipline Specific - IV:** Practical: Chemistry Practical For Physical Sciences - II	2	2	25	75
	IV	23UPHS41	**Skill Enhancement Course – VII:** Physics of Medical Instruments	2	2	25	75
		23UPHS4P	**Skill Enhancement Course – VIII:** Practical : Basics of Optical and Electronic Devices	2	2	25	75
		23UESR41	Environmental Studies	1	2	25	75
			Total	**30**	**24**		
V	III	23UPHC51	**Core Course – IX** : Mechanics	5	4	25	75
		23UPHC52	**Core Course – X :** Atomic and Nuclear Physics	5	4	25	75
		23UPHC53	**Core Course – XI :** Analog and Communication Electronics	5	3	25	75
		23UPHC5P	**Core Course – XII:** Practical: General Physics	3	3	25	75
		23UPHO51 23UPHO52	**Elective Course Generic/ Discipline Specific - V:** 1. Lasers and Fiber Optics 2. Digital Photography	5	3	25	75
		23UPHO53 23UPHO54	**Elective Course Generic/ Discipline Specific - VI:** 1. Mathematical Physics 2. Numerical Methods and C Programming	5	3	25	75
	IV	23UVED51	Value Education	2	2	25	75
		23UPHJ51	Internship/Industrial Training	-	2	25	75
			Total	**30**	**24**		
VI	III	23UPHC61	**Core Course – XIII :** Quantum Mechanics and Relativity	5	4	25	75
		23UPHC62	**Core Course – XIV :** Solid State Physics	5	4	25	75

		23UPHC63	**Core Course – XV:** Digital Electronics and Microprocessor 8085	5	3	25	75
		23UPHC6P	**Core Course – XVI:** Practical: Electronics	5	3	25	75
		23UPHJ61	**Core Course – XVII:** Project with Viva Voce	4	4	25	75
		23UPHO61 23UPHO62	**Elective Course Generic/ Discipline Specific - VIII:** 1. Materials Science 2. Nanoscience and Nano Technology	4	3	25	75
	IV	23UPHS61	**Skill Enhancement Course – IX:** Solar Photovoltaics	2	2	25	75
	V	-	Extension Activity	-	1		100
			Total	**30**	**24**		

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DEPARTMENT OF PHYSICS

UG Programme - B.Sc. Physics

CURRICULUM PATTERN

OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

(From 2023-2024 Batch onwards)

PROGRAMME ARTICULATION MATRIX (PAM)

Semester	Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	23UTAG11	Podhu Tamil / Hindi – I	10	7	2	8	2	2	3
	23UENL11	General English – I	10	7	2	8	2	2	3
	23UPHC11	**Core Course –I :** Properties of Matter and Acoustics	15	10	5	5	2	5	4
	23UPHC1P	**Core Course –II :** Practical: Properties of Matter	15	10	8	5	3	6	4
	23UPHA11	**Elective Course Generic/ Discipline Specific - I:** Mathematics - I	14	8	5	5	0	5	4
	23UPHS11	**Skill Enhancement Course - I: Foundation Course -** Introductory Physics	12	8	4	5	2	4	3
	23UPHN11	**Skill Enhancement Course - II: Non Major Elective Course :** Physics for Everyday Life	9	5	0	8	0	5	5
II	23UTAG21	Podhu Tamil / Hindi – II	10	8	2	8	2	2	3
	23UENL21	General English – II	10	8	2	8	2	2	3
	23UPHC21	**Core Course – III :** Heat, Thermodynamics and Statistical Physics	15	10	5	5	2	5	4
	23UPHC2P	**Core Course – IV :** Practical: Heat, Oscillations, Waves and Sound	15	10	8	5	3	6	4
	23UPHA21	**Elective Course Generic/ Discipline Specific - II:** Mathematics - II	14	8	5	5	0	5	4
	23UPHS21	**Skill Enhancement Course– III**: Energy Physics	13	7	4	5	2	5	5
	23UPHN21	**Skill Enhancement Course - IV: Non Major Elective Course :** Astrophysics	9	5	0	8	0	5	5
III	23UTAG31	Podhu Tamil/Hindi– III	10	8	2	8	2	2	2
	23UENL31	General English – III	10	8	3	9	3	3	2
	23UPHC31	**Core Course – V :** Electricity, Magnetism and Electromagnetism	15	10	5	5	2	5	4
	23UPHC3P	**Core Course – VI :** Practical: Electricity	15	10	8	5	3	6	4
	23UPHA31	**Elective Course Generic/ Discipline Specific - III:** Chemistry For Physical Sciences - I	15	10	5	4	2	3	3
	23UPHA3P	**Elective Course Generic/ Discipline**	15	10	7	2	2	4	4

		Specific - III: Practical: Chemistry Practical For Physical Sciences - I							
	23UPHS3P	**Skill Enhancement Course– V**: **(Entrepreneurial Skill)**- Practical : Electrical Wiring	12	10	8	5	3	6	6
	23UPHS31	**Skill Enhancement Course – VI:** Electrical Wiring and Appliances	13	8	5	5	1	5	5
	-	Environmental Studies	-	-	-	-	-	-	-
IV	23UTAG41	Podhu Tamil / Hindi – IV	10	8	2	9	2	2	2
	23UENL41	General English – IV	10	9	3	8	2	3	3
	23UPHC41	**Core Course –VII :** Optics	15	10	6	5	2	5	4
	23UPHC4P	**Core Course – VIII** : Practical: Light	15	10	8	5	3	6	4
	23UPHA41	**Elective Courses Generic/ Discipline Specific - IV:** Chemistry For Physical Sciences - II	15	10	5	4	2	3	3
	23UPHA4P	**Elective Course Generic/ Discipline Specific - IV:** Practical: Chemistry Practical For Physical Sciences - II	15	10	7	2	2	4	4
	23UPHS41	**Skill Enhancement Course – VII:** Physics of Medical Instruments	14	8	5	5	2	5	4
	23UPHS4P	**Skill Enhancement Course – VIII:** Practical : Basics of Optical and Electronic Devices	15	10	8	3	3	6	4
	23UESR41	Environmental Studies	8	5	1	7	8	5	5
V	23UPHC51	**Core Course – IX** : Mechanics	15	10	5	5	2	5	4
	23UPHC52	**Core Course – X :** Atomic and Nuclear Physics	15	10	5	5	2	5	4
	23UPHC53	**Core Course – XI :** Analog and Communication Electronics	15	10	5	5	2	5	4
	23UPHC5P	**Core Course – XII:** Practical: General Physics	15	10	8	5	3	6	4
	23UPHO51 23UPHO52	**Elective Course Generic/ Discipline Specific - V:** 1. Lasers and Fiber Optics 2. Digital Photography	15	9	5	6	3	5	4
	23UPHO53 23UPHO54	**Elective Course Generic/ Discipline Specific - VI:** 1. Mathematical Physics 2. Numerical Methods and C Programming	15	10	5	6	2	6	5
	23UVED51	Value Education	8	5	1	5	9	4	7
	23UPHJ51	Internship/Industrial Training	8	12	4	7	1	5	8
VI	23UPHC61	**Core Course – XIII :** Quantum Mechanics and Relativity	15	11	6	5	2	6	4
	23UPHC62	**Core Course – XIV :** Solid State Physics	15	10	5	5	2	5	4
	23UPHC63	**Core Course – XV:** Digital Electronics and Microprocessor 8085	15	11	5	5	2	6	4
	23UPHC6P	**Core Course – XVI:** Practical: Electronics	15	10	8	5	3	6	4
	23UPHJ61	**Core Course – XVII:** Project with Viva Voce	10	9	12	5	3	7	5

	23UPHO61 23UPHO62	**Elective Course Generic/ Discipline Specific - VIII:** 1. Materials Science 2. Nanoscience and Nano Technology	15	9	5	5	2	6	4
	23UPHS61	**Skill Enhancement Course – IX:** Solar Photovoltaics	15	9	5	5	2	6	4
	-	Extension Activity	8	2	1	7	9	8	5
Total Weightage of all Courses Contributing to PO			**569**	**392**	**214**	**248**	**102**	**203**	**178**

SRI KALISWARI COLLEGE (AUTONOMOUS), Sivakasi

(Affiliated to Madurai Kamaraj University, Re-accredited with A Grade (CGPA 3.11) by NAAC)

DEPARTMENT OF PHYSICS

UG Programme - B.Sc. Physics

CURRICULUM PATTERN

OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

(From 2023-2024 Batch onwards)

PROGRAMME ARTICULATION MATRIX – WEIGHTAGE PERCENTAGE

Semester	Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	23UTAG11	Podhu Tamil / Hindi – I	1.76	1.79	0.93	3.23	1.96	0.99	1.69
	23UENL11	General English – I	1.76	1.79	0.93	3.23	1.96	0.99	1.69
	23UPHC11	**Core Course –I :** Properties of Matter and Acoustics	2.64	2.55	2.34	2.02	1.96	2.46	2.25
	23UPHC1P	**Core Course –II :** Practical: Properties of Matter	2.64	2.55	3.74	2.02	2.94	2.96	2.25
	23UPHA11	**Elective Course Generic/ Discipline Specific - I:** Mathematics - I	2.46	2.04	2.34	2.02	0	2.46	2.25
	23UPHS11	**Skill Enhancement Course - I: Foundation Course -** Introductory Physics	2.11	2.04	1.87	2.02	1.96	1.97	1.69
	23UPHN11	**Skill Enhancement Course - II: Non Major Elective Course :** Physics for Everyday Life	1.58	1.28	0	3.23	0	2.46	2.81
II	23UTAG21	Podhu Tamil / Hindi – II	1.76	2.04	0.93	3.23	1.96	0.99	1.69
	23UENL21	General English – II	1.76	2.04	0.93	3.23	1.96	0.99	1.69
	23UPHC21	**Core Course – III :** Heat, Thermodynamics and Statistical Physics	2.64	2.55	2.34	2.02	1.96	2.46	2.25
	23UPHC2P	**Core Course – IV :** Practical: Heat, Oscillations, Waves and Sound	2.64	2.55	3.74	2.02	2.94	2.96	2.25
	23UPHA21	**Elective Course Generic/ Discipline Specific - II:** Mathematics - II	2.46	2.04	2.34	2.02	0	2.46	2.25
	23UPHS21	**Skill Enhancement Course– III**: Energy Physics	2.28	1.79	1.87	2.02	1.96	2.46	2.81
	23UPHN21	**Skill Enhancement Course - IV: Non Major Elective Course :** Astrophysics	1.58	1.28	0	3.23	0	2.46	2.81
III	23UTAG31	Podhu Tamil/Hindi– III	1.76	2.04	0.93	3.23	1.96	0.99	1.12
	23UENL31	General English – III	1.76	2.04	1.4	3.63	2.94	1.48	1.12
	23UPHC31	**Core Course – V :** Electricity, Magnetism and Electromagnetism	2.64	2.55	2.34	2.02	1.96	2.46	2.25
	23UPHC3P	**Core Course – VI :** Practical: Electricity	2.64	2.55	3.74	2.02	2.94	2.96	2.25
	23UPHA31	**Elective Course Generic/ Discipline Specific - III:** Chemistry For Physical Sciences - I	2.64	2.55	2.34	1.61	1.96	1.48	1.69
	23UPHA3P	**Elective Course Generic/ Discipline**	2.64	2.55	3.27	0.81	1.96	1.97	2.25

		Specific - III: Practical: Chemistry Practical For Physical Sciences - I							
	23UPHS3P	**Skill Enhancement Course– V**: **(Entrepreneurial Skill)**- Practical : Electrical Wiring	2.11	2.55	3.74	2.02	2.94	2.96	3.37
	23UPHS31	**Skill Enhancement Course – VI:** Electrical Wiring and Appliances	2.28	2.04	2.34	2.02	0.98	2.46	2.81
	-	Environmental Studies	-	-	-	-	-	-	-
IV	23UTAG41	Podhu Tamil / Hindi – IV	1.76	2.04	0.93	3.63	1.96	0.99	1.12
	23UENL41	General English – IV	1.76	2.3	1.4	3.23	1.96	1.48	1.69
	23UPHC41	**Core Course –VII :** Optics	2.64	2.55	2.8	2.02	1.96	2.46	2.25
	23UPHC4P	**Core Course – VIII** : Practical: Light	2.64	2.55	3.74	2.02	2.94	2.96	2.25
	23UPHA41	**Elective Courses Generic/ Discipline Specific - IV:** Chemistry For Physical Sciences - II	2.64	2.55	2.34	1.61	1.96	1.48	1.69
	23UPHA4P	**Elective Course Generic/ Discipline Specific - IV:** Practical: Chemistry Practical For Physical Sciences - II	2.64	2.55	3.27	0.81	1.96	1.97	2.25
	23UPHS41	**Skill Enhancement Course – VII:** Physics of Medical Instruments	2.46	2.04	2.34	2.02	1.96	2.46	2.25
	23UPHS4P	**Skill Enhancement Course – VIII:** Practical : Basics of Optical and Electronic Devices	2.64	2.55	3.74	1.21	2.94	2.96	2.25
	23UESR41	Environmental Studies	1.41	1.28	0.47	2.82	7.84	2.46	2.81
V	23UPHC51	**Core Course – IX** : Mechanics	2.64	2.55	2.34	2.02	1.96	2.46	2.25
	23UPHC52	**Core Course – X :** Atomic and Nuclear Physics	2.64	2.55	2.34	2.02	1.96	2.46	2.25
	23UPHC53	**Core Course – XI :** Analog and Communication Electronics	2.64	2.55	2.34	2.02	1.96	2.46	2.25
	23UPHC5P	**Core Course – XII:** Practical: General Physics	2.64	2.55	3.74	2.02	2.94	2.96	2.25
	23UPHO51 23UPHO52	**Elective Course Generic/ Discipline Specific - V:** 1. Lasers and Fiber Optics 2. Digital Photography	2.64	2.3	2.34	2.42	2.94	2.46	2.25
	23UPHO53 23UPHO54	**Elective Course Generic/ Discipline Specific - VI:** 3. Mathematical Physics 4. Numerical Methods and C Programming	2.64	2.55	2.34	2.42	1.96	2.96	2.81
	23UVED51	Value Education	1.41	1.28	0.47	2.02	8.82	1.97	3.93
	23UPHJ51	Internship/Industrial Training	1.41	3.06	1.87	2.82	0.98	2.46	4.49
VI	23UPHC61	**Core Course – XIII :** Quantum Mechanics and Relativity	2.64	2.81	2.8	2.02	1.96	2.96	2.25
	23UPHC62	**Core Course – XIV :** Solid State Physics	2.64	2.55	2.34	2.02	1.96	2.46	2.25
	23UPHC63	**Core Course – XV:** Digital Electronics and Microprocessor 8085	2.64	2.81	2.34	2.02	1.96	2.96	2.25
	23UPHC6P	**Core Course – XVI:** Practical: Electronics	2.64	2.55	3.74	2.02	2.94	2.96	2.25
	23UPHJ61	**Core Course – XVII:** Project with Viva Voce	1.76	2.3	5.61	2.02	2.94	3.45	2.81

	23UPHO61 23UPHO62	**Elective Course Generic/ Discipline Specific - VIII:** 1. Materials Science 2. Nanoscience and Nano Technology	2.64	2.3	2.34	2.02	1.96	2.96	2.25
	23UPHS61	**Skill Enhancement Course – IX:** Solar Photovoltaics	2.64	2.3	2.34	2.02	1.96	2.96	2.25
	-	Extension Activity	1.41	0.51	0.47	2.82	8.82	3.94	2.81
Total Weightage of all Courses Contributing to PO			100	100	100	100	100	100	100

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF TAMIL
UG PROGRAMME - B.A./B.Sc./B.Com./BBA./BCA.
SEMESTER - I
பொதுத்தமிழ் - I (23UTAG11)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 6**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 90 hrs**	**MAX. MARKS**	**: 100**

நோக்கங்கள்

- முதலாமாண்டு பட்ட வகுப்பு மாணவர்களுக்குத் தமிழ் மொழி இலக்கியங்களை அறிமுகம் செய்தல்.
- தற்கால இலக்கியப் போக்குகளையும் இலக்கணங்களையும் மாணவர் அறியுமாறு செய்து அவர்களின் படைப்பாற்றலைத் தூண்டுதல்.
- தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்.

கற்றலின் பயன்கள்

இத்தாளை வெற்றிகரமாக முடித்தவுடன் மாணவர்கள்,

CO1[K1]: பாரதியார் காலந்தொட்டு தற்காலக் கவிதைகள் வரை கவிதை இலக்கியம் அறிமுகப்படுத்தப்படுவதால் அவற்றை அடையாளம் காண்பர்

CO2[K2]: கவிதை வரலாற்றினை புரிந்து கொண்டு பிழை இல்லாமல் எழுதும் திறன் பெறுவர்

CO3[K3]: இக்கால இலக்கிய வகைகள் மற்றும் இலக்கணம் கற்பதன் மூலம் அவற்றை தம வாழ்நிலையோடு பொருத்திப் பார்ப்பா

CO4[K4]: மொழியறிவோடு சிந்தனைத்திறன் பெற்று இலக்கியம் மற்றும் இலக்கணங்களைப் பகுப்பாய்வர்

CO5[K5]: உலகளாவிய இலக்கியங்களைக் கற்று மதிப்பீடு செய்வர்

CO/PO Mapping Table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	2	-	2	-	-	-
CO2 [K2]	2	2	-	2	-	-	-
CO3 [K3]	2	1	-	2	1	-	1
CO4 [K4]	2	1	1	1	1	1	1
CO5 [K5]	2	1	1	1	-	1	1
Weightage of the course	10	07	02	08	02	02	03
Weighted percentage of Course contribution to POs	**1.76**	**1.79**	**0.93**	**3.23**	**1.96**	**0.99**	**1.69**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low ,'-' No Correlation)

கூறு I **(18 hrs)**

மரபுக்கவிதை: பெ.சுந்தரனார் - தமிழ்த் தெய்வ வணக்கம், பாரதிதாசன் - சிறுத்தையை வெளியில் வா, கவிமணி - புத்தரும் சிறுவனும், முடியரசன் - மொழி உணர்ச்சி, கண்ணதாசன் - ஆட்டனத்தி ஆதிமந்தி - ஆதிமந்திபுலம்பல், சுரதா - துறைமுகம் தொகுப்பிலிருந்து ஏதேனும் ஒருகவிதை, தமிழ் ஒளி - கடல்

கூறுII **(18 hrs)**

புதுக்கவிதை: அப்துல் ரகுமான் - வீட்டுக்கொருமரம் வளர்ப்போம், ஈரோடு தமிழன்பன் - சென்ரியூ கவிதைகள் (ஏதேனும் ஐந்து கவிதைகள்), வைரமுத்து - பிற்சேர்க்கை, மு.மேத்தா - வாழைமரம், அறிவுமதி - வள்ளுவம் பத்து, நா முத்துக்குமார் - ஆனந்தயாழை மீட்டுகிறாய், சுகிர்தராணி - சபிக்கப்பட்ட முத்தம், இளம் பிறை - நீ எழுத மறுக்கும் எனது அழகு.

கூறு III **(18 hrs)**

சிறுகதைகள் : வாய்ச்சொற்கள் - ஜெயகாந்தன் (மாலைமயக்கம் தொகுப்பு), கடிதம் - புதுமைப்பித்தன், கரு - உமாமகேஸ்வரி, முள்முடி - தி.ஜானகிராமன், சிதறல்கள் - விழி.பா.இதயவேந்தன், காகிதஉறவு - சு.சமுத்திரம், வீட்டின் மூலையில் சமையல் அறை - அம்பை, (மொழிபெயர்ப்புக் கதை) ஆண்டன் செக்காவ் - நாய்க்காரச் சீமாட்டி, சந்தியா பதிப்பகம்.

கூறு IV **(18 hrs)**

மரபுக்கவிதை கவிதை தோற்றம் வளர்ச்சி - புதுக்கவிதை கவிதை தோற்றம் வளர்ச்சி - சிறுகதை தோற்றம் வளர்ச்சி

கூறு V **(18 hrs)**

மொழித்திறன் போட்டிதேர்வு: பொருள் பொதிந்த சொற்றொடர் அமைத்தல், ஓர் எழுத்து ஒருமொழி, வேற்றுமை உருபுகள், திணை, பால், எண், இடம், கலைச்சொல்லாக்கம், மொழிபெயர்ப்பு.
(குறிப்பு: அலகு 4, 5 ஆகியன போட்டித் தேர்வு நோக்கில் நடத்தப்பட வேண்டும்).

பாடநூல்கள்

1. தமிழியல் துறையினர், *தொகுப்பு நூல்,* ஸ்ரீ காளீஸ்வரி கல்லூரி (தன்னாட்சி), சிவகாசி.
2. வாசுதேவன், கா. *பன்முக நோக்கில் தமிழ் இலக்கிய வரலாறு,* தேவன் பதிப்பகம், திருச்சிராப்பள்ளி, 2017.

பார்வை நூல்கள்

1. சிற்பி. பாலசுப்பிரமணியன், *தமிழ் இலக்கிய வரலாறு,* கவிதா வெளியீடு, சென்னை.
2. தமிழண்ணல், *புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு,* சோலை பதிப்பகம், மதுரை
3. பாக்கியமேரி, *வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு,* பாரி நிலையம், சென்னை.

வலைப்பதிவுகள் (Web Sources)

1. Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org>
2. Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library

3. 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

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
UG PROGRAMME - B.A./B.COM/B.B.A./B.SC./BCA
SEMESTER- I
GENERAL ENGLISH-I (23UENL11)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 6 (L-5, T-1)**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 90 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To enable learners to acquire the linguistic competence necessarily required in various life situations.
- To help them understand the written text and able to use skimming, scanning skills.
- To assist them in creative thinking abilities.
- To enable them become better readers and writers.
- To assist them in developing correct reading habits, silently, extensively and intensively.

Course Outcomes (CO)

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

CO1[K1]: identify the use of the language skills i.e. Reading, Listening, Speaking and Writing

CO2[K2]: demonstrate communicative skills by articulating simple dialogues and instructions

CO3[K3]: apply knowledge of word power and grammar in framing correct sentences

CO4[K4]: analyze prose, poetry and short stories to develop language skills through literature

CO5[K5]: assess the linguistic competence that enables them, in the future, to present their views in various social, academic and employment situations

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	2	-	2	-	-	-
CO2 [K2]	2	2	-	2	-	-	-
CO3 [K3]	2	1	-	2	1	-	1
CO4 [K4]	2	1	1	1	1	1	1
CO5 [K5]	2	1	1	1	-	1	1
Weightage of the course	10	07	02	08	02	02	03
Weighted percentage of Course contribution to POs	**1.76**	**1.79**	**0.93**	**3.23**	**1.96**	**0.99**	**1.69**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low ,'-' No Correlation)

UNIT I - PROSE **(18 hrs)**

Jerome K Jerome	–	Uncle Podger Hangs a Picture
David Sedaris	–	Us and Them -From Dress Your Family in Corduroy and Denim
Harish Bhat	–	JRD

UNIT II - POETRY **(18 hrs)**

William Ralph Emerson	–	A Nation's Strength
Paul Laurence Dunbar	–	The Sparrow
Subramania Bharati	–	A Patch of Land
Chinua Achebe	–	Love Cycle

UNIT III - SHORT STORIES **(18 hrs)**

Bhabani Bhattacharya	–	The Faltering Pendulum
R.K. Laxman	–	The Gold Frame
Sudha Murthy	–	How I Taught My Grandmother to Read

UNIT IV - LANGUAGE COMPETENCY **(18 hrs)**

Vocabulary: Synonyms, Antonyms, Word Formation
Appropriate use of Articles and Parts of speech
Error Correction

UNIT V - ENGLISH FOR WORKPLACE **(18 hrs)**

Self-Introduction, Greetings
Introducing others
Listening for General and Specific Information
Listening to and Giving Instructions/Directions

TEXTBOOKS

1. Bhattacharya, Bhabani. *Steel Hawk and other stories*. New Delhi: Sahitya Akademi, 1967.
2. Sudha, Murthy. *How I Taught My Grandmother to Read and other Stories*, India: Penguin Books, 2004.

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1. Kumar, Vijay T & K Durga Bhavani. *English in use -A Textbook for College Students.* YL Srinivas.
2. Swan, Michael. *Practical English Usage* - 4th Edition. New York: Oxford University Press, 2016.
3. Shepherd Margaret & Sharon Hogan. Penny Carter (Illustrator). *The Art of Civilized Conversation: A Guide to Expressing Yourself with Style and Grace.* Now York: Broadway Books, 2005.

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2. https://poets.org/poem/sparrow-0
3. https://poets.org/poem/nations-strength
4. https://www.best-poems.net/chinua-achebe/love-cycle.html
5. https://www.tata.com/newsroom/heritage/coffee-tea-jrd-tata-stories
6. https://legacy.npr.org/programs/morning/features/2004/jun/sedaris/usandthem.html
7. http://rosyhunt.blogspot.com/2013/01/uncle-podger-hangs-picture.html
8. https://fybaenglish.blogspot.com/2018/12/the-gold-frame-r-k-laxman.html

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - I
CORE COURSE - I: PROPERTIES OF MATTER AND ACOUSTICS (23UPHC11)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 5**	**INT. MARKS**	**: 25**
CREDITS	**: 5**	**EXT. MARKS**	**: 75**
DURATION	**: 75 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To introduce the concepts of elasticity, bending of beams, fluid dynamics, waves and oscillations, acoustics of building and ultrasonics.
- To impart knowledge on importance of constructing buildings with good acoustics and, production and applications of ultrasonics in real life.
- To derive the expression relating different physical parameters of a materials and understand the nature of materials.
- To illustrate the experimental methods to determine the moduli of elasticity, surface tension and viscosity of a liquid.
- To analyze simple harmonic motions mathematically and use the concept of resonance to evaluate the frequency of vibration.

Course Outcomes (CO)

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

CO1[K1]: Define elastic constants, surface tension, co-efficient of viscosity , simple harmonic oscillations and, state laws

CO2[K2]: derive the expressions relating elastic constants, time period of oscillations, Poiseuille's formula, Stoke's formula and Sabine's Reverberation formula

CO3[K3]: apply the concepts of properties of matter and acoustics to solve problems

CO4[K4]: analyze the variation of surface tension and viscosity with temperature, Lissajou's Figures, production and applications of ultrasonic waves

CO5[K5]: Examine the experimental methods to determine the elastic parameters of matter

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	1	-
CO3 [K3]	3	3	1	1	-	1	1
CO4 [K4]	3	2	2	1	1	1	1
CO5 [K5]	3	2	2	1	1	1	2
Weightage of the course	15	10	5	5	2	5	4
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**2.34**	**2.02**	**1.96**	**2.46**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low ,'-' No Correlation)

UNIT I – ELASTICITY (15 hrs)

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).

UNIT II – BENDING OF BEAMS (15 hrs)

Cantilever– Expression for Bending Moment – Expression for Depression at the Loaded End of the Cantilever – Oscillations of a Cantilever – Expression for Time Period – Experiment to Find Young's Modulus – Non-Uniform Bending– Experiment to Determine Young's Modulus By Koenig's Method – Uniform Bending – Expression for Elevation – Experiment to Determine Young's Modulus Using Microscope.

UNIT III – FLUID DYNAMICS (15 hrs)

Surface Tension: Definition – Molecular Forces – Excess Pressure Over Curved Surface – Application to Spherical and Cylindrical Drops and Bubbles – Shape of Liquid meniscus in a Capillary Tube – Angle of Contact – 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.

UNIT IV – WAVES AND OSCILLATIONS (15 hrs)

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.

UNIT V – ACOUSTICS OF BUILDINGS AND ULTRASONICS (15 hrs)

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 Effect – Application of Ultrasonic Waves.

UNIT VI – PROFESSIONAL COMPONENTS (NOT FOR EXAMINATION)

Expert Lectures – Seminars – Webinars – Industry Inputs – Social Accountability – Patriotism.

TEXTBOOKS

1. Mathur D.S. *Elements of Properties of Matter*. New Delhi: Chand & Company Ltd., Revised Edition, 2010.
2. Brij lal and Subramanian N. *Properties of Matter*. New Delhi: Chand & Company Ltd., First Edition, 2003.
3. Khanna D.R. and Bedi R.S. *Textbook of Sound.* AtmaRam & Sons, 1969.
4. Subrahmanyam N and Brij lal. *A Text Book of Sound*. New Dehi: Vikas Publishing House Pvt. Ltd., Second Revised Edition, Reprint 2018.
5. Murugesan R. *Properties of Matter*. New Delhi: S.Chand & Co., 2012.
6. Brijlal and Subramanyam N. Waves and Oscillations. New Delhi: Vikas Publishing House, 2001.
7. Ghosh. *Text Book of Sound*. New Delhi: S.Chand & Co., 1996.

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1. Smith C.J. *General Properties of Matter*. Orient Longman Publishers, 1960.
2. Gulati H.R. *Fundamental of General Properties of Matter.* R. Chand & Co., Fifth edition, 1977.
3. French A.P. *Vibration and Waves*, *MIT Introductory Physics*. Arnold-Heinmann India, 1973.

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1. https://www.biolinscientific.com/blog/what-are-surfactants-and-how-do-they-work
2. http://hyperphysics.phy-astr.gsu.edu/hbase/permot2.html
3. https://www.youtube.com/watch?v=gT8Nth9NWPM

4. https://www.youtube.com/watch?v=m4u-SuaSu1s&t=3s
5. https://www.biolinscientific.com/blog/what-are-surfactants-and-how-do-they-work
6. https://learningtechnologyofficial.com/category/fluid-mechanics-lab/
7. http://www.sound-physics.com/
8. http://nptel.ac.in/courses/112104026/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - I
CORE COURSE - II: PRACTICAL: PROPERTIES OF MATTER (23UPHC1P)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 3**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 45 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To set up experiments to understand the various concepts of properties of matter.
- To set up experiments to evaluate physical parameters of materials and verify theories.
- To quantify and analyze experimental results.
- To do error analysis and correlate results.

Course Outcomes (CO)

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

CO1[K1]: identify the basic concepts of properties of matter underlying in the experiments

CO2[K2]: setup the experiment and collect data to determine the physical parameters involved in the experiments

CO3[K3]: calculate the basic parameters involved in the experiments from the experimental data

CO4[K4]: analyze / interpret / plot graph / verify the theorem from the experimental data

CO5[K5]: evaluate the physical parameters using appropriate formula/make conclusions from the experimental data

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	1	1	-	1	-
CO2 [K2]	3	1	1	1	1	2	1
CO3 [K3]	3	2	2	1	-	1	1
CO4 [K4]	3	3	2	1	1	1	1
CO5 [K5]	3	3	2	1	1	1	1
Weightage of the course	15	10	8	5	3	6	4
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**3.74**	**2.02**	**2.94**	**2.96**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

LIST OF EXPERIMENTS (Minimum 8**):**

1. Determination of Rigidity Modulus without Mass Using Torsional Pendulum.
2. Determination of Rigidity Modulus with Masses Using Torsional Pendulum.
3. Determination of Moment of Inertia of an Irregular Body.
4. Verification of Parallel Axes Theorem on Moment of Inertia.
5. Verification of Perpendicular Axes Theorem on Moment of Inertia.
6. Determination of Moment of Inertia and 'g' using Bifilar Pendulum.
7. Determination of Young's Modulus by Stretching of Wire with Known Masses.
8. Verification of Hook's Law by Stretching of Wire Method.
9. Determination of Young's Modulus by Uniform Bending – Load Depression Graph.
10. Determination of Young's Modulus by Non-Uniform Bending – Scale & Telescope.
11. Determination of Young's Modulus by Cantilever – Load Depression Graph.
12. Determination of Young's Modulus by Cantilever – Oscillation Method
13. Determination of Young's Modulus by Koenig's Method – (Or Unknown Load)
14. Determination of Rigidity Modulus by Static Torsion.
15. Determination of Y, N and K by Searle's Double Bar Method.
16. Determination of Surface Tension & Interfacial Surface Tension by Drop Weight Method.
17. Determination of Co-Efficient Of Viscosity by Stokes' Method – Terminal Velocity.
18. Determination of Critical Pressure for Streamline Flow.
19. Determination of Poisson's Ratio of Rubber Tube.
20. Determination of Viscosity by Poiseullie's Flow Method.
21. Determination of Radius of Capillary Tube by Mercury Pellet Method.
22. Determination of 'g' Using Compound Pendulum.

TEXTBOOKS

1. Srinivasan M.N, Balasubramanian S and Ranganathan R. *A Textbook of Practical Physics.* New Delhi: Sultan Chand & Sons, First Edition, Reprint 2011.
2. Ouseph C.C, Rao U.J and Vijayendran V. *Practical Physics and Electronics*. Chennai: Ananda Book Depot, First Edition, Reprint 2019.
3. Ouseph C.C, Srinivasan V and Balakrishnan R. *A Textbook of Practical Physics - Part I.* Chennai: S.Viswanathan (Printers & Publishers) Pvt., Ltd., Revised Edition, Reprint 2000.

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1. Arora C.L. *B Sc Practical Physics.* New Delhi: S.Chand & Sons Co. Ltd., Reprint 2018.
2. Kakani S.L and Shubhra K. *Applied Physics: Theory and Practical*. New Delhi: Viva Books Pvt. Ltd., First Edition, 2015.
3. Manjeet S and Anita D. *Applied Physics: Theory and Experiment*. New Delhi: Vayu Education of India, First Edition, 2011.
4. Tayal D.C. *University Practical Physics*. Mumbai: Himalaya Publishing House, First Millennium Edition, 2000.

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2. https://www.youtube.com/watch?v=udN1Ra3NXPw
3. https://www.youtube.com/watch?v=V_z0AgbyfeM
4. https://www.youtube.com/watch?v=mpsZBQ_lpSM
5. https://www.egyankosh.ac.in/bitstream/123456789/18814/1/Experiment-5.pdf

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF MATHEMATICS
UG Programme - B.Sc. Physics
SEMESTER - I
ELECTIVE COURSE GENERIC / DISCIPLINE SPECIFIC - I: MATHEMATICS - I
(23UPHA11)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 6 (L-5, T-1)**	**INT. MARKS**	**: 25**
CREDITS	**: 5**	**EXT. MARKS**	**: 75**
DURATION	**: 90 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To explore the fundamental concepts of Mathematics.
- To acquire knowledge about finding approximate roots of the polynomial equations.
- To improve students' ability in solving problems of matrices and calculus.

Course Outcomes (CO)

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

CO1[K1]: state the elementary concepts of calculus, numerical methods solving equations, eigen values and eigen vectors of matrices

CO2[K2]: explain the application of differentiation, integration and the method of solving polynomial equations numerically

CO3[K3]: find the numerical solution of polynomial equations, eigen values and eigen vectors of matrices, curvature and radius of curvature of curves, area, volume and centroid of surfaces

CO4[K4]: interpret Cayley-Hamilton theorem, Leibnitz theorem, Jacobian determinant, iterative methods of solving polynomial equations

CO5[K5]: determine the approximate solution of polynomial equations numerically, inverse, eigen values and eigen vectors of a matrix, n^{th} derivative of a function, curvature and radius of curvature of a curve, double and triple integration of integrands

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	1	-	1	-
CO2 [K2]	3	1	1	1	-	1	1
CO3 [K3]	3	2	1	1	-	1	1
CO4 [K4]	3	2	1	1	-	1	1
CO5 [K5]	3	2	2	1	-	1	1
Weightage of the course	14	8	5	5	0	5	4
Weighted percentage of Course contribution to POs	**2.46**	**2.04**	**2.34**	**2.02**	**0**	**2.46**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(18 hrs)**

The Solution of Numerical Algebraic and Transcendental Equations: The Bisection Method – Iteration Method – Regula Falsi Method – Newton-Raphson Method – Simple problems.

Text Book 1

Page No. 69-97

UNIT II **(18 hrs)**

Solutions of Simultaneous Linear Algebraic Equations: Gauss-Elimination Method – Gauss Jordan Elimination Method – Iterative Methods – Gauss Jacobi Method – Gauss Seidel Iterative Method – Simple problems.

Text Book 1

Page No. 112 -126 and 145 - 158

UNIT III **(18 hrs)**

Matrices: Eigen Values and Eigen vectors – Cayley-Hamilton Theorem [without proof].

Text Book 2

Page No. 85 - 95

UNIT IV **(18 hrs)**

Successive Differentiation: The n^{th} Derivatives – Standard Results – Trigonometrical Transformation – Leibnitz Formula for the n^{th} derivative of a product Theorem [without proof]. **Curvature:** Circle, Radius and Centre of curvature – Cartesian Formula for the Radius of Curvature – The Co-ordinates of the Centre of Curvature – Evolute and Involute – Radius of Curvature when the curve is given in Polar Co-ordinates.

Text Book 3

Page No. 70 - 75, 82 – 84, 291 – 312.

UNIT V **(18 hrs)**

Multiple Integrals: Evaluation of the Double Integral – Double Integral in Polar Co-ordinates – Triple Integrals – Simple Applications to Area and Volume.

Text Book 4

Page No. 203-241

TEXTBOOKS

1. Kandasamy P., Thilagavathy K. and Gunavathy K. *Numerical Methods.* New Delhi: S. Chand & Company Ltd., 2002. **(UNITS I & II)**
2. Balasubramanyam P. and Subramanian K.G. *Ancillary Mathematics Volume I*. New Delhi: Tata McGraw-Hill Publishing Company Ltd., 1996. **(UNIT III)**
3. Narayanan S. and Manicavachagom T.K. Pillay. *Calculus Vol I*. Chennai: S.Viswanathan Pvt Ltd., 2006. **(UNITIV)**

4. Narayanan S. and Manicavachagom T.K. Pillay. *Calculus Vol II*. Chennai: S. Viswanathan Pvt Ltd., 2006. **(UNIT V)**

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1. Venkatesan S. J. *Allied Mathematics – I.* Chennai: Sri Krishna Publications.
2. Vittal P. R. *Allied Mathematics.* Chennai: Margham Publication, 2003.
3. Singaravelu A. *Numerical Methods*. Meenakshi Publications.

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1. https://www.onlinemath4all.com/characteristic-equation-of-matrix.html
2. https://www.youtube.com/watch?app=desktop&v= WcPtsuMMz0
3. https://www.youtube.com/watch?app=desktop&v=KgItZSst2sU
4. https://www.youtube.com/watch?app=desktop&v=w_KiHgultbM

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - I
SKILL ENHANCEMENT COURSE - I: FOUNDATION COURSE: INTRODUCTORY PHYSICS (23UPHS11)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 2**	**INT. MARKS**	**: 25**
CREDITS	**: 2**	**EXT. MARKS**	**: 75**
DURATION	**: 30 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To help students get an overview of Physics before learning their core courses.
- To serve as a bridge between the school curriculum and the degree programme.

Course Outcomes (CO)

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

CO1[K1]: list out different types of forces, forms of energies and types of motion

CO2[K2]: explain Laws of vector addition and subtraction, hydrostatics, flow of liquid, diffusion and osmosis

CO3[K3]: find unit and dimensions of physical quantity

CO4[K4]: summarize the basic concepts of physics pertaining to the course

CO5[K5]: examine the basic concepts of physics involved in real life examples

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	1	-	-	-
CO2 [K2]	2	1	1	1	-	1	-
CO3 [K3]	2	2	1	1	-	1	1
CO4 [K4]	3	2	1	1	1	1	1
CO5 [K5]	3	2	1	1	1	1	1
Weightage of the course	12	8	4	5	2	4	3
Weighted percentage of Course contribution to POs	**2.11**	**2.04**	**1.87**	**2.02**	**1.96**	**1.97**	**1.69**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – VECTORS AND SCALARS (6 hrs)

Vectors, Scalars – Examples for Scalars and Vectors from Physical Quantities – Addition, Subtraction of Vectors – Resolution and Resultant of Vectors – Units and Dimensions – Standard Physics Constants.

UNIT II – DIFFERENT TYPES OF FORCES (6 hrs)

Different Types of Forces – Gravitational, Electrostatic, Magnetic, Electromagnetic, Nuclear – Mechanical Forces Like, Centripetal, Centrifugal, Friction, Tension, Cohesive and Adhesive Forces.

UNIT III – DIFFERENT FORMS OF ENERGY (6 hrs)

Different Forms of Energy – Conservation Laws of Momentum, Energy – Types of Collisions – Angular Momentum – Alternate Energy Sources – Real Life Examples.

UNIT IV – TYPES OF MOTION (6 hrs)

Types of Motion – Linear, Projectile, Circular, Angular, Simple Harmonic Motions – Satellite Motion – Banking of a Curved Roads – Stream Line and Turbulent Motions – Wave Motion – Comparison of Light and Sound Waves – Free, Forced, Damped Oscillations.

UNIT V – HYDROSTATICS, FLOW OF LIQUID, DIFFUSION AND OSMOSIS (6 hrs)

Hydrostatic Pressure – Pascal's Law – Principle of Archimedes – Bernoulli's Theorem – Diffusion – Fick's Law – Graham's Law of Diffusion of Gases – Osmosis and Osmotic Pressure – Laws of Osmotic Pressure - Real Life Examples.

UNIT VI – PROFESSIONAL COMPONENTS (NOT FOR EXAMINATION)

Expert Lectures – Seminars – Webinars – Industry Inputs – Social Accountability – Patriotism.

TEXTBOOKS

1. Mathur D.S. *Elements of Properties of Matter*. New Delhi: Chand & Company Ltd., 2010.
2. Brij lal and Subramanian N. *Properties of Matter*. New Delhi: Chand & Company Ltd., 2003.

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1. Gulati H.R. *Fundamental of General Properties of Matter.* R. Chand & Co., Fifth edition, 1977.

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1. http://hyperphysics.phyastr.gsu.edu/hbase/permot2.html
2. https://science.nasa.gov/ems/
3. https://eesc.columbia.edu/courses/ees/climate/lectures/radiation_hays/
4. https://www.khanacademy.org/science/physics/one-dimensional-motion/displacement-velocity-time/v/introduction-to-vectors-and-scalars
5. https://nptel.ac.in/courses/115106090

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - I
SKILL ENHANCEMENT COURSE - II: NON MAJOR ELECTIVE COURSE: PHYSICS FOR EVERYDAY LIFE (23UPHN11)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 2**	**INT. MARKS**	**: 25**
CREDITS	**: 2**	**EXT. MARKS**	**: 75**
DURATION	**: 30 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To introduce all basic physics principles used in daily life.
- To appreciate the basic concepts of physics in everyday life with a better understanding.
- To introduce about the Indian scientists who have made significant contributions to Physics.

Course Outcomes (CO)

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

CO1[K1]: list out the mechanical objects, optical instruments, home appliances used in everyday life

CO2[K2]: explain the basic principles behind working of optical instruments, home appliances, solar water heaters and solar cells

CO3[K3]: present the contributions of Indian physicist to the society

CO4[K4]: summarize the concepts and applications of physics in everyday life

CO5[K5]: examine the functions of instruments/devices/systems used in everyday life

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	1	-	1	-
CO2 [K2]	2	1	-	2	-	1	-
CO3 [K3]	2	1	-	2	-	1	2
CO4 [K4]	2	1	-	2	-	1	2
CO5 [K5]	1	1	-	1	-	1	1
Weightage of the course	09	05	00	08	00	05	05
Weighted percentage of Course contribution to POs	**1.58**	**1.28**	**0**	**3.23**	**0**	**2.46**	**2.81**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – MECHANICAL OBJECTS (6 hrs)

Spring Scales – Bouncing Balls – Roller Coasters – Bicycles – Rockets and Space Travel.

UNIT II – OPTICAL INSTRUMENTS AND LASER (6 hrs)

Vision Corrective Lenses – Polaroid Glasses – UV Protective Glass – Polaroid Camera – Colour Photography – Holography and Laser.

UNIT III – PHYSICS OF HOME APPLIANCES (6 hrs)

Bulb – Fan – Hair Drier – Television – Air Conditioners – Microwave Ovens – Vacuum Cleaners.

UNIT IV – SOLAR ENERGY (6 hrs)

Solar Constant – General Applications of Solar Energy – Solar Water Heaters – Solar Photo – Voltaic Cells – General Applications of Solar Cells.

UNIT V – INDIAN PHYSICIST AND THEIR CONTRIBUTIONS (6 hrs)

C.V.Raman, Homi Jehangir Bhabha, Vikram Sarabhai, Subrahmanyan Chandrasekhar, Venkatraman Ramakrishnan, Dr. APJ Abdul Kalam and Their Contribution to Science and Technology.

TEXTBOOKS

1. Umme Ammara. *The Physics in our Daily Lives*. Hyderabad: Gugucool Publishing, 2019.
2. Walter Lawin. *For the love of Physics.* New York: Free Press, 2011.
3. Khan B.H. *Non-Conventional Energy Resources.* New Delhi: McGraw Hill Education (India) Pvt. Ltd., Second Edition, Reprint 2014.

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1. Bhatia K.B. Electrical Appliances and Devices. New Delhi: Khanna Publishrs, Seventh Edition, Reprint 2022.
2. Subraminyam N, Brij lal and Avadhanulu M.N. *A Textbook of Optics.* New Delhi: S.Chand & Company Ltd., Twenty Fifth Revised Edition, Reprint 2018.

Web Sources

1. http://www.ingenia.org.uk/ingenia/issue-85/how-does-that-work#:~:text=The%20electric%20fan%20rotates%20and,moisture%20and%20dries%20the%20hair.
2. https://www.youtube.com/watch?v=1yBwWLunlOM
3. https://www.energy.gov/eere/solar/solar-photovoltaic-cell-basics

4. https://mechanicalnotes.com/solar-cell-definition-working-types-applications-advantages/
5. https://www.scienceabc.com/innovation/air-conditioner-ac-work.html
6. https://www.britannica.com/technology/holography
7. https://en.wikipedia.org/wiki/C. V. Raman
8. https://en.wikipedia.org/wiki/Homi J. Bhabha

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF TAMIL

UG PROGRAMME - B.A./B.Sc./B.Com./BBA./BCA.

SEMESTER - II

பொதுத்தமிழ் - II (23UTAG21)

(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 6**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 90 hrs**	**MAX. MARKS**	**: 100**

நோக்கங்கள்

- சமய இலக்கியங்களையும் சிற்றிலக்கியங்களையும் மாணவர்களுக்கு அறிமுகப்படுத்துதல்.
- மொழித்திறனையும் சிறுகதை இலக்கிய வடிவத்தையும் மாணவர்களுக்கு உணர்த்துதல்.

கற்றலின் பயன்கள்

இத்தாளை வெற்றிகரமாக முடித்தவுடன் மாணவர்கள்,

CO1[K1]: பக்தி இலக்கியங்களைக் கற்பதன் மூலம் பக்தி நெறியினையும், சமய நல்லிணக்கத்தையும் அறிவா

CO2[K2]: சமயப்பாடல்கள் மற்றும் சிற்றிலக்கியங்களின் அமைப்பினையும், நோக்கத்தினையும் தெளிவாகக் கூறுவா

CO3[K3]: தமிழில் உள்ள பக்தி இலக்கியம் மற்றும் சிற்றிலக்கியங்களின் பொருண்மைகளுடன் இலக்கணத் தெளிவையும் அடைவா

CO4[K4]: தமிழ்ச் சமூகப் பண்பாட்டு வரலாற்றினை இலக்கியங்கள் வாயிலாக அறிந்து கொண்டு பாகுபடுத்துவா

CO5[K5]: போட்டித் தேர்வுகளில் வெற்றி பெறுவதற்குத் தமிழ்ப் பாடத்தினைப் பயன்கொள்ளும் வகையில் ஏற்ற பயிற்சி பெற்று மதிப்பீடு செய்வர்

CO/PO Mapping Table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	1	-	-	-
CO2 [K2]	2	2	-	1	1	-	1
CO3 [K3]	2	2	-	2	-	1	-
CO4 [K4]	2	2	1	2	1	-	1
CO5 [K5]	2	1	1	2	-	1	1
Weightage of the course	10	08	02	08	02	02	03
Weighted percentage of Course contribution to POs	**1.76**	**2.04**	**0.93**	**3.23**	**1.96**	**0.99**	**1.69**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

கூறு I **(18 hrs)**

பக்தி இலக்கியம்: திருநாவுக்கரசர் தேவாரம் - நாமார்க்கும் குடியெல்லாம் எனத் தொடங்கும் பதிகம் (10 பாடல்கள்), ஆண்டாள் - திருப்பாவை (முதல் 10 பாசுரம்)

கூறு II **(18 hrs)**

வள்ளலார் - அருள் விளக்கமாலை (முதல் 10 பாடல்),எச்.ஏ.கிருட்டிணப் பிள்ளை - இரட்சணியமனோகரம் - பால்யபிரார்த்தனை, குணங்குடி மஸ்தான் சாகிபு - பராபரக்கண்ணி (முதல் 10 கண்ணி)

கூறு III **(18 hrs)**

சிற்றிலக்கியங்கள்: தமிழ்விடு தூது (முதல் 20 கண்ணி), திருக்குற்றாலக் குறவஞ்சி - குறத்தி மலைவளம் கூறுதல், முக்கூடல் பள்ளு - நாட்டு வளம்

கூறு IV **(18 hrs)**

பாடம் தழுவிய இலக்கிய வரலாறு (பல்லவர் காலம், நாயக்கர் காலம்)

கூறு V **(18 hrs)**

மொழித்திறன் போட்டித்தேர்வுதிறன்: தொடர் வகைகள், மரபுத்தொடர், பழமொழிகள், பிறமொழிச் சொற்களைக் களைதல், வழுச்சொற்கள் நீக்குதல், இலக்கணக் குறிப்பு அறிதல்.

(குறிப்பு: அலகு 4, 5 ஆகியன போட்டித் தேர்வு நோக்கில் நடத்தப் பட வேண்டும்).

பாடநூல்கள்

1. தமிழியல் துறையினர், *தொகுப்பு நூல்,* ஸ்ரீ காளீஸ்வரி கல்லூரி (தன்னாட்சி), சிவகாசி.
2. வாசுதேவன், கா. *பன்முக நோக்கில் தமிழ் இலக்கிய வரலாறு,* தேவன் பதிப்பகம், திருச்சிராப்பள்ளி, 2017.

பார்வை நூல்கள்

1. சிற்பி. பாலசுப்பிரமணியன், *தமிழ் இலக்கிய வரலாறு,* கவிதா வெளியீடு, சென்னை.
2. தமிழண்ணல், *புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு,* சோலை பதிப்பகம், மதுரை
3. பாக்கியமேரி, *வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு,* பாரி நிலையம், சென்னை.

வலைப்பதிவுகள் (Web Sources)

1. Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org>
2. Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library
3. 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

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
UG PROGRAMME - B.A./B.COM/B.B.A./B.SC./BCA
SEMESTER- II
GENERAL ENGLISH-II (23UENL21)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 6(L-5, T-1)**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 90 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To introduce learners to the essential skills of communication in English.
- To enable them use these skills effectively in academic and non-academic contexts.
- To help them identify and eliminate common mistakes in writing and speaking.
- To enable them use various business communication strategies and to use advanced vocabulary.
- To familiarize them in writing descriptive essays and respond to arguments orally and in writing.

Course Outcomes (CO)

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

CO1[K1]: identify appropriate literary terms such as diction, tone, imagery, figures of speech, motif etc.,

CO2[K2]: define verbs, tenses and concord and its role in speaking and writing effectively

CO3[K3]: apply the knowledge of language competency at workplace and day-to-day life

CO4[K4]: analyze prose, poetry and short stories to develop language skills through literature

CO5[K6]: construct grammatically correct and meaningful sentences by choosing apt words

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	1	-	-	-
CO2 [K2]	2	2	-	1	1	-	1
CO3 [K3]	2	2	-	2	-	1	-
CO4 [K4]	2	2	1	2	1	-	1
CO5 [K6]	2	1	1	2	-	1	1
Weightage of the course	10	08	02	08	02	02	03
Weighted percentage of Course contribution to POs	**1.76**	**2.04**	**0.93**	**3.23**	**1.96**	**0.99**	**1.69**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I- PROSE **(18 hrs)**

W.R. Inge	-	The Spoon-Fed Age
Dale Carnegie	-	If You Are Wrong. Admit it
Shashi Tharoor	-	Kindly Adjust to our English

UNIT II- POETRY **(18 hrs)**

Alfred Lord Tennyson	-	The Flower
Nissim Ezekiel	-	Very Indian Poem in Indian English
Maya Angelou	-	Still I Rise
Dr. Gieve Patel	-	On Killing a Tree

UNIT III- FICTION **(18 hrs)**

Paulo Coelho	-	The Alchemist

UNIT IV- LANGUAGE COMPETENCY **(18 hrs)**

Homonyms, Homophones, Homographs, Portmanteau words
Verbs and Tenses, Subject Verb Agreement, Error correction

UNIT V- ENGLISH IN THE WORKPLACE **(18 hrs)**

Reading for General and Specific information [charts, tables, schedules, graphs etc.]
Reading news and weather reports
Writing paragraphs
Taking and making notes

TEXTBOOKS

1. Coelho, Paulo. *The Alchemist*. New York: Harper, 2005.
2. Pillai, Radhakrishna. *Emerald English Grammar and Composition.* Chennai: Emerald Publishers,2016.

REFERENCES

Books

1. Hewings, Martin. *Advanced English Grammar*. Cambridge University Press, 2000.
2. Bakshi S.P., Richa Sharma. *Descriptive English*. India: Arihant Publications Ltd, 2019.
3. Sheena Cameron, Louise Dempsey. *The Reading Book: A Complete Guide to Teaching Reading*. London: S & L. Publishing, 2019.
4. Sherman, Barbara. *Skimming and Scanning Techniques.* Virginia: Liberty University Press, 2014.
5. Chambers, Phil. *Brilliant Speed Reading: Whatever you need to read, However You want to Read it-Twice as Quickly*, India: Pearson, 2013.
6. Coelho, Paulo. *The Archer*. New York: Penguin Viking, 2020.

Web Sources

1. http://econtent.in/pacc.in/admin/contents/40_%20_2020103001102714.pdf
2. https://www.poetryfoundation.org/poems/46446/still-i-rise
3. https://www.poemhunter.com/poem/the-flower-2/
4. https://www.poemhunter.com/poem/on-killing-a-tree/
5. https://www.tbr.fun/if-youre-wrong-admit-it/
6. https://www.theweek.in/columns/shashi-tharoor/2018/05/25/kindly-adjust-to-our-english.html?fbclid=IwAR3IhtdXqvuV4ySECn9S7SA6HmCEYISyd1QHd3BlwKgiNKKwdkeSg3qWp-U/
7. https://docplayer.net/217945876-The-spoon-fed-age-1-by-the-very-reverend-w-r-inge.html
8. https://www.youtube.com/watch?v=lxBYpmxjeDU

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - II
CORE COURSE - III: HEAT, THERMODYNAMICS AND STATISTICAL PHYSICS
(23UPHC21)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 5**	**INT. MARKS**	**: 25**
CREDITS	**: 5**	**EXT. MARKS**	**: 75**
DURATION	**: 75 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To introduce the basic concepts of calorimetry, low temperature Physics, Laws of thermodynamics, modes of heat transfer and different statistical distribution functions.
- To describe the experimental methods to determine the specific heat capacity of gases and thermal conductivity of solids.
- To describe the process of liquefactions of gases, working of heat engines and concepts of change in entropy with theory.
- To derive the Maxwell's thermo dynamical relations, Clasius-Clapeyron's Equation and statistical distribution functions.
- To analyze P-V and T-S diagrams of thermo dynamical processes and efficiency of heat engines.

Course Outcomes (CO)

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

CO1[K1]: define the basic physical terms involved in heat, thermodynamics and statistical physics

CO2[K2]: explain the basic concepts of heat engines, modes of heat transfer, thermodynamics, and ensembles

CO3[K3]: apply the concepts of thermal physics and statistical mechanics to derive the relations and solve problems

CO4[K4]: distinguish different types of specific heat capacity of gases, modes of heat transfer, engines and statistical distribution functions

CO5[K5]: examine the experimental methods to determine the physical parameters related to heat, thermodynamics and statistical physics

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	1	-
CO3 [K3]	3	3	1	1	-	1	1
CO4 [K4]	3	2	2	1	1	1	1
CO5 [K5]	3	2	2	1	1	1	2
Weightage of the course	15	10	5	5	2	5	4
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**2.34**	**2.02**	**1.96**	**2.46**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – CALORIMETRY AND LOW TEMPERATURE PHYSICS (15 hrs)

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.

Joule-Kelvin Effect – Porous Plug Experiment – Joule-Thomson Effect – Boyle Temperature – Temperature of Inversion – Liquefaction of Gas by Linde's Process – Adiabatic Demagnetisation.

UNIT II – THERMODYNAMICS-I (15 hrs)

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.

UNIT III – THERMODYNAMICS-II (15 hrs)

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 – Un-attainability of Absolute Zero – Heat Death.

UNIT IV – HEAT TRANSFER (15 hrs)

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.

UNIT V – STATISTICAL MECHANICS (15 hrs)

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.

UNIT VI – PROFESSIONAL COMPONENTS (NOT FOR EXAMINATION)

Expert Lectures – Seminars – Webinars – Industry Inputs – Social Accountability – Patriotism.

TEXTBOOKS

1. Brij lal, Subramanyam N and Hemne P.S. *Heat Thermodynamics and Statistical Physics*. New Delhi: S.Chand & Company Ltd., Revised Edition, Reprint 2020.
2. Narayanamoorthy and KrishnaRao. *Heat.* Chennai: Triveni Publishers, 1969.
3. Khanna V.R. and Bedi R.S. *Text book of Sound*. Meerut: Kedharnaath Publish & Co, First Edition, 1998.
4. R.Murugeshan & Kiruthiga Sivaprasath. Thermal Physics. NewDelhi: S.Chand& Co., First Edition, 2004.

REFERENCES

Books

1. Rajam J.B. and Arora C.L. *Heat and Thermodynamics*. New Delhi: S.Chand & Co. Ltd., Eighth Edition, 1976.
2. Mathur D.S. *Heat and Thermodynamics.* New Delhi: Sultan Chand & Sons., Fifth Edition, 2004.
3. Gupta, Kumar, Sharma. *Statistical Mechanics*. New Delhi: S. Chand & Co., Twenty Sixth Edition, 2013.
4. Resnick, Halliday and Walker. *Fundamentals of Physics.* 6th Edition, 2010.
5. Sears, Zemansky, Hugh D. Young, Roger A. Freedman. *University Physics with Modern Physics.* Fifteenth Edition, Pearson, 2021.

Web Sources

1. https://www.youtube.com/watch?v=4M72kQulGKk&vl=en
2. https://youtu.be/M_5KYncYNyc
3. Lecture 1: Thermodynamics Part 1 | Video Lectures | Statistical Mechanics I: Statistical Mechanics of Particles | Physics | MIT OpenCourseWare

4. http://www.freebookcentre.net/Physics/Physics-Books-Online.html
5. https://archive.nptel.ac.in/courses/115/106/115106119/
6. https://www.youtube.com/watch?v=YbMn153a35U

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - II
CORE COURSE - IV: PRACTICAL: HEAT, OSCILLATIONS, WAVES & SOUND
(23UPHC2P)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 3**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 45 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To set up experiments to understand the various concepts of heat, oscillations, waves and sound.
- To set up experiments to evaluate physical parameters of materials and to verify theories.
- To quantify and analyze experimental results.
- To do error analysis and correlate results.

Course Outcomes (CO)

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

CO1[K1]: identify the basic concepts of heat, oscillations, waves and sound underlying in the experiments

CO2[K2]: setup the experiment and collect data to determine the physical parameters involved in the experiments

CO3[K3]: calculate the basic parameters involved in the experiments from the experimental data

CO4[K4]: analyze / interpret / plot graph / verify the theorem from the experimental data

CO5[K5]: evaluate the physical parameters using appropriate formula/make conclusions from the experimental data

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	1	1	-	1	-
CO2 [K2]	3	1	1	1	1	2	1
CO3 [K3]	3	2	2	1	-	1	1
CO4 [K4]	3	3	2	1	1	1	1
CO5 [K5]	3	3	2	1	1	1	1
Weightage of the course	15	10	8	5	3	6	4
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**3.74**	**2.02**	**2.94**	**2.96**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

LIST OF EXPERIMENTS (Minimum 8**):**

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 Thermal Conductivity of Bad Conductor by Charlaton's Method.
5. Determination of Specific Heat Capacity of Solid by Method of Mixtures.
6. Determination of Specific Heat of Liquid by Joule's Electrical Heating Method (Applying Radiation Correction by Barton's Correction/Graphical Method).
7. Determination of Latent Heat of a Vaporization of a Liquid.
8. Determination of Stefan's Constant for Black Body Radiation.
9. Verification of Stefan's-Boltzmans Law.
10. Determination of Thermal Conductivity of Rubber Tube.
11. Helmholtz Resonator.
12. Velocity of Sound through a Wire using Sonometer.
13. Determination of Velocity of Sound using Kunds Tube.
14. Determination of Frequency of an Electrically Maintained Tuning Fork
15. To Verify the Laws of Transverse Vibration using Sonometer.
16. To Verify the Laws of Transverse Vibration using Melde's Apparatus.
17. To Compare the Mass per Unit Length of Two Strings Using Melde's Apparatus.
18. Frequency of AC by using Sonometer.

TEXTBOOKS

1. Srinivasan M.N, Balasubramanian S and Ranganathan R. *A Textbook of Practical Physics.* New Delhi: Sultan Chand & Sons, First Edition, Reprint 2011.
2. Ouseph C.C, Rao U.J and Vijayendran V. *Practical Physics and Electronics*. Chennai: Ananda Book Depot, First Edition, Reprint 2019.
3. Ouseph C.C, Srinivasan V and Balakrishnan R. *A Textbook of Practical Physics - Part I.* Chennai: S.Viswanathan (Printers & Publishers) Pvt., Ltd., Revised Edition, Reprint 2000.

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1. Arora C.L. *B Sc Practical Physics.* New Delhi: S.Chand & Sons Co. Ltd., Reprint 2018.
2. Kakani S.L and Shubhra K. *Applied Physics: Theory and Practical*. New Delhi: Viva Books Pvt. Ltd., First Edition, 2015.

3. Manjeet S. and Anita D. *Applied Physics: Theory and Experiment*. New Delhi: Vayu Education of India, First Edition, 2011.
4. Tayal D.C. *University Practical Physics*. Mumbai: Himalaya Publishing House, First Millennium Edition, 2000.

Web Sources

1. http://sites.iiserpune.ac.in/~bhasbapat/phy221_files/Lee's%20Method.pdf
2. https://byjus.com/physics/find-frequency-ac-mains-sonometer/#:~:text=Move%20the%20wooden%20bridge%20P,the%20maximum%20amplitude%20of%20vibration
3. https://dkpandey.weebly.com/uploads/1/3/5/3/13534845/meldes_experment.pdf
4. https://www.youtube.com/watch?v=WtIG3zWaTK8
5. https://www.youtube.com/watch?v=yjOcbjpTCFA

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF MATHEMATICS
UG Programme - B.Sc. Physics
SEMESTER - II
ELECTIVE COURSE GENERIC / DISCIPLINE SPECIFIC - II: MATHEMATICS - II
(23UPHA21)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 6 (L-5, T-1)**	**INT. MARKS**	**: 25**
CREDITS	**: 5**	**EXT. MARKS**	**: 75**
DURATION	**: 90 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To study the method of interpolating data.
- To gain knowledge on expansion of trigonometric functions and the method of solving partial differential equations.
- To know the basic concepts of vector calculus.
- To know the basics of Hyperbolic Function.

Course Outcomes (CO)

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

CO1[K1]: describe the terminologies intrigonometric functions, hyperbolic functions, partialdifferentiation, vector calculus and interpolation

CO2[K2]: explain the elementary concepts of trigonometric functions, hyperbolic functions, partial differentiation, vector calculus and interpolation

CO3[K3]: find out the expansions of trigonometric functions, the missing values of given data, divergence and curl of the vector field, partial differentiation of functions

CO4[K4]: characterize the properties of divergence and curl, hyperbolic functions and partial derivatives of functions

CO5[K5]: determine the missing values of given data, partial differentiation of functions, expansion of trigonometric functions, derivatives of vector functions

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	1	-	1	-
CO2 [K2]	3	1	1	1	-	1	1
CO3 [K3]	3	2	1	1	-	1	1
CO4 [K4]	3	2	1	1	-	1	1
CO5 [K5]	3	2	2	1	-	1	1
Weightage of the course	14	8	5	5	0	5	4
Weighted percentage of Course contribution to POs	**2.46**	**2.04**	**2.34**	**2.02**	**0**	**2.46**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(18hrs)**

Trigonometry: Expansions of sin nθ, cos nθ, $\sin^n\theta$, $\cos^n\theta$, tan nθ.

TextBook: 1

Page No: 61-82

UNIT II **(18 hrs)**

Hyperbolic Functions: Hyperbolic and Inverse Hyperbolic Functions – **Resolution Into Factors**: Logarithm of complex quantities

Text Book:1

Page No: 93-104, 122-127

UNIT III **(18 hrs)**

Vector Differentiation: Vector functions – Directional Derivative – Normal Derivative – Maximal Directional Derivative – Divergence and Curl

Text Book: 2

Page No:245-269

UNIT IV **(18 hrs)**

INTERPOLATION: Linear interpolation – Gregory-Newton's forward and backward interpolation formula – Equidistant terms with one or more missing values – Lagrange's interpolation formula – Inverse interpolation.

Text Book: 3

Page No: 209-227, 271-278

UNIT V **(18 hrs)**

PARTIAL DIFFERENTIATION: Successive partial derivatives – Functions of functions rule – Total differential coefficient – Implicit functions – Homogeneous functions – Partial derivatives of a function of two functions.

Text Book: 4

Page No: 178-182 & 188-198

TEXTBOOKS

1. Narayanan S and Manicavachagom Pillay T.K. *Trigonometry*. Chennai: S.Viswanathan Pvt. Ltd., 2007. **(UNITS I & II)**
2. Balasubramanyam P and Subramanian K.G. *Ancillary Mathematics Vol I*. New Delhi: Tata McGraw-Hill Publishing Company Ltd, 1996. **(UNIT III)**
3. Kandasamy P, Thilagavathy K and Gunavathy K. *Numerical Methods.* New Delhi: S. Chand & Company Ltd, 2002. **(UNIT IV)**
4. Narayanan S and Manicavachagom Pillay T.K. *Calculus Vol I.* Chennai: S.Viswanathan Pvt Ltd, 2006. **(UNIT V)**

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Books

1. Rajagopalan S.P and Sattanathan R. *Allied Mathematics Vol I & II*. New Delhi: Vikas Publications, 2005.
2. SVenkatesan S.J. *Allied Mathematics – II.* Chennai: Sri Krishna Publications.
3. Vittal P.R. *Allied Mathematics. Chennai:* Margham Publications, 2003.
4. Kandhasamy P and Thilagavathy K. *Allied Mathematics Vol I & II.* New Delhi: Tata McGraw Hill, 2003.
5. Kandasamy P and Thilagavathy K. *Calculus of Finite differences & Numerical Analysis.* New Delhi: S. Chand & Company Ltd, 2003.

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1. https://uomustansiriyah.edu.iq/media/lectures/6/6_2018_11_10!11_16_14_AM.pdf
2. https://www.scribd.com/document/323436605/3-Problems-on-Expansion-of-Sinn%CE%B8-and-Cosn%CE%B8-in-Terms-of-Sinn%CE%B8-Andcosn%CE%B8
3. https://solitaryroad.com/c254.html
4. https://nptel.ac.in/courses/111108144
5. https://mathworld.wolfram.com/FiniteDifference.html

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - II
SKILL ENHANCEMENT COURSE - III: ENERGY PHYSICS (23UPHS21)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 2**	**INT. MARKS**	**: 25**
CREDITS	**: 2**	**EXT. MARKS**	**: 75**
DURATION	**: 30 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To get the understanding of the conventional and non-conventional energy sources.
- To describe the energy conservation and storage systems.

Course Outcomes (CO)

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

CO1[K1]: list out the various non-conventional energy resources available in our earth

CO2[K2]: explain the physics concepts behind solar, wind and biomass energy conversion technologies

CO3[K3]: present the applications of non-conventional energy resources

CO4[K4]: summarize the importance of the solar energy, wind energy, biomass energy and energy storage systems

CO5[K5]: justify the merits and demerits of non-conventional energy resources

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	1	-	1	-
CO2 [K2]	3	2	1	1	-	1	-
CO3 [K3]	3	1	1	1	-	1	2
CO4 [K4]	3	1	1	1	1	1	2
CO5 [K5]	2	2	1	1	1	1	1
Weightage of the course	13	7	4	5	2	5	5
Weighted percentage of Course contribution to POs	**2.28**	**1.79**	**1.87**	**2.02**	**1.96**	**2.46**	**2.81**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – INTRODUCTION TO ENERGY SOURCES (6 hrs)

Energy Consumption as a Measure of Prosperity – World Energy Future – Energy Sources and Their Availability – Conventional Energy Sources – Non-Conventional and Renewable Energy Sources – Comparison – Merits and Demerits.

UNIT II – SOLAR ENERGY (6 hrs)

Solar Energy Introduction – Solar Constant – Solar Radiation at the Earth's Surface – Solar Radiation Geometry – Solar Energy Storage and Storage Systems – Solar Pond – Solar Cooker – Solar Water Heater – Solar Cells.

UNIT III – WIND ENERGY (6 hrs)

Introduction – Nature of the Wind – Basic Principle of Wind Energy Conversion – Wind Energy Data and Energy Estimation – Basic Components of Wind Energy Conversion Systems (WECS) – Advantages and Disadvantages of WECS – Applications.

UNIT IV – BIOMASS ENERGY (6 hrs)

Introduction – Classification – Biomass Conversion Technologies – Photosynthesis – Fermentation – Biogas Generation –Classification of Biogas Plants – Anaerobic Digestion for Biogas – Wood Gasification – Advantages and Disadvantages.

UNIT V – ENERGY STORAGE (6 hrs)

Importance of Energy Storage – Batteries – Lead Acid Battery – Nickel-Cadmium Battery – Fuel Cells – Advantages and Disadvantages of Fuel Cells – Applications of Fuel Cells.

TEXTBOOKS

1. Rai G.D. *Non-Conventional Sources of Energy*. Khanna Publishers, Fourth Edition, 2009.
2. Sukhstme S.P. and Nayak J.K. *Solar Energy. Principles of Thermal Collection and Storage.* McGraw Hill, Third Edition, 2008.
3. Kothari D.P, Singal K.C and Rakesh Ranjan. *Renewable Energy Sources and Emerging Technologies.* New Delhi: Prentice Hall of India Pvt. Ltd., Second Edition, 2011.
4. Khan B.H. *Non-Conventional Energy Resources.* New Delhi: McGraw Hill Education (India) Pvt. Ltd., Second Edition, Reprint 2014.

REFERENCES

Books

1. John Twidell and Tony Weir. *Renewable Energy Resources*. Taylor and Francis, Second Edition, 2005.
2. Abbasi S.A and Nasema Abbasi. *Renewable Energy sources and their environmental impact.* PHI Learning Pvt. Ltd., 2008.
3. Agarwal M.P. *Solar Energy.* S. Chand and Co. Ltd., 1982.
4. Jain H.C. *Non-Conventional Sources of Energy.* Sterling Publishers, 1986.

Web Sources

1. https://prepp.in/news/e-492-non-conventional-energy-resources-in-india-geography-notes
2. https://www.un.org/en/climatechange/what-is-renewable-energy?gclid=EAIaIQobChMIjo29nP73_wIVDHt9Ch10IwmmEAAYASAAEgIrtvD_BwE
3. https://www.lkouniv.ac.in/site/writereaddata/siteContent/2020032615361507 19jyotsna_Wind_Energy_conversion1.pdf
4. https://www.intechopen.com/chapters/73832
5. https://www.ucsusa.org/resources/how-energy-storage-works

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - II
SKILL ENHANCEMENT COURSE - IV: NON MAJOR ELECTIVE COURSE:
ASTROPHYSICS (23UPHN21)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 2**	**INT. MARKS**	**: 25**
CREDITS	**: 2**	**EXT. MARKS**	**: 75**
DURATION	**: 30 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To introduce principles of astrophysics in describing the science of formation and evolution of stars.
- To provide an understanding of the physical nature of celestial bodies.
- To interpret the various heavenly phenomena.
- To introduce the instrumentation and techniques used in astronomical research.

Course Outcomes (CO)

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

CO1[K1]: recall the fundamentals of astrosphysics
CO2[K2]: explain the physics of telescopes and eclipses
CO3[K3]: present the fundamentals of solar systems, sun, stellar evolution and galaxies
CO4[K4]: distinguish different types of telescopes, stellar objects, eclipse, stars and galaxies
CO5[K5]: construct simple telescopes, develop models and do case study

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	2	-	1	-
CO2 [K2]	2	1	-	2	-	1	-
CO3 [K3]	2	1	-	2	-	1	1
CO4 [K4]	2	1	-	1	-	1	2
CO5 [K5]	1	1	-	1	-	1	2
Weightage of the course	9	5	0	8	0	5	5
Weighted percentage of Course contribution to POs	**1.58**	**1.28**	**0**	**3.23**	**0**	**2.46**	**2.81**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – TELESCOPES **(6 hrs)**

Optical Telescopes – Magnifying Power, Brightness, Resolving Power and f/a Ratio – Types of Reflecting and Refracting Telescopes – Detectors and Image Processing – Radio Telescopes – Hubble Space Telescope.

UNIT II – SOLAR SYSTEM **(6 hrs)**

Bode's Law of Planetary Distances – Meteors, Meteorites, Comets, Asteroids – Kuiper Belt – Oort Cloud – Detection of Gravitational Waves – Recent Advances in Astrophysics.

UNIT III – ECLIPSES AND THE SUN: **(6 hrs)**

Types of Eclipses – Solar Eclipse – Total and Partial Solar Eclipse – Lunar Eclipse – Total and Partial Lunar Eclipse – Transits.

Physical and Orbital Data – Solar Atmosphere – Photosphere – Chromosphere – Solar Corona – Prominences – Sunspots – 11 Year Solar Cycle – Solar Flares.

UNIT IV – STELLAR EVOLUTION AND GALAXIES **(6 hrs)**

H-R Diagram – Birth & Death of Low Mass, Intermediate Mass and Massive Stars – Chandrasekar Limit – White Dwarfs – Neutron Stars – Pulsars – Black Holes – Supernovae.

Classification of Galaxies – Galaxy Clusters – Interactions of Galaxies, Dark Matter and Super Clusters – Evolving Universe.

UNIT V – ACTIVITIES IN ASTROPHYSICS **(6 hrs)**

(i) Basic Construction of Telescope
(ii) Develop Models to Demonstrate Eclipses/Planetary Motion
(iii) Night Sky Observation
(iv) Conduct Case Study Pertaining to any Topic in This Paper
(v) Visit to any One of the National Observatories

Any Three Activities to be Done Compulsorily.

TEXTBOOKS

1. Baidyanath Basu. *An Introduction to Astrophysics*. New Delhi: Prentice – Hall of India (P) Ltd., Second Printing, 2001.
2. Krishnaswamy K.S. *Astrophysics – A Modern Perspective*. New Delhi: New Age International (P) Ltd., 2002.
3. Shylaja B.S. and Madhusudan H.R. *Eclipse: A Celestial Shadow Play*. Orient Black Swan, 1999.

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1. Eric Chaisson and Steve McMillan. *Astronomy Today*. New Jersey: Prentice Hall, Third edition, 1999.
2. Mujiber Rahman A. *Concepts to Astrophysics*. Chennai: Scitech Publications (India) Pvt. Ltd., 2018.

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1. https://en.wikipedia.org/wiki/Hubble_Space_Telescope
2. https://spaceplace.nasa.gov/telescopes/en/
3. https://esahubble.org/videos/heic1017b/
4. https://sites.astro.caltech.edu/~george/ay127/Ay127_GalClusters.pdf
5. https://www.youtube.com/watch?v=cxrLRbkOwKs
6. https://www.youtube.com/watch?v=fgqnh_6cCE4

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF TAMIL
UG PROGRAMME - B.A./B.Sc./B.Com./BBA./BCA.,
SEMESTER – III
பொதுத்தமிழ் - III (23UTAG31)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 6**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 90 hrs**	**MAX. MARKS**	**: 100**

நோக்கங்கள்

- இலக்கியங்களின் சிறப்பினை உணர்த்துதல்.
- காலந்தோறும் எழுந்த காப்பியங்களின் போக்கையும், புதினத்தின் இலக்கிய வடிவத்தையும் யாப்பு, அணி போன்ற இலக்கிய வகைகளையும் மொழிபெயர்ப்புத் திறனையும் மாணவர்கள் உணருமாறு செய்தல்.
- தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்.

கற்றலின் பயன்கள்

இத்தாளை வெற்றிகரமாக முடித்தவுடன் மாணவர்கள்,

CO1[K1]: இலக்கியங்களின் வழி வாழ்வியல் சிந்தனைகள் பற்றி அறிவர்

CO2[K2]: காப்பிய சமயக் கருத்துக்களையும் நோக்கங்களையும் அடையாளம் காண்பர்

CO3[K3]: தமிழ் புதினங்களின் வழி சமகாலப் படைப்புகளின் வாழ்க்கை முறையின் ஆற்றலைப் பெறுவர்

CO4[K4]: காப்பியங்கள் மற்றும் புதினங்களின் வரலாற்றினைப் பாகுபடுத்துவர்

CO5[K5]: இலக்கிய இலக்கணங்களை கற்று அவற்றை மதிப்பீடு செய்வர்

CO/PO Mapping Table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	1	-	-	-
CO2 [K2]	2	1	-	1	-	-	-
CO3 [K3]	2	2	-	2	1	-	-
CO4 [K4]	2	2	1	2	-	1	1
CO5 [K5]	2	2	1	2	1	1	1
Weightage of the course	10	8	2	8	2	2	2
Weighted percentage of Course contribution to POs	**1.76**	**2.04**	**0.93**	**3.23**	**1.96**	**0.99**	**1.12**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

கூறு I **(18 hrs)**

பெருங்காப்பியங்கள்: சிலப்பதிகாரம் - வழக்குரை காதை - இளங்கோவடிகள், மணிமேகலை ஆதிரை பிச்சையிட்ட காதை – சீத்தலைச்சாத்தனார், சீவகசிந்தாமணி – பூமகள் இலம்பகம் - திருத்தக்கதேவர், வளையாபதி – நாதகுந்தனார்.

கூறுII **(18 hrs)**

சமயக் காப்பியங்கள்: பெரியபுராணம் - பூசலார் நாயனார் புராணம் - சேக்கிழார், கம்பராமாயணம் - மந்தரை சூழ்ச்சிப் படலம் - கம்பர், வில்லிபாரதம் - மற்போர் சருக்கம் - வில்லிப்புத்தூராழ்வார், சீறாப்புராணம் - புலி வசனித்த படலம் - உமறுப்புலவர்.

கூறு III **(18 hrs)**

புதினம்: வஞ்சிமாநகரம் (வரலாற்றுப் புதினம்) - நா.பார்த்தசாரதி.

கூறு IV **(18 hrs)**

காப்பியத்தின் தோற்றமும் வளர்ச்சியும் - புதினத்தின் தோற்றமும் வளர்ச்சியும்

கூறு V **(18 hrs)**

மொழித்திறன்: நூல் மதிப்புரை, திறனாய்வு செய்தல், கடிதம் வரைதல், விண்ணப்பம் எழுதுதல்.

பாடநூல்கள்

1. தமிழியல் துறையினர், *தொகுப்பு நூல்,* ஸ்ரீ காளீஸ்வரி கல்லூரி (தன்னாட்சி), சிவகாசி.
2. வாசுதேவன், கா. *பன்முக நோக்கில் தமிழ் இலக்கிய வரலாறு,* தேவன் பதிப்பகம், திருச்சிராப்பள்ளி, 2017.
3. நா.பார்த்தசாரதி, வஞ்சி மாநகரம், கவிதா வெளியீடு, சென்னை, 600017

பார்வை நூல்கள்

1. சிற்பி. பாலசுப்பிரமணியன், *தமிழ் இலக்கிய வரலாறு,* கவிதா வெளியீடு, சென்னை.
2. தமிழண்ணல், *புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு,* சோலை பதிப்பகம், மதுரை
3. பாக்கியமேரி, *வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு*, பாரி நிலையம், சென்னை

வலைப்பதிவுகள் (Web Sources)

1. Tamil Heritage Foundation- www.tamilheritage.org http://www.tamilheritage.org
2. Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library
3. 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

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
UG PROGRAMME - B.A./B.COM/B.B.A./B.SC./BCA
SEMESTER- III
GENERAL ENGLISH - III (23UENL31)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 6 (L- 5, T-1)**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 90 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To enhance the level of literary and aesthetic experience of students and to help them respond creatively.
- To sensitize them to the major issues in the society and the world.
- To provide them with an ability to build and enrich their communication skills.
- To equip them to utilize the digital knowledge resources effectively for their chosen fields of study.
- To help them think and write imaginatively and critically.

Course Outcomes (CO)

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

CO1[K1]: relate and state ideas by reading simple poems and scenes from Shakespearean plays

CO2[K2]: demonstrate effective speaking skills by listening to speeches of famous personalities and express it in day-to-day life

CO3[K3]: apply the knowledge of language competency in writing letters, emails and display social etiquettes in everyday life

CO4[K4]: analyse data interpretation, meeting etiquettes, organizing and participating in a meeting

CO5[K5]: develop language skills through literature and assess the knowledge of English in the workplace

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	2	-	-	-
CO2 [K2]	2	2	-	2	1	1	-
CO3 [K3]	2	2	1	2	1	1	-
CO4 [K4]	2	2	1	2	-	-	1
CO5 [K5]	2	1	1	1	1	1	1
Weightage of the course	10	8	3	9	3	3	2
Weighted percentage of Course contribution to POs	**1.76**	**2.04**	**1.4**	**3.63**	**2.94**	**1.48**	**1.12**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I - SPEECHES OF FAMOUS PERSONALITIES **(18 hrs)**

Jawaharlal Nehru	-	Tryst with Destiny
Steve Jobs	-	You've got to Find What You Love
Barack Obama	-	Yes, We Can

UNIT II- POETRY **(18 hrs)**

Christina Rossetti	-	In an Artist's Studio
Toru Dutt	-	Sita
Oodgeroo Noonuccal	-	A Song of Hope
Mamang Dai	-	The Voice of the Mountains

UNIT III - SCENES FROM SHAKESPEARE **(18 hrs)**

Romeo & Juliet	-	The Balcony Scene
Macbeth	-	Banquet Scene
Julius Caesar	-	Murder Scene

UNIT IV - LANGUAGE COMPETENCY **(18 hrs)**

Writing letters and emails
Writing and messaging in social media platforms [blogs, twitter, Instagram, facebook]
Learning netiquette, email etiquette

UNIT V - ENGLISH FOR WORK PLACE **(18 hrs)**

Data Interpretation and Reporting
Data Presentation and analysis
Meeting Etiquettes - language, dress code, voice modulation
Online Meetings - Terms and expressions used
Conducting and participating in a meeting

TEXTBOOK

1. Arden Shakespeare*: Complete works of William Shakespeare*. Bloomsbury, 2011.

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1. Wells, Stanley. *The Shakespeare Book: Big Ideas Simply Explained*, et al. DK Publishing, 2015.
2. Gandhi, Mahatma. *Famous Speeches by Mahatma Gandhi*, Create space Independent Publishing Platform, 2016.
3. Bernish, Jeanne Kelly. *How to Build a Professional Digital Profile* Kindle Edition, Bernish Communications Associates, LLC; 1st edition (May 29, 2012).
4. Folse, Keith.S. *Keys to Teaching Grammar to English Language Learners*, Second Ed.: A Practical Handbook, Michigan Teacher Training, 2016.
5. Yardley, Krysia.M. *Role Play- Theory and Practice*. Matwiejczuk, SAGE publications ltd, 1997.

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2. http://www.wordslikethis.com.au/
3. https://www.poetryfoundation.org/poems/146804/in-an-artist39s-studio
4. https://www.poetrynook.com/poem/s%E2%94%9C%C2%ABta
5. https://www.cam.ac.uk/files/a-tryst-with-destiny/index.html#:~:text=Jawaharlal%20Nehru%2C%20delivering%20his%20Tryst%20with%20Destiny%20speech.&text=%22Long%20years%20ago%20we%20made,awake%20to%20life%20and%20freedom

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF PHYSICS

UG Programme – B.Sc. Physics

SEMESTER - III

CORE COURSE – V: ELECTRICITY, MAGNETISM AND ELECTROMAGNETISM (23UPHC31)

(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 5**	**INT. MARKS**	**: 25**
CREDITS	**: 5**	**EXT. MARKS**	**: 75**
DURATION	**: 75 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To classify materials based on their electrical and magnetic properties.
- To understand the behavior of dc, ac and transient currents.
- To know about the communication by electromagnetic waves.
- To analyze the working principles of electrical gadgets.

Course Outcomes (CO)

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

CO1[K1]: state the basic concepts of capacitors, thermoelectricity, magnetic effects of currents, electromagnetic induction, AC current, Maxwell's equation and electromagnetic waves

CO2[K2]: explain the concepts of capacitors, thermoelectricity, magnetic effects of currents, electromagnetic induction, AC current, Maxwell's equation and electromagnetic waves

CO3[K3]: apply the concepts of electricity, magnetism and electromagnetism to solve problems

CO4[K4]: analyze the applications of concepts of electricity, magnetism and electromagnetism

CO5[K5]: examine the parameters related to electricity, magnetism and electromagnetism

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	1	-
CO3 [K3]	3	3	2	1	-	1	2
CO4 [K4]	3	2	2	1	1	1	1
CO5 [K5]	3	2	1	1	1	1	1
Weightage of the course	15	10	5	5	2	5	4
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**2.34**	**2.02**	**1.96**	**2.46**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – CAPACITORS AND THERMO ELECTRICITY (15 hrs)

Capacitor – Principle – Capacitance of Spherical and Cylindrical Capacitors – Capacitance of a Parallel Plate Capacitor (With and Without Dielectric Slab) – Effect of Dielectric –Carey Foster Bridge – Temperature Coefficient of Resistance – Seebeck Effect – Laws of Thermo emf – Peltier Effect – Thomson Effect – Thermoelectric Diagrams – Uses of Thermoelectric Diagrams – Thermodynamics of Thermo Couple – Determination of Peltier and Thomson Coefficients.

UNIT II – MAGNETIC EFFECTS OF CURRENT (15 hrs)

Biot and Savart's law – Magnetic Induction Due to Circular Coil – Magnetic Induction Due to Solenoid – Helmholtz Tangent Galvanometer – Force on a Current Element by Magnetic Field – Force Between Two Infinitely Long Conductors – Torque on a Current Loop in a Field – Moving Coil Galvanometer – Damping Correction – Ampere's Circuital Law –Differential Form – Divergence of Magnetic field – Magnetic Induction Due to Toroid.

UNIT III – MAGNETISM AND ELCTROMAGNETIC INDUCTION (15 hrs)

Magnetic Induction B – Magnetization M – Relation Between B, H and M – Magnetic Susceptibility – Magnetic Permeability – Experiment to Draw B-H Curve – Energy Loss Due to Hysteresis – Importance of Hysteresis Curves – Faraday and Lenz Laws – Vector Form – Self-Induction – Coefficient of Self-Inductance of Solenoid – Anderson's Method – Mutual Induction – Coefficient of Mutual Inductance Between Two Coaxial Solenoids – Coefficient of Coupling – Earth Inductor – Determination of Angle of Dip (Φ).

UNIT IV – TRANSIENT AND ALTERNATING CURRENTS (15 hrs)

Growth and Decay of Current in a Circuit Containing Resistance and Inductance – Growth and decay of Charge in a Circuit Containing Resistance and Capacitor – Growth and Decay of Charge in an LCR Circuit (Expressions for Charge Only) – Peak, Average and rms Values of AC – LCR Series and Parallel Circuits – Resonance Condition – Q Factor – Power Factor.

UNIT V – MAXWELLS EQUATIONS AND ELECTROMAGNETIC WAVES (15 hrs)

Maxwell's Equations in Vacuum, Material Media– Physical Significance of Maxwell's Equations – Displacement Current – Plane Electromagnetic Waves in Free Space – Velocity of Light – Poynting Vector– Electromagnetic Waves in a Linear Homogenous Media – Refractive Index.

UNIT VI – PROFESSIONAL COMPONENTS (NOT FOR EXAMINATION)

Lectures – Seminars – Webinars – Industry Inputs – Social Accountability – Patriotism.

TEXTBOOKS

1. Murugeshan R. *Electricity and Magnetism.* New Delhi: S.Chand and Co, Eighth Edition, 2006.
2. Shegal D.L, Chopra K.L and Shegal N.K. *Electricity and Magnetism*. New Delhi: S.Chand & Co., Sixth Edition, 2004.
3. Narayanamurthy M and Nagarathnam N. *Electricity and Magnetism.* Meerut: National Publishing Co., Fourth Edition, 2005.

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1. Brijlal and Subramanian. *Electricity and Magnetism*. Ratan and Prakash, Agra, Sixth Edition.
2. Brijlal, Subramanyan.N and Jivan Seshan. *Mechanics and Electrodynamics*. New Delhi: Eurasia Publishing House (Pvt.) Ltd., 2005.
3. David J. Griffiths. *Introduction to Electrodynamics*. New Delhi: Prentice Hall of India Pvt. Ltd., Second Edition, 1997.
4. Halliday. D, Resnik. R and Walker. J. *Fundamentals of Physics.* Wiley, NY, Sixth Edition, 2001.

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1. https://www.edx.org/course/electricity
2. https://www.udemy.com/courses/ electricity
3. https://www.edx.org/course/magnetism
4. http://www.hajim.rochester.edu/optics/undergraduate/courses.html
5. https://ncert.nic.in/ncerts/l/jesc113.pdf
6. https://www.youtube.com/watch?v=t-EhLjdAY0M
7. https://www.youtube.com/watch?v=mOEFTX9DAEw
8. https://www.youtube.com/watch?v=ibF0L6X53tg

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - III
CORE COURSE - VI: PRACTICAL: ELECTRICITY (23UPHC3P)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 3**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 45 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To construct circuits to learn about the concept of electricity, current, resistance and different parameters that affect a circuit.
- To set up experiments to evaluate physical parameters related to electricity and verify theories/
- To quantify and analyze the experimental results.
- To do error analysis and correlate results.

Course Outcomes (CO)

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

CO1[K1]: identify the basic concepts of electricity underlying in the experiments

CO2[K2]: setup the experiment and collect data to determine the electrical and magnetic parameters involved in the experiments

CO3[K3]: calculate the basic parameters involved in the experiments from the experimental data

CO4[K4]: analyze/interpret/plot graph/verify the theorem from the experimental data

CO5[K5]: evaluate the electrical and magnetic parameters using appropriate formula/make conclusions from the experimental data

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	1	1	-	1	-
CO2 [K2]	3	1	1	1	1	2	1
CO3 [K3]	3	2	2	1	-	1	1
CO4 [K4]	3	3	2	1	1	1	1
CO5 [K5]	3	3	2	1	1	1	1
Weightage of the course	15	10	8	5	3	6	4
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**3.74**	**2.02**	**2.94**	**2.96**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low ,'-' No Correlation)

LIST OF EXPERIMENTS (Minimum 8**):**

1. Calibration of Low Range and High Range Voltmeter Using Potentiometer
2. Calibration of Ammeter Using Potentiometer.
3. Measurement of Low Resistances Using Potentiometer.
4. Determination of Field along the Axis of a Current Carrying Circular Coil.
5. Determination of Earth's Magnetic Field Using Field along Axis of Current Carrying Coil.
6. Determination of Specific Resistance of the Material of the Wire Using PO Box.
7. Determination of Resistance and Specific Resistance Using Carey Foster's Bridge.
8. Determination of Internal Resistance of a Cell Using Potentiometer.
9. Determination of Specific Conductance of an Electrolyte.
10. Determination of E.M.F of Thermo Couple Using Potentiometer
11. Determination of Capacitance Using Desauty's Bridge and B.G./Spot Galvanometer/Head Phone.
12. Determination of Figure of Merit of BG or Spot Galvanometer.
13. Comparison of EMF of Two Cells Using BG.
14. Comparison of Capacitance Using BG.

TEXTBOOKS

1. Srinivasan M.N, Balasubramanian S and Ranganathan R. *A Textbook of Practical Physics.* New Delhi: Sultan Chand & Sons, First Edition, Reprint 2011.
2. Ouseph C.C, Rao U.J and Vijayendran V. *Practical Physics and Electronics*. Chennai: Ananda Book Depot, First Edition, Reprint 2019.
3. Ouseph C.C, Srinivasan V and Balakrishnan R. *A Textbook of Practical Physics - Part I.* Chennai: S.Viswanathan (Printers & Publishers) Pvt., Ltd., Revised Edition, Reprint 2000.

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Books

1. Arora C.L. *B Sc Practical Physics.* New Delhi: S.Chand & Sons Co. Ltd., Reprint 2018.
2. Kakani S.L and Shubhra K. *Applied Physics: Theory and Practical*. New Delhi: Viva Books Pvt. Ltd., First Edition, 2015.
3. Manjeet S and Anita D. *Applied Physics: Theory and Experiment*. New Delhi: Vayu Education of India, First Edition, 2011.
4. Tayal D.C. *University Practical Physics*. Mumbai: Himalaya Publishing House, First Millennium Edition, 2000.

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2. https://www.youtube.com/watch?v=Ke3xGTfVeCk
3. https://www.pdfdrive.com/experiments-in-physics-physics-1292-general-physics-ii-lab-d34669771.html
4. https://byjus.com/physics/to-compare-the-emf-of-two-given-primary-cells-using-potentiometer-experiment/
5. https://www.youtube.com/watch?v=6Zcv3gbNxJM

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Physics
SEMESTER- III
ELECTIVE COURSE GENERIC / DISCIPLINE SPECIFIC – III: CHEMISTRY FOR PHYSICAL SCIENCES – I (23UPHA31)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 4**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 60 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To know the basics of atomic orbitals, chemical bonds and hybridization.
- To inculcate the concepts of thermodynamics and its applications.
- To get an idea about the concepts of nuclear chemistry.
- To ensure the importance of chemical industries.
- To improve qualitative and analytical methods.

Course Outcomes (CO)

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

CO1[K1]: describe the principles chemical bonding, nuclear chemistry, thermodynamics and hybridization of organic compounds

CO2[K2]: explain the concepts involved in Fuels, analytical chemistry, thermodynamics and phase equilibria

CO3[K3]: find out the use of isotopes, fertilizers and reaction mechanism

CO4[K4]: analyze the MO theory, silicones, heterocycles and therodynamics

CO5[K5]: evaluate the application of chromatography, radioisotopes and phase rule

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	-	-	1	-
CO2 [K2]	3	2	1	1	-	-	-
CO3 [K3]	3	2	1	1	1	1	1
CO4 [K4]	3	2	1	1	-	-	1
CO5 [K5]	3	2	1	1	1	1	1
Weightage of the course	15	10	5	4	2	3	3
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**2.34**	**1.61**	**1.96**	**1.48**	**1.69**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low ,'-' No Correlation)

UNIT I – CHEMICAL BONDING AND NUCLEAR CHEMISTRY (12 hrs)

Chemical Bonding: Molecular Orbital Theory – Bonding, Antibonding and Non-Bonding Orbitals. Molecular Orbital Diagrams for Hydrogen, Helium, Nitrogen; Discussion of Bond Order and Magnetic Properties. **Nuclear Chemistry:** Fundamental Particles – Isotopes, Isobars, Isotones and Isomers – Differences between Chemical Reactions and Nuclear Reactions – Group Displacement Law. Nuclear Binding Energy – Mass Defect – Calculations. Nuclear Fission and Nuclear Fusion – Differences – Stellar Energy. Applications of Radioisotopes – Carbon Dating, Rock Dating and Medicinal Applications.

UNIT II – INDUSTRIAL CHEMISTRY (12 hrs)

Fuels: Fuel Gases: Natural Gas, Water Gas, Semi Water Gas, Carbureted Water Gas, Producer Gas, CNG, LPG And Oil Gas (Manufacturing Details Not Required). Silicones: Synthesis, Properties and Uses of Silicones. Fertilizers: Urea, Ammonium Sulphate, Potassium Nitrate, NPK Fertilizer, Superphosphate, Triple Superphosphate.

UNIT III – FUNDAMENTALS CONCEPTS IN ORGANIC CHEMISTRY (12 hrs)

Hybridization: Orbital Overlap, Hybridization and Geometry of CH_4, C_2H_4, C_2H_2 and C_6H_6. Electronic Effects: Inductive Effect and Consequences on K_a and K_b of Organic Acids and Bases, Electromeric, Mesomeric, Hyper Conjugation and Steric – Examples. Reaction Mechanisms: Types of Reactions – Aromaticity (Huckel's Rule) – Aromatic Electrophilic Substitution; Nitration, Halogenation, Friedel – Craft's Alkylation and Acylation. Heterocyclic Compounds: Preparation, Properties of Pyrrole and Pyridine.

UNIT IV – THERMODYNAMICS AND PHASE EQUILIBRIA (12 hrs)

Thermodynamics: Types of Systems, Reversible and Irreversible Processes, Isothermal and Adiabatic Processes and Spontaneous Processes. Statements of First Law and Second Law of Thermodynamics. Carnot's Cycle and Efficiency of Heat Engine. Entropy and Its Significance. Free Energy Change and Its Importance (No Derivation). Conditions for Spontaneity in Terms of Entropy and Gibbs Free Energy. Relationship between Gibbs Free Energy and Entropy. **Phase Equilibria:** Phase Rule – Definition of Terms in It. Applications of Phase Rule to Water System. Two Component System – Reduced Phase Rule and Its Application to A Simple Eutectic System (Pb-Ag).

UNIT V – ANALYTICAL CHEMISTRY (12 hrs)

Introduction to Qualitative and Quantitative Analysis. Principles of Volumetric Analysis. Separation and Purification Techniques – Extraction, Distillation and Crystallization. Chromatography: Principle and Application of Column, Paper and Thin Layer Chromatography

TEXTBOOKS

1. Veeraiyan V, *Textbook of Ancillary Chemistry,* 1st Edition, High Mount Publishing House: Chennai, 2009.
2. Vaithiyanathan S, *Textbook of Ancillary Chemistry*, Priya Publications: Karur, 2006.
3. Bahl B. S and ArulBhal. *Advanced Organic Chemistry*. New Delhi: S. Chand and Company, 23rd Edition, 2012.
4. Soni P. L and Chawla H. M. *Textbook of Organic Chemistry*. New Delhi: Sultan Chand & Sons, 29th Edition, 2007.

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1. Soni P. L and Mohan Katyal, *Textbook of Inorganic Chemistry*, 20th Edition, Sultan Chand & amp; Sons, 2007.
2. Puri B R, Sharma L. R, Pathania M.S, *Textbook of Physical Chemistry,* 44th Edition, Vishal Publishing Co: New Delhi, 2018.
3. Sharma B K. *Industrial Chemistry*. 16th Edition, Goel Publishing House: Meerut, 2014.

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2. https://www.youtube.com/watch?v=q5CZUnsWkYQ&list=PLF_7kfnwLFCFijVGjd7zrjtWrxi4-4xeY
3. https://youtu.be/DGYwnbboTtI

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc Physics
SEMESTER III
ELECTIVE COURSE GENERIC / DISCIPLINE SPECIFIC – III: PRACTICAL: CHEMISTRY PRACTICAL FOR PHYSICAL SCIENCES – I (23UPHA3P)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 2**	**INT. MARKS**	**: 25**
CREDITS	**: 2**	**EXT. MARKS**	**: 75**
DURATION	**: 30 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To know the safety in chemistry lab.
- To get an idea to handle the glassware.
- To understand the basic principle of volumetric analysis.
- To acquire knowledge to prepare solutions.
- To have hands on experience in the volumetric analysis.

Course Outcomes (CO)

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

CO1[K1]: estimate oxalic acid by acidimetric and permanganometric method
CO2[K2]: choose suitable indicator for carrying out volumetric estimation
CO3[K3]: apply acidimetric and alkalimetric method for the quantitative volumetric estimation of acids and bases
CO4[K4]: measure quantitatively the amount of inorganic compound accurately with the help of color change of the indicator
CO5[K6]: plan various volumetric procedures for the estimation of any inorganic compounds

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	-	-	-	1
CO2 [K2]	3	2	1	1	-	1	1
CO3 [K3]	3	2	1	-	1	1	-
CO4 [K4]	3	2	2	1	-	1	1
CO5 [K6]	3	2	2	-	1	1	1
Weightage of the course	15	10	7	2	2	4	4
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**3.27**	**0.81**	**1.96**	**1.97**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

VOLUMETRIC ANALYSIS

1. Estimation of Sodium Hydroxide using Standard Sodium Carbonate.
2. Estimation of Hydrochloric Acid using Standard Oxalic Acid.
3. Estimation of Ferrous Sulphate using Standard Mohr's Salt.
4. Estimation of Oxalic Acid using Standard Ferrous Sulphate.
5. Estimation of Potassium Permanganate using Standard Sodium Hydroxide.
6. Estimation of Magnesium using EDTA.
7. Estimation of Ferrous Ion using Diphenyl Amine as Indicator.

TEXTBOOK

1. Venkateswaran V, Veerasamy R, Kulandaivalu A. R, *Basic Principles of Practical Chemistry*, 2nd Edition, Sultan Chand & Sons, 1997.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - III
SKILL ENHANCEMENT COURSE – V: ENTREPRENEURIAL SKILL:
PRACTICAL: ELECTRICAL WIRING (23UPHS3P)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 1**	**INT. MARKS**	**: 25**
CREDIT	**: 1**	**EXT. MARKS**	**: 75**
DURATION	**: 15 hrs**	**MAX. MARKS**	**: 100**

Course Objective

- To gain practical skill on electrical instruments, installations and domestic wiring techniques with safety precautions.

Course Outcomes (CO)

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

CO1[K1]: identify different electrical tools/wires/devices/accessories used in electrical wiring
CO2[K2]: demonstrate simple home electrical wiring circuits
CO3[K3]: use electrical measuring devices for measurements
CO4[K4]: verify properties of series and parallel electrical circuits
CO5[K5]: construct simple home electrical switch board wiring circuits with energy meter and fuse

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	1	1	-	1	-
CO2 [K2]	2	2	2	1	1	2	1
CO3 [K3]	3	2	2	1	1	1	2
CO4 [K4]	2	2	1	1	-	1	1
CO5 [K5]	3	3	2	1	1	1	2
Weightage of the course	12	10	8	5	3	6	6
Weighted percentage of Course contribution to POs	**2.11**	**2.55**	**3.74**	**2.02**	**2.94**	**2.96**	**3.37**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

LIST OF EXPERIMENTS (Minimum 8**):**

1. Measure the Gauge of a Given Wire with Help of the Wire Gauge.
2. Test the Supply by Test Lamp, and To Test the Phase and Neutral by the Test Lamp and Neon Tester.
3. Make a Simple Twist Joint and Tee Joint of Single Core PVC Wire
4. Connect Three Lamps in Series and Verify the Properties of Series Circuit.
5. Connect Three Lamps in Parallel and Verify the Properties of Parallel Circuit.
6. Control of One Lamp by a Switch
7. Control of Two Lamps by Two Switches Independently
8. Staircase Wiring
9. Control of One Lamp by Three Switches at Three Different Locations
10. Control of One Lamp and Two Ceiling Roses by Three Switches Independently
11. Control of One Lamp and Two Ceiling Roses Through Fuse by Three Switches Independently (Switch Board Connection).
12. Connect the Single Phase Energy Meter with Load.
13. Measure the Power of an Electric Iron by Voltmeter and Ammeter.
14. Hospital Wiring Circuit for Light Control using Switches

TEXTBOOK

1. Lab Manual is prepared by Department of Physics, Sri Kaliswari College, Sivakasi.

REFERENCES

Books

1. Bhatia K.B. *Electrical Appliances and Devices*. New Delhi: Khanna Publishrs, Seventh Edition, Reprint 2022.
2. Premkumar N and Gnanavadivel J. *Basic Electrical and Electronics Engineering*. Kumbakonam: Anuradha Agencies, Fourth Edition, 2010.
3. Theraja B.L. *Electrical, Electronics and Tele Communication Engineering*. New Delhi: S.Chand and Company Ltd., Sixth Edition, 2012.
4. Rongy D.W. *Home Electrical Wiring: A Complete Guide.* New Delhi: Tata McGraw-Hill Pvt. Ltd., Second Edition, 2013.
5. Rex Cauldwell. *Wiring a House.* Taunton Pr. Publisher., Fifth Edition, 2014.
6. Black and Decker. *Advanced Home Wiring - Backup Power - Panel Upgrades - AFCI Protection - "Smart" Thermostats.* Cool Springs Press, Fifth Edition, 2018.
7. Kevin Ryan. *Complete Beginners Guide to Rough in Electrical Wiring.* US: Amazon Digital Services LLC - KDP Print, 2022.

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1. https://www.youtube.com/watch?v=xAH37bcckD4
2. https://www.youtube.com/watch?v=6z-R7pZUIds
3. https://www.youtube.com/watch?v=U3p2-pZFpzg
4. https://www.youtube.com/watch?v=3sxmJtEgzd8
5. https://www.youtube.com/watch?v=5YNSiE7HWsY

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - III
SKILL ENHANCEMENT COURSE - VI: ELECTRICAL WIRING AND APPLIANCES (23UPHS31)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 2**	**INT. MARKS**	**: 25**
CREDITS	**: 2**	**EXT. MARKS**	**: 75**
DURATION	**: 30 hrs**	**MAX. MARKS**	**: 100**

Course Objective

- To gain knowledge on electrical instruments, installations and domestic wiring techniques with safety precautions and, home appliances.

Course Outcomes (CO)

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

CO1[K1]: identify the basic concepts of electricity, electrical wiring and home appliances

CO2[K2]: explain the usage of AC and DC currents, motors, lighting accessories, earthing, fuses and electric devices

CO3[K3]: apply concepts of electricity, electrical wiring and home appliances to solve problems

CO4[K4]: analyze the functions of AC and DC currents, AC machines, switches, types of wires, fuses and home appliances

CO5[K5]: justify the simple house wiring circuits

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	1	-	-	1	-
CO2 [K2]	3	1	1	2	-	1	-
CO3 [K3]	3	2	1	1	-	1	2
CO4 [K4]	2	2	1	1	-	1	2
CO5 [K5]	2	2	1	1	1	1	1
Weightage of the course	13	8	5	5	1	5	5
Weighted percentage of Course contribution to POs	**2.28**	**2.04**	**2.34**	**2.02**	**0.98**	**2.46**	**2.81**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – FUNDAMENTAL CONCEPTS (6 hrs)

AC and DC Power Supply – Ohm's Law – Resistances in Series and Parallel – Types of Circuits – Effect of Electric Current – Power Factor – Single Phase – Poly Phase – Connections of Three Phases – Production and Transmission of Electricity – Energy Consumption – Electrical Energy Unit in kWh.

UNIT II – LIGHTING ACCESSORIES AND BASIC WIRING (6 hrs)

Switches – Lamp Holders – Wires and Cables – Types of Wires – Systems of Wiring – Megger Testing – Instruction for Wiring – Rules Related to Wiring – Installation of Two Way Switch – Role of Sockets, Plugs – Installation of Meters – Basic Switch Board.

UNIT III – EARTHING, FUSES AND SAFETY MEASUREMENTS (6 hrs)

Introduction – Pipe Earthing – Plate Earthing – Specifications Required for Earthing – Artificial Respiration – Fuses – Types of Fuses – Kit-Kat, HRC, Cartridge, MCB, ELCB – Safety Precautions in Electricity and Handling Tools – Line Tester.

UNIT IV – AC MACHINES (6 hrs)

Transformer – Types of Transformers – Transformer in Distribution System – Induction Motor – Table Fan – Ceiling Fan.

UNIT V – ELECTRICAL APPLIANCES (6 hrs)

Power Rating of Electrical Appliances – Filament Lamp – Fluorescent Tube – Room Heater – Electric Iron - Electric Kettle – Hot Plate – Water Heaters Induction Stove – Measures to Save Electrical Energy.

TEXTBOOK

1. Study material is prepared by Department of Physics, Sri Kaliswari College, Sivakasi.

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1. Bhatia K.B. *Electrical Appliances and Devices.* New Delhi: Khanna Publishers, Seventh Edition, Reprint 2022.
2. Premkumar N and Gnanavadivel J. *Basic Electrical and Electronics Engineering*. Kumbakonam: Anuradha Agencies, Fourth Edition, 2010.
3. Theraja B.L. *Electrical, Electronics and Tele Communication Engineering*. New Delhi: S.Chand and Company Ltd., Sixth Edition, 2012.
4. Rongy D.W. *Home Electrical Wiring: A Complete Guide.* New Delhi: Tata McGraw-Hill Pvt. Ltd., Second Edition, 2013.
5. Rex Cauldwell. *Wiring a House.* Taunton Pr. Publisher., Fifth Edition, 2014.

6. Black and Decker. *Advanced Home Wiring - Backup Power - Panel Upgrades - AFCI Protection - "Smart" Thermostats.* Cool Springs Press, Fifth Edition, 2018.
7. Kevin Ryan. *Complete Beginners Guide to Rough in Electrical Wiring.* US: Amazon Digital Services LLC - KDP Print, 2022.

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1. https://ncert.nic.in/vocational/pdf/kvcj103.pdf
2. https://www.youtube.com/watch?v=I2_-etus0KQ
3. https://wisconsindot.gov/dtsdManuals/traffic-ops/programs/training/slights/03-slights-electrical-wiring.pdf
4. https://www.electricaltechnology.org/2015/09/types-of-wiring-systems-electrical-wiring-methods.html
5. https://www.electricaltechnology.org/2020/03/hospital-wiring-circuit-using-switches.html

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF TAMIL
UG PROGRAMME - B.A./B.Sc./B.Com./BBA./BCA.
SEMESTER - IV
பொதுத்தமிழ் - IV (23UTAG41)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 6**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 90 hrs**	**MAX. MARKS**	**: 100**

நோக்கங்கள்

- இலக்கியங்களின் சிறப்பினை உணர்த்துதல்.
- சங்க இலக்கியத்தின் சிறப்பையும், நாடகம் என்னும் இலக்கிய வகையின் தன்மையையும் அகபுற இலக்கணங்களையும் மாணவர்களுக்கு அறிமுகப்படுத்துதல்.
- தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்.

கற்றலின் பயன்கள்

இத்தாளை வெற்றிகரமாக முடித்தவுடன் மாணவர்கள்,

CO1[K1]: சங்க இலக்கியத்தில் காணப்பெறும் அறக்கருத்துக்களை அறிந்து கொள்வர்

CO2[K2]: சங்க இலக்கியங்கள் மற்றும் நாடக இலக்கியம் வாயிலாக மக்களின் வாழ்க்கை முறையினை எடுத்துரைப்பா

CO3[K3]: நாடக இலக்கியம் மூலம் நடிப்பாற்றலையும், கலைத்தன்மையையும், படைப்பாற்றலையும் கற்பர். மேலும் மொழிபெயர்ப்பு ஆற்றலையும் பெறுவர்

CO4[K4]: கலைச்சொற்களைக் கண்டறிந்து அவற்றோடு தொடர்புடைய சொல்லைப் பகுப்பர்

CO5[K5]: சங்க இலக்கியம் மற்றும் நாடக இலக்கியங்களை மதிப்பீடு செய்வர்

CO/PO Mapping Table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	1	-	-	-
CO2 [K2]	2	1	-	2	-	-	-
CO3 [K3]	2	2	-	2	1	-	1
CO4 [K4]	2	2	1	2	1	1	-
CO5 [K5]	2	2	1	2	-	1	1
Weightage of the course	10	8	2	9	2	2	2
Weighted percentage of Course contribution to POs	**1.76**	**2.04**	**0.93**	**3.63**	**1.96**	**0.99**	**1.12**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

கூறு I **(18 hrs)**

எட்டுத்தொகை: நற்றிணை (10,14,16பாடல்கள்), குறுந்தொகை (16,17,19,20,25,29,38,440), கலித்தொகை (38,51), அகநானூறு (15,33,55), புறநானூறு (37,86,112), பரிபாடல் (55)

கூறு II **(18 hrs)**

பத்துப்பாட்டு: நெடுநல்வாடை - நக்கீரர்

கூறு III **(18 hrs)**

நாடகம்: சபாபதி - பம்மல் சம்பந்த முதலியார்

கூறு IV **(18 hrs)**

சங்க இலக்கியம் தோற்றம் வளர்ச்சி - நாடகத்தின் தோற்றம் வளர்ச்சி

கூறு V **(18 hrs)**

மொழித்திறன்: மொழிபெயர்ப்பு - கலைச்சொற்கள், கொடுக்கப்பட்டுள்ள ஆங்கிலப் பகுதியைத் தமிழில் மொழிபெயர்தல், அலுவலகக் கடிதம் - தமிழில் மொழிபெயர்த்தல்.

பாடநூல்கள்

1. தமிழியல் துறையினர், *தொகுப்பு நூல்,* ஸ்ரீ காளீஸ்வரி கல்லூரி (தன்னாட்சி), சிவகாசி.
2. வாசுதேவன், கா. *பன்முக நோக்கில் தமிழ் இலக்கிய வரலாறு,* தேவன் பதிப்பகம், திருச்சிராப்பள்ளி, 2017.
3. சபாபதி, *பம்மல் சம்பந்த முதலியார்,* கௌரா பதிப்பகக் குழுமம், சென்னை

பார்வை நூல்கள்

1. சிற்பி. பாலசுப்பிரமணியன், *தமிழ் இலக்கிய வரலாறு,* கவிதா வெளியீடு, சென்னை.
2. தமிழண்ணல், *புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு,* சோலை பதிப்பகம், மதுரை
3. பாக்கியமேரி, *வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு,* பாரி நிலையம், சென்னை.

வலைப்பதிவுகள் (Web Sources)

1. Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org>
2. Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library
3. 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

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
UG PROGRAMME - B.A./B.COM/B.B.A./B.SC./BCA
SEMESTER- IV
GENERAL ENGLISH –IV (23UENL41)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 6 (L-5, T-1)**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 90 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To help learners imbibe the rules of language unconsciously and tune to deduce language structure and usage.
- To use receptive skills through reading and listening to acquire good exposure to language and literature.
- To develop language skill for effective communication.
- To provide exposure to plays, autobiographies and expose them to value based ideas.
- To enhance the learner's language skills especially in the areas of grammar and pronunciation.

Course Outcomes (CO)

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

CO1[K1]: state ideas effectively and appropriately in real life situations
CO2[K2]: demonstrate speaking skills in appreciating literature
CO3[K3]: use grammar and pronunciation effectively and appropriately
CO4[K4]: examine the literary works to develop language skills
CO5[K6]: construct grammatically correct and meaning full sentences

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	1	-	-	-
CO2 [K2]	2	1	-	1	-	-	-
CO3 [K3]	2	2	1	2	1	1	1
CO4 [K4]	2	2	1	2	1	1	1
CO5 [K6]	2	3	1	2	-	1	1
Weightage of the course	10	9	3	8	2	3	3
Weighted percentage of Course contribution to POs	**1.76**	**2.3**	**1.4**	**3.23**	**1.96**	**1.48**	**1.69**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I - LIFE WRITING **(18 hrs)**

Malala Yousafzai - I am Malala - Chapter 1
Nikola Tesla - My Inventions - Chapter 2

UNIT II - ONE ACT PLAYS **(18 hrs)**

Edward Albee - The Zoo Story
Anton Chekhov - The Proposal

UNIT III - INTERVIEWS **(18 hrs)**

Nelson Mandela's Interview with Larry King
Rakesh Sharma's Interview with Indira Gandhi from Space
Lionel Messi with Sid Lowe (Print)

UNIT IV - LANGUAGE COMPETENCY **(18 hrs)**

Refuting, Arguing & Debating, Making Suggestions & Responding to Suggestions, Asking for and Giving Advice or Help, Interviews (face to face, telephone and video conferencing)

UNIT V - ENGLISH FOR WORKPLACE **(18 hrs)**

Job Applications: Covering letters, CV and Resume
Creating a digital profile - Linkedin
Filling Forms (Online & Manual): creation of account, railway reservation, ATM, Credit/debit card
Body Language -Practical Skills for Interviews

TEXTBOOKS

1. Yousafzai, Malala, and Christina Lamb. *I Am Malala The Girl Who Stood Up for Education and Was Shot by the Taliban*. New York: Little Brown, 2013.
2. Tesla , Nikola. *My Inventions.* London: Ingram Short Title, 2011.

REFERENCES

Books

1. Taylor, Mary Borg, & Francis, *Writing Your Life: A Guide to Writing Autobiographies.* Routledge, 2021.
2. Bert, A. Norman. *One-act Plays for Acting Students: An Anthology of Short one- Act Plays for one, Two or Three actors*. Christian Publisher LLC, 1987.
3. Dolley, Colin. and Rex Welford. *The One-Act Play Companion: A Guide to plays, Play wrights and Performance*. Bloomsbury Publishing, 2015.
4. Bernis, Jeanne Kelly. Editor. *How to Build a Professional Digital Profile*. Bernish, Bernish Communications Associates, LLC, 2012
5. Yardley, M Yardley - Matwiejczuk, *Role Play-Theory and Practice.* SAGE publications ltd, 1997.

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1. For Readers' Theatre: https://www.youtube.com/watch?v=JaLQJt8orSw&t=469s(the link to the

performance; refer scripts by Aaron Sheperd) http://BBC learn English.com

2. https://www.infoplease.com/dictionary/brewers/animals-cries
3. http://onestopenglish.com
4. http://hearn-english-today.com
5. http://talkenglish.com

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - IV
CORE COURSE - VII: OPTICS (23UPHC41)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 4**	**INT. MARKS**	**: 25**
CREDITS	**: 4**	**EXT. MARKS**	**: 75**
DURATION	**: 60 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To provide an in-depth understanding of the basics of various phenomena in geometrical and wave optics.
- To understand the differences in the important phenomena namely interference, diffraction and Polarization and apply the knowledge in day to day life.
- To understand the design of optical systems and methods to minimise aberrations.
- To solve problems in optics by selecting the appropriate equations and performing numerical or analytical calculations.
- To describe experimental methods to evaluate the physical/optical parameters.

Course Outcomes (CO)

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

CO1[K1]: list out aberration in lenses, different optical elements and its applications

CO2[K2]: explain the construction and working of eyepieces, interferometers, zone plates, quarter and half wave plates.

CO3[K3]: apply the concepts of geometrical optics and physical optics to drive expressions and solve problems

CO4[K4]: distinguish optical phenomena due to refraction, interference, diffraction and polarization

CO5[K5]: examine the experimental methods to evaluate the physical/optical parameters

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	1	-
CO3 [K3]	3	3	2	1	-	1	1
CO4 [K4]	3	2	2	1	1	1	1
CO5 [K5]	3	2	2	1	1	1	2
Weightage of the course	15	10	6	5	2	5	4
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**2.8**	**2.02**	**1.96**	**2.46**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – LENSES (12hrs)

Fermat's Principle of Least Time – Postulates of Geometrical Optics – Thick and Thin Lenses – Cardinal Points of an Optical System – Newton's Formula and Graphical Construction of Image using Cardinal Points – Cardinal points of a coaxial system of two thin lenses – Focal Length, Critical Thickness, Power and Cardinal Points of a Thick Lens.

Lens Aberrations – Spherical Aberration, Chromatic Aberrations, Coma, and Astigmatism – Curvature of the Field – Distortion – Removal Methods of Chromatic Aberration in Lenses – Achromatic Lens.

UNIT II – PRISMS AND EYEPIECES (12 hrs)

Prism: Angular and Chromatic Dispersion of a prism – Achromatic Combination of Prism – Deviation without Dispersion – Dispersion without Deviation – Constant Deviation Spectroscope – Theory of Primary Rainbow and Secondary Rainbows – Halos - Narrow Angled Prisms.

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.

UNIT III – INTERFERENCE (12 hrs)

Division of Wave Front, Fresnel's Biprism – Fringes with White Light – Division of Amplitude: 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)

Determination of the Wavelength and Separation D1 and D2 Lines of Sodium Light, (iii) Determination of a Thickness of a Mica Sheet.

UNIT IV – DIFFRACTION (12 hrs)

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 – Diffraction due to a Narrow Slit – Fraunhofer Type of Diffraction – Fraunhofer Diffraction at a Single Slit – Plane Diffraction Grating – Experiment to Determine Wavelengths – Width of Principle Maxima.

UNIT V – POLARIZATION (12 hrs)

Optical Activity – Optically Active Crystals – Polarizer and Analyser – Double Refraction – Optic Axis, Principle 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.

TEXTBOOKS

1. Subraminyam N, Brij lal and Avadhanulu M.N. *A Textbook of Optics.* New Delhi: S.Chand & Company Ltd., Twenty Fifth Revised Edition, Reprint 2018.
2. Sasikumar P.R. *Photonics.* New Delhi: PHI Pvt Ltd., 2012.
3. Rajagopal K. *Engineering Physics.* New Delhi: PHI Pvt Ltd., 2008.
4. Rajendran V. *Engineering Physics.* Tata McGraw Hill. 2012.
5. Murugeshan R. *Optics and Spectroscopy*. New Delhi: S.Chand & Company Ltd., Sixth Edition, 2006.

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Books

1. Ajoy Ghatak. Agarwal B.S. *Optics*. Meerut: Kedernath Ramnath Publishers, 2011.
2. Sathya prakash. *Optics.* New Delhi: Ratan Prakashan Mandhir, Sevanth Edition, 1990.
3. Ajoy Ghatak. *Optics*. New Delhi: McGraw Hill Education (India) Pvt. Ltd., Fifth Edition, Reprint 2013.
4. Singh and Agarwal, *Optics and Atomic Physics.* Meerut: Pragati Prakashan Nineth Edition, 2002.
5. Halliday D. Resnick R. and Walker J. *Fundamentals of Physics.* New York: Willey, Sixth Edition, 2001.

6. Jenkins A. Francis and White, *Fundamentals of Optics.* New Delhi: McGraw Hill Inc., Fourth Edition, 2011.

Web Sources

1. https://science.nasa.gov/ems/
2. https://www.youtube.com/watch?v=tL3rNc1G0qQ&list=RDCMUCzwo7UlGkb-8Pr6svxWo-LA&start_radio=1&t=2472
3. https://www.youtube.com/watch?v=PgW7qaOZD0U
4. https://www.youtube.com/watch?v=wTEIYtivVhM
5. https://www.youtube.com/watch?v=6_C8KyU67RU
6. https://nptel.ac.in/courses/122107035
7. https://byjus.com/physics/rayleigh-criterion/#:~:text=%E2%80%9CRayleigh%20criterion%20for%20the%20diffraction,diffraction%20pattern%20of%20the%20other.%E2%80%9D

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme –B.Sc. Physics
SEMESTER - IV
CORE COURSE - VIII: PRACTICAL: LIGHT (23UPHC4P)
(From 2021-2022 Batch onwards)

HOURS/WEEK	**: 3**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 45 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To demonstrate various optical phenomena applying various concepts of optics.
- To set up experiments to evaluate optical/physical parameters of materials and verify theories.
- To quantify and analyze experimental results.
- To do error analysis and correlate results.

Course Outcomes (CO)

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

CO1[K1]: identify the basic concepts of optics underlying in the experiments

CO2[K2]: setup the experiment and collect data to determine the optical/physical parameters involved in the experiments

CO3[K3]: calculate the basic parameters involved in the experiments from the experimental data

CO4[K4]: analyze / interpret / plot graph / verify the theorem from the experimental data

CO5[K5]: evaluate the optical/physical parameters using appropriate formula/make conclusions from the experimental data

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	1	1	-	1	-
CO2 [K2]	3	1	1	1	1	2	1
CO3 [K3]	3	2	2	1	-	1	1
CO4 [K4]	3	3	2	1	1	1	1
CO5 [K5]	3	3	2	1	1	1	1
Weightage of the course	15	10	8	5	3	6	4
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**3.74**	**2.02**	**2.94**	**2.96**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low ,'-' No Correlation)

LIST OF EXPERIMENTS (Minimum 8**):**

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. Comparison of Intensities using Lummer Brodhum Photometer.
10. Determination of Range of Motion using Searles goniometer.
11. Verification of Newton's Formula for a Lens Separated by a Distance.
12. Determination of Refractive Index of a given Liquid by Forming Liquid Lens
13. Determination of Refractive Index using Laser.
14. Determination of Wavelengths, Particle Size using Laser/Monochromatic Source.
15. Determination of Resolving Power of Diffraction Grating using Laser
16. Determination of Diameter of a Wire using Laser.

TEXTBOOKS

1. Srinivasan M.N, Balasubramanian S and Ranganathan R. *A Textbook of Practical Physics.* New Delhi: Sultan Chand & Sons, First Edition, Reprint 2011.
2. Ouseph C.C, Rao U.J and Vijayendran V. *Practical Physics and Electronics*. Chennai: Ananda Book Depot, First Edition, Reprint 2019.
3. Ouseph C.C, Srinivasan V and Balakrishnan R. *A Textbook of Practical Physics - Part I.* Chennai: S.Viswanathan (Printers & Publishers) Pvt., Ltd., Revised Edition, Reprint 2000.

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1. Arora C.L. *B Sc Practical Physics.* New Delhi: S.Chand & Sons Co. Ltd., Reprint 2018.
2. Kakani S.L and Shubhra K. *Applied Physics: Theory and Practical*. New Delhi: Viva Books Pvt. Ltd., First Edition, 2015.
3. Manjeet S and Anita D. *Applied Physics: Theory and Experiment*. New Delhi: Vayu Education of India, First Edition, 2011.
4. Tayal D.C. *University Practical Physics*. Mumbai: Himalaya Publishing House, First Millennium Edition, 2000.

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1. https://www.youtube.com/watch?v=aFH90Kdwzb8
2. https://www.youtube.com/watch?v=l0XmP4YY6-w
3. https://www.youtube.com/watch?v=o6E59ZIECKk
4. http://www.bsauniv.ac.in/UploadImages/Downloads/PHYSICS-LAB-MANUAL2017-(new-regulation).pdf
5. http://www.stpius.ac.in/crm/assets/download/Practical_paper-2.pdf

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Physics
SEMESTER - IV
ELECTIVE COURSE GENERIC / DISCIPLINE SPECIFIC – IV: CHEMISTRY FOR PHYSICAL SCIENCES – II (23UPHA41)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 4**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 60 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To know the basics of coordination chemistry and water technology
- To get knowledge on carbohydrates and amino acids.
- To ensure the basics and applications of electrochemistry.
- To acquire knowledge in the basics and applications of kinetics and catalysis.
- To understand various photochemical reactions.

Course Outcomes (CO)

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

CO1[K1]: describe the principles coordination chemistry, carbohydrates, catalysis, photochemistry and electrochemistry

CO2[K2]: explain the concepts in water technology, amino acids and kinetics

CO3[K3]: apply the Werner's theory, energy of activation and photochemical laws

CO4[K4]: analyze structure of carbohydrate, biomolecules, water components and quantum yield

CO5[K5]: discuss the various cells, order of reactions and amino acids

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	-	-	1	-
CO2 [K2]	3	2	1	1	-	-	-
CO3 [K3]	3	2	1	1	1	1	1
CO4 [K4]	3	2	1	1	-	-	1
CO5 [K5]	3	2	1	1	1	1	1
Weightage of the course	15	10	5	4	2	3	3
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**2.34**	**1.61**	**1.96**	**1.48**	**1.69**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I – CO-ORDINATION CHEMISTRY AND WATER TECHNOLOGY (12 hrs)

Co-Ordination Chemistry: Definition of Terms – IUPAC Nomenclature – Werner's Theory – EAN Rule – Pauling's Theory – Postulates – Applications to $[Ni(CO)_4]$, $[Ni(CN)_4]^{2-}$, $[Co(CN)_6]^{3-}$ – Chelation – Biological Role of Haemoglobin And Chlorophyll (Elementary Idea) – Applications in Qualitative and Quantitative Analysis. Water Technology: Hardness of Water, Determination of Hardness of Water using EDTA Method, Zeolite Method – Purification Techniques – BOD, COD.

UNIT II – CARBOHYDRATES AND AMINO ACIDS (12 hrs)

Carbohydrates: Classification, Preparation and Properties of Glucose, Fructose and Sucrose. Discussion of Open Chain Ring Structures of Glucose and Fructose. Glucose – Fructose Interconversion. Properties of Starch and Cellulose. **Amino Acids:** Classification – Preparation and Properties of Alanine, Preparation of Dipeptides Using Bergmann Method. RNA and DNA (Elementary Idea Only).

UNIT III – ELECTROCHEMISTRY (12 hrs)

Galvanic Cells – Standard Hydrogen Electrode – Calomel Electrode – Standard Electrode Potentials – Electrochemical Series. Strong and Weak Electrolytes – Ionic Product of Water – pH, pK_a, pK_b– Conductometric Titrations – pH Determination by Colorimetric Method – Buffer Solutions and its Biological Applications – Electroplating – Nickel and Chrome Plating – Types of Cells – Fuel Cells – Corrosion and its Prevention.

UNIT IV – KINETICS AND CATALYSIS (12 hrs)

Order and Molecularity. Integrated Rate Expression for I and II ($2A \rightarrow$ Products) Order Reactions. Pseudo First Order Reaction, Methods of Determining Order of a Reaction – Half-Life Period – Catalysis – Homogeneous and Heterogeneous, Catalyst used in Contact and Haber's Processes. Concept of Energy of Activation and Arrhenius equation.

UNIT V – PHOTOCHEMISTRY (12 hrs)

Grothus – Draper's Law and Stark-Einstein's Law of Photochemical Equivalence, Quantum Yield – Hydrogen Chloride reaction. Phosphorescence, Fluorescence, Chemiluminescence and Photosensitization and Photosynthesis (Definition with Examples).

TEXTBOOKS

1. Veeraiyan V. *Textbook of Ancillary Chemistry*. Chennai: High Mount Publishing House, 1st Edition, 2009.
2. Vaithiyanathan S. *Textbook of Ancillary Chemistry*. Karur: Priya Publications, 2006.

3. Bahl B. S. and ArulBhal. *Advanced Organic Chemistry*. New Delhi: S. Chand and company, 23rd Edition, 2012.
4. Soni P. L and Chawla H M. *Textbook of Organic Chemistry*, New Delhi: Sultan Chand & Sons, 29th Edition, 2007.

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1. Soni P. L and Mohan Katyal, Textbook of Inorganic *Chemistry.* Sultan Chand & amp; Sons, 20th Edition. 2007.
2. Puri B. R, Sharma L. R and Pathania M.S. *Textbook of Physical Chemistry.* New Delhi: Vishal Publishing Co., 44th Edition, 2018.
3. Sharma B. K. *Industrial Chemistry*. Meerut: Goel Publishing House, 16th Edition, 2014.

Web Sources

1. https://www.youtube.com/watch?v=m5cDbtdokqY
2. https://www.youtube.com/watch?v=j7PYqR1iGMg&list=PLF_7kfnwLFCF_VxKKAhHSLryCsJr3GW71
3. https://www.youtube.com/watch?v=zDok_HKM-aA&list=PLYXnZUqtB3K_uubnuRpEzgoLdZP3LhpY

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF CHEMISTRY

UG Programme –B.Sc Physics / B.Sc Botany

SEMESTER IV

ELECTIVE COURSE GENERIC / DISCIPLINE SPECIFIC – IV: PRACTICAL: CHEMISTRY PRACTICAL FOR PHYSICAL SCIENCES – II (23UPHA4P)

(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 2**	**INT. MARKS**	**: 25**
CREDITS	**: 2**	**EXT. MARKS**	**: 75**
DURATION	**: 30 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To know the safety in chemistry lab.
- To get an idea to handle the glassware.
- To gain knowledge in the identification of organic functional groups.
- To acquire knowledge for elemental determination.
- To understand and differentiate organic compounds with functional groups.

Course Outcomes (CO)

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

CO1[K1]: recognize the analytical procedure to identify the given organic compounds

CO2[K2]: determine the saturation/unsaturation nature of given organic compounds

CO3[K3]: inspect the aliphatic/aromatic and nature of given organic compounds

CO4[K4]: predict elements (other than C, H and O) present in the given compound

CO5[K6]: perform systematic analysis and report the functional groups present in the given organic compound.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	-	-	-	1
CO2 [K2]	3	2	1	1	-	1	1
CO3 [K3]	3	2	1	-	1	1	-
CO4 [K4]	3	2	2	1	-	1	1
CO5 [K6]	3	2	2	-	1	1	1
Weightage of the course	15	10	7	2	2	4	4
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**3.27**	**0.81**	**1.96**	**1.97**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

SYSTEMATIC ANALYSIS OF ORGANIC COMPOUNDS

i. The Analysis must be Carried out as Follows:
ii. Functional Group Tests [Phenol, Acids (Mono & Di) Aromatic Primary Amine, Amide (Mono & Di), Aldehyde and Glucose].
iii. Detection of Elements (N, S, Halogens).
iv. To Distinguish between Aliphatic and Aromatic Compounds.
v. To Distinguish – Saturated and Unsaturated Compounds

TEXTBOOK

1. Venkateswaran V, Veerasamy R and Kulandaivalu A. R. *Basic Principles of Practical Chemistry*. Sultan Chand & Sons, 2nd Edition, 1997.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme –B.Sc. Physics
SEMESTER - IV
SKILL ENHANCEMENT COURSE - VII: PHYSICS OF MEDICAL INSTRUMENTS
(23UPHS41)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 2**	**INT. MARKS**	**: 25**
CREDITS	**: 2**	**EXT. MARKS**	**: 75**
DURATION	**: 30 hrs**	**MAX. MARKS**	**: 100**

Course Objective

- To expose the medical instruments like ECG, EEG, EMG, medical imaging, diagnostic specialties, operation theater and its safety which will kindle interest to specialize in instrument servicing.

Course Outcomes (CO)

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

CO1[K1]: list out bio-medical instruments and its components, and medical imaging methods

CO2[K2]: explain the concepts of physics applied in bio medical instruments, x-ray diagnostics and laser surgery

CO3[K3]: present the basics of operation theatre, radiation safety measures, applications of X-rays and Laser in medicine

CO4[K4]: compare the different types of bio potential electrodes and biomedical recording setup

CO5[K5]: examine the functioning of bio-medical instruments, medical imaging systems, x-ray radiography and Laser endoscopes

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	1	-	1	-
CO2 [K2]	3	1	1	1	-	1	-
CO3 [K3]	3	2	1	1	-	1	2
CO4 [K4]	3	2	1	1	1	1	1
CO5 [K5]	3	2	2	1	1	1	1
Weightage of the course	14	8	5	5	2	5	4
Weighted percentage of Course contribution to POs	**2.46**	**2.04**	**2.34**	**2.02**	**1.96**	**2.46**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – BIO-POTENTIALS AND ELECTRODES (6 hrs)

Transport of Ions through Cell Membrane – Resting and Action Potential – Characteristics of Resting Potential – Bio-Electric Potential – Design of Medical Instruments – Components of Bio-Medical Instrumentation – Electrodes – Electrode Potential – Metal Microelectrode – Depth and Needle Electrodes – Types of Surface Electrode – The pH Electrode.

UNIT II – BIO-POTENTIAL BASED INSTRUMENTATION (6 hrs)

Electrocardiography (ECG) – Origin of Cardiac Action Potential – ECG Lead Configuration – Block Diagram of ECG Recording Setup (Qualitative) – Electroencephalography (EEG) – Origin of EEG – Action and Evoked Potentials – Brain Waves – Block Diagram of Modern EEG Setup – Electromyography (EMG) – Block Diagram of EMG Recording Setup.

UNIT III – OPERATION THEATRE AND SAFETY (6 hrs)

Diathermy – Block Diagram of the Electrosurgical Diathermy – Shortwave, Microwave, Ultrasonic Diathermy – Ventilators – Servo Controlled Systems – **Radiation Safety:** Units of Radiation – Pocket Dosimeter – Pocket Type Radiation Alarm – Thermo-Luminescence Dosimeter.

UNIT IV – MEDICAL IMAGING (6 hrs)

Nuclear Imaging Technique – Computer Tomography (CT) – Principle – Mathematical Basis of Image Construction – Block Diagram of CT Scanner – Ultrasonic Imaging Systems – Construction of Transducer – Display Modes – MRI Principle and Instrumentation.

UNIT V – DIAGNOSTICS AND SPECIALITIES (6 hrs)

X-Rays in Radiography – Fluoroscopy – Comparison – Image Intensifiers – Angiography – Applications of X-Ray Examination (Problems).

Laser in Medicine: Laser Interactions with Biomolecules – Advantages of Laser Surgery – Endoscopy – Types of Endoscopes with their Operation (Qualitative).

TEXTBOOKS

1. Leslie Cromwell. *Biomedical Instrumentation and measurement*. PHI, 2015.
2. Arumugam M. *Medical Instrumentation*. Anuradha agencies. 1992.
3. Kumar Doss M.J. *Medical Electronics*. Prathibha Publishers, 1987.
4. John R. Cameron and James G. Skofronick. *Medical Physics.* Atlanta: Thrift books, 1985.
5. Anand M.M.M. *Electronic Instruments and Instrumentation Technology,* PHI, 2015.

6. Arumugam M. *Biomedical Instrumentation*. Kumbakonam: Anuradha Publications, Second Edition, 2010.

REFERENCES

Books

1. Anandanatarajan R. *Biomedical Instrumentation and Measurements*. New Delhi: PHI Learning Pvt. Ltd., 2011.
2. Kandhpur R.S. *Handbook of Biomedical Instrumentation.* New Delhi: Tata McGraw Hill, Second Edition, Reprint 2008.
3. Arumugam N. and Kumaresan V. *Biophysics.* Nagercoil: Saras Publication, First Edition, 2016.

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1. https://www.sciencedirect.com/topics/engineering/biopotential-electrode
2. https://www.youtube.com/watch?v=UTudEz0U_fo
3. https://www.youtube.com/watch?v=0OdNI3lSgLc
4. https://www.fda.gov/radiation-emitting-products/medical-x-ray-imaging/radiography
5. https://www.slideshare.net/ankitmadharia/operating-room-safety

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme –B.Sc. Physics
SEMESTER - IV
SKILL ENHANCEMENT COURSE - VIII: PRACTICAL: BASICS OF OPTICAL AND ELECTRONIC DEVICES (23UPHS4P)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 2**	**INT. MARKS**	**: 25**
CREDITS	**: 2**	**EXT. MARKS**	**: 75**
DURATION	**: 30 hrs**	**MAX. MARKS**	**: 100**

Course Objective

- To gain practical skill on operating and measuring various basic physical parameters optical and electronic devices and, instruments used.

Course Outcomes (CO)

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

CO1[K1]: list the various optical and electronic devices, and instruments
CO2[K2]: classify the various optical and electronic devices, and instruments
CO3[K3]: operate the various optical and electronic devices, and instruments
CO4[K4]: measure various basic physical parameters of optical and electronic devices
CO5[K5]: analyze the various physical parameters of optical and electronic devices

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	-	1	1	-	-	-
CO2 [K2]	3	2	1	1	-	1	-
CO3 [K3]	3	2	2	-	1	2	2
CO4 [K4]	3	3	2	-	1	2	1
CO5 [K5]	3	3	2	1	1	1	1
Weightage of the course	15	10	8	3	3	6	4
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**3.74**	**1.21**	**2.94**	**2.96**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

LIST OF EXPERIMENTS (Minimum 10**):**

1. Reading Color Codes and Symbols to Determine the Resistance and Capacitance and verifying it with multimeter
2. Determination of Focal Length of a Convex Lens by UV and Displacement Methods
3. Determination of Focal Length of a Concave Lens by Convex Lens in Contact and Auxiliary Convex Lens Methods
4. Determination of Focal Length of a Combination of Two Lenses/Thick Lens by u-v and Displacement Methods
5. Identification of Aberration in Lens
6. Determination of Radius of Curvature of a Surface using Spherometer
7. Constructing Simple Digital Circuits using Bread Boards
8. Constructing Simple Electronic Circuits by Soldering
9. DC and AC Forward Resistance of Diodes
10. Current Gain of a NPN and PNP Transistors
11. CRO as a Versatile Measuring Device - Measurement of Voltage, Time Period, Frequency of AC & DC Voltage
12. Forming Lissajous Patterns in CRO
13. Weighing Samples using Physical Balance and Electronic Balances, and Its Calibration.
14. Estimation of Errors in Measurements

TEXTBOOKS

1. Srinivasan M.N, Balasubramanian S and Ranganathan R. *A Textbook of Practical Physics.* New Delhi: Sultan Chand & Sons, First Edition, Reprint 2011.
2. Ouseph C.C, Rao U.J and Vijayendran V. *Practical Physics and Electronics*. Chennai: Ananda Book Depot, First Edition, Reprint 2019.
3. Ouseph C.C, Srinivasan V and Balakrishnan R. *A Textbook of Practical Physics - Part I.* Chennai: S.Viswanathan (Printers & Publishers) Pvt., Ltd., Revised Edition, Reprint 2000.

REFERENCES

Books

1. Arora C.L. *B Sc Practical Physics.* New Delhi: S.Chand & Sons Co. Ltd., Reprint 2018.
2. Kakani S.L and Shubhra K. *Applied Physics: Theory and Practical*. New Delhi: Viva Books Pvt. Ltd., First Edition, 2015.
3. Tayal D.C. *University Practical Physics*. Mumbai: Himalaya Publishing House, First Millennium Edition, 2000.

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1. https://electronicsclub.info/cro.htm
2. https://byjus.com/physics/aberration-of-lens/#:~:text=In%20an%20ideal%20lens%2C%20light,an%20aberration%20of%20the%20lens.
3. https://www.youtube.com/watch?v=hag5ss1ZxH0
4. https://www.youtube.com/watch?v=EMFjY1cQGxY
5. https://www.youtube.com/watch?v=t6nGiBzGLD8
6. https://www.youtube.com/watch?v=WEY9XA9mnxI

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG PROGRAMME
SEMESTER- III & IV
ENVIRONMENTAL STUDIES (23UESR41)
(From 2023 - 2024 Batch onwards)

HOURS/WEEK	**: 2(III SEM-1, IV SEM-1)**	**INT. MARKS**	**: 25**
CREDITS	**: 2**	**EXT. MARKS**	**: 75**
DURATION	**: 30 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To provide a comprehensive understanding of various environmental issues, including pollution, deforestation, climate change, loss of biodiversity, water scarcity, and resource depletion.
- To encourage sustainable practices in various sectors, such as energy, transportation, agriculture, and waste management.
- To promote the conservation and preservation of natural resources, habitats, and ecosystems.
- To foster a sense of environmental ethics and values.
- To encourage individuals to, participate in community initiatives, and contribute to sustainable development at local, national, and global levels.

Course Outcomes (CO)

On successful completion of the course, the learners should be able to

CO1[K1]: recognize the importance of environment and role of individuals in its protection.

CO2[K2]: explain the key concepts of ecosystem, biodiversity and climatic change

CO3[K3]: apply the right measures for the sustainable use of natural resources

CO4[K4]: analyse the ethical, cross-cultural, and historical context of environmental issues and the links between Human and Natural Systems

CO5[K5]: evaluate the impact of human action on the biological environment

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	2	2	1	1
CO2 [K2]	2	1	-	2	1	1	1
CO3 [K3]	2	1	-	1	1	1	1
CO4 [K4]	1	1	1	1	2	1	1
CO5 [K5]	1	1	-	1	2	1	1
Weightage of the course	8	5	1	7	8	5	5
Weighted percentage of Course contribution to POs	**1.41**	**1.28**	**0.47**	**2.82**	**7.84**	**2.46**	**2.81**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I – NATURAL RESOURCES (6 hrs)

Natural resources: Definition of resource; Classification of natural resources – biotic and abiotic, renewable and non-renewable. **Biotic resources:** Major type of biotic resources- forests, grasslands, wetlands, wildlife and aquatic (fresh water and marine); Microbes as a resource; Status and challenges. **Water resources:** Types of water resources – fresh water and marine resources; Availability and use of water resources; Environmental impact of over-exploitation, issues and challenges; Water scarcity and stress; Conflicts over water.

UNIT II – SUSTAINABLE DEVELOPMENT (6 hrs)

Soil as a resource and its degradation. **Energy resources:** Sources of energy and their classification, renewable and non-renewable sources of energy; Conventional energy sources- coal, oil, natural gas, nuclear energy; Non-conventional energy sources- solar, wind, tidal, hydro, wave, ocean thermal, geothermal, biomass, hydrogen and fuel cells; Implications of energy use on the environment. **Introduction to sustainable development:** Sustainable Development Goals (SDGs) – targets and indicators, challenges and strategies for SDGs.

UNIT III – ENVIRONMENTAL ISSUES LOCAL, REGIONAL AND GLOBAL (6 hrs)

Industrial revolution and its impact on the environment; Population growth and natural resource exploitation; Global environmental change. **Pollution:** Impact of sectoral processes on Environment, Types of Pollution- air, noise, water, soil, municipal solid waste, hazardous waste; Trans boundary air pollution; Acid rain; Smog. Land use and Land cover change: land degradation, deforestation, desertification, urbanization. **Biodiversity loss:** past and current trends, impact. Global change: Ozone layer depletion; Climate change.

UNIT IV – CONSERVATION OF BIODIVERSITY AND ECOSYSTEM (6 hrs)

Biodiversity and its distribution: Biodiversity as a natural resource; Levels and types of biodiversity; Biodiversity in India and the world; Biodiversity hotspots; Species and ecosystem threat categories. **Ecosystems and ecosystem services:** Major ecosystem types in India and their basic characteristics- forests, wetlands, grasslands, agriculture, coastal and marine; Threats to biodiversity and ecosystems. Major conservation policies: in-situ and ex-situ conservation approaches; Major protected areas.

UNIT V – CLIMATE CHANGE: IMPACTS, ADAPTATION AND MITIGATION (6 hrs)

Climate change: Natural variations in climate; Structure of atmosphere; Anthropogenic climate change from greenhouse gas emissions – past, present and future; Projections of global climate change with special reference to temperature, rainfall, climate variability and extreme events; Importance of 1.5 °C and 2.0 °C limits to global warming; Impacts of climate change on ocean and land systems; Sea level rise, changes in marine and coastal ecosystems; Impacts on forests and natural ecosystems; **Mitigation of climate change -** Renewable energy sources; Carbon capture and storage, National climate action plan and Intended Nationally Determined Contributions (INDCs)

TEXTBOOKS

1. Chiras D. D and Reganold J. P. *Natural Resource Conservation: Management for a Sustainable Future.* 10th Edition, Pearson, 2010
2. Harris and Frances, *Global Environmental Issues.* 2nd Edition, Wiley-Blackwell.

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1. Krishnamurthy K. V, *Textbook of Biodiversity,* Science Publishers, Plymouth, UK.
2. Pittock, Barrie, *Climate Change: The Science, Impacts and Solutions,* 2nd Edition, Routledge.

Web Sources

1. https://www.youtube.com/watch?v=QewEi2U1jLs
2. https://www.unep.org/news-and-stories/story/marine-biodiversity-gets-lifeline-high-seas-treaty

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme –B.Sc. Physics
SEMESTER - V
CORE COURSE - IX: MECHANICS (23UPHC51)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 5**	**INT. MARKS**	**: 25**
CREDITS	**: 4**	**EXT. MARKS**	**: 75**
DURATION	**: 75 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To provide the basic understanding of the laws and principles of mechanics.
- To apply the concepts of forces existing in the system.
- To understand the forces of physics in everyday life.
- To visualize conservation laws.
- To apply Lagrangian equation to solve complex problems.

Course Outcomes (CO)

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

CO1[K1]: state laws of motion, gravitation, conservation of linear momentum, angular momentum and energy

CO2[K2]: explain the conservation laws, classical and Einstein's theory of gravitation, concepts of translational motion, rotational motion and Lagrangian mechanics

CO3[K3]: apply concepts of mechanics to simple problems and drive equations/find solution

CO4[K4]: distinguish conservative and non-conservative forces

CO5[K5]: examine the satellite kinetic energy, body rolling down an inclined plane, gyroscopic precision, simple pendulum, atwood's machine on the basis of concepts of mechanics

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	-	-	1	-	1	-
CO2 [K2]	3	1	-	1	-	1	-
CO3 [K3]	3	3	2	1	-	1	1
CO4 [K4]	3	3	2	1	1	1	1
CO5 [K5]	3	3	1	1	1	1	2
Weightage of the course	15	10	5	5	2	5	4
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**2.34**	**2.02**	**1.96**	**2.46**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low,'-' No Correlation)

UNIT I – LAWS OF MOTION AND GRAVITATION (15 hrs)

Newton's Laws – Forces – Equations of Motion – Frictional Force – Motion of a particle in a Uniform Gravitational Field – Types of Everyday Forces in Physics.

Classical Theory of Gravitation – Kepler's Laws, Newton's Law of Gravitation – Determination of G by Boy's Method – Earth-Moon System – Weightlessness – Earth Satellites – Parking Orbit – Earth Density – Mass of The Sun – Gravitational Potential – Velocity of Escape – Satellite Potential and Kinetic Energy – Einstein's Theory of Gravitation – Introduction – Principle of Equivalence – Experimental Tests of General Theory of Relativity – Gravitational Red Shift – Bending of Light – Perihelion of Mercury.

UNIT II – CONSERVATION LAWS OF LINEAR AND ANGULAR MOMENTUM (15 hrs)

Conservation of Linear and Angular Momentum – Internal Forces and Momentum Conservation – Center of Mass – Examples – General Elastic Collision of Particles of Different Masses – System with Variable Mass – Examples – Conservation of Angular Momentum – Torque Due to Internal Forces – Torque Due to Gravity – Angular Momentum about Center of Mass – Proton Scattering by Heavy Nucleus.

UNIT III – CONSERVATION LAWS OF ENERGY (15 hrs)

Introduction – Significance of Conservation Laws – Law of Conservation of Energy – Concepts of Work - Power – Energy – Conservative Forces – Potential Energy and Conservation of Energy in Gravitational and Electric Field – Examples – Non-Conservative Forces – General Law of Conservation of Energy.

UNIT IV – RIGID BODY DYNAMICS (15 hrs)

Translational and Rotational Motion – Angular Momentum – Moment of Inertia – General Theorems of Moment of Inertia – Examples – Rotation about Fixed Axis – Kinetic Energy of Rotation – Examples – Body Rolling along a Plane Surface – Body Rolling Down an Inclined Plane – Gyroscopic Precision – Gyrostatic Applications.

UNIT V – LAGRANGIAN MECHANICS (15 hrs)

Generalized Coordinates – Degrees of Freedom – Constraints – Principle of Virtual Work and D' Alembert's Principle – Lagrange's Equation From D' Alembert's Principle – Application – Simple Pendulum – Atwood's Machine.

UNIT VI – PROFESSIONAL COMPONENTS (NOT FOR EXAMINATION)

Expert Lectures – Seminars – Webinars – Industry Inputs – Social Accountability – Patriotism.

TEXTBOOKS

1. Upadhyaya J.C. *Classical Mechanics*. Mumbai: Himalya Publishing House, Third Revised Edition, 2019.
2. Durai Pandian.P, Laxmi Durai Pandian and Muthamizh Jayapragasam. *Mechanics*. S. Chand & Co, Sixth Revised Edition, 2005.
3. Mathur D.S. and Hemne P.S. *Mechanics.* S.Chand & Co., Revised Edition, 2000.
4. Narayanamurthi M and Nagarathnam N. *Dynamics*. Chennai: The National Publishing, 1998.
5. Narayanamurthi M. and Nagarathnam N. *Statics, Hydrostatics and Hydrodynamics*. Chennai: The National Publishers, 1982.

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1. Goldstein Herbert. *Classical Mechanics*. U.S.A: Addison and Wesely, 1980.
2. Halliday, David and Robert Resnick. *Physics Volume I*. Chennai: New Age International, 1995.
3. Halliday, David, Robert Resnick and Walker Jearl. *Fundamentals of Physics.* New Delhi: John Wiley, 2001.

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1. https://youtu.be/X4_K-XLUIB4
2. https://nptel.ac.in/courses/115103115
3. https://www.youtube.com/watch?v=p075LPq3Eas
4. https://www.youtube.com/watch?v=mH_pS6fruyg
5. https://onlinecourses.nptel.ac.in/noc22_me96/preview
6. https://www.youtube.com/watch?v=tdkFc88Fw-M
7. https://onlinecourses.nptel.ac.in/noc21_me70/preview

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF PHYSICS

UG Programme –B.Sc. Physics

SEMESTER - V

CORE COURSE – X: ATOMIC AND NUCLEAR PHYSICS (23UPHC52)

(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 5**	**INT. MARKS**	**: 25**
CREDITS	**: 4**	**EXT. MARKS**	**: 75**
DURATION	**: 75 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To make students to understand the development of atom models, quantum numbers, coupling schemes and analysis of magnetic moments of an electrons.
- To gain knowledge on excitation and ionization potentials, splitting of spectral lines in magnetic and electric fields.
- To get knowledge on radioactive decay.
- To know the concepts used in nuclear reactions.
- To understand the quark model of classification of elementary particles.

Course Outcomes (CO)

On successful completion of the course, the learners will able to

CO1[K1]: reproduce the concepts of various atom models, atomic spectra, radioactivity, nuclear reactions, nuclear structure models and elementary particles

CO2[K2]: describe the important phenomena in atomic and nuclear physics

CO3[K3]: apply the concepts of atomic and nuclear physics to solve problems and to derive expressions

CO4[K4]: analyze the various atom models, atomic of spectral lines, radioactive decays and nuclear structure models

CO5[K5]: examine the experimental methods to understand the concepts of atomic and nuclear physics

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	-	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	1	-
CO3 [K3]	3	3	2	1	-	1	2
CO4 [K4]	3	3	2	1	1	1	1
CO5 [K5]	3	2	1	1	1	1	1
Weightage of the course	15	10	5	5	2	5	4
Weightedpercentage of Course contributionto POs	**2.64**	**2.55**	**2.34**	**2.02**	**1.96**	**2.46**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – VECTOR ATOM MODEL (15 hrs)

Introduction to Atom Model – Vector Atom Model – Electron Spin – Spatial Quantization – Quantum Numbers Associated with Vector Atom Model – L-S and J-J Coupling – Pauli's Exclusion Principle – Magnetic Dipole Moment Due to Orbital Motion and Spin Motion of the Electron – Bohr Magnetron – Stern-Gerlach Experiment – Selection Rules – Intensity Rule.

UNIT II – ATOMIC SPECTRA (15 hrs)

Origin of Atomic Spectra – Excitation and Ionization Potentials – Davis and Goucher's Method – Spectral Terms and Notations – Fine Structure of Sodium D-lines – Zeeman Effect –Larmor's Theorem – Quantum Mechanical Explanation of Normal Zeeman Effect – Anomalous Zeeman Effect (Qualitative Explanation) – Paschen-Back Effect – Stark Effect.

UNIT III – RADIOACTIVITY (15 hrs)

Discovery of Radioactivity – Natural Radio Activity – Properties of Alpha Rays, Beta Rays and Gamma Rays – Geiger-Nuttal Law – Alpha Particle Spectra – Gammow's Theory of Alpha Decay (Qualitative Study) – Beta Ray Spectra – Neutrino Theory of Beta Decay – Nuclear Isomerism – Internal Conversion – Non-Conservation of Parity in Weak Interactions.

UNIT IV – NUCLEAR REACTIONS (15 hrs)

Conservation Laws of Nuclear Reaction – Q-Value Equation for a Nuclear Reaction – Threshold Energy – Scattering Cross Section – Artificial Radio Activity – Application of Radio Isotopes – Classification of Neutrons – Models of Nuclear Structure – Liquid Drop Model – Shell Model.

UNIT V – ELEMENTARY PARTICLES (15 hrs)

Classification of Elementary Particles – Fundamental Interactions – Elementary Particle Quantum Numbers – Isospin and Strangeness Quantum Number – Conservation Laws and Symmetry – Quarks – Quark Model (Elementary Ideas Only) – Discovery of Cosmic Rays – Primary and Secondary Cosmic Rays – Latitude Effect – Altitude Effect.

UNIT VI – PROFESSIONAL COMPONENTS (NOT FOR EXAMINATION)

Expert Lectures – Seminars – Webinars – Industry Inputs – Social Accountability – Patriotism.

TEXTBOOKS

1. Murugeshan R and Kiruthiga Sivaprasath. *Modern Physics.* New Delhi: S.Chand & Company Ltd., Eighteenth Edition, Reprint 2019. **(UNITS I, II, III, IV & V) (Units I & II - Problems)**
2. Brijlal and Subrahmanyam N. *Atomic and Nuclear Physics.* New Delhi: S. Chand and Co., Revised Edition, 2013. **(UNITS I, II, III, IV & V)**
3. Rajam J.B. *Modern Physics.* S. Chand & Co., 1957.
4. Sehgal and Chopra. *Modern Physics*. New Delhi: Sultan Chand, Seventh Edition, 1997.
5. Arthur Beiser. *Concepts of Modern Physics.* New Delhi: Tata McGraw-Hill Publication, Sixth Edition, Reprint 2006.

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1. Arthur Beiser. *Perspective of Modern Physics*. McGraw Hill, 1969.
2. Ramamoorthy.S. *Modern Physics*. National Publishing & Co., 1962.
3. Laud B.B. *Laser and Non-Linear Optics.* New York: Wiley Easter Ltd., 1985.
4. Tayal D.C. *Nuclear Physics*. Mumbai: Himalaya Publishing House, 2000.
5. Irving Kaplan. *Nuclear Physics*. New Delhi: Oxford and IBH Publish and Co, Second Edition, 1962.
6. Rajam J.B. *Atomic Physics*. S. Chand Publication, Seventh Edition, 1966.
7. Roy and Nigam. *Nuclear Physics*. New Delhi: Wiley Eastern Limited, First edition, 1967.

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1. http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html
2. https://makingphysicsfun.files.wordpress.com/2015/01/photoelectric-effect.pptx
3. https://www.khanacademy.org/science/physics/quantum-physics/in-in-nuclei/v/types-of-decay

4. https://www.khanacademy.org/science/in-in-class-12th-physics-india/nuclei
5. https://gdcplnr.edu.in/admin/uploads/2175iv%20SEM%20NOTES%20E.M%20paper%20v.pdf
6. https://pediaa.com/difference-between-zeeman-effect-and-stark-effect/
7. https://courses.lumenlearning.com/suny-physics/chapter/31-1-nuclear-radioactivity/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme –B.Sc. Physics
SEMESTER - V
CORE COURSE – XI: ANALOG AND COMMUNICATION ELECTRONICS
(23UPHC53)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 5**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 75 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To study the design, working and applications of semiconducting devices.
- To construct various electronic circuits such as DC power supply, transistor amplifiers, oscillators, operational amplifiers and to study them in details.
- To apply the concepts of modulation and demodulation in communication systems.

Course Outcomes (CO)

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

CO1[K1]: identify the basic principles behind electronic devices and circuits
CO2[K2]: describe the functioning of diode rectifiers, transistor amplifiers and oscillators, electronic circuits based on op-amplifiers
CO3[K3]: apply basic principles to solve numerical problems pertaining to electronics circuits
CO4[K4]: analyze the theory of different types of modulation, electronic circuits of demodulation and its applications
CO5[K5]: evaluate the output of the electronic circuits

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	-	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	1	-
CO3 [K3]	3	3	2	1	-	1	1
CO4 [K4]	3	2	1	1	1	1	1
CO5 [K5]	3	3	2	1	1	1	2
Weightage of the course	15	10	5	5	2	5	4
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**2.34**	**2.02**	**1.96**	**2.46**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – DIODES **(15 hrs)**

Diode Characteristics – Rectifiers – Clipper Circuits, Clamping Circuits v Half Wave Rectifier – Center Tapped and Bridge Full Wave Rectifiers – Calculation of Efficiency and Ripple Factor. DC Power Supply: Block Diagram of a Power Supply, Qualitative Description of Shunt Capacitor Filter, Zener Diode as Voltage Regulator, Temperature Coefficient of Zener Diode – Energy Relation.

UNIT II – TRANSISTOR AMPLIFIERS **(15 hrs)**

Transistor Configurations: CB, CE CC Modes – I-V Characteristics and Hybrid Parameters – DC Load Line – Q Point Self-Bias – RC Coupled CE Amplifier – Power Amplifiers – Classification of Power Amplifiers: A, B, C – Push Pull Amplifiers – Tuned Amplifiers.

UNIT III – TRANSISTOR OSCILLATORS **(15 hrs)**

Feedback Amplifier – Principle of Feedback, Positive and Negative Feedback of Voltage and Current Gain – Advantages of Negative Feedback – Barkhausen's Criterion – Transistor Oscillators – Hartely – Colpitt – Phase Shift Oscillators with Mathematical Analysis.

UNIT IV – OPERATIONAL AMPLIFIERS **(15 hrs)**

Differential Amplifiers – OP-AMP Characteristics – IC 741 Pin Configuration – Inverting and Non-Inverting Amplifiers – Unity Follower – Summing and Difference Amplifiers – Differentiator and Integrator – Astable Multivibrator (Square Wave Generator) – Monostable Vibrator.

UNIT V – MODULATION AND DEMODULATION **(15 hrs)**

Theory of Amplitude Modulation – Frequency Modulation – Comparison of AM and FM – Phase Modulation – Sampling Theorem – Pulse Width Modulation – Pulse Modulation Systems: PAM, PPM, and PCM – Demodulation: AM and FM Detection – Duper Heterodyne Receiver (Block Diagram).

UNIT VI – PROFESSIONAL COMPONENTS (NOT FOR EXAMINATION)

Expert Lectures – Seminars – Webinars – Industry Inputs – Social Accountability – Patriotism.

TEXTBOOKS

1. Mehta V.K. and Rohit Mehta. *Principles of Electronics.* New Delhi: S.Chand & Company Ltd., Revised Eleventh Edition, Reprint 2013.
2. Vijayendran V. *Integrated Electronics*. Chennai: S.Vishwanathan Publishers, 2009.
3. Theraja B.L. *Basic Electronics*. New Delhi: S.Chand & Company Ltd., Reprint 2003.

4. John D. Ryder. *Electronic fundamentals and Applications.* Fifth Edition. 2002.
5. Albert Malvino and David J.Bates. *Electronic Principles*. Chennai: McGraw Hill Education (India) Pvt. Ltd., Seventh Edition, Reprint 2018.

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1. Grob B. *Basic Electronics.* NY: McGraw Hill, Sixth edition, 1989.
2. Herbert Taub and Donald schilling. *Digital Integrated Electronics.* NY: McGraw Hill, 2017.
3. Ramakant A. *Op amp Principles and Linear Integrated Circuits*. Gaykward, Third Edition, 2000.
4. Bagde and Singh S. P. *Elements of Electronics.* New Delhi: S.Chand and Company Ltd., Reprint 2002.
5. Jacob Millman and Christer C.Halkias. *Integrated Electronics*. Tata McGraw Hill, 2002.

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1. www.ocw.mit.edu>...> Circuits and Electronics
2. www.ocw.mit.edu>...> Introductory Analog Electronics Laboratory
3. https:// www.elprocus.com> semiconductor devices
4. https://nptel.ac.in/courses/117/107/117107094/
5. https://www.youtube.com/watch?v=mHvV_Tv8HDQ
6. https://www.youtube.com/watch?v=kiiA6WTCQn0

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - V
CORE COURSE – XII: PRACTICAL: GENERAL PHYSICS (23UPHC5P)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 3**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 45 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To set up experiments to understand the concepts of optics, electricity, electromagnetism and modern physics.
- To set up experiments to evaluate optical/physical parameters of materials and verify theories.
- To quantify and analyze experimental results.
- To do error analysis and correlate results.

Course Outcomes (CO)

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

CO1[K1]: identify the basic concepts of optics, electricity and electromagnetism and modern physics underlying in the experiments

CO2[K2]: setup the experiment and collect data to determine the physical parameters involved in the experiments

CO3[K3]: calculate the basic parameters involved in the experiments from the experimental data

CO4[K4]: analyze / interpret / plot graph / verify the theorem from the experimental data

CO5[K5]: evaluate the physical parameters using appropriate formula/make conclusions from the experimental data

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	1	1	-	1	-
CO2 [K2]	3	1	1	1	1	2	1
CO3 [K3]	3	2	2	1	-	1	1
CO4 [K4]	3	3	2	1	1	1	1
CO5 [K5]	3	3	2	1	1	1	1
Weightage of the course	15	10	8	5	3	6	4
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**3.74**	**2.02**	**2.94**	**2.96**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

LIST OF EXPERIMENTS (Minimum 8**):**

1. Diffraction grating Normal incidence.
2. Diffraction grating minimum deviation.
3. Diffraction at a wire.
4. Specific rotation of sugar solution.
5. Bi-prism – Determination of μ.
6. Thickness of a thin film of Bi-prism
7. Brewster's law – polarization
8. Double refraction (μe and μo)
9. Y – by Corlus method.
10. Dispersive power of plane diffraction grating.
11. Diffraction a straight edge.
12. Kundt's tube – Velocity of sound, Adiabatic Young's modulus of the material of the rod.
13. Forbe's method – Thermal conductivity of a metal rod.
14. Spectrometer – Grating – Normal incidence – Wave length of Mercury spectral lines.
15. Spectrometer – Grating – Minimum deviation – Wave length of Mercury spectral lines.
16. Spectrometer – (i-d) curve.
17. Spectrometer – (i-i′) curve.
18. Spectrometer – Narrow angled prism.
19. Rydberg's constant
20. e/m Thomson method
21. h by photocell
22. Spectral response of photo conductor (LDR).
23. Potentiometer –Resistance and Specific resistance of the coil.
24. Potentiometer – E.M.F of a thermocouple.
25. Carey Foster's bridge – Temperature coefficient of resistance of the coil.
26. Deflection Magnetometer – Determination of Magnetic moment of a bar magnet and $B_H$using circular coil carrying current.
27. Vibration magnetometer – Determination of B_H using circular coil carrying current – Tan B position.
28. B.G – Figure of Merit – Charge Sensitivity.

TEXTBOOKS

1. Srinivasan M.N, Balasubramanian S. and Ranganathan R. *A Textbook of Practical Physics.* New Delhi: Sultan Chand & Sons, First Edition, Reprint 2011.
2. Ouseph C.C, Rao U.J. and Vijayendran V. *Practical Physics and Electronics*. Chennai: Ananda Book Depot, First Edition, Reprint 2019.

3. Ouseph C.C, Srinivasan V. and Balakrishnan R. *A Textbook of Practical Physics - Part I.* Chennai: S.Viswanathan (Printers & Publishers) Pvt., Ltd., Revised Edition, Reprint 2000.

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1. Arora C.L. *B Sc Practical Physics.* New Delhi: S.Chand& Sons Co. Ltd., Reprint 2018.
2. Kakani S.L. and Shubhra K. *Applied Physics: Theory and Practical*. New Delhi: Viva Books Pvt. Ltd., First Edition, 2015.
3. Manjeet S. and Anita D. *Applied Physics: Theory and Experiment*. New Delhi: Vayu Education of India, First Edition, 2011.
4. Tayal D.C. *University Practical Physics*. Mumbai: Himalaya Publishing House, First Millennium Edition, 2000.

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1. https://www.youtube.com/watch?v=bC0ma0HtznA
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3. https://www.youtube.com/watch?v=XK7cHkoo7_I
4. https://www.youtube.com/watch?v=Z_3LFQNOkG8
5. https://www.niser.ac.in/sps/sites/default/files/basic_page/emission%20spectra%20of%20hydrogen.pdf

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - V
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC- V: LASERS AND FIBER OPTICS (23UPHO51)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 5**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 75hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To introduce the fundamental principle and properties of Laser.
- To know the types of lasers, laser instrumentation and their applications.
- To introduce the fundamentals of fiber optics, characteristics and fabrication of optical fibers.
- To interconnect the optics with Laser.

Course Outcomes (CO)

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

CO1[K1]: list the types, characteristics and applications of Laser and optical fibers

CO2[K2]: explain principle and mechanism of working of Lasers and optical fibers and its fabrication techniques

CO3[K3]: present the fundamentals of Lasers and fiber optics for different applications

CO4[K4]: summarize the characteristics and applications of different types of Laser and optical fibers

CO5[K5]: inspect the characteristics, construction, fabrication and applications of Lasers and optical fibers

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	1	-
CO3 [K3]	3	2	1	2	1	1	1
CO4 [K4]	3	2	2	1	1	1	1
CO5 [K5]	3	2	2	1	1	1	2
Weightage of the course	15	9	5	6	3	5	4
Weighted percentage of Course contribution to POs	**2.64**	**2.3**	**2.34**	**2.42**	**2.94**	**2.46**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – FUNDAMENTALS OF LASER (15 hrs)

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.

UNIT II – TYPES OF LASER (15 hrs)

Solid State Laser: Ruby Laser, Nd:YAG Laser, Nd:Glass Laser – Semiconductor Laser: Intrinsic Semiconductor Laser, Doped Semiconductor Laser, Injection Laser – Dye Laser – Chemical Laser: HCL Laser, DF- CO_2, CO Chemical Laser. Gas Laser: Neutral Atom Gas Laser (He-Ne Laser), CO_2 Laser, Copper Vapour Laser.

UNIT III – APPLICATIONS OF LASER (15 hrs)

Application of Laser in Metrology – Optical Communication – Material Processing: Laser Instrumentation of Material Processing, Powder Feeder, Laser Heating, Laser Welding, Laser Melting – Medical Application – Laser Instrumentation for Surgeries – Laser in Astronomy.

UNIT IV – FIBER OPTICS (15 hrs)

Basic Components of Optical Fiber Communication – Principles of Light Propagation through Fiber – Total Internal Reflection – Optical Fiber – Coherent Bundle – Numerical Aperture and Skew Mode – Phase Shift and Attenuation during Total Internal Reflection – Types of Fiber: Single Mode and Multi-Mode Fiber – Step Index and Graded Index Fiber – Fiber Optic Sensors – Application of Fiber Optics.

UNIT V – CHARACTERISTICS AND FABRICATION OF OPTICAL FIBER (15 hrs)

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.

TEXTBOOKS

1. Laud B.B. *Laser and Non-linear Optics.* NewDelhi: New Age International Publications, Third Edition, 2011.
2. Avadhunulu M.N. *An Introduction to laser, theory and applications.* NewDelhi: S. Chand & Co., Second Revised Edition, 2012.
3. Wilson J. and Hawkes J.F.B. *Introduction to Optoelectronics*. Pearson Education, 2018.

4. Richa Sharma and Vibhu Sharma. *Laser Systems and Applications*. India: ALTBS Publishers, First Edition, 2010.

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1. Sennaroglu A. *Photonics and Laser Engineering: Principles, Devices and Applications*. McGraw-Hill Education, 2010.
2. Nambiar K.R. *Lasers: Principles, Types and Applications*. New Age International, 2004.
3. Optics, Ajoy Ghatak. McGraw-Hill Education (India) Pvt, Ltd., Sixth Edition, 2017.

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1. https://archive.nptel.ac.in/courses/104/104/104104085/
2. https://www.physics-and-radio-electronics.com/physics/laser/rubylaserdefinitionconstructionworking.html
3. https://www.rp-photonics.com/laser_applications.html
4. https://www.tutorialspoint.com/principles_of_communication/principles_of_optical_fiber_communications.htm
5. https://circuitglobe.com/optical-time-domain-reflectometer.html
6. https://nptel.ac.in/courses/115107095
7. https://technobyte.org/ray-theory-light

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - V
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC- V: DIGITAL PHOTOGRAPHY (23UPHO52)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 5**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 75hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To understand the principles of photography and image formation.
- To know the science and arts behind photography.
- To understand the essential components of conventional and digital cameras.
- To use the different image processing techniques.

Course Outcomes (CO)

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

CO1[K1]: list out the types of camera and its components
CO2[K2]: explain the basic principles of formation and controlling of images in film and digital camera
CO3[K3]: present the concepts of photography
CO4[K4]: summarize the image formation, components and post production process in cameras
CO5[K5]: discuss the image formation, controlling of images, post production process in cameras

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	1	-
CO3 [K3]	3	2	1	2	1	1	1
CO4 [K4]	3	2	2	1	1	1	1
CO5 [K5]	3	2	2	1	1	1	2
Weightage of the course	15	9	5	6	3	5	4
Weighted percentage of Course contribution to POs	**2.64**	**2.3**	**2.34**	**2.42**	**2.94**	**2.46**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low ,'-' No Correlation)

UNIT I – PHOTOGRAPHY AND BASIC PRINCIPLE OF IMAGE FORMATION (15 hrs)

Principle – Chemical Route and Digital Route – Light, Wavelengths, Colours – Shadows – Light Intensity and Distance – Making Light Form Images – Pin-Hole Images – Practical Limitations to Pin-Hole Images – Lens Instead of Pin-Hole – Focal Length and Image Size – Imaging of Closer Subjects.

UNIT II – LENSES – CONTROLLING THE IMAGES (15 hrs)

Photographic Lens – Focal Length and Angle of View (Problems) – Focusing Movement – Aperture and F-numbers (Problems) – Depth of Field– Depth of Focus – Image Stabilization – Lenses for Digital Cameras – Lens and Camera Care.

UNIT III – CAMERA USING FILMS AND ITS TYPES (15 hrs)

Camera and Its Essential Components – Shutter – Aperture – Light Measurement – Film Housing – Camera Types: View Camera – View Finder Camera – Reflex Camera – Single Lens Reflex (SLR) Camera.

UNIT IV – DIGITAL CAMERAS PRINCIPLE AND TYPES (15 hrs)

Principle of Digital Image Capturing – Comparison of Digital and Analog Picture Information – Megapixel – Grain, Noise and Pixel Density – Optical and Digital Zooming – Image Stabilizer – Bit Depth – White Balance – Colour Modes – File Formats (TIFF, RAW & JPEG) – Storage Cards and Types – Digital Cameras: camera Phones – Compact Camera – Hybrid Camera – Digital SLR.

UNIT V –THE DIGITAL IMAGE – POST PRODUCTION (15 hrs)

Hardware: Computer and Its Peripherals – Software: Saving Digital File – Basic Editing: Navigating the Image – Undo/Redo/History – Crop – Rotate – Brightness & Contrast – Colour Balance – Hue/Saturation – Dodge/Burn – Cloning & Retouching – Removing an Element in An Image – Advanced Editing: Histogram/ Levels – Curves – Selection Tools: Magic Wand – Printing Digital Images: Inkjet Printer – Laser Printer – Dye Sub Printer – Lambda/Light Jet Printers.

TEXTBOOKS

1. Michel J. Langford. *Basic photography.* London: Anna Fox & Richard Sawdon Smith, NL, Focal press, Nineth Edition, 2010.
2. Henry Carroll. *Read this if you want to take great photographs of people*, Laurence King Publishing, 2014.

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1. Mark Galer. *Digital Photography in Available Light essential skills.* London: Focal press, 2006.
2. Paul Harcourt Davies. *The Photographer's practical handbook.* UK Press, 2005.

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1. https://www.masterclass.com/articles/basic-photography-101-understanding-camera-lenses
2. https://www.photographyaxis.com/photography-articles/parts-of-a-camera/
3. https://www.electrical4u.net/electronics/how-does-camera-works/
4. https://archive.nptel.ac.in/courses/117/105/117105135/
5. https://www.youtube.com/watch?v=1AlgIBb_WtY

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - V
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC - VI: MATHEMATICAL PHYSICS (23UPHO53)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 5**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 75hrs**	**MAX. MARKS**	**: 100**

Course Objective

- To understand higher mathematical concepts which are applied to solve problems in Physics and similar situations.

Course Outcomes (CO)

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

CO1[K1]: state the fundamental theorems in matrix, vector calculus, orthogonal curvilinear coordinates, Fourier series and Fourier transform

CO2[K2]: explain the fundamental theorems in pertaining to the course

CO3[K3]: apply the formulae and theorems to solve the problems

CO4[K4]: classify the types of matrices, operators, Fourier series and Fourier transform

CO5[K5]: evaluate a physical system problem by using partial differential equations

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	2	-
CO3 [K3]	3	3	2	1	-	1	2
CO4 [K4]	3	2	1	1	1	1	1
CO5 [K5]	3	2	2	2	1	1	2
Weightage of the course	15	10	5	6	2	6	5
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**2.34**	**2.42**	**1.96**	**2.96**	**2.81**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – MATRICES (15 hrs)

Types of Matrices – Symmetric, Hermitian, Unitary and Orthogonal Matrices – Characteristic Equation of a Matrix – Eigen Values and Eigen Vectors of a Matrix – Cayley-Hamilton Theorem – Inverse of Matrix by Cayley-Hamilton Theorem – Similarity Transformations – Diagonalization of 2x2 Real Symmetric Matrices.

UNIT II – VECTOR CALCULUS (15 hrs)

Vector Differentiation – Directional Derivatives – Definitions & Physical Significance of Gradient, Divergence, Curl – Laplace Operators – Vector Identities – Line, Surface and Volume Integrals – Statement, Proof and Simple Problems for Gauss's Divergence Theorem, Stoke's Theorem, Green's Theorem.

UNIT III – ORTHOGONAL CURVILINEAR COORDINATES (15 hrs)

Tangent Basis Vectors – Scale Factors – Unit Vectors in Cylindrical and Spherical Coordinate Systems – Gradient of a Scalar – Divergence and Curl of a Vector – Laplacian in Three Coordinate Systems.

UNIT IV – FOURIER SERIES AND FOURIER TRANSFORMS (15 hrs)

FOURIER SERIES: Periodic Functions – Dirichlet's Conditions – General Fourier Series – Even and Odd Functions and Their Fourier Expansions – Fourier Cosine and Sine – Half Range Series – Change of Length of Interval. Fourier Analysis of Square Wave, Saw-Tooth Wave, Half Wave/Full Wave Rectifier Wave Forms.

FOURIER TRANSFORMS: Fourier Integral Theorem (Statement only) – Fourier, Fourier Sine and Fourier Cosine Transforms – Fourier Transform of Single Pulse – Trigonometric, Exponential and Gaussian Functions – Inverse Fourier Transform – Convolution Theorem.

UNIT V – APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS (PDE) (15 hrs)

PDE For Transverse Vibrations in Elastic Strings (One Dimensional Wave Equation) – One Dimensional Heat Flow Equation – Solutions to These PDE's By Method of Separation of Variables – Problems Based on Boundary Conditions and Initial Conditions.

TEXTBOOKS

1. Erwin Kreyszig. *Advanced Engineering Mathematics.* Wiley India, 2008.
2. Chattopadhyay P.K. *Mathematical Physics.* New Delhi: New Age International Pvt. Ltd., Publishers, First Edition, Reprint 2005.
3. Gupta B.D, *Mathematical Physics*, New Delhi: Vikas Publishing House Pvt. Ltd., Fourth Edition, Reprint 2020.

4. Dass H.K and Rama Verma. *Mathematical Physics.* New Delhi: S.Chand and Company Ltd., Eighth Edition, Reprint 2019.
5. Murugesan R. *Mechanics and Mathematical Physics.* New Delhi: S.Chand & Company Pvt. Ltd., Third Edition, Reprint 2014.

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1. Spiegel M.R. *Fourier Analysis.* Tata McGraw-Hill, 2004.
2. Venkataraman B, M. K. *Engineering Mathematics III*. Second Edition, 1986.
3. Bruce R. Kusse & Erik A. Westwig. *Applied Mathematics for Scientists and Engineers*. Second Edition, WILEY-VCH Verlag, 2006.
4. Jain M. C. *Vector space & Matrices*. Narosa Publishing House Pvt. Ltd., 2007.

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1. https://www.cuemath.com/algebra/cayley-hamilton-theorem/
2. https://mathinsight.org/greens_theorem_idea
3. https://www.math.toronto.edu/ivrii/PDE-textbook/Chapter6/S6.3.html
4. https://www.youtube.com/watch?v=blS_OImUJ-c
5. https://www.vedantu.com/physics/derivation-of-heat-equation
6. https://nptel.ac.in/courses/115/103/115103036/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - V
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC- VI: NUMERICAL METHODS AND C PROGRAMMING (23UPHO54)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 5**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 75hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To understand the methods in numerical differentiation and integration.
- To develop the problem solving skills.
- To explain the basic structure, rules of compiling and execution of C programming.

Course Outcomes (CO)

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

CO1[K1]: recall the different numerical methods and fundamental terms in C programming

CO2[K2]: explain numerical differentiation, integration and curve fitting and different control statements used in C programming

CO3[K3]: find out the solutions by using different numerical methods

CO4[K4]: analyze the applications of numerical methods and programming in C.

CO5[K5]: write algorithm, flow chart and programs for simple problems using numerical methods and C programmes

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	2	-
CO3 [K3]	3	3	2	1	-	1	2
CO4 [K4]	3	2	1	1	1	1	1
CO5 [K5]	3	2	2	2	1	1	2
Weightage of the course	15	10	5	6	2	6	5
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**2.34**	**2.42**	**1.96**	**2.96**	**2.81**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I –NUMERICAL SOLUTIONS (15 hrs)

Determination of Zeros of Polynomials – Roots of Linear and Nonlinear Algebraic and Transcendental Equations – Bisection and Newton-Raphson Methods – Convergence and Divergence of Solutions.

UNIT II – NUMERICAL DIFFERENTIATION, INTEGRATION AND CURVE FITTING (15 hrs)

Newton's Forward and Backward Interpolation – Lagrange's Interpolation – Newton-Raphson Method to Find Square Root and Cube Roots – Principle of Least Squares – Fitting a Straight Line and Exponential Curve – Trapezoidal Rule – Simpson's 1/3 and 1/8 rule.

UNIT III – ALGORITHM, FLOW CHART AND PROGRAM (15 hrs)

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.

UNIT IV – INTRODUCTION TO C (15 hrs)

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.

UNIT V –CONTROL STRUCTURE (15 hrs)

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.

TEXTBOOKS

1. Singaravelu. *Numerical methods*. Meenakshi Publication, Fourth Edition 1999.
2. Kandasamy P., Thilagavathy K and Gunavathi K. *Numerical Methods*. New Delhi: S.Chand, 2016.
3. Balagurusamy. *Programming in C.* TMG, ND, 2012.
4. Venkatraman. M.K. *Numerical Analysis.* NPH, 2013.
5. Gupta B.D. *Numerical Analysis.* Konark Publishers, New Delhi, 2013.
6. Sastry S.S. *Introductory Methods of Numerical Analysis*. New Delhi: Prentice Hall of India Pvt. Ltd., Third Edition, 1999.

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1. Byron. C and Gottfried. S. *Theory and Problems of programming in C*. Schaum's outline series, Tata McGraw Hill, 2003.
2. Veerarajan. *Numerical methods and C Programming*. 2015.

Web Sources

1. https://math.libretexts.org/Courses/Monroe Community College/MTH 165 College Algebra MTH 175 Precalculus/03%3A Polynomial and Rational Functions/3.06%3A Zeros of Polynomial Functions
2. https://www.geeksforgeeks.org/newton-forward-backward-interpolation/
3. https://www.nielit.gov.in/gorakhpur/sites/default/files/Gorakhpur/OLevel 2 B4 CLang 31Mar SS.pdf
4. https://www.javatpoint.com/structure-of-a-c-program
5. https://towardsdatascience.com/essential-programming-control-structures-2e5e73285df4

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
UG PROGRAMME
SEMESTER –V
VALUE EDUCATION (23UVED51)
(From 2023 - 2024 Batch onwards)

HOURS/WEEK	**: 2 (T-2, L-)**	**INT. MARKS**	**:25**
CREDITS	**: 2**	**EXT. MARKS**	**:75**
DURATION	**: 30 Hours**	**MAX. MARKS**	**:100**

Course Objectives

- To inculcate the values towards personal development.
- To know the social values for the global development.
- To ensure the modern challenges of Adolescent.
- To be aware of human right.
- To enrich the knowledge to control the mind.

Course Outcomes (CO)

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

CO1[K1]: identify the basic human values and ethics necessary for harmonious human relationship

CO2[K3]: explain the significance of social values and religious tolerance to live in peace

CO3[K4]: articulate the life-changing principles of brotherhood, honesty, loyalty and community solidarity

CO4[K5]: analyse emotional, social, spiritual attribute to acquire well balanced personality

CO5[K6]: assess the importance of harmonious living in the multi-cultural pluralistic society

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	1	1	-	2
CO2 [K3]	2	1	-	1	2	1	2
CO3 [K4]	2	1	-	1	2	1	1
CO4 [K5]	1	1	1	1	2	1	1
CO5 [K6]	1	1	-	1	2	1	1
Weightage of the course	8	5	1	5	9	4	7
Weighted percentage of Course contribution to POs	**1.41**	**1.28**	**0.47**	**2.02**	**8.82**	**1.97**	**3.93**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I – CONCEPT OF HUMAN VALUES, VALUE EDUCATION TOWARDS PERSONAL DEVELOPMENT (6 hrs)

Aim of Education and Value Education; Evolution of Value Oriented Education; Concept of Human Values; Types of Values; Components of Value Education**. Personal Development:** Self Analysis and Introspection; Sensitization Towards Gender Equality, Physically Challenged, Intellectually Challenged. Respect to - Age, Experience, Maturity, Family Members, Neighbours, Co-Workers. **Character Formation towards Positive Personality:** Truthfulness, Constructivity, Sacrifice, Sincerity, Self-Control, Altruism, Tolerance, Scientific Vision.

UNIT II – VALUE EDUCATION TOWARDS NATIONAL AND GLOBAL DEVELOPMENT (6 hrs)

National and International Values: Constitutional or national values – Democracy, socialism, secularism, equality, justice, liberty, freedom and fraternity. Social Values – Pity and probity, self-control, universal brotherhood. Professional Values – Knowledge thirst, sincerity in profession, regularity, punctuality and faith. Religious Values – Tolerance, wisdom, character. Aesthetic values – Love and appreciation of literature and fine arts and respect for the same. National Integration and international understanding.

UNIT III – IMPACT OF GLOBAL DEVELOPMENT ON ETHICS AND VALUES (6 hrs)

Conflict of cross-cultural influences, mass media, cross-border education, materialistic values, professional challenges and compromise. Modern Challenges of Adolescent Emotions and behavior; Sex and spirituality: Comparision and competition; positive and negative thoughts. Adolescent Emotions, arrogance, anger, sexual instability, selfishness, defiance

UNIT IV – THERAUPATIC MEASURES (6 hrs)

Control of the mind through

1. Simplified physical exercise
2. Meditation – Objectives, types, effect on body, mind and soul
3. Yoga – Objectives, Types, Asanas
4. Activities: (i) Moralisation of Desires (ii) Neutralisation of Anger (iii)Eradication of Worries (iv)Benefits of Blessings

UNIT V – HUMAN RIGHTS **(6 hrs)**

Concept of Human Rights – Indian and International Perspectives – Evolution of Human Rights – Definitions under Indian and International documents – **Broad classification of Human Rights and Relevant Constitutional Provisions** – Right to Life, Liberty and Dignity – Right to Equality – Right against Exploitation – Cultural and Educational Rights – Economic Rights – Political Rights – Social Rights – **Human Rights of Women and Children** – Social Practice and Constitutional Safeguards – Female Foeticide and Infanticide – Physical assault and harassment – Domestic violence – Conditions of Working Women – **Institutions for Implementation -** Human Rights Commission – Judiciary – Violations and Redressel – Violation by State – Violation by Individuals – Nuclear Weapons and terrorism – Safeguards.

REFERENCES

BOOKS

1. Pitchaikani Prabhaharan, A. Babu Franklin, M.Archana Devi, *Value Education*, Sri Kaliswari College (Autonomous), Sivakasi, 2017.
2. Subramanyam, K. *Values in Education*, Ramana Publications, 1995
3. Swamy Chidbhavananda, *Indian National Education*, Publication by Ramakirshna Tapovanam.

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1. https://www.youtube.com/watch?v=ruKY3GqBvYQ.
2. https://www.republicworld.com/technology-news/science/15-famous-indian-scientists-list-know-what-were-their-innovations.html.
3. https://www.youtube.com/watch?v=M9_l9DDvEsw.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - V
INTERNSHIP (23UPHJ51)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**:-**	**INT. MARKS**	**:25**
CREDITS	**:2**	**EXT. MARKS**	**:75**
DURATION	**:25 Days**	**MAX. MARKS**	**:100**

Course Objectives

- To learn and develop new skills relevant to the field of study or career interests.
- To understand different departments, roles, and functions within the organization to broaden knowledge and explore potential career paths.
- To apply the knowledge gained in academic studies to real-world scenarios.
- To bridge the gap between classroom learning and professional life.
- To gain exposure to different tasks, projects, and challenges relevant to the chosen field.

Course Outcomes (CO)

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

CO1[K1]: identify different career paths within the industry and gain insights into potential future roles.

CO2[K3]: apply theoretical concepts and academic knowledge to real-world situations and challenges encountered during the internship

CO3[K4]: analyse problems, generate innovative solutions, and make informed decisions

CO4[K5]: evaluate how to manage time effectively and prioritize tasks to meet deadlines and deliver quality work

CO5[K6]: create a portfolio of the work, projects, and achievements during the internship

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	-	1	1	1	2
CO2 [K3]	2	3	-	1	-	1	2
CO3 [K4]	2	2	-	2	-	1	1
CO4 [K5]	-	2	1	-	-	1	1
CO5 [K6]	1	3	3	3	-	1	2
Weightage of the course	8	12	4	7	1	5	8
Weighted percentage of Course contribution to POs	**1.41**	**3.06**	**1.87**	**2.82**	**0.98**	**2.46**	**4.49**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

Rules and Regulations

1. Each Student has to undergo 25 days institutional/industry based training during the fourth semester summer vacation.

2. Internships could be undertaken in different media organizations, industries and educational institutions which should be approved by the department.

3. Students should keep a detailed record of activities performed and hours spent in training and report the same to the Faculty Coordinator/Mentor/Guide regularly about the progress of internship on weekly basis

4. At the end of the internship, the student must submit a full-fledged detailed internship report (not exceeding 20 pages) along with attendance certificate

5. The Internship carries 100 marks out of which 25 marks for Internal and 75 Marks for External.

6. The viva voce board shall consist of the Head of the Department and the Internal Examiner (Senior Faculty member)

7. The training programme shall be evaluated as per the following pattern

The following rubrics will be taken into account for the evaluation of the Training Programme:

Internal Assessment (25 Marks)		**External Examination (75 Marks)**	
Training Report & Review	: 15 Marks	Training Report	: 25 Marks
Daily Log Report/Attendance	: 5 Marks	Viva Voce	: 50 Marks
PPT Presentation	: 5 Marks		

EACH INTERNSHIP REPORT WILL FOLLOW THE FORMAT DESCRIBED:

- Title Page
- College Certificate Page
- Internship Certificate provided by the internship institution
- Declaration Page
- Acknowledgement
- Company Profile
- Organizational structure of the concern
- Weekly work plan
- List of figures, List of Tables
- Index
- Chapters

List of Chapters

1. Introduction
2. Nature of work
3. Role in the organization
4. Questionnaires and Observations about work
5. Operating Environment
6. Detailed Description of Technology used
7. Implementation
8. Conclusion
9. Appendix

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - VI
CORE COURSE - XIII: QUANTUM MECHANICS AND RELATIVITY (23UPHC61)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 5**	**INT. MARKS**	**: 25**
CREDITS	**: 4**	**EXT. MARKS**	**: 75**
DURATION	**: 75 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To understand the theory of relativity, its postulates and the consequences.
- To learn the importance of transformation equations and also to differentiate between special and general theory of relativity.
- To interpret the wave theory of matter with various theoretical and experimental evidences.
- To derive and use Schrodinger's wave equation and also learn about various operators.
- To solve Schrodinger's wave equation for simple problems and analyse to understand the solutions.

Course Outcomes (CO)

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

CO1[K1]: state basic terms in relativity and quantum mechanics

CO2[K2]: explain about relativity, transformation relations, wave mechanical concepts, general formalism and applications of Schrödinger equations

CO3[K3]: apply the concepts of relativity and quantum mechanics to solve problems

CO4[K4]: analyze the validity conditions of relativity, transformation relations and quantum mechanical concepts

CO5[K5]: deduce the solutions of simples problems by solving Schrödinger equation

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	2	-
CO3 [K3]	3	3	2	1	-	1	1
CO4 [K4]	3	2	2	1	1	1	1
CO5 [K5]	3	3	2	1	1	1	2
Weightage of the course	15	11	6	5	2	6	4
Weighted percentage of Course contribution to POs	**2.64**	**2.81**	**2.8**	**2.02**	**1.96**	**2.96**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – SPECIAL THEORY OF RELATIVITY (15 hrs)

Michelson-Morley Experiment – Frames of Reference – Galilean Relativity – Postulates of Special Theory of Relativity – Lorentz Transformation – Consequences – Time Dilation – Concept of Simultaneity – Doppler Effect – Length Contraction – Variation of Mass with Velocity – Einstein's Mass-Energy Relation – Relativistic Momentum – Energy Relation.

UNIT II – TRANSFORMATION RELATIONS (15 hrs)

Transformation of Velocity, Mass, Energy and Momentum – Four Vector – Invariance under Transformation – Lorentz Transformation and Velocity Addition Equations in Terms of Hyperbolic Functions.

General Theory of Relativity: Inertial and Gravitational Mass – Principle of Equivalence – Experimental Evidences for General Theory of Relativity.

UNIT III – PHOTONS AND MATTER WAVES (15 hrs)

Difficulties of Classical Physics and Origin of Quantum Theory – Black Body Radiation – Planck's Law – Einstein's Photoelectric Equation – Compton Effect – Pair Production – De Broglie Waves – Phase Velocity and Group Velocity – Davisson and Germer's Experiment – Uncertainty Principle – Consequences – Illustration of Gamma Ray Microscope.

UNIT IV – OPERATORS AND SCHRÖDINGER EQUATION (15 hrs)

Postulates of Quantum Mechanics – Wave Function and its Interpretation – Schrödinger's Equation – Linear Operators – Eigen Value – Hermitian Operator – Properties of Hermitian Operator – Observable – Operators for Position, Linear Momentum, Angular Momentum Components – Commutator Algebra – Commutator Between These Operators – Expectation Values of Position and Momentum – Ehrenfest Theorem.

UNIT V – SOLVING SCHRÖDINGER EQUATION FOR SIMPLE PROBLEMS

(15 hrs)

One-Dimensional Problems: (i) Particle in a Box, (ii) Barrier Penetration Problem – Quantum Mechanical Tunneling, (iii) Linear Harmonic Oscillator.

Higher Dimensional Problems: (i) Rigid Rotator (Qualitative), (ii) Hydrogen Atom (Qualitative).

UNIT VI – PROFESSIONAL COMPONENTS

Expert Lectures – Seminars – Webinars – Industry Inputs – Social Accountability – Patriotism.

TEXTBOOKS

1. Murugeshan R. and Kiruthiga Sivaprasath. *Modern Physics.* New Delhi: S.Chand & Company Ltd., Eighteenth Edition, Reprint 2019.
2. Arthur Beiser. *Concepts of Modern Physics.* New Delhi: Tata McGraw-Hill Publication, Sixth Edition, Reprint 2006.
3. Puri S.P. *Special Theory of Relativity*. India: Pearson Education, 2013.
4. Ghatak and Loganathan. *Quantum Mechanics*. Macmillan Publications, Fourth Edition, 2001.
5. Satya Prakash and Swati Saluja. *Quantum Mechanics*. Meerut: Kedar Nath Ram Nath, 2019.

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1. Peter J. Nolan. *Fundamentals of Modern Physics.* First Edition, 2014.
2. Devanathan V. *Quantum Mechanics.* Chennai: Narosa Pub. House, 2005.
3. Thangappan V.K. *Quantum Mechanics*. New Delhi: New Age International, 2003.
4. Mathews and Venkatesan. *A Text Book of Quantum Mechanics*. New Delhi: Tata McGraw Hill, 2006.
5. Pauling and Wilson. *Introduction to Quantum Mechanics*. NewYork: McGraw Hill Co., 2005.

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1. https://www.pdfdrive.com/quantum-mechanics-d19668777.html
2. http://hyperphysics.phy-astr.gsu.edu/hbase/qapp.html
3. https://swayam.gov.in/nd2_arp19_ap83/preview
4. https://swayam.gov.in/nd1_noc20_ph05/preview
5. https://www.khanacademy.org/science/physics/special-relativity/minkowski-spacetime/v/introduction-to-special-relativity-and-minkowski-spacetime-diagrams
6. https://www.youtube.com/watch?v=TcmGYe39XG0

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - VI
CORE COURSE - XIV: SOLID STATE PHYSICS (23UPHC62)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 5**	**INT. MARKS**	**: 25**
CREDITS	**: 4**	**EXT. MARKS**	**: 75**
DURATION	**: 75 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To classify the bonding and crystal structures in solid state materials and X-ray direction.
- To discuss lattice dynamics and, electrical and thermal properties of materials.
- To classify magnetic material on the basis of their behavior.
- To comprehend the dielectric behavior of materials.
- To ferroelectric and super conducting properties of materials.

Course Outcomes (CO)

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

CO1[K1]: reproduce the basic principles behind the solid state materials
CO2[K2]: explain the basic concepts of bonding in solids, crystal structures and lattice dynamics
CO3[K3]: apply the concepts of solid state physics to solve numerical problems
CO4[K4]: examine the properties of magnetic, dielectric, ferroelectric and superconducting materials
CO5[K5]: evaluate the different physical parameters of solid materials

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	1	-
CO3 [K3]	3	3	2	1	-	1	1
CO4 [K4]	3	2	1	1	1	1	1
CO5 [K5]	3	2	2	1	1	1	2
Weightage of the course	15	10	5	5	2	5	4
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**2.34**	**2.02**	**1.96**	**2.46**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – BONDING IN SOLIDS, CRYSTAL STRUCTURE (15 hrs)

Types of Bonding – Ionic Bonding – Bond Energy of NaCl Molecule – Covalent Bonding – Metallic Bonding – Hydrogen Bonding – Van-der-Waals Bonding – Crystal Lattice – Lattice Translational Vectors – Lattice with Basis – Unit Cell – Bravais Lattices – Miller Indices – Procedure for Finding Them – Packing of BCC and FCC Structures – Structures of NaCl and Diamond Crystals – Reciprocal Lattice – Reciprocal Lattice Vectors – Properties – Reciprocal Lattices to SC, BCC and FCC Structures – Brillouin Zones – X-Rays – Bragg's Law (Simple Problems) – Experimental Methods: Laue Method, Powder Method and Rotating Crystal Method.

UNIT II – ELEMENTARY LATTICE DYNAMICS (15 hrs)

Lattice Vibrations and Phonons: Linear Mono Atomic and Diatomic Chains. Acoustical and Optical Phonons – Qualitative Description of the Phonon Spectrum in Solids – 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 – Weidemann-Franz' Law – Sommerfeld's Quantum Free Electron Theory (Qualitative Only) – Einstein's Theory of Specific Heat Capacity.

UNIT III – MAGNETIC PROPERTIES OF SOLIDS (15 hrs)

Permeability, Susceptibility, Relation between them – Classification of Magnetic Materials – Properties of Dia, Para, Ferro, Ferri, and Anti ferromagnetism – Langevin's Theory of Diamagnetism – Langevin's Theory of Paramagnetism – Curie-Weiss Law – Weiss Theory of Ferromagnetism (Qualitative Only) – Heisenberg's Quantum Theory of Ferromagnetism – Domains – Discussion of B-H Curve – Hysteresis and Energy Loss – Soft and Hard Magnets – Magnetic Alloys.

UNIT IV – DIELECTRIC PROPERTIES OF MATERIALS (15 hrs)

Polarization and Electric Susceptibility – Local Electric Field of an Atom – Dielectric Constant and Polarisability – Polarization Processes: Electronic Polarization – Calculation of Polarisability – Ionic, Orientational and Space Charge Polarization – Internal Field – Clausius-Mosotti Relation – Frequency Dependence of Dielectric Constant – Dielectric Loss – Effect of Temperature on Dielectric Constant – Dielectric Breakdown and Its Types – Classical Theory of Electric Polarisability – Normal and Anomalous Dispersion – Cauchy and Sellmeir Relations – Langevin-Debye Equation – Complex Dielectric Constant – Optical Phenomena. Application – Plasma Oscillations – Plasma Frequency – Plasmons.

UNIT V – FERROELECTRIC & SUPERCONDUCTING PROPERTIES OF MATERIALS (15 hrs)

Ferroelectric Effect: Curie-Weiss Law – Ferroelectric Domains, P-E Hysteresis Loop – Elementary Band Theory: Kronig-Penny Model – Band Gap (No Derivation) – Conductor, Semiconductor (P and N Type) and Insulator – Conductivity of Semiconductor – Mobility – Hall Effect – Measurement of Conductivity (Four Probe Method) – Hall Coefficient.

Superconductivity: Experimental Results – Critical Temperature – Critical Magnetic Field – Meissner Effect – Type-I and Type-II Superconductors – London's Equation and Penetration Depth – Isotope Effect – Idea of BCS Theory (No Derivation).

UNIT VI – PROFESSIONAL COMPONENTS

Expert Lectures – Seminars – Webinars – Industry Inputs – Social Accountability – Patriotism.

TEXTBOOKS

1. Charles Kittel. *Introduction to Solid State Physics.* New Delhi: Willey India (P) Ltd., Eighth Edition, Reprint 2013.
2. Rita John. *Solid state Physics.* Tata McGraw Hill Publishers, First edition, 2014.
3. Singhal R.L. *Solid State Physics*. Meerut: Kedarnath Ram Nath and Co.., 2003.
4. Srivastava J.P. *Elements of Solid State Physics.* Prentice-Hall of India, Second Edition, 2006.
5. Leonid V. Azaroff. *Introduction to Solids*. Tata Mc-Graw Hill., 2004.
6. Ashcroft N.W. and Mermin N.D. *Solid State Physics.* New Delhi: Cengage Learning India Pvt. Ltd., Reprint 2014.
7. Ibach H. and Luth H., *Solid State Physic.* Springer., 2009.
8. Ali Omar M. *Elementary Solid State Physics*. New Delhi: Pearson Education, Inc., 2006.
9. Wahab M.A. *Solid State Physics*. New Delhi: Narosa Publishing House, 2011.

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1. Puri R.K. and Babber V.K. *Solid State Physics*. New Delhi: S.Chand & Co., Thrid Edition, 1997.
2. Kittel. *Introduction to Solid State Physics.* Wiley and Sons, Seventh Edition, 1996.
3. Raghavan V. *Materials science and Engineering: A First Course.* PHI. Sixth Edition, 2015.

4. Azaroff. *Introduction to solids.* TMH, 2006.
5. Pillai S.O. *Solid State Physics*. New Delhi: New Age International (P) Ltd., Sixth Edition, Reprint 2006.
6. Dekker J. *Solid State Physics*. New Delhi: Macmillan India Ltd., First Edition, Reprint 2003.
7. Srivastava J.P. *Elements of Solid State Physics.* Prentice-Hall of India, Second Edition, 2006.

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2. https://nptel.ac.in/courses/115106061/
3. https://authors.library.caltech.edu/105209/15/TR000574_06_chapter-6.pdf
4. https://www.youtube.com/watch?v=HCWwRh5CXYU
5. https://www.youtube.com/watch?v=aFyjUhFCL5Q
6. http://www.phys.ubbcluj.ro/~iosif.deac/courses/ASSP/5_dielectrics.pdf
7. https://www.brainkart.com/article/Classification-of-Magnetic-Materials_38453/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - VI
CORE COURSE - XV: DIGITAL ELECTRONICS AND MICROPROCESSOR 8085
(23UPHC63)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 5**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 75 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To learn all types of number systems, Boolean algebra and identities.
- To know the construction of digital circuits for addition and subtraction, flip-flops, registers, counters.
- To get the knowledge on fundamentals of 8085 architecture, instruction sets and simple programs.

Course Outcomes (CO)

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

CO1[K1]: recall the fundamentals of number systems, Boolean algebra, flip flop, registers, counters, logic families and 8085 microprocessor

CO2[K2]: explain the functioning of logic gates, digital circuits, memory operations and 8085 microprocessor.

CO3[K3]: apply concepts of digital electronics to simplify the Boolean equations and one number system to another number system.

CO4[K4]: analyze the functioning of digital circuits, programs and I/O interfaces of the 8085 microprocessor.

CO5[K5]: construct simple digital circuits and write simple programs to perform mathematical operations using 8085 microprocessor

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	1	-
CO3 [K3]	3	2	1	1	-	1	1
CO4 [K4]	3	3	2	1	1	1	1
CO5 [K5]	3	3	2	1	1	2	2
Weightage of the course	15	11	5	5	2	6	4
Weighted percentage of Course contribution to POs	**2.64**	**2.81**	**2.34**	**2.02**	**1.96**	**2.96**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I - NUMBER SYSTEMS AND BOOLEAN ALGEBRA (15 hrs)

Decimal, Binary, Octal, Hexadecimal Numbers Systems and Their Conversions – Codes: BCD, Gray and Excess-3 Codes – Code Conversions – Complements (1's, 2's, 9's and 10's) – Binary Addition, Binary Subtraction using 1's & 2's Complement Methods – Boolean Laws – De-Morgan's Theorem –Basic Logic Gates – Universal Logic Gates (NAND and NOR) – Standard Representation of Logic Functions (SOP and POS) – Minimization Techniques (Karnaugh Map: 2, 3, 4 Variables).

UNIT II - ARITHMATIC AND DATA PROCESSING CIRUCITS (15 hrs)

Adders, Half and Full Adder – Subtractors, Half and Full Subtractor – Parallel Binary Adder – Magnitude Comparator – Multiplexers (4:1) and Demultiplexers (1:4), Encoder (8-line-to-3- line) and Decoder (3-line-to-8-line), BCD to Seven Segment Decoder.

UNIT III - REGISTERS, COUNTERS, MEMORY AND LOGIC FAMILIES (15 hrs)

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 Out – Counters Asynchronous:- Mod-8, Mod-10, Synchronous - 4-bit and Ring Counter – General Memory Operations, ROM, RAM (Static and Dynamic), PROM, EPROM, EEPROM, EAROM. IC – Logic Families: RTL, DTL, TTL Logic, CMOS NAND and NOR Gates, CMOS Inverter, Programmable Logic Devices – Programmable Logic Array (PLA), Programmable Array Logic (PAL).

UNIT IV - 8085 MICROPROCESSOR (15 hrs)

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 and 16-Bit), Subtraction (8-Bit and 16-Bit), Multiplication (8- Bit), Division (8-Bit) – Largest and Smallest Number in an Array – BCD to ASCII and ASCII to BCD.

UNIT V - I/O INTERFACES (15 hrs)

Serial Communication Interface (8251-USART) – Programmable Peripheral Interface (8255-PPI) – Programmable Interval Timers (8253) – Keyboard and Display (8279), DMA Controller (8237).

UNIT VI – PROFESSIONAL COMPONENTS

Expert Lectures – Seminars – Webinars – Industry Inputs – Social Accountability – Patriotism.

TEXTBOOKS

1. Morris Mano M. *Digital Design*. New Delhi: PHI, 3rd Edition, 2001.

2. Ronald J. Tocci. *Digital Systems-Principles and Applications.* New Delhi: Sixth Edition, PHI, 1999. **(UNITS I to IV)**
3. Salivahana S. and Arivazhagan S. *Digital Circuits and Design.* Third Edition, 2007.
4. Ramesh S.Gaonkar. *Microprocessor Architecture, Programming and Applications with 8085.* Mumbai: Penram International Publishing (India) Pvt. Ltd., Sixth Edition, 2013.
5. YU-Cheng Liu and Glen S.A. *Microcomputer Systems the 8086/8088 family*. Prentice-Hall, 1986.
6. Albert P.Malvino, Donald P.Leach and Goutam Saha. *Digital Principles and Applications.* Chennai: Tata McGraw Hill Education (India) Pvt. Ltd., Eighth Edition, Reprint 2017.
7. Senthilkumar N, Saravanan M and Jeevananthan S. *Microprocessors and Microcontrollers.* New Delhi: Oxford University Press, Reprint 2014.

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1. Herbert Taub and Donald Schilling. *Digital Integrated Electronics*. McGraw Hill., 1985.
2. Bose S.K. *Digital Systems.* Second Edition. New Age International, 1992.
3. Anvekar D.K. and Sonade B.S. *Electronic Data Converters: Fundamentals & Applications.* TMH, 1994.
4. Douglas V.Hall, *Microprocessors and Interfacing: Programming and Hardware*. New Delhi: Tata McGraw-Hill Publishing Company Limited, Second Edition, Reprint 2000.
5. Douglas V.Hall. *Microprocessor and Digital Systems*. US: McGraw-Hill Inc., Second Edition, 1983.

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2. https://youtu.be/s1DSZEaCX_g
3. https://www.geeksforgeeks.org/data-transfer-instructions-8085-microprocessor/
4. https://nptel.ac.in/courses/108/105/108105132/
5. https://www.elprocus.com/8085-microprocessor-architecture/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - VI
CORE COURSE - XVI: PRACTICAL: ELECTRONICS (23UPHC6P)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 5**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 75 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To perform basic experiments on characteristics of electronic devices.
- To set up electronics circuits such as amplifiers, oscillators, counters, multivibrators.
- Perform fundamental experiments on microprocessor 8085 and learn to write programs by themselves.

Course Outcomes (CO)

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

CO1[K1]: identify the basic concepts of analog and digital electronics, and microprocessor 8085 underlying in the experiments

CO2[K2]: setup the experiment and collect data to determine the physical parameters involved in the experiments

CO3[K3]: calculate the basic parameters involved in the experiments from the experimental data

CO4[K4]: analyze / interpret / plot graph / verify the theorem from the experimental data

CO5[K5]: evaluate the physical parameters using appropriate formula/make conclusions from the experimental data

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	1	1	-	1	-
CO2 [K2]	3	1	1	1	1	2	1
CO3 [K3]	3	2	2	1	-	1	1
CO4 [K4]	3	3	2	1	1	1	1
CO5 [K5]	3	3	2	1	1	1	1
Weightage of the course	15	10	8	5	3	6	4
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**3.74**	**2.02**	**2.94**	**2.96**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

LIST OF EXPERIEMENTS (Any 14**):**

1. Zener Diode – Voltage Regulations.
2. Bride Rectifier using Diodes.
3. Clipping and Clamping Circuits using Diodes.
4. Characteristics of a Transistor –(CE mode).
5. Characteristics of a Transistor –(CB mode).
6. RC Coupled CE Transistor Amplifier - Single Stage.
7. Transistor Emitter Follower.
8. Colpitt's Oscillator - Transistor.
9. Hartley Oscillator - Transistor.
10. Astable Multivibrator - Transistor.
11. Bistable Multivibrator - Transistor.
12. FET - Characteristics.
13. FET - Amplifier (Common Drain).
14. UJT – Characteristics.
15. AC Circuits with LCR - Series Resonance.
16. AC Circuits with LCR - Parallel Resonance.
17. Operational Amplifier - Inverting Amplifier and Summing.
18. Operational Amplifier - Non-Inverting Amplifier and Summing.
19. Operational Amplifier - Differential Amplifier.
20. Operational Amplifier - Differentiator & Integrator.
21. Operational Amplifier - D/A Converter by Binary Resistor Method.
22. 5V, IC Regulated Power Supply.
23. Construction of Seven Segment Display.
24. Study of Gate ICs – NOT, OR, AND, NOR, NAND, XOR, XNOR.
25. Verification of De Morgan's Theorem using ICs –NOT, OR, AND.
26. NAND as Universal Building Block.
27. NOR as Universal Building Block.
28. Half Adder / Half Subtractor using Basic Logic Gate ICs.
29. Microprocessor 8085 – Addition (8 bit only).
30. Microprocessor 8085 – Subtraction (8 bit only).
31. Microprocessor 8085 – Multiplication (8 bit only).
32. Microprocessor 8085 – Division (8 bit only).
33. Microprocessor 8085 – Square (8 bit only).
34. Microprocessor 8085 – Square root (8 bit only).
35. Microprocessor 8085 – Largest / Smallest of Numbers (8 bit only).
36. Microprocessor 8085 – Ascending / Descending order.
37. Microprocessor 8085 – Fibonacci Series.

TEXTBOOKS

1. Srinivasan M.N., Balasubramanian S. and Ranganathan R. *A Textbook of Practical Physics.* New Delhi: Sultan Chand & Sons, First Edition, Reprint 2011.
2. Ouseph C.C, Rao U.J and Vijayendran V. *Practical Physics and Electronics*. Chennai: Ananda Book Depot, First Edition, Reprint 2019.
3. Ouseph C.C, Srinivasan V. and Balakrishnan R. *A Textbook of Practical Physics - Part I & II.* Chennai: S.Viswanathan (Printers & Publishers) Pvt., Ltd., Revised Edition, Reprint 2000.
4. Virendra Kumar. *Digital Electronics: Theory and Experiments*. New Delhi: New Age International (P) Ltd., Second Edition, 2015.
5. Palaniappan M. *B.Sc. Practical Physics*. Madurai: LMN Publicatons, First Edition, 1994.

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1. Arora C.L. *B Sc Practical Physics.* New Delhi: S.Chand & Sons Co. Ltd., Reprint 2018.
2. Kakani S.L. and Shubhra K. *Applied Physics: Theory and Practical*. New Delhi: Viva Books Pvt. Ltd., First Edition, 2015.
3. Manjeet S and Anita D. *Applied Physics: Theory and Experiment*. New Delhi: Vayu Education of India, First Edition, 2011.
4. Tayal D.C. *University Practical Physics*. Mumbai: Himalaya Publishing House, First Millennium Edition, 2000.

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2. https://www.youtube.com/watch?v=U6zPYMazCs0
3. https://www.youtube.com/watch?v=pcosWEhvink
4. https://www.youtube.com/watch?v=hA_rZZTfcFM
5. https://www.youtube.com/watch?v=xqSh4_Gcmlo
6. https://www.youtube.com/watch?v=aKMD5S-fI1g
7. https://www.youtube.com/watch?v=LEenetGNueU
8. https://www.youtube.com/watch?v=FCMX5R8mk6w&pp=ygU3T3BlcmF0aW9uYWwgYW1wbGlmaWVyIC0gaW52ZXJ0aW5nIGFtcGxpZmllciBhbmQgc3VtbWluZw%3D%3D

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - VI
CORE COURSE – XVII: PROJECT WITH VIVA VOCE (23UPHJ61)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 4**	**INT. MARKS**	**: 25**
CREDITS	**: 4**	**EXT. MARKS**	**: 75**
DURATION	**: 60 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To familiarize the learners with the objectives and stages in formulating a Research Project.
- To relate conceptual knowledge and the fundamentals of the research.
- To apply fundamental and disciplinary concepts and methods in ways appropriate to their principal areas of study.
- To develop the art of writing the project report coherently, originally and analytically.

Course Outcomes (CO)

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

CO1[K2]: demonstrate the physical, chemical and mathematical concepts of their project work
CO2[K3]: present the physical, chemical and mathematical concepts of their project work
CO3[K4]: analyze the their project work qualitatively and quantitatively
CO4[K5]: justify the benefits of their project work to the society
CO5[K6]: develop new plans for further improvement of their project work

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K2]	2	2	3	1	-	1	1
CO2 [K3]	2	1	3	2	-	2	1
CO3 [K4]	2	3	3	1	1	2	1
CO4 [K5]	2	2	2	1	1	1	1
CO5 [K6]	2	1	1	-	1	1	1
Weightage of the course	10	9	12	5	3	7	5
Weighted percentage of Course contribution to POs	**1.76**	**2.3**	**5.61**	**2.02**	**2.94**	**3.45**	**2.81**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

Guidelines for Project Submission (UG)

1. Students will work individually or in groups with maximum 4 members on a semester-long project.
2. Depending on the interest of the students, project titles will be chosen.
3. Students must meet the guide periodically.
4. The project report should be of minimum 25 pages (excluding bibliography & appendices)
5. The project carries 100 marks of which 25 marks for Internal Assessment and 75 Marks for External Examination.
6. There will be two project review sessions.
7. A draft of the final project report should be submitted to the Project Guide for review at least two weeks prior to the end of the semester.
8. Three copies of the final project report should be submitted.
9. The Head of the department and the Project Guide will evaluate the final Project Report.
10. The viva-voce board shall consist of the External Examiner, the Head of the Department and the Internal Examiner

The following rubrics will be taken into account for the evaluation of Project work and viva-voce:

Internal Assessment (25 Marks)		**External Examination (75 Marks)**	
Project Report & Review	: 15 Marks	Project Report	: 25 Marks
Power Point Presentation	: 5 Marks	Viva Voce	: 50 Marks
Demo/Performance	: 5 Marks		

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - VI
ELECTIVE COURSE GENERIC/ DISCIPLINE SPECIFIC - VIII:
MATERIALS SCIENCE (23UPHO61)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 4**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 60 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To learn imperfections in crystals, deformation of materials and testing of materials.
- To get knowledge on behavior of a material, under the action of light and their applications.
- To know the applications of crystal defects.

Course Outcomes (CO)

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

CO1[K1]: list out the different types of crystal imperfections, material strengthening methods, optical materials and mechanical testing methods

CO2[K2]: explain the crystal imperfections, material strengthening methods, elastic behavior of materials and non-destructive testing methods

CO3[K3]: present the applications of point defects and NLO Materials

CO4[K4]: analyze the effect of imperfections, viscoelastic behaviour of materials and materials testing methods

CO5[K5]: inspect the working of display devices, radiographic, ultrasonic and thermal method of NDT, and metallurgical microscope

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	1	-
CO3 [K3]	3	2	1	1	-	2	1
CO4 [K4]	3	2	2	1	1	1	1
CO5 [K5]	3	2	2	1	1	1	2
Weightage of the course	15	9	5	5	2	6	4
Weighted percentage of Course contribution to POs	**2.64**	**2.3**	**2.34**	**2.02**	**1.96**	**2.96**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – CRYSTAL IMPERFECTIONS (12 hrs)

Introduction – Point Defects: Vacancies (Problems), Interstitials, Impurities, Electronic Defects – Equilibrium Concentration of Point Imperfections (Problems) – Application of Point Defects – Line Defects: Edge Dislocation (Problems), Screw Dislocation – Surface Defects: Extrinsic Defects – Intrinsic Defects: Grain Boundaries, Tilt and Twist Boundaries, Twin Boundaries, Stacking Faults – Volume Defects – Effect of Imperfections.

UNIT II – MATERIAL DEFORMATION (12 hrs)

Introduction – Elastic Behavior of Materials – Atomic Model of Elastic Behavior – Modulus as a Parameter in Design – Rubber Like Elasticity – Inelastic Behavior of Materials – Relaxation Process – Viscoelastic Behavior of Materials – Spring – Dash Pot Models of Viscoelastic Behavior of Materials.

UNIT III – PERMANENT DEFORMATION AND STRENGTHENING METHODS OF MATERIALS (12 hrs)

Introduction – Plastic Deformation: Tensile Stress - Strain Curve – Plastic Deformation by Slip – Creep: Mechanism of Creep – Creep Resistant Materials – Strengthening Methods: Strain Hardening, Grain Refinement – Solid Solution Strengthening – Precipitation Strengthening.

UNIT IV – OPTICAL MATERIALS (12 hrs)

Introduction – Optical Absorption in Metals, Semiconductors and Insulators – NLO Materials and Their Applications – Display Devices and Display Materials: Fluorescence and Phosphorescence – Light Emitting Diodes – Liquid Crystal Displays.

UNIT V – MECHANICAL TESTING (12 hrs)

Destructive Testing: Tensile Test, Compression Test, Hardness Test – Nondestructive Testing (NDT): Radiographic Methods, Ultrasonic Methods – Thermal Methods of NDT: Thermography – Equipment Used for NDT: Metallurgical Microscope.

TEXTBOOKS

1. Raghavan V. *Material science and Engineering*. Prentice Hall of India, Sixth Edition, 2015.
2. Rajendran V. *Materials science.* McGraw Hill publications, 2011.

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1. William D. Callister, Jr. *Material Science & Engineering – An Introduction*, John Wiley & Sons Inc., Eighth Edition, 2007.

2. Bolton W. *Engineering materials technology*. Butterworth & Heinemann, Third Edition, 2001.
3. Donald R. Askeland, Pradeep P. Phule. *The Science and Engineering of Materials*. Thomson Learning, Fifth Edition, First Indian Reprint, 2007.
4. William F. Smith. *Structure and Properties of Engineering Alloys.* Mc-Graw-Hill Inc., U.S.A, Second Edition, 1993.

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4. https://www.ias.ac.in/article/fulltext/pram/057/05-06/0871-0883
5. https://www.ccmr.cornell.edu/wp-content/uploads/sites/2/2016/02/Non-DestructiveTestingReading.pdf

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - VI
ELECTIVE COURSE GENERIC/ DISCIPLINE SPECIFIC - VIII:
NANOSCIENCE AND NANO TECHNOLOGY (23UPHO62)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 4**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 60 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To provide an overall understanding of Nanoscience and Nanotechnology.
- To introduce different types of nanomaterials, their properties, fabrication methods, characterization techniques and a range of applications.

Course Outcomes (CO)

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

CO1[K1]: list out different types of nanostructures, properties of nanomaterials, fabrication methods and characterization techniques

CO2[K2]: explain physics behind quantum confinement, electrical, mechanical, dielectric and magnetic properties of nanomaterials

CO3[K3]: present different fabrication methods and analysis of nanomaterials by different characterization techniques

CO4[K4]: analyze the size effect on the properties of nanomaterials

CO5[K5]: examine the applications of nanomaterials in medicine, sensors, energy storage systems and nanoelectronics

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	1	-
CO3 [K3]	3	2	1	1	-	2	1
CO4 [K4]	3	2	2	1	1	1	1
CO5 [K5]	3	2	2	1	1	1	2
Weightage of the course	15	9	5	5	2	6	4
Weighted percentage of Course contribution to POs	**2.64**	**2.3**	**2.34**	**2.02**	**1.96**	**2.96**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – NANOSCIENCE AND NANOTECHNOLOGY (12 hrs)

Nanoscale – Nature and Nanostructures – Nanostructures: 0D, 1D, 2D – Surface to Volume Ratio – Size Effect – Excitons – Quantum Confinement – Metal Based Nanoparticles (Metal and Metal Oxide) – Nanocomposites (Non-Polymer Based) – Carbon Nanostructures – Fullerene – SWCNT and MWCNT.

UNIT II – PROPERTIES OF NANOMATERIALS (12 hrs)

Introduction – Mechanical Behavior – Elastic Properties – Hardness and Strength – Ductility and Toughness – Superplastic Behavior – Optical Properties – Surface Plasmon Resonance – Electrical Properties – Dielectric Materials and Properties – Magnetic Properties – Super Paramagnetism – Electrochemical Properties – Properties of CNTs.

UNIT III – FABRICATION METHODS AND VACUUM TECHNIQUES (12 hrs)

Top-Down and Bottom-Up Approaches – Electrochemical Method – Chemical & Physical Vapour Depositions (CVD & PVD) – Plasma Arc Discharge – Sputtering – Thermal Evaporation – Pulsed Laser Deposition – Ball Milling – Lithography: Photolithography – e-Beam Lithography – Sol-Gel Methods – Synthesis of CNT.

UNIT IV – CHARACTERIZATION TECHNIQUES (12 hrs)

Scanning Probe Microscopy – Scanning Tunneling Microscopy – Atomic Force Microscopy – Scanning Electron Microscopy – Transmission Electron Microscopy – Powder XRD Method: Determination of Structure and Grain Size Analysis – UV-Visible and Photoluminescence Spectroscopy.

UNIT V – APPLICATIONS OF NANOMATERIALS (12 hrs)

Medicine: Drug Delivery – Photodynamic Therapy – Molecular Motors – Energy: Fuel Cells – Rechargeable Batteries – Supercapacitors – Photovoltaics. Sensors: Nanosensors Based on Optical and Physical Properties – Electrochemical Sensors – Nanobiosensors. Nanoelectronics: CNTFET – Display Screens – GMR Read/Write Heads – Nanorobots – Applications of CNTs.

TEXTBOOKS

1. Chattopadhyay K.K. and Banerjee A.N. *Introduction to Nanoscience and Nanotechnology.* PHI Learning Pvt Ltd., 2012
2. Shah M.A. Tokeer Ahmad. *Principles of Nanoscience and Nanotechnology.* Narosa Publishing House Pvt Ltd., 2010.
3. Mick Wilson. *Nanotechnology*. Overseas Press, 2005.
4. Shah M.A. and Shah K.A. *Nanotechnology-The science of small.* New Delhi: Wiley India Pvt. Ltd., First Edition, 2013.

5. Charles P.Poole and Frank J.Owens. *Introduction to Nanotechnology.* New Delhi: Wiley India Pvt. Ltd., Reprint 2009

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1. Richard Booker and Earl Boysen. *Nanotechnology*. Wiley Publishing Inc. USA, 2005.
2. Fendler J.H. *Nano particles and nano structured films; Preparation, Characterization and Applications.* John Wiley & Sons, 2007.
3. Murty B.S. *Textbook of Nanoscience and Nanotechnology*. Universities Press, 2012.

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2. https://www.cheaptubes.com/carbon-nanotubes-properties-and-applications/
3. https://vaccoat.com/blog/what-is-pulsed-laser-deposition-pld/
4. https://en.wikipedia.org/wiki/Scanning_tunneling_microscope
5. https://www.nhs.uk/conditions/photodynamic-therapy/#:~:text=Photodynamic%20therapy%20(PDT)%20is%20a,as%20certain%20types%20of%20cancer.
6. https://www.japsonline.com/admin/php/uploads/159_pdf.pdf
7. https://www.emm-nano.org/what-is-nanoscience-nanotechnology/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Physics
SEMESTER - VI
SKILL ENHANCEMENT COURSE - IX: SOLAR PHOTOVOLTAICS (23UPHS61)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 2**	**INT. MARKS**	**: 25**
CREDITS	**: 2**	**EXT. MARKS**	**: 75**
DURATION	**: 30 hrs**	**MAX. MARKS**	**: 100**

Course Objective

- This course familiarizes the learners with the concepts of solar energy, photo-voltaic, types of solar cells and design of photovoltaic power systems.

Course Outcomes (CO)

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

CO1[K1]: state the fundamentals of solar radiation, solar cells and design of PV systems

CO2[K2]: explain the spectral energy distribution of solar radiation, IV characteristics of solar cell, maximizing the PV output and design of PV systems

CO3[K3]: present the characteristics, classification and design of solar cells and solar PV systems

CO4[K4]: classify the solar cells on the basis of thickness and types of active material, and solar PV systems.

CO5[K5]: examine the different applications of solar PV systems

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	1	-
CO3 [K3]	3	2	1	1	-	2	1
CO4 [K4]	3	2	2	1	1	1	1
CO5 [K5]	3	2	2	1	1	1	2
Weightage of the course	15	9	5	5	2	6	4
Weighted percentage of Course contribution to POs	**2.64**	**2.3**	**2.34**	**2.02**	**1.96**	**2.96**	**2.25**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – SOLAR RADIATION ANALYSIS (6 hrs)

The Sun as a Source of Energy – The Earth – Sun and Earth Radiation Spectrums – Extraterrestrial and Terrestrial Radiations – Spectral Energy Distribution of Solar Radiation – Measurements of Solar Radiation.

UNIT II – SOLAR PHOTOVOLTAIC SYSTEMS (6 hrs)

Solar Cell Fundamentals – Semiconductors – A pn Junction – Generation of Electron-Hole Pair by Photo Absorption – Photoconduction – Solar Cell Characteristics – I-V Characteristic – Energy Losses and Efficiency.

UNIT III – SOLAR CELL CLASSIFICATION (6 hrs)

Solar Cell Classification – On the Basis of Thickness of Active Material – On the Basis of Junction Structure – On the Basis of Type of Active Material – Silicon Crystal Silicon Solar Cell – Multicrystalline Silicon Solar Cell – Amorphous Silicon Solar Cell – Ga-As Cell – Copper Indium Diselenide Cell – Cadmium Telluride Cell.

UNIT IV – DESIGN OF PV SYSTEMS (6 hrs)

Solar Cell – Solar PV Module – Cell Mismatch in a Module – Effect of Shadowing – Solar PV Panel – Solar PV Array – Maximizing the Solar PV Output and Load Matching.

UNIT V – SOLAR PV SYSTEMS AND APPLICATIONS (6 hrs)

Classification – Stand Alone Solar PV System – Grid – Interactive Solar PV System – Hybrid Solar PV System – Solar PV Applications – Grid-Interactive PV Power Generation – Water Pumping – Lighting – Medical Refrigeration – Village Power – Telecommunication and Signalling.

Hands on Training: (NOT FOR EXAMINATION)

1. Measure the Voltage and Current of a Given Solar Cells
2. Perform the Parallel and Series Circuit Design using Solar Cells
3. Power a Small Light Bulb using Solar Cells
4. Calculate the Power Output and Efficiency of a Solar Arrays
5. Observe the Voltage, Current and Power Output of a Solar Cell When It Is Placed at Different Heights
6. Observe the Voltage, Current and Power Output of a Solar Cell When It Is Placed in an Environment Like Cloudy Day/Dust Accumulation/ Dark Room/ Snow Covered.

TEXTBOOK

1. Khan B.H. *Non-Conventional Energy Resources.* New Delhi: McGraw Hill Education (India) Pvt. Ltd., Second Edition, Reprint 2014.

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1. Chenming Hu and Richard M.White. *Solar Cells from Basic to Advanced Systems*. USA: McGraw-Hill Book Company, 1983.
2. Klaus Jäger, Olindo Isabella, Arno H.M. Smets, René A.C.M.M. Van Swaaij, and Miro Zeman. *Solar Energy Fundamentals, Technology and Systems*. Delft University of Technology, 2014.
3. Zekaisen. *Solar Energy Fundamentals and Modeling Techniques*. Springer-Verlag London Ltd., 2008.

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1. https://www.nrel.gov/docs/legosti/old/16319.pdf
2. https://www.pveducation.org/pvcdrom/solar-cell-operation/solar-cell-structure
3. https://www.youtube.com/watch?v=5bRt_LxKwpg

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
UG Programme
SEMESTER V & VI
PART V – EXTENSION
(From 2023 -2024 Batch Onwards)

HOURS/WEEK : -
CREDIT : 1
DURATION : - **INT. MARKS : 100**

Course Objectives

- To promote community involvement, encourage civic participation, and foster a sense of ownership and responsibility.
- To involve the learners in organizing campaigns, seminars, or public events to educate the public, promote understanding, and advocate for positive change.
- To create platforms for knowledge sharing, partnership development, and collective action.
- To encourage environmental conservation, promote responsible resource management, or foster sustainable livelihoods.
- To raise awareness about social issues, advocate for marginalized groups, or implement programs that promote inclusivity and equal opportunities.

Course Outcomes (CO)

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

CO1[K1]: recognize the importance of community service through training and education

CO2[K2]: interpret ecological concerns, consumer rights, gender issues & legal protection

CO3[K3]: develop team spirit, verbal / nonverbal communication and organizational ethics by participating in community service

CO4[K4]: examine the necessity of professional skills & community-oriented services for a holistic development

CO5[K6]: create awareness on human rights, legal rights, First Aid, Physical fitness and wellbeing

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	-	-	2	2	1	1
CO2 [K2]	2	1	-	2	1	1	1
CO3 [K3]	2	-	-	1	2	2	1
CO4 [K4]	1	1	1	1	2	2	1
CO5 [K6]	1	-	-	1	2	2	1
Weightage of the course	8	2	1	7	9	8	5
Weighted percentage of Course contribution to POs	**1.41**	**0.51**	**0.47**	**2.82**	**8.82**	**3.94**	**2.81**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

Details of the Courses

1. National Cadet Corps (NCC) – 190 hrs
2. National Service Scheme (NSS) – 240 hrs
3. Physical Education
4. Red Ribbon Club (RRC)
5. Youth Red Cross (YRC)
6. Fine Arts Club
7. Library and Information Service Club
8. Yoga Club
9. ECO Club
10. Consumer Club
11. Human Rights Club
12. Women Empowerment Cell
13. Legal Awareness League

Courses Offered to Other Departments

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Maths/Chemistry
SEMESTER - I/III
ELECTIVE COURSE GENERIC/ DISCIPLINE SPECIFIC - I/III:
PHYSICS – I (23UMAA11/23UCHA31)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 4**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 60 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To analyze and demonstrate the various dynamic motions mathematically and relate the theory with practical applications.
- To impart the basic concepts of elasticity, viscosity and surface tension of materials and describe the experimental methods to determine it.
- To describe the process of liquefactions of gases, working of heat engines and concepts of change in entropy with theory.
- To impart the basic concepts of electricity and magnetism, AC current and voltage, household and factory electrical wiring.
- To introduce logic gates, universal building blocks, Boolean theorems
- To know the government initiatives for Digital India.

Course Outcomes (CO)

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

CO1[K1]: outline the basic concepts of waves, oscillations, ultrasonics, properties of matter, heat and thermodynamics, electricity and magnetism, and digital electronics

CO2[K2]: explain the basic principles with theory pertaining to the course

CO3[K3]: apply basic concepts to derive the expressions and solve problems

CO4[K4]: analyze and verify the basic concepts in the physical processes

CO5[K5]: examine the experimental methods to determine the physical parameters

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	-	-
CO2 [K2]	3	1	-	2	-	-	-
CO3 [K3]	3	3	1	1	1	1	1
CO4 [K4]	2	3	1	1	1	1	1
CO5 [K5]	2	3	1	1	1	1	1
Weightage of the course	13	11	03	06	03	03	03
Weighted percentage of Course contribution to POs							

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – WAVES, OSCILLATIONS AND ULTRASONICS (12 hrs)

Simple Harmonic Motion (SHM) – Composition of Two SHMs at Right Angles (Periods in the Ratio 1:1) – Lissajous Figures – Uses – Laws of Transverse Vibrations of Strings – Determination of AC Frequency Using Sonometer (Steel and Brass Wires). Ultrasound – Production – Piezoelectric Method – Application of Ultrasonics: Medical Field – Lithotripsy, Ultrasonography – Ultrasonoimaging-Ultrasonics in Dentistry – Physiotheraphy, Opthalmology – Advantages of Noninvasive Surgery – Ultrasonics in Green Chemistry.

UNIT II – PROPERTIES OF MATTER (12 hrs)

Elasticity: Elastic Constants – Bending of Beam – Theory of Non-Uniform Bending – Determination of Young's Modulus by Non-Uniform Bending – Energy Stored in a Stretched Wire – Torsion of a Wire – Determination of Rigidity Modulus by Torsional Pendulum.

Viscosity: Streamline and Turbulent Motion – Critical Velocity – Coefficient of Viscosity – Poiseuille's Formula – Comparison of Viscosities – Burette Method.

Surface Tension: Definition – Molecular Theory – Droplets Formation – Shape, Size and Lifetime – COVID Transmission through Droplets, Saliva – Drop Weight Method – Interfacial Surface Tension.

UNIT III – HEAT AND THERMODYNAMICS (12 hrs)

Joule-Kelvin Effect – Joule-Thomson Porous Plug Experiment – Theory – Temperature of Inversion – Liquefaction of Oxygen – Linde's Process of Liquefaction of Air – Liquid Oxygen for Medical Purpose – Importance of Cryocoolers – Thermodynamic System – Thermodynamic Equilibrium – Laws of Thermodynamics – Heat Engine – Carnot's Cycle – Efficiency – Entropy – Change of Entropy in Reversible and Irreversible Process.

UNIT IV – ELECTRICITY AND MAGNETISM (12 hrs)

Potentiometer – Principle – Measurement of Thermo emf using Potentiometer – Magnetic Field due to a Current Carrying Conductor – Biot-Savart's law – Field along the Axis of the Coil Carrying Current – Peak, Average and RMS Values of AC Current and Voltage – Power Factor and Current Values in an AC circuit – Types of Switches in Household and Factories – Smart WiFi Switches – Fuses and Circuit Breakers in Houses.

UNIT V – DIGITAL ELECTRONICS AND DIGITAL INDIA (12 hrs)

Logic Gates, OR, AND, NOT, NAND, NOR , EXOR Logic Gates – Universal Building Blocks – Boolean Algebra – De Morgan's Theorem – Verification. Overview of Government Initiatives: Software Technological Parks Under MeitY, NIELIT – Semiconductor Laboratories Under Dept. of Space – An Introduction to Digital India.

UNIT VI – PROFESSIONAL COMPONENTS (NOT FOR EXAMINATION)

Expert Lectures – Seminars – Webinars – Industry Inputs – Social Accountability – Patriotism.

TEXTBOOKS

1. Murugesan R. *Allied Physics*. New Delhi: S.Chand & Co., 2001.
2. Brijlal and N. Subramanyam. Waves and Oscillations. New Delhi: Vikas Publishing House, 2001.
3. Murugesan R. *Properties of Matter*. New Delhi: S.Chand & Co., 2012.
4. Rajam J.B. and Arora C.L. *Heat and Thermodynamics.* New Delhi: S.Chand & Co., Eighth edition, 1976.
5. Murugeshan R. *Optics and Spectroscopy*. New Delhi: S.Chand & Company Ltd., Sixth Edition, 2006.
6. Subramaniyam A. *Applied Electronics*. Chennai: National Publishing Co., Second Edition, 1996.

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1. Resnick Halliday and Walker. *Fundamentals of Physics*. Singapore: John Willey and Sons, Asia Pvt. Ltd., Eleventh edition, 2018.
2. Khanna V.R. and Bedi R.S. *Text book of Sound.* Meerut: Kedharnaath Publish & Co, First Edition, 1998.
3. Khare N.S. and Srivastava S.S. *Electricity and Magnetism.* New Delhi: Atma Ram & Sons, Tenth Edition, 1983.
4. Khanna D.R. and Gulati H.R. *Optics.* New Delhi: S. Chand & Co. Ltd., 1979.

5. Mehta V.K. and Rohit Mehta. *Principles of Electronics.* New Delhi: S.Chand & Company Ltd., Revised Eleventh Edition, Reprint 2013.

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3. https://youtu.be/7mGqd9HQ_AU
4. https://youtu.be/h5jOAw57OXM
5. https://www.youtube.com/watch?v=t6nGiBzGLD8
6. https://ncert.nic.in/ncerts/l/jesc113.pdf

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Maths/Chemistry
SEMESTER - I/III
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC- I/III: PRACTICAL: PHYSICS – I (23UMAA1P/23UCHA3P)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 2**	**INT. MARKS**	**: 25**
CREDITS	**: 2**	**EXT. MARKS**	**: 75**
DURATION	**: 30 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To set up experiments to understand the various concepts of properties of matter.
- To arrange the experiments to evaluate physical parameters of materials and verify theories.
- To quantify and analyze experimental results.
- To do error analysis and correlate results.

Course Outcomes (CO)

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

CO1[K1]: identify the basic concepts of properties of matter, electricity and digital electronics underlying in the experiments

CO2[K2]: setup the experiment and collect data to determine the physical parameters involved in the experiments

CO3[K3]: calculate the basic parameters involved in the experiments from the experimental data

CO4[K4]: analyze / interpret / plot graph / verify the theorem from the experimental data

CO5[K5]: evaluate the physical parameters using appropriate formula/make conclusions from the experimental data

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	-	-	-	-
CO2 [K2]	2	2	-	1	1	-	-
CO3 [K3]	2	2	1	1	1	1	1
CO4 [K4]	2	2	1	1	1	1	1
CO5 [K5]	2	3	1	1	1	1	1
Weightage of the course	10	10	03	04	04	03	03
Weighted percentage of Course contribution to POs							

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

LIST OF EXPERIMENTS (Minimum 8**):**

1. Young's Modulus by Non-Uniform Bending using Pin and Microscope
2. Young's Modulus by Non-Uniform Bending using Optic Lever, Scale and Telescope
3. Rigidity Modulus by Static Torsion Method
4. Rigidity Modulus by Torsional Oscillations Without Mass
5. Surface Tension and Interfacial Surface Tension – Drop Weight Method
6. Comparison of Viscosities of Two Liquids – Burette Method
7. Specific Heat Capacity of a Liquid – Half Time Correction
8. Verification of Laws of Transverse Vibrations using Sonometer
9. Calibration of Low Range Voltmeter using Potentiometer
10. Determination of Thermo emf using Potentiometer
11. Verification of Truth Tables of Basic Logic Gates using ICs
12. Verification of De Morgan's Theorems using Logic Gate ICs.
13. Use of NAND as Universal Building Block.

TEXTBOOKS

1. Srinivasan M.N, Balasubramanian S and Ranganathan R. *A Textbook of Practical Physics.* New Delhi: Sultan Chand & Sons, First Edition, Reprint 2011.
2. Ouseph C.C, Rao U.J and Vijayendran V. *Practical Physics and Electronics*. Chennai: Ananda Book Depot, First Edition, Reprint 2019.
3. Ouseph C.C, Srinivasan V and Balakrishnan R. *A Textbook of Practical Physics - Part I.* Chennai: S.Viswanathan (Printers & Publishers) Pvt., Ltd., Revised Edition, Reprint 2000.

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1. Arora C.L. *B Sc Practical Physics.* New Delhi: S.Chand & Sons Co. Ltd., Reprint 2018.
2. Kakani S.L. and Shubhra K. *Applied Physics: Theory and Practical*. New Delhi: Viva Books Pvt. Ltd., First Edition, 2015.
3. Manjeet S. and Anita D. *Applied Physics: Theory and Experiment*. New Delhi: Vayu Education of India, First Edition, 2011.
4. Tayal D.C. *University Practical Physics*. Mumbai: Himalaya Publishing House, First Millennium Edition, 2000.

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2. https://www.youtube.com/watch?v=Ke3xGTfVeCk
3. https://www.youtube.com/watch?v=-vbtoSsRpfk
4. https://www.youtube.com/watch?v=yjOcbjpTCFA
5. https://egyankosh.ac.in/bitstream/123456789/18821/1/Experiment-7.pdf

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Maths/Chemistry
SEMESTER - II/IV
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC - II/IV:
PHYSICS – II (23UMAA21/23UCHA41)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 4**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 60 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To explain concepts of interference, diffraction and polarization.
- To outline the basic foundation of different atom models and various experiments establishing quantum concepts.
- To summarize the properties of nuclei, nuclear models, nuclear processes, importance of nuclear energy and safety measures to be carried out.
- To describe the basic concepts of special theory of relativity, mass energy equivalence and give an overview of research projects of National and International importance.
- To summarize the working of semiconductor devices like junction diode, Zener diode, transistors and practical devices we use in our daily life.

Course Outcomes (CO)

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

CO1[K1]: outline the basic concepts of wave optics, relativity, atomic, nuclear and semiconductor physics

CO2[K2]: explain the physical phenomena pertaining to the course

CO3[K3]: apply the concepts to derive the expressions and solve problems

CO4[K4]: distinguish different physical phenomena, models, processes, and semiconductor devices

CO5[K5]: examine the experimental methods to determine the physical parameters using basic concepts

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	-	-
CO2 [K2]	3	1	-	2	-	-	-
CO3 [K3]	3	3	1	1	1	1	1
CO4 [K4]	2	3	2	1	1	1	1
CO5 [K5]	2	3	2	1	1	1	1
Weightage of the course	13	11	05	06	03	03	03
Weighted percentage of Course contribution to POs							

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

UNIT I – OPTICS (12 hrs)

Interference – Interference in Thin Films – Colors of Thin Films – Air Wedge – Determination of Diameter of a Thin Wire by Air Wedge – Diffraction – Diffraction of Light Vs Sound – Normal Incidence – Experimental Determination of Wavelength using Diffraction Grating (No Theory) – Polarization – Polarization by Double Reflection – Brewster's Law – Optical Activity – Application in Sugar Industries.

UNIT II – ATOMIC PHYSICS (12 hrs)

Atom Models – Bohr Atom Model – Mass Number – Atomic Number – Nucleons – Vector Atom Model – Various Quantum Numbers – Pauli's Exclusion Principle – Electronic Configuration – Periodic Classification of Elements – Bohr Magneton – Stark Effect – Zeeman Effect (Elementary Ideas Only) – Photo Electric Effect – Einstein's Photoelectric Equation – Applications of Photoelectric Effect: Solar Cells, Solar Panels, Optoelectric Devices.

UNIT III – NUCLEAR PHYSICS (12 hrs)

Nuclear Models – Liquid Drop Model – Magic Numbers – Shell Model – Nuclear Energy – Mass Defect – Binding Energy – Radioactivity – Uses – Half Life – Mean Life – Radio Isotopes and Uses – Controlled and Uncontrolled Chain Reaction – Nuclear Fission – Energy Released in Fission – Chain Reaction – Critical Reaction – Critical Size – Atom Bomb – Nuclear Reactor – Breeder Reactor – Importance of Commissioning PFBR in Our Country – Heavy Water Disposal, Safety of Reactors: Seismic and Floods – Introduction to DAE, IAEA – Nuclear Fusion – Thermonuclear Reactions – Differences between Fission and Fusion.

UNIT IV – INTRODUCTION TO RELATIVITY AND GRAVITATIONAL WAVES (12 hrs)

Frame of Reference – Postulates of Special Theory of Relativity – Galilean Transformation Equations – Lorentz Transformation Equations – Derivation – Length Contraction – Time Dilation – Twin Paradox – Mass-Energy Equivalence – Introduction on Gravitational Waves, LIGO, ICTS Opportunities at International Centre for Theoretical Sciences.

UNIT V – SEMICONDUCTOR PHYSICS (12 hrs)

P-N Junction Diode – Forward and Reverse Biasing – Characteristic of Diode – Zener Diode – Characteristic of Zener Diode – Voltage Regulator – Full Wave Bridge Rectifier – Construction and Working – Advantages (No Mathematical Treatment) – USB Cell Phone Charger – Introduction to e-Vehicles and EV Charging Stations.

UNIT VI – PROFESSIONAL COMPONENTS (NOT FOR EXAMINATION)

Expert Lectures – Seminars – Webinars – Industry Inputs – Social Accountability – Patriotism.

TEXTBOOKS

1. Murugesan R. *Allied Physics*. NewDelhi: S.Chand & Co., 2005.
2. Thangaraj K. and Jayaraman D. *Allied Physics*. Chennai: Popular Book Depot., 2004.
3. Subraminyam N., Brij lal and Avadhanulu M.N. *A Textbook of Optics.* New Delhi: S.Chand & Company Ltd., Twenty Fifth Revised Edition, Reprint 2018.
4. Murugeshan R. and Kiruthiga Sivaprasath. *Modern Physics.* New Delhi: S.Chand & Company Ltd., Eighteenth Edition, Reprint 2019.
5. Subramaniyam A. *Applied Electronics.* Chennai: National Publishing Co., Second Edition, 1996.

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1. Resnick Halliday and Walker. *Fundamentals of Physics*. Singapore:John Willey and Sons, Asia Pvt. Ltd., Eleventh edition, 2018.
2. Khanna D.R. and Gulati H.R. *Optics*. New Delhi: S.Chand & Co., 1979.
3. Arthur Beiser. *Concepts of Modern Physics.* New Delhi: Tata McGraw-Hill Publication, Sixth Edition, Reprint 2006.
4. Thomas L. Floyd. *Digital Fundamentals*. New Delhi: Universal Book Stall, Eleventh edition 2017.

5. Mehta V.K and Rohit Mehta. *Principles of Electronics.* New Delhi: S.Chand & Company Ltd., Revised Eleventh Edition, Reprint 2013.

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2. https://www.metoffice.gov.uk/weather/learn-about/weather/optical-effects
3. https://archive.nptel.ac.in/courses/115/101/115101011/
4. https://www.elprocus.com/semiconductor-devices-types-and-applications/
5. https://www.khanacademy.org/science/in-in-class-12th-physics-india/nuclei

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG PROGRAMME – B.Sc. Maths/Chemistry
SEMESTER - II/IV
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC - II/IV: PRACTICAL: PHYSICS – II (23UMAA2P/23UCHA4P)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 2**	**INT. MARKS**	**: 25**
CREDITS	**: 2**	**EXT. MARKS**	**: 75**
DURATION	**: 30 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To set up experiments to understand the various concepts of optics, thermal physics, electricity, sound and electronics.
- To arrange the experiments to evaluate physical parameters of materials and verify theories.
- To quantify and analyze experimental results.
- To do error analysis and correlate results.

Course Outcomes (CO)

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

CO1[K1]: identify the basic concepts of physics underlying in the experiments

CO2[K2]: setup the experiment and collect data to determine the physical parameters involved in the experiments

CO3[K3]: calculate the basic parameters involved in the experiments from the experimental data

CO4[K4]: analyze / interpret /plot graph / verify the theorem from the experimental data

CO5[K5]: evaluate the physical parameters using appropriate formula/make conclusions from the experimental data

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	-	-	-	-
CO2 [K2]	2	2	-	1	1	-	1
CO3 [K3]	2	2	1	1	1	1	1
CO4 [K4]	2	2	1	1	1	1	1
CO5 [K5]	2	3	1	1	1	1	1
Weightage of the course	10	10	03	04	04	03	04
Weighted percentage of Course contribution to POs							

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low, '-' No Correlation)

LIST OF EXPERIMENTS (Minimum 8**):**

1. Radius of Curvature of Lens by Forming Newton's Rings
2. Thickness of a Wire using Air Wedge
3. Wavelength of Mercury Lines using Spectrometer and Grating
4. Refractive Index of Material of the prism by Minimum Deviation
5. Refractive Index of Liquid using Liquid Prism
6. Determination of AC Frequency using Sonometer
7. Specific Resistance of a Wire using PO Box
8. Thermal Conductivity of Poor Conductor using Lee's Disc
9. Determination of figure of merit table galvanometer
10. Determination of Earth's Magnetic Field using Field along the Axis of a Coil
11. Characterisation of Zener Diode
12. Construction of Zener/IC Regulated Power Supply
13. Construction of AND, OR, NOT Gates using Diodes and Transistor
14. NOR Gate as a Universal Building Block

TEXTBOOKS

1. Srinivasan M.N., Balasubramanian S and Ranganathan R. *A Textbook of Practical Physics.* New Delhi: Sultan Chand & Sons, First Edition, Reprint 2011.
2. Ouseph C.C, Rao U.J. and Vijayendran V. *Practical Physics and Electronics*. Chennai: Ananda Book Depot, First Edition, Reprint 2019.
3. Ouseph C.C, Srinivasan V. and Balakrishnan R. *A Textbook of Practical Physics - Part I & II.* Chennai: S.Viswanathan (Printers & Publishers) Pvt., Ltd., Revised Edition, Reprint 2000.
4. Virendra Kumar. *Digital Electronics: Theory and Experiments*. New Delhi: New Age International (P) Ltd., Second Edition, 2015.

REFERENCES

Books

1. Arora C.L. *B Sc Practical Physics.* New Delhi: S.Chand & Sons Co. Ltd., Reprint 2018.
2. Kakani S.L. and Shubhra K. *Applied Physics: Theory and Practical*. New Delhi: Viva Books Pvt. Ltd., First Edition, 2015.
3. Manjeet S. and Anita D. *Applied Physics: Theory and Experiment*. New Delhi: Vayu Education of India, First Edition, 2011.
4. Tayal D.C. *University Practical Physics*. Mumbai: Himalaya Publishing House, First Millennium Edition, 2000.

Web Sources

1. https://www.youtube.com/watch?v=l0XmP4YY6-w
2. https://www.youtube.com/watch?v=DD5woC4ZYAQ
3. https://www.youtube.com/watch?v=6Ha-ePYMyfM
4. https://www.youtube.com/watch?v=fWhgguWc8rk
5. https://www.youtube.com/watch?v=BxbXnYFqygU&t=311s
6. https://www.youtube.com/watch?v=aXFNoYa95-8