

**GOVERNMENT ARTS COLLEGE (Autonomous),**  
(Re-accredited with 'A' Grade by NAAC and Affiliated to Bharathidasan University, Tiruchirappalli)

**KARUR - 639 005.**



**UG**  
**COURSE STRUCTURE**

**Course Structure under CBCS System**

(Applicable to the Candidates admitted from the Academic Year **2021 - 2022** onwards)

**B.Sc.,**  
**PHYSICS**

# **GOVERNMENT ARTS COLLEGE (Autonomous),**

**KARUR - 639 005**

## **Course structure under CBCS system**

### **UNDERGRADUATE COURSES**

#### **ABOUT THE DEPARTMENT OF PHYSICS**

Department of Physics (BSc physics) was established in the year 1969 and MSc physics was started in the year 2005. After Autonomy, some modern inter-disciplinary subjects like Nano science, Biophysics, Medical physics, Advanced Computer applications in Physics have been included in the present syllabus at both UG and PG level. CBCS system is being followed successfully curriculum has been designed with keen interest so as to ensure that our students get maximum benefits while they study the higher education. Apart from the traditional method of teaching through chalk and talk methods, group discussions, seminar are being conducted at frequent intervals, power point presentation and video clipping are also being used effectively.

Department has B.Sc, M.Sc, M.Phil and Ph.D Physics (Regular) courses. Department has got a good library with 4000 books and 7 journals. The laboratory in this department is a well equipped one with modern amenities like, UV Spectrometer, Constant temperature bath, Spray Pyrolysis apparatus with computerized equipment, Mercury spectrum with computerized, Research softwares are available like Gaussian-2009, Gauss view 05 and wingx (crystallography Softwares).

### **GOVERNMENT ARTS COLLEGE (AUTONOMOUS)**

#### **VISION**

It is our vision to persuade every mind in this temple of learning to tirelessly seek the truth to face the challenges of the times and honestly participate in the establishment of universal peace, progress and love.

#### **MISSION**

It is our mission to create in everyone an honest searching mind to be ready for value-based creative citizenship for regional, national and global peace and progress.

### **PG AND RESEARCH DEPARTMENT OF PHYSICS**

#### **VISION**

#### **MISSION**

## What is Credit system?

Weightage to a course is given in relation to the hours assigned for the course. The following Table shows the correlation between credits and hours. However, there could be some flexibility because of practical, field visits, tutorials and nature of project work.

For UG courses, a student must earn a minimum of **140 (+4)** credits as mentioned in the table below.

The total number of minimum courses offered by a department is given in the course pattern.

### UNDER GRADUATE COURSE PATTERN (2021 ONWARDS)

PART	SEMESTER	SPECIFICATION	NO. OF COURSES	HOURS	CREDITS	TOTAL CREDITS
I	I - IV	Part I	4	22	12	24
II	I - IV	Part II	4	22	12	
III	I - VI	Core courses Theory	9	49	42	92
	I - VI	Core courses Practical	4	23	17	
	I - IV	Allied Course	4	22	16	
	I - IV	Allied Course Practical	1	4	4	
	V - VI	Elective Course	3	15	13	
IV	I - VI	Value Education Environmental Studies Soft Skills Development	3	6	6	22 + (4)
	I - III	Value Added Course (CLP)	2	4	2	
		Extra Credit Course (MOOC)	1	-	2	
	III - IV	Non Core Elective	2	4	4	
	IV - V	Skill Based Elective - Practical	3	6	12	
V	VI	Gender Education	1	1	1	2
		Extension Activities	1	-	1	
<b>TOTAL</b>				<b>180</b>	<b>140 (+4)</b>	<b>140 (+4)</b>

## **Course Pattern**

The Undergraduate degree course consists of five vital components. They are as follows:

**Part - I:** Language (Tamil)

**Part - II:** General English

**Part - III:** Core Course (Theory) Allied, Core Electives)

**Part - IV:** Value Education, Value Added Course, Extra Credit Course, Environmental Studies, Non Core Elective and Soft Skills Development.

**Part - V:** Gender Education and Extension Activities (NSS, NCC, Sports and Games, PEC, FAPA, YRC, RRC, RC, LC and CC).

## **Core Courses**

A core course is the course offered by the parent department related to the major subjects, components like theories, practical's, Project work, field visits and etc.

## **Noncore elective**

Noncore elective Core should be shared by the various Departments of college. This course should be opted by all the students belonging to the particular Department. Each department of the respective college should allocate themselves the schedule and the units of the course.

## **Core Elective**

The core elective course is also offered by the parent department. The objective is to provide choice and flexibility within the department. There are THREE core electives. They are offered in different semesters according to the choice of the college.

## **Extra Credit Courses**

In order to facilitate the students gaining extra credits, the extra credit courses are given. There are two extra credit courses - Massive Open Online Courses (MOOC) and Skill-based Course - offered in the III and V Semesters respectively. According to the guidelines of UGC, the students are encouraged to avail this option of enriching by enrolling themselves in the MOOC provided by various portals such as SWAYAM, NPTEL, etc. Skill based course is offered by the department apart from their regular class hours.

## **Value Education Courses**

There are four courses offered in the first semesters for the First year students.

## **Non-Major Elective / Skill Based Elective**

These courses are offered in two perspectives as electives "Within college".

## Subject Code Fixation

The following code system (11 characters) is adopted for Under Graduate courses:

Year of Revision	UG Code of the Dept	Semester	Specification of Part	Running number in the part
↓	↓	↓	↓	↓
<b>21</b>	<b>U21</b>	<b>x</b>	<b>x</b>	<b>xx</b>
<b>21</b>	<b>UPH</b>	<b>1</b>	<b>x</b>	<b>1</b>

For example:

### **IB.Sc., - Properties of Matter and Acoustics,**

The code of the paper is **U21 PH 1C1**.

Thus, the subject code is fixed for other subjects.

## EXAMINATION

### **Continuous Internal Assessment (CIA):**

<b>UG - Distribution of CIA Marks</b>	
<b>Passing Minimum: 40 Marks</b>	
THEORY CIA MAXIMUM = 25	THEORY CIA MINIMUM = 10
PRACTICAL CIA MAXIMUM = 40	PRACTICAL CIA MINIMUM = 16

### **End - Semester Tests**

Centralized - Conducted by the office of Controller of Examinations.

### **Semester Examination**

Testing with Objective and Descriptive questions.

**Section - A:** 10 Questions x 2 Marks = 20 Marks (No Choice - Two questions from each unit)

**Section - B:** 5 Questions x 5 Marks = 25 Marks (Either... or Type - One pair from each unit)

**Section - C:** 3 Questions x 10 Marks = 30 Marks (3 Out of 5 - One question from each unit)

### **Duration of Examination:**

3- Hours examination for courses.

## Grading System

### **1. Grading**

Once the marks of the CIA and the end-semester examination for each of the courses are available, they will be added. The marks thus obtained, will then be graded as per the scheme provided in Table 1.

From the second semester onwards the total performance within a semester and the continuous performance starting from the first semester are indicated by **Semester Grade Point Average (GPA)** and **Cumulative Grade Point Average (CGPA)**, respectively. These two are calculated by the following formulae

$$\text{GPA} = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i} \quad \text{WAM (Weighted Average Marks)} = \frac{\sum_{i=1}^n C_i M_i}{\sum_{i=1}^n C_i}$$

Where, 'C<sub>i</sub>' is the Credit earned for the Course - i,

'G<sub>i</sub>' is the Grade Point obtained by the student for the Course 'i'.

'M' is the marks obtained for the course 'i', and

'n' is the number of Courses **Passed** in that semester.

CGPA: Average GPA of all the Courses starting from the first semester to the current semester.

## 2. Classification of Final Results

- i) For each of the three parts, there shall be separate classification on the basis of the CGPA, as indicated in the following Table - 2.
- ii) For the purpose of Classification of Final Results, the Candidates who earn CGPA 9.00 and above shall be declared to have qualified for the Degree as 'Outstanding'. Similarly, the candidates who earn the CGPA between 8.00 - 8.99, 7.00 - 7.99, 6.00 - 6.99 and 5.00 - 5.99 shall be declared to have qualified for their Degree in the respective programmes as 'Excellent', 'Very Good', 'Good' and 'Above Average' respectively.
- iii) Absence from an examination shall not be taken as an attempt.

**Table - I - Grading of the Courses**

Marks Range	Grade Point	Corresponding Grade
90 and above	10	O
80 and above but below 90	9	A+
70 and above but below 80	8	A
60 and above but below 70	7	B+
50 and above but below 60	6	B
40 and above but below 50	5	C
Below 40	0	RA

**Table – 2 – Final Result**

<b>CGPA</b>	<b>Classification of Final Results</b>	<b>Corresponding Grade</b>
9.00 and above	O	Outstanding
8.00 to 8.99	A+	Excellent
7.00 to 7.99	A	Very Good
6.00 to 6.99	B+	Good
5.00 to 5.99	B	Above Average
4.00 to 4.99	C	Average
Below 4.00	RA	Re - Appearance

Credit based weighted Mark System is adopted for individual semesters and cumulative semesters in the column 'Marks Secured' (for 100).

**Declaration of Result:**

Mr./Ms. \_\_\_\_\_ has successfully completed the Under Graduate in \_\_\_\_\_ programme. The candidate's Cumulative Grade Point Average (CGPA) in Part - III is \_\_\_\_\_ and the class secured is \_\_\_\_\_ by completing the minimum of 140 credits. The candidate has acquired \_\_\_\_\_ (if any) extra credits offered by the parent department courses.

## **PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**

On obtaining an undergraduate degree the students will be able to:

**PEO1:** Apply the fundamental knowledge of physics for the advancement in technology and research

**PEO2:** Candidates also gain expertise in lab work through practical sessions and training programmes which help them excel at the workplace.

**PEO3:** They can implement their imagination in understanding the scientific phenomena and discover methodologies for the benefit of mankind

**PEO4:** Can become a Physicist .Also eligible to work as a research assistant or technician in a similar field

**PEO5:** Candidates can take admission in Integrated M.Sc. course through JEST, Dual Degree (M.Sc.-Ph.D.)

## **PROGRAMME OUTCOMES (POs)**

At the end of the program the students will be able to

**PO1:** Undergraduate students are to be motivated to enhance their knowledge, understanding and applying new ideas in order to get employability/ self-employment.

**PO2:** Students can pursue higher studies from top educational and research institutes like IIT JAM, JEST, TIFR GS, in India.

**PO3:** Inculcate skills to evaluate, innovate and integrate the contemporary issues and motivate further learning.

**PO4:** Enhance their ethical values, communicative and employability skills.

**PO5:** Gain quality education, global in perspective and contribute towards holistic development.

## **PROGRAMME SPECIFIC OUTCOMES (PSOs)**

After completion of the Specific programme, the student will.

**PSO1:** get an idea to enhance conceptual knowledge.

**PSO2:** get awareness on impact of physics.

**PSO3:** learn observational, measuring and computational techniques.

**PSO4:** Impart experimental skills

**PSO5:** analyzing problem, logical thinking, reasoning, troubleshooting and solving skill

**PSO6:** Ethics, Social Responsibility, Leadership and Entrepreneurial Skills Research Orientation and Internship and Employability Enhancement.

**PSO7:** be able to succeed the entrance exam conducted for admission in M.Sc Degree course, Integrated courses (M.Sc.-Ph.D), Dual Degree (M.Sc.-Ph.D.) or Post-Bachelor's Degree programme at IITs or Integrated Ph.Dprogrammes at IISc.





**GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639 005**  
 (Reaccredited with ‘A’ Grade by NAAC and Affiliated to Bharathidasan University, Tiruchirappalli)

**B.Sc. PHYSICS PROGRAMME STRUCTURE UNDER CBCS SYSTEM**

(For the candidates admitted from the year 2021-2022 onwards)

SEMESTER	PART	COURSE	COURSE TITLE	COURSE CODE	INSTR. HOURS WEEK	CREDIT	EXAM HOURS	MARKS		TOTAL
								INT	ESE	
I	I	Tamil - I	Tamil– I	U21L1T1	5	3	3	25	75	100
	II	English -I	English-I	U21L1E1	5	3	3	25	75	100
	III	Core Course - I	Properties of Matter and Acoustics	U21PH1C1	6	5	3	25	75	100
		Core Course - II	Core Practical – I	-	3	-	-	-	-	-
		First Allied Course –I	Allied Mathematics - I	U21MM1A4	5	3	3	25	75	100
	IV	First Allied Course - II	Allied Mathematics - II	-	2	-	-	-	-	-
	IV	Value Education	Value Education	U21VE1	2	2	3	25	75	100
	IV	Value added Course	CLP/SAP (Special Assistance Programme) SAP Applicable for B.Sc.(CS) & B.Com(CA)		2					
					30	16				500
II	I	Tamil -II	Tamil–II	U21L2T2	5	3	3	25	75	100
	II	English– II	English–II	U21L2E2	5	3	3	25	75	100
	III	Core Course- II	Core Practical–1	U21PH2C2P	3	4	3	40	60	100
		Core Course–III	Mechanics	U21PH2C3	6	5	3	25	75	100
		First Allied Course–II	Allied Mathematics-II	U21MM2A5	2	4	3	25	75	100
	IV	First Allied Course–III	Allied Mathematics-III	U21MM2A6	5	3	3	25	75	100
	IV	Environmental Studies	Environmental Studies	U21ES2	2	2	3	25	75	100
	IV	Value added Course	CLP/SAP (Special Assistance Programme) SAP Applicable for B.Sc.(CS) & B.Com(CA)		2	(2)				
					30	24				700
III	I	Tamil -III	Tamil - III	U21L3T3	6	3	3	25	75	100
	II	English – III	English - III	U21L3E3	6	3	3	25	75	100
	III	Core Course–IV	Thermodynamics and Statistical Physics	U21PH3C4	6	5	3	25	75	100
		Core Course–V	Core Practical- II	-	3	-	-	-	-	-
		Second Allied Course - I	Allied Chemistry– I	U21CH3A1	5	3	3	25	75	100
	IV	Second Allied Course - II	Allied Chemistry–II	-	2	-	-	-	-	-
	IV	Non-Core Elective -I	Laboratory Hygiene and Safety	U21CH3N1	2	2	3	25	75	100
					30	16				500

IV	I	Tamil –IV	Tamil-IV	U21L4T4	6	3	3	25	75	100
	II	English– IV	English–IV	U21L4E4	6	3	3	25	75	100
	III	Core Course –V	Core Practical –II	U21PH4C5P	2	4	3	40	60	100
		Core Course - VI	Optics	U21PH4C6	5	5	3	25	75	100
		Second Allied Course - II	Allied Chemistry –II Practical	U21CH4A2P	2	4	3	40	60	100
		Second Allied Course - III	Allied Chemistry - III	U21CH4A3	5	3	3	25	75	100
	IV	Skill Based Elective - I	Desktop Publishing and Photoshop	U21PH4S1P	2	4	3	40	60	100
	IV	Non-Core Elective - II	Water Pollution and Treatment	U21CH4N2	2	2	3	25	75	100
	IV	Extra Credit Course	Massive Open Online Course (MOOC's)			2				
				30	28				800	
					(2)					
V		Core Course – VII	Electricity and Magnetism	U21PH5C7	5	5	3	25	75	100
		Core Course – VIII	Atomic and Nuclear physics	U21PH5C8	5	4	3	25	75	100
	III	Core Course – IX	Quantum Mechanics & Relativity	U21PH5C9	4	3	3	25	75	100
		Core Course - X	Core Practical – III (General)	-	3	-	-	-	-	-
		Core Course - XI	Core Practical –IV (Electronics)	-	3	-	-	-	-	-
		Elective Course - I	Basic Electronics	U21PH5E1	4	4	3	25	75	100
	IV	Skill Based Elective - II	Electrical Wiring and Winding Lab	U21PH5S2P	2	4	3	40	60	100
		Skill Based Elective - III	Programming in “C” Languages (Lab)	U21PH5S3P	2	4	3	40	60	100
	V	Soft Skill Development	Soft Skill Development	U21SSD3	2	2	3	25	75	100
				30	26				700	
VI	III	Core Course- X	Core Practical- III (General)	U21PH6C10P	3	4	3	40	60	100
		Core Course–XI	Core Practical – IV (Electronics)	U21PH6C11P	3	5	3	40	60	100
		Core Course–XII	Solid State Physics	U21PH6C12	6	5	3	25	75	100
		Core Course–XIII	Spectroscopy and Laser Physics	U21PH6C13	6	5	3	25	75	100
		Elective Course-II	Digital Electronics and Microprocessor	U21PH6E2	5	5	3	25	75	100
		Elective Course-III	Numerical Methods	U21PH6E3	6	4	3	25	75	100
	V	Extension Activities	Gender Studies	U21EA4	1	1	3	25	75	100
		Extension Activities (NSS/ NCC / RRB / YRC / Fine Arts/ Environmental Education / Population, Education Club / Rotract club/ Leo Club /Sports & Games)			1					
				30	30				700	
	TOTAL				180	140				3900
						(4)				

CHAIRMAN  
BOAR OF STUDIES IN PHYSICS

CONTROLLER OF EXAMINATIONS

<b>CREDIT:5</b>		<b>COURSE CODE:U21PHIC1</b>	
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS – I SEMESTER – CORE COURSE - I</b> (For the candidates admitted from the year 2021-22 onwards)			
<b>PROPERTIES OF MATTER AND ACOUSTICS</b>			
<b>COURSE OBJECTIVES :</b>			
To make the Students to			
<ol style="list-style-type: none"> <li>1. Analyze and comprehend regarding the strength of the solid materials of different size.</li> <li>2. Differentiate between the streamline and turbulent flow of liquids and reason out the effects of liquids while flowing</li> <li>3. Compare the viscosity and interfacial surface tension between the liquids</li> <li>4. Understand the effect of gravitation on objects and understand the principle of rocket</li> <li>5. Assimilate and analyze the motion in fluids and express the changes occurring in them in turns of boiling point and freezing point.</li> </ol>			
<b>UNIT - I</b>	<b>ELASTICITY</b>		
	Elastic moduli - Poisson's ratio - Bending of a beam - Expression for bending moment - Depression of the loaded end of a Cantilever - Uniform - Non uniform bending - Theory - Experiment pin and microscope method - Work done in uniform bending – Non-uniform bending - Theory - Expression for couple per unit twist - Determination of rigidity modulus - Static torsion method with scale and telescope - Rigidity modulus by torsion pendulum with mass I shape girders		
<b>UNIT - II</b>	<b>VISCOSITY</b>		
	Streamline and Turbulent flow - Critical velocity - Poisseulle's formula-Determination of coefficient of viscosity by capillary flow method – Comparison of viscosities, Oswald's viscometer - Viscosity of a highly viscous liquid - Stoke's method -Variations of viscosity with temperature and pressure –Viscosity of gases - Mayer's formula for the rate of flow of a gas through a capillary tube - Rankine's method for the determination of viscosity of agas.		
<b>UNIT - III</b>	<b>SURFACE TENSION</b>		
	Surface energy - Angle of contact and its determination - Excess of pressure inside curved - Cylindrical and spherical surfaces - Formation of drops - Experimental study of variation of surface tension with temperature - Drop weight method of determining surface tension and interfacial surface tension - Angle of contact of mercury - Quincke's method – Jaegar's method.		
<b>UNIT - IV</b>	<b>OSMOSIS AND DIFFUSION</b>		
	Osmosis: Vapour pressure osmosis - Experimental determination of osmotic pressure - Laws of osmotic pressure - Osmotic and vapour pressure of a solution - Determination of boiling point of solution and freezing point of solution - Diffusion: Fick's law - Experimental determination of diffusivity - Analogy between diffusion and thermal conduction -Applications.		

<b>UNIT - V</b>	<b>ACOUSTICS</b> Theory of vibrations: Simple harmonic motion - Lissajous figures - Undamped vibration - Damped vibration - Forced vibration - Resonance and sharpness of resonance - Acoustics of buildings: Requisites of good acoustics - Sabine's reverberation formula - Ultrasonics: Properties - Production of ultrasonic waves: Magnetostriction method - Piezoelectric method - Applications.
<b>TEXT BOOKS:</b>  1. BrijLal and N. Subramaniyam, <i>Properties of Matter</i> – Eurasia Publishing Housing, 1983 2. R.Murugesan, <i>Properties of Matter Properties of Matter and Acoustics</i> -.Chand &Co, Delhi. 3. BrijLal and Subramaniyam, <i>Text Book of Sound</i> – Vikas Publishing House, Delhi.	
<b>REFERENCE BOOKS:</b>  1. P.E. Subramanian Iyer, <i>Properties of Matter</i> . 2. L.P. Sharma and H.C. Saxena, <i>Oscillations, waves and sound</i> .	

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

**Teaching Learning Methods**

Chalk and talk Lectures; seminar; ICT based presentations; Video Lectures; Group Discussions; Interactive activities; Mini – project; MCQs

**COURSE OUTCOMES:**

By the end of this course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	Know the concepts of statics, hydrostatics, hydrodynamics	K2
CO2	Understand the rigid body dynamics in terms of Moments of Inertia.	K4
CO3	Learn to solve problems in statics	K5
CO4	Apply gravitation at various situations and its applications	K3
CO5	Acquire a knowledge of variations of acceleration due to gravity and its importance	K2

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

Nature of Course			
Knowledge and skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

**Mapping Course Outcome with PO and PSO**

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO4	PSO 5	Score
CO1	1	4	4	2	2	3	4	4	3	4	3.2
CO2	1	4	3	2	2	4	3	4	3	2	2.8
CO3	2	3	4	3	2	3	4	4	3	2	3.0
CO4	3	4	3	4	2	3	3	4	4	3	3.3
CO5	2	3	3	2	3	3	3	4	3	3	2.9

**Result: The core of the course is 2.9 (High relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

Mean Score COs =  $\frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}}$       Mean overall score for COs =  $\frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$

**COURSE DESIGNER: DR.V.SHANMUGAM**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:4</b>	<b>COURSE CODE:U21PH2C2P</b>
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS – II SEMESTER – CORE COURSE - II</b> (For the candidates admitted from the year 2021-22 onwards) <b>CORE PRACTICAL - I</b>	
<b>COURSE OBJECTIVES :</b> To make the Students to <ol style="list-style-type: none"> <li>1. Understand the physical phenomena and fundamentals of general physics.</li> <li>2. Perform experiments in the field of general physics and gaining understanding of the results.</li> <li>3. Interpret the practical result to support the theory.</li> </ol>	
<b>List of Experiments (Any Fifteen)</b>	
<ol style="list-style-type: none"> <li>1. Young's Modulus - Non Uniform Bending - Pin and Microscope.</li> <li>2. Young's Modulus - Uniform Bending - Optic lever method.</li> <li>3. Young's Modulus - Cantilever Depression - Scale and Telescope Method.</li> <li>4. Compound Pendulum - g and K.</li> <li>5. Torsional Pendulum - Rigidity Modulus.</li> <li>6. Surface tension and Interfacial surface tension of the given liquid - Drop weight method.</li> <li>7. Sonometer - Verification of laws of transverse vibrations and determination of frequency of a tuning fork.</li> <li>8. Sonometer – Determination of AC frequency.</li> <li>9. Melde's Experiment.</li> <li>10. Specific heat capacity of liquid - Newton's law of cooling.</li> <li>11. Thermal Conductivity of bad conductor - Lee's disc method.</li> <li>12. Spectrometer - refractive index of solid prism (A,D and <math>\mu</math> ).</li> <li>13. Co-efficient of viscosity of the given liquid - Poiseuille's flow method.</li> <li>14. Air Wedge -Thickness of wire and thickness of insulation.</li> <li>15. Meter Bridge - Specific resistance.</li> <li>16. P.O. Box - Temperature Co efficient of resistance.</li> <li>17. Potentiometer - Calibration of low range voltmeter.</li> </ol>	
<b>TEXT BOOKS:</b> <ol style="list-style-type: none"> <li>1. Practical Physics, Anchal Srinivasa and R.K. Shukka , New age International Publishers , 2018, second Edition .</li> <li>2. A text book of Physics Practical - Part I, Prof. C.C. Ouseph and Prof. V. Srinivasan, S.Visvanathan Publisher ,1990</li> <li>3. A text book of Physics Practical - Part II, Prof. C.C. Ouseph and Prof. V.Srinivasan, S.Visvanathan, Publisher ,1996</li> </ol>	
<b>REFERENCE BOOKS:</b> <ol style="list-style-type: none"> <li>1. Practical Physics , S.L.Gupta and V.Kumar , PragatiPrakashan- Meerut,1999, 23rd Edition</li> <li>2. A Text book of Practical Physics, H.S.Aller and H.Moore, Mac millan and Co. Limited, 1941.</li> <li>3. Practical Physics with viva –voce , S.P. Singh, Pragati Prakashan- Meerut,1999, 23rd Edition Advanced level Practical Physics , M.Nelkon and J.M. Ogborn, Heinemann Educational Books Limited - London , 1967</li> </ol>	

**COURSE OUTCOMES**

By the end of the course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	Provide hands on experiences in conducting scientific investigations and laboratory experiments.	K5
CO2	Develop the ability to analyze basic experiments and analyze the relationship between theory and experimental results.	K5
CO3	Take measurements to compare experimental results in the laboratory with the theoretical analysis.	K5
CO4	Will be familiar to conduct experimental investigations of simple mechanical, heat and optical physics.	K5
CO5	Practice record keeping of experimental work and data graphing.	K5

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

**Mapping Course Outcome with PO and PSO**

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	TOT	Score
CO1	3	2	3	2	3	3	2	2	3	3	26	2.6
CO2	2	2	3	3	2	2	2	3	3	2	24	2.4
CO3	2	3	3	2	3	3	3	3	2	2	26	2.6
CO4	2	2	3	2	2	2	3	3	2	2	23	2.3
CO5	3	2	2	3	3	3	2	2	3	3	26	2.6
Mean overall Score											125	2.5

**Result: The core of the course is 2.5 (High relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}}$$

$$\text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER: DR.S.LALITHA**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:5</b>	<b>COURSE CODE:U21PH2C3</b>
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS – II SEMESTER – CORE COURSE - III</b> (For the candidates admitted from the year 2021-22 onwards) <b>MECHANICS</b>	
<b>COURSE OBJECTIVES :</b>	
<ol style="list-style-type: none"> <li>1. To study the statics and dynamics of solid bodies and liquids.</li> <li>2. To understand their physical properties.</li> <li>3. To solve problems in statics and dynamics.</li> </ol>	
<b>UNIT - I</b>	<b>STATICS</b> Center of gravity - C.G. of solid hemisphere; hollow hemisphere; tetrahedron hollow cone and solid cone. Friction - laws of friction - cone of friction - angle of friction - static and dynamic friction - equilibrium of a body on a rough inclined plane with and without the application of external force - friction clutch.
<b>UNIT - II</b>	<b>DYNAMICS</b> Projectile - Horizontal projection - Oblique projection - Path of a projectile - Resultant velocity - Time of flight - Vertical height - Range - Impulse and Impact - Laws of Impact - Direct and Oblique impact - Loss of kinetic energy due to direct impact - Motion of two interacting bodies- reduced mass.
<b>UNIT - III</b>	<b>DYNAMICS OF RIGID BODIES</b> Moment of Inertia - Kinetic energy of rotating body and Angular momentum - Parallel and Perpendicular axes theorems - Moment of inertia of a rod , rectangular lamina, sphere, shell, cylinder and fly wheel - Kinetic energy of rolling body – body rolling down an inclined plane.
<b>UNIT - IV</b>	<b>HYDROSTATICS</b> Centre of pressure - centre of pressure of a rectangular lamina and triangular lamina - Floating Bodies - Laws of floatation - stability of floating bodies - Atmospheric pressure - variation of atmospheric pressure with altitude
<b>UNIT - V</b>	<b>HYDRODYNAMICS</b> Equation of continuity - Energy of the fluid - Euler Equation of unidirectional flow - Bernoulli's theorem (Explanation, Proof) - Applications of Bernoulli's theorem: Torricelli's theorem - venturimeter meter - Pitot tube
<b>TEXT BOOKS:</b>	
<ol style="list-style-type: none"> <li>1. Murugesan, R., Mechanics &amp; Mathematical Physics, Chand &amp; Sons, New Delhi, 2015.</li> <li>2. Narayanamoorthy &amp; Vishwanathan (2008) Dynamics, The National Publishing, Company, Chennai, 2008.</li> </ol>	
<b>REFERENCE BOOKS:</b>	
<ol style="list-style-type: none"> <li>1. Mechanics, D.S. Mathur, S.Chand&amp; Company Ltd, New Delhi(2000)</li> <li>2. Fundamentals of Physics D. Halliday, R. Resnick and J. Walker, 6th edition, Wiley, NY.</li> </ol>	



<b>Teaching Learning Methods</b> Chalk and talk Lectures; seminar; ICT based presentations; Video Lectures; Group Discussions; Interactive activities; Mini – project; MCQs
---

**COURSE OUTCOMES**

By the end of the course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	The concepts of statics, hydrostatics, hydrodynamics	K2
CO2	Understand the rigid body dynamics in terms of Moments of Inertia.	K2
CO3	Learn to solve problems in statics	K5
CO4	Will be familiar to learn to solve problems in statics	K3
CO5	Acquire a knowledge of variations of acceleration due to gravity and its importance	K4

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

<b>Nature of Course</b>			
Knowledge and skill	✓	Employability oriented	
Skill oriented		Entrepreneurship oriented	

**Mapping Course Outcome with PO and PSO**

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	TOT	Score
CO1	1	4	4	2	2	3	4	4	3	4	3.2	1
CO2	1	4	3	2	2	4	3	4	3	2	2.8	1
CO3	2	3	4	3	2	3	4	4	3	2	3.0	2
CO4	3	4	3	4	2	3	3	4	4	3	3.3	3
CO5	2	3	3	2	3	3	3	4	3	3	2.9	2
Mean overall Score												2.65

**Result: The core of the course is 2.65 (High relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}} \quad \text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER: M.SENGANI SELVI**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:5</b>		<b>COURSE CODE:U21PH3C4</b>	
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS - III SEMESTER - CORE COURSE - IV</b> (For the candidates admitted from the year 2021-22 onwards) <b>THERMODYNAMICS AND STATISTICAL PHYSICS</b>			
<b>COURSE OBJECTIVES :</b>			
CEO1: To make the students understand the working function of internal combustions engines. CEO2: Acquire knowledge of changes of entropy in different process. CEO3: Evaluate the thermal conductivities of good and bad conductors. CEO4: Apply the principle of Refrigerating mechanism. CEO5: Use thermal and statistical principle in a wide range of applications.			
<b>UNIT - I</b>	<b>HEAT</b>	Specific heat of solids - Dulong and Petit's law - Specific heat capacities of gases - Determination of $C_v$ by Joly's differential steam calorimeter - Determination of $C_p$ by Regnault's method - Isothermal and adiabatic processes - Reversible and irreversible processes - Carnot's theorem - Proof - Internal combustion engines (Otto and diesel engines) - Cycle of operation - Indicator diagram – Efficiency.	
<b>UNIT - II</b>	<b>THERMODYNAMICS</b>	Entropy - Change of entropy in adiabatic process - Change of entropy in reversible and irreversible process - T-S diagram - Entropy of perfect gas - Kelvin's thermodynamic scale of temperature - Maxwell's thermo dynamical relations - Applications: Clausius - Clapeyron's equations – T- dS equations.	
<b>UNIT - III</b>	<b>CONDUCTION AND RADIATION</b>	Conduction: Coefficient of thermal conductivity - Thermal conductivity of a good and bad conductor: Forbe's method - Lee's disc method - Radiation: Stefan's law - Determination of Stefan's constant (laboratory method) - Disappearing filament Optical Pyrometer - Solar constant - Temperature of the Sun - Water flow pyroheliometer - Water Stir Pyroheliometer.	
<b>UNIT - IV</b>	<b>LOW TEMPERATURE PHYSICS</b>	Joule - Kelvin effect - Temperature of inversion - Porous plug experiment - theory Liquefaction of gases (principle of regenerative cooling) - Adiabatic expansion process - Adiabatic demagnetization - Refrigerating mechanism - Liquefaction of air- Linde's process - Liquefaction of Helium.	
<b>UNIT - V</b>	<b>STATISTICAL PHYSICS</b>	Phase space - Statistical equilibrium - Micro and Macro states - Ensembles - Statistics of Particles - M.B - B.E - F.D statistics - Application of B.E statistics to photon gases - F.D statistics - Application of F.D. statistics to electron gas - Comparison of three statistics.	
<b>TEXT BOOKS:</b>			
1. BrijLal, Dr. N. Subrahmaniyam and P.S. Hemine, <i>Heat, Thermodynamics and Statistical Physics</i> - S.Chand& Co., New Delhi.,2010 2. J.B. Rajam and C.L.Arora, <i>Heat and thermodynamics</i> - S.Chand & Co., New Delhi. 3. R. Murugesan, <i>Thermal Physics</i> - 1 <sup>st</sup> Edition2002.			
<b>REFERENCE BOOKS:</b>			
1. D.S. Mathur, <i>Heat and thermodynamics</i> - S.Chand& Co., 2002. 2. Agarwal, Singhal, Sathyaprakash, <i>Heat and thermodynamics</i> . 3. H.C. Saxena and Agarwal <i>Thermal physics</i> .			

<b>Teaching Learning Methods</b> Lecture method; ICT, Seminar, Quiz, Group Discussion.
---

**COURSE OUTCOMES**

By the end of the course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	Recall the different specific heat capacities of matters	K1
CO2	Understand Maxwell’s thermodynamic relations to relate the changes in the fundamental and derived properties	K2
CO3	Apply Stefan’s constant to evaluate temperature of sun at a particular place	K3
CO4	Analyze the different principles used in liquefaction of gases	K4
CO5	Compare the different statics of particles	K5

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

<b>Nature of Course</b>			
Knowledge and skill	✓	Employability oriented	
Skill oriented		Entrepreneurship oriented	

**Mapping Course Outcome with PO and PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	POS6	POS7	POS8	TOT	Score
CO1	3	2	3	3	2	3	2	3	2	1	3	2	2	31	2.3
CO2	3	2	2	3	2	3	3	1	2	3	3	2	3	32	2.5
CO3	3	2	3	3	2	3	2	3	3	3	2	3	2	34	2.6
CO4	3	3	3	3	2	3	3	2	3	3	2	2	2	34	2.5
CO5	3	3	3	2	3	2	3	2	2	3	2	3	2	33	2.5
Mean overall score															2.5

**Result: The core for this course is 2.5 (High relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}} \quad \text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER: DR.S.SHANTHI**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:4</b>	<b>COURSE CODE:U21PH4C5P</b>
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS – IV SEMESTER – CORE COURSE - V</b> (For the candidates admitted from the year 2021-22 onwards) <b>CORE PRACTICAL - II</b>	
<b>COURSE OBJECTIVES :</b> To make the Students to CEO1: Calculate the Rigidity modulus of a given rod. CEO2: Verify the output of Logic gate using IC's. CEO3: Study the characteristics of given Transisto. CEO4: Calibrate an ammeter using Potentiometer. CEO5: Analyze the effect of refractive index of a medium using optical Instruments.	
<b>List of Experiments (Any Fifteen)</b>	
<ol style="list-style-type: none"> <li>1. Temperature of coefficient of resistance - Potentiometer.</li> <li>2. Specific heat capacity of a liquid - Joule's calorimeter.</li> <li>3. Emissive power of a surface - spherical calorimeter.</li> <li>4. Convex Lens - f, R and <math>\mu</math>.</li> <li>5. Potentiometer - calibration of ammeter.</li> <li>6. Figure of merit [current sensitivity and voltage sensitivity] - mirror galvanometer.</li> <li>7. Refractive index of liquid prism - spectrometer.</li> <li>8. Zener controlled voltage regulator.</li> <li>9. Surface Tension – Capillary rise method.</li> <li>10. Resistance and specific resistance - Carey foster bridge.</li> <li>11. Verification of Logic Gates - AND, OR, NOT, NAND and NOR using IC's.</li> <li>12. Transistor characteristics - CE Configuration.</li> <li>13. Rigidity modulus of the given wire - Torsion pendulum with equal masses.</li> <li>14. Spectrometer - i-d curve.</li> <li>15. Spectrometer - Grating - Minimum Deviation method.</li> <li>16. Determination of rigidity modulus of the given rod - Static torsion.</li> <li>17. Kundt's tube - Young's modulus of the material of the rod.</li> <li>18. Stoke's method - Viscosity of highly viscous liquid.</li> <li>19. CRO study of wave forms - Lissajou's figures - frequency determination.</li> <li>20. Newton's rings - Radius of curvature of a convex lens.</li> </ol>	
<b>TEXT BOOKS:</b> <ol style="list-style-type: none"> <li>1. Practical Physics, AnchalSrinivasa and R.K. Shukka , New age International Publishers ,2018, second Edition .</li> <li>2. A text book of Physics Practical - Part I, Prof. C.C. Ouseph and Prof. V. Srinivasan, S.Visvanathan Publisher ,1990.</li> <li>3. A text book of Physics Practical - Part II, Prof. C.C. Ouseph and Prof. V. Srinivasan, S.Visvanathan, Publisher ,1996.</li> </ol>	
<b>REFERENCE BOOKS:</b> <ol style="list-style-type: none"> <li>1. Practical Physics , S.L.Gupta and V.Kumar , PragatiPrakashan- Meerut,1999, 23rd Edition</li> <li>2. A Text book of Practical Physics, H.S.Aller and H.Moore, Mac millan and Co. Limited, 1941.</li> <li>3. Practical Physics with viva –voce , S.P. Singh, PragatiPrakashan- Meerut,1999, 23rd Edition Advanced level Practical Physics , M.Nelkon and J.M. Ogborn, Heinemann Educational Books Limited - London , 1967</li> </ol>	

**COURSE OUTCOMES**

By the end of the course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	Recall the properties of convex lens.	K1
CO2	Calculate the viscosity of highly Viscous liquid.	K2
CO3	Apply the circuit of Zener controlled Voltage regulator real - world situations.	K3
CO4	Analyze the specific heat capacity of different liquids.	K4
CO5	Evaluate the different wavelength of a spectrum.	K5

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

**Mapping Course Outcome with PO and PSO**

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	TOT	Score
CO1	1	4	4	2	2	3	4	4	3	4	3.2	1
CO2	1	4	3	2	2	4	3	4	3	2	2.8	1
CO3	2	3	4	3	2	3	4	4	3	2	3.0	2
CO4	3	4	3	4	2	3	3	4	4	3	3.3	3
CO5	2	3	3	2	3	3	3	4	3	3	2.9	2
Mean overall Score												2.76

**Result: The core for this course is 2.5 (High relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}} \quad \text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER:**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:5</b>	<b>COURSE CODE:U21PH4C6</b>
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS – IV SEMESTER – CORE COURSE - VI</b> (For the candidates admitted from the year 2021-22 onwards) <b>OPTICS</b>	
<b>COURSE OBJECTIVES :</b> To make the Students to <ol style="list-style-type: none"> <li>1. Acquire knowledge in ray optics.</li> <li>2. Understand mechanism of energy transfer in the form of waves.</li> <li>3. Basic principles of optical instruments.</li> </ol>	
<b>UNIT - I</b>	<b>GEOMETRICAL OPTICS</b> Aberrations - Spherical aberration in lens Methods of reducing spherical aberration - Coma - Astigmatism - Curvature of the field - Distortion - Chromatic aberration in a lens - Achromatic lenses - Dispersive power: Achromatism in prism - Deviation without dispersion - Dispersion without deviation.
<b>UNIT - II</b>	<b>INTERFERENCE</b> Introduction - Coherence - Conditions for interference - Interference in thin films - Interference due to reflected light - Conditions for Maxima and Minima - Air wedge - Testing the planeness of a surface - Michelson's interferometer - Principle - Construction - Working - Types of fringes - Applications - Determination of $\lambda$ and $d\lambda$ - Thickness of a thin transparent sheet - Fabryperot interferometer.
<b>UNIT - III</b>	<b>DIFFRACTION AND OPTICAL INSTRUMENT</b> Fresnel's diffraction - Diffraction at a Circular aperture and Straight edge - Fraunhofer diffraction - Diffraction at a single slit - Double slit - N slits (diffraction grating) - Normal incident - Absent and overlapping spectra of diffraction grating - Huygens eye piece - Rayleigh's criterion - Resolving power of a telescope, microscope and grating.
<b>UNIT - IV</b>	<b>POLARIZATION</b> Huygen's explanation of double refraction in uniaxial crystals - Quarter wave plate and half wave plate - Babinet's compensator - Production and detection of plane elliptically and circularly polarised light – Nicol prism - Optical activity - Laurent's half shade polarimeter.
<b>UNIT - V</b>	<b>QUANTUM OPTICS</b> Fibre optic system – Advantages over copper cable communication - Principle - Acceptance angle and Numerical aperture - Types of Optical fibre: Based on materials, refractive index and modes of propagation - Fibre optic communication system - Introduction to Non-linear optics - Linear medium - Nonlinear polarization - Second harmonic generation.
<b>TEXT BOOKS:</b> <ol style="list-style-type: none"> <li>1. N. Subramaniam and BrijLal, A Text book of optics, Revised by M.N. Avadhanullah, - S.Chand&amp; Co., 2004.</li> <li>2. R. Murugesan and Kiruthiga Sivaprasath, Optics and spectroscopy - S.Chand&amp; Co., New Delhi 2006.</li> </ol>	
<b>REFERENCE BOOKS:</b> <ol style="list-style-type: none"> <li>1. P.K. Chakrabarthy, Geometrical and Physical Optics - New Central Book Agency, Kolkata., 2005.</li> <li>3. D.R. Khanna and H.R. Gulati, Optics - R.Chand&amp; Co., New Delhi. 1979.</li> </ol> Ajoychatak, Optics – TMH, Delhi.	

**Teaching Learning Methods**

Chalk and talk Lectures; seminar; ICT based presentations; Video Lectures; Group Discussions; Interactive activities; Mini – project; MCQs

**COURSE OUTCOMES**

By the end of the course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	Develop an understanding of the principles of optics	K2
CO2	Build connections between mathematical development and conceptual understanding	K2
CO3	Learn to use geometrical approximation, understand the aberration with an emphasis on image forming systems and they can be reduced	K3
CO4	Understand geometrical optics, Interference, Diffraction and polarization	K2
CO5	Be acquainted with Fresnel and Fraunhofer diffraction	K6

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

Nature of Course			
Knowledge and skill	✓	Employability oriented	
Skill oriented		Entrepreneurship oriented	

**Mapping Course Outcome with PO and PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	POS6	POS7	POS8	TOT	Score
CO1	3	2	3	3	2	3	2	3	2	1	3	2	2	31	2.3
CO2	3	2	2	3	2	3	3	1	2	3	3	2	3	32	2.5
CO3	3	2	3	3	2	3	2	3	3	3	2	3	2	34	2.6
CO4	3	3	3	3	2	3	3	2	3	3	2	2	2	34	2.5
CO5	3	3	3	2	3	2	3	2	2	3	2	3	2	33	2.5
Mean overall score															2.5

**Result: The core of the course is 2.5 (High relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

Mean Score COs =  $\frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}}$

Mean overall score for COs =  $\frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$

**COURSE DESIGNER: DR.S.LALITHA**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:4</b>		<b>COURSE CODE:U21PH4S1P</b>	
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS – IV SEMESTER – SKILL BASED ELECTIVE - I</b> (For the candidates admitted from the year 2021-22 onwards) <b>DESKTOP PUBLISHING AND PHOTOSHOP - LAB</b>			
<b>COURSE OBJECTIVES :</b>			
<ol style="list-style-type: none"> <li>1. Compile word document independently along with usage of access for generation of multiple end user.</li> <li>2. Preparation of spread sheet and working with multiple data.</li> <li>3. Hands on experience with MS Office.</li> <li>4. To designing e books, brochures, visiting cards and other printing works.</li> </ol> Adobe page maker can take print in printing press			
<b>UNIT - I</b>	<b>MS Word</b>	Document formatting options - Tables, Bullets and Numbering - Font - Alignment Paragraph Formatting - Insert Picture, Clipart, Shapes and WordArt - Header and Footer - Text Box – Page Layout - Mail Merge - Spelling and Grammar.	
<b>UNIT - II</b>	<b>MS Excel and Power Point</b>	Cell Formatting Options - Formulae and Functions - Charts - Sort - Filter -Grouping. Creating Slide show by using Animation Technique - Slide Master - Clip Art - Picture Editing.	
<b>UNIT - III</b>	<b>PAGE MAKER</b>	Creating new Filets - Entering text - Defining Style - Saving files - Creating Frame - Inserting and removing pages - Adding shapes - Creating frame - Creating header and footer - Using story Editor - Developing long documents - Using color - Printing - Practice on Multilingual software like INDIC .	
<b>UNIT - IV</b>	<b>COREL DRAW</b>	Drawing-lines, Shapes - Inserting Pictures, Objects, Tables, Templates - Use of Pick tools, Zoom tools, Free hand tool, Square tool, Rectangle tool, Text tool, Fill tool - Fonts used in designing of monograms, Logos, Posters, Stickers, Greeting cards, Wedding cards, Visiting cards - Adding special effects - Exporting drawings - Outlining and filling objects – Inserting symbols and Clip arts - Exporting file - Use features of Corel draw to create artistic characters and shapes.	
<b>UNIT - V</b>	<b>PHOTOSHOP</b>	The File menu - The Tools menu - Drawing lines and shapes - Formats - Photo Editing / Inserting setting up - Introduction of layers – The interface managing Palettes - Working with layers - WEB and WEB GALLERY using internet explorer - Image ready - Creating Animations and presentations - Different color scheme Palettes Digital Imaging - Working with different Palettes - Image adjustment options - Labels - Auto labels, Auto contrasts - Curves - Color balance - Posterize - Variations - Preparing the file and work area - Creating three Dimensional effects using Layers - Working with different tools - Editing Selections - Creating images and giving special effects using Filters - Using layer styles - Produce an image by mixing two or more different images using layer - Tips and tricks in Photoshop.	
<b>TEXT BOOKS:</b>			
<b>REFERENCE BOOKS:</b>			



<b>Teaching Learning Methods</b> Chalk and talk Lectures; seminar; ICT based presentations; Video Lectures; Group Discussions; Interactive activities; Mini – project; MCQs
--

**COURSE OUTCOMES**

By the end of the course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	Recall the different specific heat capacities of matters	K1
CO2	Understand Maxwell’s thermodynamic relations to relate the changes in the fundamental and derived properties	K2
CO3	Apply Stefan’s constant to evaluate temperature of sun at a particular place	K3
CO4	Analyze the different principles used in liquefaction of gases	K4
CO5	Compare the different statics of particles	K5

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

**Mapping Course Outcome with PO and PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	TOT	Score
CO1	2	3	2	2	3	3	3	3	2	3	26	2.6
CO2	3	2	4	2	3	2	3	4	2	3	28	2.8
CO3	2	3	4	2	2	3	2	4	1	3	27	2.7
CO4	4	3	2	1	4	2	3	3	3	2	27	2.7
CO5	2	4	3	3	2	3	2	2	4	3	28	2.8
Mean overall score											2.72	

**Result: The Score for this course is 2.72 (High relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}} \quad \text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER: C.GUNASEKARAN**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:5</b>	<b>COURSE CODE:U21PH5C7</b>
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS – V SEMESTER – CORE COURSE - VII</b> (For the candidates admitted from the year 2021-22 onwards) <b>ELECTRICITY AND MAGNETISM</b>	
<b>COURSE OBJECTIVES :</b>	
<ol style="list-style-type: none"> <li>1. To know the fundamentals of electricity, magnetism and electromagnetism.</li> <li>2. To grasp the principle behind the electrical components and simple electrical Instruments.</li> <li>5. To understand electromagnetic Induction and alternating circuits.</li> </ol>	
<b>UNIT - I</b>	<b>ELECTROSTATIC</b> Coulomb's law - Electric field due to a point charge - Electric potential - Relation between electric field and electric potential - Electric potential energy – Poisson's and Laplace equations - Flux of the electric field - Gauss's theorem - Electric field due to a uniformly charged solid sphere and a uniform infinite solid Cylindrical charge - Energy stored per unit volume in the medium surrounding the Charged conductor - Electrometer: Quadrant Electrometer - Measurement of ionization current - Attractive disc electrometer.
<b>UNIT - II</b>	<b>MAGNETO STATICS</b> Definitions: Magnetic Induction - Magnetization - Magnetic susceptibility - Magnetic permeability - Relation between B, H and M - Properties of diamagnetic, paramagnetic and ferromagnetic materials - Soft and Hard Magnetic Materials – BH curve for a magnetic material by magnetometer method - Ballistic Galvanometer method - Hysteresis curve - Retentivity and Coercivity - Calculation of energy loss in a hysteresis cycle.
<b>UNIT - III</b>	<b>MAGNETIC EFFECT OF CURRENT</b> Ampere's Circuital Law - Biot-Savert's law - Magnetic induction at a point due to a straight conductor carrying current - Force between two parallel current carrying conductors - Fleming's left hand rule - Moving coil Galvanometer - Theory and working of moving coil ballistic galvanometer - Damping correction - Comparison of two capacitors using B.G
<b>UNIT - IV</b>	<b>CURRENT ELECTRICITY AND THERMO ELECTRICITY</b> Kirchoff's Laws - Carey Foster's Bridge - Potentiometer - Calibration of Ammeter - Low range and High range voltmeter - Laws of Thermo e.m.f - Definition and Determination of Peltier and Thomson coefficients - Application of thermodynamics to a thermocouple - Measurement of thermo e.m.f of a thermo couple using potentiometer - Thermo-electric Diagrams - Uses.
<b>UNIT - V</b>	<b>ELECTROMAGNETIC INDUCTION AND ALTERNATING CIRCUITS</b> Faraday's Laws of electromagnetic Induction - Determination of Self Inductance by Rayleigh's Method - Mutual Inductance - Experimental determination of Mutual Inductance by direct method - Coefficient of Coupling - Eddy Current - Uses AC circuits -Ac- average and rms value - AC through L and R in series vector diagram method - AC through C and R in series vector diagram method - LCR series and parallel circuit - sharpness of resonance - Q factor, Power factor, choke coil.
<b>TEXT BOOKS:</b>	
<ol style="list-style-type: none"> <li>1. Murugesan, R., 2006, Electricity and Magnetism - Chand &amp; Co., New Delhi.</li> <li>2. Sehgal – Chopra- Sehgal, Electricity and magnetism, Sultan Chand and sons Ltd, New Delhi, 6th edition reprint, 2010</li> </ol>	
<b>REFERENCE BOOKS:</b>	
<ol style="list-style-type: none"> <li>1. Brijlal and Subrahmanyam, Electricity and Magnetism, Ratan Prakashan Mandir, Agra, 1995. (Unit 1,2)</li> <li>2. R.Murugesan, Electricity and Magnetism, S.Chand and Company, 2005.(Unit 3-5)</li> <li>3. D.N.Vasudeva, Fundamentals of Magnetism and Electricity, S.Chand&amp; Co, 2007.</li> <li>4. Sehgal, Chopra and Sehgal, Electricity and Magnetism, Sultan Chand and Sons, New Delhi, 2014.</li> <li>5. K.K. Tiwari, Electricity and Magnetism, S. Chand and Company, New Delhi, 2002.</li> </ol>	

<b>Teaching Learning Methods</b> Chalk and talk Lectures; seminar; ICT based presentations; Video Lectures; Group Discussions; Interactive activities; Mini – project; MCQs
--

**COURSE OUTCOMES**

By the end of the course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	Understand the fundamental principles of electrostatics, able to employ methods of calculus to calculate electric field from a distribution of charges.	K2
CO2	Understand Biot-Savart law and use to compute the field due to current carrying conductors	K2
CO3	To apply the basic knowledge of electromagnetic induction to explain observational phenomenon.	K3
CO4	Study Kirchoff's law and use it to analyze circuits	K4
CO5	The student has acquired knowledge of Faraday's Laws of electromagnetic Induction.	K5

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

<b>Nature of Course</b>			
Knowledge and skill		Employability oriented	
Skill oriented	✓	Entrepreneurship oriented	

**Mapping Course Outcome with PO and PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Score
CO1	1	3	4	2	2	3	3	3	3	4	2.8
CO2	1	4	3	3	2	4	3	4	3	3	3.0
CO3	3	3	3	3	2	3	3	4	3	3	3.0
CO4	3	4	3	4	2	3	3	4	4	3	3.3
CO5	2	3	3	2	3	3	3	4	3	3	2.9
Mean overall score											2.72

**Result: The Score for this course is 2.72 (High relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}} \quad \text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER: T.SEETHALAKSHMI**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:4</b>		<b>COURSE CODE:U21PH5C8</b>	
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS – V SEMESTER – CORE COURSE - VIII</b> (For the candidates admitted from the year 2021-22 onwards) <b>ATOMIC AND NUCLEAR PHYSICS</b>			
<b>COURSE OBJECTIVES :</b>			
To make the Students to			
<ol style="list-style-type: none"> <li>1. Understand the positive rays, soft and hard x-rays.</li> <li>2. Recognize how the electrons are filled in various orbitals.</li> <li>3. Examine why sodium vapor emits yellow light with two different wavelengths.</li> <li>4. Evaluate various nuclear models.</li> <li>5. Assess the importance of nuclear fission and nuclear fusion.</li> </ol>			
<b>UNIT - I</b>	<b>POSITIVE RAY AND X-RAY ANALYSIS</b>		
	Positive Rays: Properties of positive rays – determination of e/m ratio of positive rays by Thomson’s parabola method - critical potential – Frank- Hertz’s experiment - X- rays: Production of X- rays - Continuous and Characteristic X- rays - Scattering of X-rays - Compton Scattering- properties and applications of x-rays- solving problems.		
<b>UNIT - II</b>	<b>VECTOR ATOM MODEL</b>		
	Various quantum numbers - Coupling Schemes - Pauli’s exclusion principle -Electronics configuration of elements - Periodic classification of elements - Magnetic dipole moment of electron due to orbital and spin motion - Bohr Magneton - Stern and Gerlach Experiment and its applications-problems.		
<b>UNIT - III</b>	<b>FINE STRUCTURE OF SPECTRAL LINES</b>		
	Special terms and notations - Selection rules - Intensity rule and interval rule - Fine structure of sodium D lines - Zeeman effect - Larmor’s theorem - Debye’s quantum mechanical explanation of the normal Zeeman effect - Anomalous Zeeman effect - Theoretical explanation Lande’s g-factor - Explanation of splitting of D1 and D2 lines of sodium - Paschen back effect and Stark effect.		
<b>UNIT - IV</b>	<b>BASIC NUCLEAR PROPERTIES</b>		
	Nuclear size, charge, mass, spin, isotopes, isomers - Nuclear Magnetic dipole moment - Electric quadrapole moment - Mass defect - Binding energy - Packing fraction - Nuclear forces - Nuclear models: Shell model - Liquid drop model – Particle accelerators: Cyclotron - Betatron – Detectors: Wilson’s cloud chamber - Bubble chamber.		
<b>UNIT - V</b>	<b>NUCLEAR REACTIONS AND ELEMENTARY PARTICLES</b>		
	Q-value of nuclear reaction – Chain reaction - Nuclear reaction cross section - Nuclear Fission - Energy released in fission - Nuclear fusion – Nuclear breeder reactor - Source of Solar energy - Plasma - Magnetic bottle - Plasma confinement - Elementary particles: Baryons - Leptons - Mesons - Strange particles.		
<b>TEXT BOOKS:</b>			
<ol style="list-style-type: none"> <li>1. S. Murugesan, Modern Physics - S.Chand&amp; Co.</li> <li>2. J.B Rajam, Modern Physics - S. Chand &amp; Co.</li> </ol>			
<b>REFERENCE BOOKS:</b>			
<ol style="list-style-type: none"> <li>1. G.JoseRobinand A.Ubald Raj, <i>Modern Physics</i> –Indira Publications.</li> <li>2. N.Subramaniam and BrijLal, <i>Atomic And Nuclear Physics</i>.</li> </ol>			

<b>Teaching Learning Methods</b> Chalk and talk Lectures; seminar; ICT based presentations; Video Lectures; Group Discussions; Interactive activities; Mini – project; MCQs
--

**COURSE OUTCOMES**

By the end of the course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	Analyze why soft x-rays are for medical purpose and hard x-rays are used for research purpose.	K5
CO2	Distinguish the orbital and spin motion of the electron	K3
CO3	Calculate the Lande’s g-factor and wavelength of light emitted by sodium vapor lamp	K4
CO4	Analyze how the mass difference is converted into energy	K3
CO5	Evaluate the energy released by I Kg of U235	K5

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

<b>Nature of Course</b>			
Knowledge and skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

**Mapping Course Outcome with PO and PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	TOT	Score
CO1	3	3	2	3	3	3	3	2	2	3	27	2.7
CO2	2	3	3	3	3	3	3	2	3	2	27	2.7
CO3	3	3	2	3	2	3	2	3	3	3	26	2.6
CO4	2	3	3	2	3	2	3	2	3	3	25	2.5
CO5	3	3	2	3	3	3	3	2	3	2	27	2.7
Mean overall score												2.64

**Result: The Score for this course is 2.64 (High relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}} \quad \text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER: DR.K.PUSHPANATHAN**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:3</b>		<b>COURSE CODE:U21PH5C9</b>	
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS – V SEMESTER – CORE COURSE - IX</b> (For the candidates admitted from the year 2021-22 onwards) <b>QUANTUM MECHANICS AND RELATIVITY</b>			
<b>COURSE OBJECTIVES :</b>			
To make the Students to			
<ol style="list-style-type: none"> <li>1. Understand the positive rays, soft and hard x-rays.</li> <li>2. Recognize how the electrons are filled in various orbitals.</li> <li>3. Examine why sodium vapor emits yellow light with two different wavelengths.</li> <li>4. Evaluate various nuclear models.</li> <li>5. Assess the importance of nuclear fission and nuclear fusion.</li> </ol>			
<b>UNIT - I</b>	<b>FOUNDATIONS OF QUANTUM MECHANICS</b>		
	Inadequacy of classical mechanics - Black body radiation - Characteristics of black body radiation - Kirchoff's law - Wien's law - Stefan's law - Rayleigh Jean's law - Energy distribution in black body - Planck's hypothesis and Radiation law - Planck's quantum theory - Properties of photons - Laws of photo electric effect - Experiment - Einstein's photo electric equation.		
<b>UNIT - II</b>	<b>MATTER WAVES</b>		
	De - Broglie's waves - de-Broglie wavelength - de-Broglie concept of stationary orbits - de-Broglie wave length associated with electron accelerated through a potential difference - Velocity of de-Broglie waves - Properties of matter waves - Experimental verification of matter waves: G.P. Thomson experiment - Davisson and Germer's experiment.		
<b>UNIT - III</b>	<b>DEVELOPMENT OF QUANTUM MECHANICS</b>		
	Concept of wave function and its physical significance - Wave velocity and group velocity - Relation between phase velocity and group velocity for a Non-Relativistic free particle - Normalized and orthogonal wave functions - Expansion theorem - Conditions satisfied by wave function - Heisenberg's uncertainty principle - Experiment: Heisenberg's Gamma ray microscope - Applications: Minimum energy of a harmonic oscillator – Energy of a particle in one dimensional box.		
<b>UNIT - IV</b>	<b>OPERATOR FORMALISM &amp; SCHROEDINGER'S WAVE EQUATION</b>		
	Operators associated with different observables - Expectation values of dynamical quantities - Eigen values and Eigen functions - Orbital angular momentum operator and their commutation rules - Time - Independent wave equation - Time-dependent wave equation - Application: Particle in one dimensional box.		
<b>UNIT - V</b>	<b>RELATIVITY</b>		
	Frame of reference - Galilean transformation equations - Michelson - Morley experiment - Postulates of special theory of relativity - Lorentz transformation equations - Length contraction - Time dilation - Addition of velocities - Variation of mass with velocity - Mass-Energy equivalence - Relation between relativistic momentum and energy.		
<b>TEXT BOOKS:</b>			
<ol style="list-style-type: none"> <li>1. SatyaPrakash, Quantum Mechanics, PragatiPrakashan, Meerut, 2008.</li> <li>2. A.K. Saxena, Principles of Modern Physics, Narosa publishing house, New Delhi, 2005. R. Murugesan&amp;KiruthigaSivaprasath, Modern Physics, S.ChandPublishing, New Delhi.</li> </ol>			
<b>REFERENCE BOOKS:</b>			
<ol style="list-style-type: none"> <li>1. H.S. Mani and G.K. Metha, Introduction to Modern physics, EWP, New Delhi, LCSE, 1988.</li> <li>2. B.L. Theraja, Modern physics, S. Chand publishing, New Delhi. V. Rajendran and A. Marikani, Applied Physics for Engineers, TMH, New Delhi,2001</li> </ol>			

<b>Teaching Learning Methods</b> Chalk and talk Lectures; seminar; ICT based presentations; Video Lectures; Group Discussions; Interactive activities; Mini – project; MCQs
--

**COURSE OUTCOMES**

By the end of the course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	Understand the general concepts and principles in quantum mechanics.	K3
CO2	Acquire knowledge related to matter waves.	K2
CO3	Solve the time independent and time dependent Schrödinger equation	K5
CO4	Master the concepts of angular momentum and spin.	K3
CO5	Appreciate the importance of relativity in mechanics.	K4

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

<b>Nature of Course</b>			
Knowledge and skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

**Mapping Course Outcome with PO and PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Score
CO1	3	3	2	2	3	3	3	3	2	3	2.7
CO2	3	3	2	3	2	3	3	2	2	3	2.6
CO3	3	2	3	3	3	3	2	3	2	2	2.6
CO4	2	3	2	3	3	3	3	2	2	3	2.6
CO5	3	3	2	3	2	2	3	3	3	3	2.7
Mean overall score											2.64

**Result: The Score for this course is 2.64 (Moderate Relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}} \quad \text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER: DR.V.SHANMUGAM**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:4</b>		<b>COURSE CODE:U21PH5E1</b>	
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS – V SEMESTER – ELECTIVE COURSE - I</b> (For the candidates admitted from the year 2021-22 onwards) <b>BASIC ELECTRONICS</b>			
<b>COURSE OBJECTIVES :</b>			
To make the Students to			
<ol style="list-style-type: none"> <li>1. Have a basic knowledge of semiconductor diode, rectifier and filter circuits.</li> <li>2. Understand transistor biasing and working principle of Amplifiers.</li> <li>3. Explain feedback and oscillatory circuits.</li> <li>4. Comprehend the operation and characteristics of FET, MOSFET, SCR and UJT.</li> <li>5. An idea about operational amplifiers.</li> </ol>			
<b>UNIT - I</b>	<b>SEMICONDUCTOR AND PN JUNCTION DIODE</b>		
	Types of semiconductors - Intrinsic semiconductors - Extrinsic semiconductors - Forward and reverse biased PN junction - V-I characteristics - Half wave and full wave rectifiers - Ripple factor – Efficiency - Zener diode – Reverse characteristic of Zener diode - Zener diode shunt regulator - Clipping circuits - Positive clipper - Negative clipper - Clamping circuits - Voltage doubler		
<b>UNIT - II</b>	<b>SPECIAL PURPOSE DIODES AND OPTOELECTRONIC DEVICES</b>		
	Tunnel diode - V-I Characteristics - Parameters - Varactor diode - PIN diode - Light Emitting diode - Multicolour LEDs - Seven segment display - Liquid crystal display - Advantages and disadvantages of LCDs - Photo diode - Photoconductive cell - Photovoltaic cell–Laser diode.		
<b>UNIT - III</b>	<b>BIJUNCTION TRANSISTOR AND FIELD EFFECT TRANSISTOR</b>		
	BJT symbols - BJT biasing - Operation of npn and pnp transistors - Transistor configurations - Characteristics of a transistor in CB and CE configurations - Current gain in CB and CE configurations - Operating point - Load line - Voltage divider bias - h-parameters of a transistor - Hybrid equivalent circuit for CE transistor - FET and its types - JFET - Operation - Characteristics - Parameters - Types of MOSFET (qualitative analysis only)		
<b>UNIT - IV</b>	<b>AMPLIFIERS AND OSCILLATORS</b>		
	Classification of amplifiers: RC coupled amplifier - Frequency response of RC coupled amplifier - Power amplifiers - Class-A amplifier - Class-B amplifier - Class-B push-pull amplifier - Efficiency - Feedback amplifiers - Principle of feedback amplifier - Advantages and disadvantages of negative feedback. Classification of oscillators: Barkhausen criterion - Hartley oscillator - Colpitt's oscillator - Phase shift oscillator - Wien bridge oscillator.		
<b>UNIT - V</b>	<b>OPERATIONAL AMPLIFIER</b>		
	Ideal OP-AMP - Inverting amplifier - Non-inverting amplifier - Differential amplifier - CMRR - d.c characteristics: Input bias current - Input offset current - Input offset voltage - a.c characteristics - Frequency response - Slew rate - Applications: Adder - Sub tractor - Differentiator - Integrator - Comparators - Schmitt trigger - Weighted resistor DAC - R- 2R ladder DAC – Counter type ADC.		
<b>TEXT BOOKS:</b>			
<ol style="list-style-type: none"> <li>1. Dr. R.S. Sedha, A text book of applied electronics - Revised edition 2013 - S.CHAND Publishing, New Delhi (For Unit-I to Unit-IV).</li> <li>2. D. Roy Choudhury, Linear Integrated circuits - Fourth edition, New age international (P) Limited, New Delhi (For Unit-V).</li> </ol>			
<b>REFERENCE BOOKS:</b>			
<ol style="list-style-type: none"> <li>1. Bhargava Kulshreshta and Gupta, Basic Electronics and linear circuits - DTMH 1989.</li> <li>2. Beboo and Burrows, Integrated circuit and Semiconductor devices - TMHG 1989. Mill Man Halkias, Integrated Electronics - TMH.</li> </ol>			



<b>Teaching Learning Methods</b> Chalk and talk Lectures; seminar; ICT based presentations; Video Lectures; Group Discussions; Interactive activities; Mini – project; MCQs
---

**COURSE OUTCOMES**

By the end of the course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	Energy level of semiconductors.	K5
CO2	Applications of power electronics	K3
CO3	Difference between BJT, FET, MOSFET	K4
CO4	how to construct the oscillators and amplifiers	K3
CO5	students will be able to construct some circuits using op-amps	K5

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

<b>Nature of Course</b>			
Knowledge and skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

**Mapping Course Outcome with PO and PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Score
CO1	3	3	2	2	3	3	3	3	2	3	2.7
CO2	3	3	2	3	2	3	3	2	2	3	2.6
CO3	3	2	3	3	3	3	2	3	2	2	2.6
CO4	2	3	2	3	3	3	3	2	2	3	2.6
CO5	3	3	2	3	2	2	3	3	3	3	2.7
Mean overall score											2.64

**Result: The Score for this course is 2.64 (Moderate Relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}} \quad \text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER:**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

**CREDIT:4**

**COURSE CODE:U21PH52P**

**GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005**

**B.Sc. PHYSICS – V SEMESTER – SKILL BASED ELECTIVE - II**

(For the candidates admitted from the year 2021-22 onwards)

**ELECTRICAL WIRING AND WINDING LAB**

**COURSE OBJECTIVES :**

To make the Students to

1. To check the electrical power supply from the switch.
2. It shows the components of the circuits as simple shapes.
3. Electrical wiring is the electrical distribution through the wires.
4. Wiring diagram gives information about the relative position on the device.

**LIST OF EXPERIMENTS**

1. Control of a lamp through 2-way switch.
2. Two lamps dimmer
3. Series control of 2-lamps.
4. Parallel control of 2-lamps.
5. Control of 2-lamps with two switches and a 3-pin wall socket.
6. Service connections.
7. Estimations for a small pump house.
8. Estimation for a small house PVC WIRING.
9. Street lighting.
10. Estimation for SAW mill.
11. Designing of winding of a Transformer(230V, 12V-0-12V with 5 Amps)
12. Winding of a no volt coil for a direct OV line starter.
13. Winding of a fluorescent lamp choke.
14. End connections of a 3-phase induction motor.
15. Winding of a Rotor and stator of a single phase induction motor.

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

### Mapping Course Outcome with PO and PSO

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Score
CO1	2	3	2	4	3	3	3	3	2	4	28
CO2	3	2	4	2	3	2	3	4	2	3	28
CO3	2	3	4	2	3	3	2	4	3	3	30
CO4	4	3	2	1	4	2	3	3	3	2	27
CO5	2	4	3	3	2	3	2	2	4	3	28
Mean overall score											2.82

**Result: The Score for this course is 2.82 (High relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

### Value Scaling

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}} \quad \text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER: DR.C.GUNASEKARAN**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:4</b>	<b>COURSE CODE:U21PH5S3P</b>
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS – V SEMESTER – SKILL BASED ELECTIVE - III</b> (For the candidates admitted from the year 2021-22 onwards) <b>PROGRAMMING IN “C” LANGUAGE (LAB)</b>	
<b>COURSE OBJECTIVES :</b> To make the Students to <ol style="list-style-type: none"> <li>1. Compile word document independently along with usage of access for generation of multiple end user.</li> <li>2. Preparation of spread sheet and working with multiple data.</li> <li>3. Execution of simple “C” Programme.</li> <li>4. Assimilate knowledge on working of internet.</li> <li>5. Hands on experience with MS Office and “C” Programming.</li> </ol>	
<b>BASIC STRUCTURE OF C PROGRAMMING</b> Programs - Constants - Variables - Data type - Declaration of variables - Defining symbolic constants, operators and expression - Formatted input and output statements.	
<b>CONTROL STATEMENTS</b> Simple if, If-Else, Else-if ladder - Switching statements - Go- to statement - Break and continue looping - While - do and For statements.	
<b>ARRAYS</b> User defined functions - String functions - strcpy, strlen, strcmp - Elementary idea.	
<b>DEVELOPMENT OF ALGORITHM, FLOW CHART AND PROGRAM FOR THE FOLLOWING.</b> <ol style="list-style-type: none"> <li>1. Write a C Program to print your name, date of birth and mobile number.</li> <li>2. Write a C Program to get Average of a set of numbers.</li> <li>3. Write a C program to find the Area of a triangle.</li> <li>4. Write a C Program to find greatest of three numbers.</li> <li>5. Write a C Program to check if number is odd or even.</li> <li>6. Write a C Program to find sum of first n natural numbers.</li> <li>7. To find Sorting a set of numbers in ascending and descending order.</li> <li>8. Write a C Program to solve quadratic equation.</li> <li>9. Write a C Program to find factorial using recursion.</li> <li>10. Write a C Program to calculate mean and variance.</li> </ol>	
<b>TEXT BOOK:</b> E. Balagurusamy, Programming in ANSI “C”.	
<b>REFERENCE BOOK:</b> Yashavant P. Kanitkar, Let Us C - Fifth Edition.	

**Teaching Learning Methods**

Chalk and talk Lectures; seminar; ICT based presentations; Video Lectures; Group Discussions; Interactive activities; Mini – project; MCQs

**COURSE OUTCOMES**

By the end of the course, students will be able to

Course outcome No.	Course Outcome
CO1	Students will gain a thorough understanding of the fundamentals of C programming.
CO2	Students will be able to code, compile and list C programs
CO3	Students can learn an Advanced C programming course.

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

**Mapping Course Outcome with PO and PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Score
CO1	3	4	3	3	3	3	2	3	4	3	3.1
CO2	3	3	4	3	4	3	3	4	2	3	3.2
CO3	4	2	3	3	4	3	4	3	3	2	3.1
CO4	4	3	3	4	3	3	3	2	4	3	3.2
CO5	3	3	3	3	3	4	3	3	3	4	3.2
Mean overall score											3.16

**Result: The Score for this course is 3.16 (High Relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}}$$

$$\text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER: G.MAHALAKSHMI**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

**CREDIT:4**

**COURSE CODE:U21PH6C10P**

**GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005**

**B.Sc. PHYSICS – VI SEMESTER – CORE COURSE - X**

(For the candidates admitted from the year 2021-22 onwards)

**CORE PRACTICAL III (GENERAL)**

**COURSE OBJECTIVES :**

To make the Students to

1. To make the students to understand experimental physics.
2. To apply the theoretical knowledge for developing new devices.

**LIST OF EXPERIMENTS**

1. Koenig's Method –Uniform Bending-Young's Modulus.
2. Spectrometer-i-i' Curve.
3. Spectrometer-Small angle Prism
4. Spectrometer-Grating Normal Incidence Method-dispersive power.
5. Spectrometer-dispersive power of a given prism.
6. Spectrometer-Cauchy's Constant.
7. Spectrometer-Fraunhofer lines.
8. Spectrometer-Hartmann's Formula.
9. Earth Inductor using B.G-Determination of Band H.
10. Field along the axis of a coil-Determination of M.
11. M and H absolute determination using deflection and vibration  
Magne to meter.
12. Potentiometer- EMF of a thermocouple.
13. Potentiometer-Temperature Coefficient of thermistor.
14. Potentiometer- High range voltmeter calibration.
15. Band gap energy of Thermistor.
16. Ballistic Galvanometer-Figure of merit.
17. B.G. Absolute capacity of condenser.
18. B.G.-Absolute Self Inductance.
19. B.G-Absolute Mutual Inductance.
20. B.G - Comparison of Mutual Inductance.
21. Anderson's bridge -Self Inductance of a coil.
22. He-Ne Laser experiments.

**TEXT BOOKS:**

1. Practical Physics, Anchal Srinivasa & R.K.Shukla, New age International Publishers, 2018, second edition.
2. A textbook of Physics Practical - Part I, Prof. C.C.Ouseph & Prof. V.Srinivasan, S. Viswanathan Publishers, 1990
3. A textbook of Physics Practical-Part II, Prof.C.C. Ouseph&Prof.G.RangaRajan.
4. S. Viswanathan Publishers, 1996
5. Advanced Practical Physics II, Dr.S.P.Singh, PragatiPrakashan-Meerut , 2000, Twelfth Edition

**REFERENCE BOOKS:**

1. Practical Physics with Viva- voce, Dr.S.P.Singh, PragatiPrakashan-Meerut, 1999 Twenty third Edition.
2. Practical Physics, S.L.Gupta & V.Kumar, PragatiPrakashan - Meerut, 1999, Twenty third, Edition.
3. Advanced Level Practical Physics II, M.Nelkon & J.M. Ogborn, Heinemann Educational Books. Ltd-London. 1967
4. A text book of Practical Physics, H.S.Aller & H.Moore, Macmillan and Co & Limited, 1941

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

**COURSE OUTCOMES**

By the end of the course, students will be able to

Course outcome No.	Course Outcome
CO1	Students will gain a thorough understanding of the fundamentals of C Programming.
CO2	Students will be able to code, compile and list C programs.
CO3	Students will be able to code, compile and list C programs.

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

**Mapping Course Outcome with PO and PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Score
CO1	3	4	3	3	3	3	2	3	4	3	3.1
CO2	3	3	4	3	4	3	3	4	2	3	3.2
CO3	4	2	3	3	4	3	4	3	3	2	3.1
CO4	4	3	3	4	3	3	3	2	4	3	3.2
CO5	3	3	3	3	3	4	3	3	3	4	3.2
Mean overall score											3.16

**Result: The Score for this course is 3.16 (High Relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}} \quad \text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER: DR.V.KATHIRAVAN**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:5</b>	<b>COURSE CODE:U21PH6C11P</b>
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS – VI SEMESTER – CORE COURSE - XI</b> (For the candidates admitted from the year 2021-22 onwards) <b>CORE PRACTICAL IV (ELECTRONICS)</b>	
<b>COURSE OBJECTIVES :</b> To make the Students to <ol style="list-style-type: none"> <li>1. Explain the characteristics and applications of operational amplifier.</li> <li>2. Verify FET and its characteristics.</li> <li>3. Design circuits using universal gates such as NAND and NOR.</li> <li>4. Design and verify truth tables of adder, subtractor.</li> <li>5. Write mnemonics for simple applications using 8085 microprocessor.</li> </ol>	
<b>SECTION-A ELECTRONICS</b> <b>(Any twelve experiments)</b> <ol style="list-style-type: none"> <li>1. Series and Parallel resonance circuits.</li> <li>2. Single Stage - RC coupled amplifier - Transistor.</li> <li>3. Emitter follower - Frequency response.</li> <li>4. IC regulated power supply.</li> <li>5. Hartley oscillator using transistor.</li> <li>6. Colpitt's Oscillator using transistor.</li> <li>7. Phase Shift Oscillator using IC 741.</li> <li>8. Astable Multi vibrator using IC 741.</li> <li>9. FET Characteristics.</li> <li>10. FET amplifier.</li> <li>11. RS and JK Flip Flops using gates.</li> <li>12. Universal Gates NAND/NOR and basic gates from universal gates.</li> <li>13. Adder and Subtractor – Op-Amp.</li> <li>14. Verification of De Morgan's theorems and Boolean Algebra.</li> <li>15. OP-Amp: Integrator and Differentiator.</li> </ol>	
<b>SECTION-B MICROPROCESSOR 8085</b> <b>(Any three experiments)</b> <ol style="list-style-type: none"> <li>16.8-bit Addition and Subtraction.</li> <li>17.8-bit Multiplication and Division.</li> <li>18. Ascending and Descending Order.</li> <li>19. Largest and Smallest number in an Array.</li> <li>20. Conversion from decimal to hexadecimal system.</li> <li>21. Conversion from hexadecimal to decimal system.</li> <li>22. Sum of N numbers.</li> </ol>	
<b>TEXT BOOKS:</b> <ol style="list-style-type: none"> <li>1. Practical Physics, AnchalSrinivasa&amp;R.K.Shukla, New age International Publishers, 2018, second edition.</li> <li>2. A textbook of Physics Practical - Part I, Prof.C.C. Ouseph&amp;Prof.V.Srinivasan, S. Viswanathan Publishers, 1990</li> <li>3. A textbook of Physics Practical - Part II, Prof.C.C. Ouseph&amp; Prof. G.RangaRajan. S. Viswanathan Publishers, 1996</li> <li>4. Advanced Practical Physics II, Dr.S.P.Singh, PragatiPrakashan–Meerut , 2000, Twelfth Edition</li> </ol>	
<b>REFERENCE BOOKS:</b> <ol style="list-style-type: none"> <li>1. Practical Physics with Viva - voce, Dr.S.P.Singh, PragatiPrakashan–Meerut, 1999 Twenty third Edition.</li> <li>2. Practical Physics, S.L.Gupta&amp;V.Kumar, PragatiPrakashan–Meerut, 1999, Twenty third, Edition</li> <li>3. Advanced Level Practical Physics II, M.Nelkon&amp; J.M. Ogborn, Heinemann Educational Books. Ltd–London. 1967.</li> <li>4. A text book of Practical Physics, H.S.Aller&amp;H.Moore, Macmillan and Co &amp;Limited, 1941.</li> </ol>	



**COURSE OUTCOMES**

By the end of the course, students will be able to

Course outcome No.	Course Outcome
CO1	Students will gain a thorough understanding of the fundamentals of C programming.
CO2	Students will be able to code, compile and list C programs.
CO3	Students will be able to code, compile and list C programs.

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

**Mapping Course Outcome with PO and PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Score
CO1	3	4	3	3	3	3	2	3	4	3	3.1
CO2	3	3	4	3	4	3	3	4	2	3	3.2
CO3	4	2	3	3	4	3	4	3	3	2	3.1
CO4	4	3	3	4	3	3	3	2	4	3	3.2
CO5	3	3	3	3	3	4	3	3	3	4	3.2
Mean overall score											3.16

**Result: The Score for this course is 3.16 (High Relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}}$$

$$\text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER: S.SAKTHIVEL**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:5</b>		<b>COURSE CODE:U21PH6C12</b>	
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS – VI SEMESTER – CORE COURSE - XII</b> (For the candidates admitted from the year 2021-22 onwards) <b>SOLID STATE PHYSICS</b>			
<b>COURSE OBJECTIVES :</b>			
To make the Students			
<ol style="list-style-type: none"> <li>1. To study bondings in crystals and various structures.</li> <li>2. To determine crystal structure.</li> <li>3. To study basic electric laws and important theories.</li> <li>4. To distinguish magnetic materials and super conductors.</li> <li>5. To study Dielectrics and ferroelectrics.</li> </ol>			
<b>UNIT - I</b>	<b>CRYSTAL STRUCTURE AND CHEMICAL BONDING</b>		
	Elementary concepts of crystals: Distinction between crystalline and amorphous solids - isotropic and anisotropic crystals with examples - Space lattice - Primitive and Unit cell - Brava is lattices - Crystal directions - Miller indices - Separation between lattice planes in a cubic crystal - Crystal structure: SC, BCC, FCC and HCP - Bonding in solids- primary bonds - Ionic, covalent and metallic bonds - secondary bonds - Vander Waals' bond and hydrogen bond.		
<b>UNIT - II</b>	<b>CRYSTALLOGRAPHY</b>		
	X ray Spectrum - Moseley's law - diffraction of X-rays by crystals - Bragg's law - Bragg's Diffrac to meter - Determination of Crystal structure: Debye Scherrer method - evaluation of lattice parameter 'a' for a simple cubic structure - Laue's method, rotating crystal method –Reciprocal lattice.		
<b>UNIT - III</b>	<b>ELECTRONS IN SOLIDS</b>		
	Free electron theory : Drude Lorentz theory - Expression for current density - Ohm's law - Electrical conductivity - Temperature dependence of electrical conductivity in metals - Thermal conductivity - Wide-Mann and Franz Law - Hall effect - Hall voltage and Hall coefficient - Mobility and Hall angle – Importance of Hall effect - Experimental determination of Hall coefficient		
<b>UNIT - IV</b>	<b>MAGNETIC AND SUPERCONDUCTING MATERIALS</b>		
	Magnetism - Langevin's theory of dia and paramagnetism - Wien's theory of ferromagnetism - Quantum theory of ferromagnetism (Heisenberg's model) – Domain theory of ferromagnetism- ferromagnetic hysteresis - Ferrites - Anti ferromagnetic materials. Superconductors: Properties – Critical temperature - Isotopic effect - Meissner effect - Type I and Type II superconductor		
<b>UNIT - V</b>	<b>DIELECTRICS AND FERROELECTRICS</b>		
	Basic definitions of dielectrics - Types of polarization - Effect of frequency and temperature on polarization - Local field (internal field) - Clausiu - Mosotti relation - Dielectric loss and breakdown - Determination of Dielectric constant - applications - Ferroelectric crystals - Ferroelectric domains - Hysteresis effect in a ferroelectric materials.		
<b>TEXT BOOKS:</b>			
<ol style="list-style-type: none"> <li>1. C. Kittel, Introduction to Solid State Physics - John Wiley (2004).</li> <li>2. M. Arumugam, Material Science - Anuradha Agencies, (2004).</li> <li>3. G.Vijayakumari, Engineering Physics –Vikas Publications.</li> </ol>			
<b>REFERENCE BOOKS:</b>			
<ol style="list-style-type: none"> <li>1. Raghavan, Materials Science and Engineering - (2004).</li> <li>2. Azaroff, Introduction to Solids - (2004).</li> <li>3. A.J. Decker, Solid State Physics-(2004)</li> </ol>			

<b>Teaching Learning Methods</b> Lecture Method, ICT, Seminar, Quiz.
---

**COURSE OUTCOMES:**

By the end of this course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	Understand the fundamental knowledge of crystals	K1
CO2	Acquiring the knowledge of x-ray spectrum, Diffraction effect and calculating lattice parameter.	K2
CO3	Analyze and study the merits and demerits of free electron theory and electrical conductivity	K3
CO4	Ability to Distinguish different types of magnetic materials.	K4
CO5	Explore various types of Polarization and its influence on Dielectrics and ferroelectrics	K5

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

Nature of Course			
Knowledge and skill	✓	Employability oriented	
Skill oriented		Entrepreneurship oriented	

**Mapping Course Outcome with PO and PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	POS6	POS7	POS8	TOT	Score
CO1	3	3	2	-	3	3	3	2	2	2	2	3	2	30	2.3
CO2	3	3	3	3	-	2	3	2	2	2	3	2	2	30	2.3
CO3	3	2	-	3	-	2	3	2	2	3	-	2	1	23	1.8
CO4	3	3	3	1	2	3	3	3	3	-	3	2	2	31	2.9
CO5	3	2	3	2	2	3	2	2	3	2	2	2	1	29	2.2
Mean overall score															2.3

**Result: The core for this course is 2.3 (High relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}}$$

$$\text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER: V.SUBHA**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:5</b>	<b>COURSE CODE:U21PH6C13</b>
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS – VI SEMESTER – CORE COURSE - XIII</b> (For the candidates admitted from the year 2021-22 onwards) <b>SPECTROSCOPY AND LASER PHYSICS</b>	
<b>COURSE OBJECTIVES :</b> To make the Students <ol style="list-style-type: none"> <li>1. To study the electromagnetic radiation spectrum and techniques and instrumentation of microwave spectroscopy.</li> <li>2. To understand the vibrations of diatomic molecule and poly atomic molecules by vibrational spectroscopy.</li> <li>3. To study the classical theory of Raman Effect and techniques and instrumentation of Raman spectroscopy.</li> <li>4. To know the Laser, principle, characteristics and different types of Lasers</li> <li>5. To know the applications of Laser in material processing, Holography and medical endoscope.</li> </ol>	
<b>UNIT - I</b>	<b>MICROWAVESPECTROSCOPY</b> Introduction to EM radiation-The rotation of molecules, its spectra, Diatomic Molecules-Rigiddi atomic molecule-Intensities of spectra lines-Effect of is otopicsubstitution-Non rigid, rotator its spectrum-Techniques and Instrumentation of Microwave Spectros copy.
<b>UNIT - II</b>	<b>VIBRATIONAL SPECTROSCOPY</b> Vibrating diatomic molecule-Energy of diatomic molecule - Harmonic Oscillator - Vibrating rotator -Vibration - Rotation Spectrum of CO - Vibrations of poly atomic molecules Fundamental vibrations and their symmetry - Overtones and combinations off requeencies - Sample preparation–Techniques and instrumentation.
<b>UNIT - III</b>	<b>RAMAN SPECTROSCOPY</b> Classical theory of Raman Effect-Pure rotational Raman Spectra-Linear, Symmetric top molecules - Pure Vibration Raman spectra-Raman activity of vibration - Rule of mutual exclusion Principle - Polarization of light and the Raman Effect –Techniques and instrumentation.
<b>UNIT - IV</b>	<b>LASER PHYSICS</b> Introduction to Lasers - Laser principle - characteristics of laser - Einstein’s co-efficient derivation - Population Inversion - Pumping action - Optical resonator - Types oflasers - Nd-YAG, CO2, Dye laser and semiconductor laser - Homo junction and Hetro junction.
<b>UNIT - V</b>	<b>APPLICATIONSOFLASER</b> Material processing: welding, drilling, cutting and heat treatment - Holography - constructionandReconstruction-Applications-DifferencebetweenHolographyand photography - LIDAR-Medical applications.
<b>TEXT BOOKS:</b> <ol style="list-style-type: none"> <li>1. C.N.Banwell, <i>Fundamental of molecular spectres copy</i>, -Tata McGraw Hill Publishing Co. Ltd., 3<sup>rd</sup> Edition (1972).</li> <li>2. G.Aruldas <i>Molecular, Structure and spectroscopy</i> –Prentice Hall ofIndia.</li> </ol>	
<b>REFERENCE BOOKS:</b> <ol style="list-style-type: none"> <li>1. B.B.Laud, <i>Lasers and non-linear optics</i> –Wiley Eastern Ltd., (1985)</li> <li>2. K.Thiyagarajan and A.K.Ghatak, <i>LASERS: Theory and applications</i>-Macmillan India Ltd.</li> </ol>	

<b>Teaching Learning Methods</b> Chalk and Talk Lectures, Video Lectures, Seminars, Group Discussions
--

**COURSE OUTCOMES:**

By the end of this course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	Understand microwave spectroscopy and applications	K1
CO2	Analyze prerequisite in a molecule towards its rotational and vibrational activity	K2
CO3	Understand Raman Spectroscopy and instrumentation	K3
CO4	Understand the basic principle and working of different types of Lasers	K4
CO5	Know the applications of Lasers in various fields	K5

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

<b>Nature of Course</b>			
Knowledge and skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

**Mapping Course Outcome with PO and PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	POS6	POS7	POS8	TOT	Score
CO1	3	3	2	-	3	3	3	2	2	2	2	3	2	30	2.3
CO2	3	3	3	3	-	2	3	2	2	2	3	-	3	29	2.2
CO3	3	2	-	3	-	2	3	2	2	3	-	2	3	25	1.9
CO4	3	3	3	1	2	3	3	3	3	-	3	2		29	2.2
CO5	3	2	3	2	2	3	2	2	3	2	2	2	2	30	2.3
Mean overall score															2.6

**Result: The core for this course is 2.6 (High relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}} \quad \text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER: DR.V.KATHIRAVAN**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:5</b>		<b>COURSE CODE:U21PH6E2</b>	
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS – VI SEMESTER – ELECTIVE COURSE - II</b> (For the candidates admitted from the year 2021-22 onwards) <b>DIGITAL ELECTRONICS AND MICROPROCESSOR</b>			
<b>COURSE OBJECTIVES :</b>			
To make the Students to			
<ol style="list-style-type: none"> <li>1. Have a basic knowledge of semiconductor diode, rectifier and filter circuits.</li> <li>2. Understand transistor biasing and working principle of Amplifiers.</li> <li>3. Explain feedback and oscillatory circuits.</li> <li>4. Comprehend the operation and characteristics of FET, MOSFET, SCR and UJT.</li> <li>5. An idea about operational amplifiers.</li> </ol>			
<b>UNIT - I</b>	<b>Number Systems, Logic Gates &amp; Boolean Algebra and K - Maps</b> Different Number Systems - Binary, Octal and Hexa-decimal Conversion between the number systems. Different Digital codes - ASCII, BCD, Gray codes. AND, OR and NOT Gates- Universality of NAND & NOR gates, Special Gates - Ex-OR, Ex-NOR - Boolean Laws, De-Morgan's Theorems. Simplification of Logical expression using Boolean algebra, Karnaugh Maps - 4 Variables.		
<b>UNIT - II</b>	<b>Combinational and Memory Circuits</b> Half and full adder - Half and full Sub tractor - Basic study of TTL, CMOS - Multiplexers and De - multiplexers - Encoders and Decoders - Decimal to BCD, Parity Generator and Checker - Memories: Read-only memories (ROM), PROM, EPROM and RAM.		
<b>UNIT - III</b>	<b>Sequential Circuits</b> Sequential Circuits: RS, D, JK and T Flip-Flops - Edge Triggered Flip-Flops - Master-Slave JK Flip-Flop - Shift Register: Serial-in-Serial-out, Serial-in-Parallel-out, Parallel-in-Serial-out and Parallel-in - Parallel-out - Counters: Asynchronous and Synchronous Counters, Decade Counter, UP- DOWN Counters, Ring Counter.		
<b>UNIT - IV</b>	<b>Microprocessor (8085)</b> Operators associated with different observables - Expectation values of dynamical quantities - Eigen values and Eigen functions - Orbital angular momentum operator and their commutation rules - Time - Independent wave equation - Time-dependent wave equation - Application: Particle in one dimensional box.		
<b>UNIT - V</b>	<b>8085 Programming</b> Algorithm and Flowcharts - Simple programs - Addition and subtraction of two 8-bit data - Sum of a string of data - 8 bit Multiplication and Division - Block transfer - Smallest and largest number in an array - Ascending and Descending order of array of numbers.		
<b>TEXT BOOKS:</b>			
<ol style="list-style-type: none"> <li>1. Digital Principles and Applications by Donald P. Leach &amp; Albert Paul Malvino. (Glenoe, 1995)</li> <li>2. Microprocessor Architecture, Programming and Application with the 8085 by Ramesh S. Goankar (Prentice hall, 2002).</li> </ol>			
<b>REFERENCE BOOK:</b>			
<ol style="list-style-type: none"> <li>1. Digital Fundamentals, 3rd Edition by Thomas L. Floyd (Universal Book Stall, India 1998). Microprocessor Architecture, Programming and systems featuring the 8085 by William A. Rout (Thomson Delmar Learning, 2006).</li> </ol>			

**Teaching Learning Methods**

Chalk and talk Lectures; seminar; ICT based presentations; Video Lectures; Group Discussions; Interactive activities; Mini – project; MCQs

**COURSE OUTCOMES:**

By the end of this course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	Understand the structure of various number systems and basic logic gates.	K2
CO2	Ability to solve the Boolean Expressions using Boolean algebra and Karnaugh Maps.	K5
CO3	Develop skill to build combinational circuits and study different types of semiconductor memories.	K3
CO4	Ability to construct sequential circuits and to design counters.	K4
CO5	Understand the architecture of 8 bit Microprocessor and to write simple ALP programs.	K2

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6 = Create**

Nature of Course			
Knowledge and skill	✓	Employability oriented	
Skill oriented		Entrepreneurship oriented	

**Mapping Course Outcome with PO and PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	POS6	Score
CO1	4	3	2	3	4	4	4	4	3	3	2	3.3
CO2	4	4	3	4	3	4	3	4	3	4	3	3.5
CO3	4	3	3	3	4	4	4	3	3	3	1	3.2
CO4	3	4	1	4	3	4	3	4	3	3	3	3.2
CO5	4	4	2	4	4	3	4	4	3	4	3	3.5
Mean overall score												3.34

**Result: The core for this course is 3.34 (High relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}}$$

$$\text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER: S.SAHUL HAMEED**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:4</b>	<b>COURSE CODE:U21PH6E3</b>
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. PHYSICS – VI SEMESTER – ELECTIVE COURSE - III</b> (For the candidates admitted from the year 2021-22 onwards) <b>NUMERICAL METHODS</b>	
<b>COURSE OBJECTIVES :</b> To make the Students to <ol style="list-style-type: none"> <li>1. Curve fitting examines they relationship between one or more independent variables.</li> <li>2. Transcendental equations contains trigonometric , logarithmic, exponential functions.</li> <li>3. Numerical differentiation is an important technique for engineers.             <ul style="list-style-type: none"> <li>· Numeriacal integration compute numerical approximation to the integral of the function at isolated points.</li> </ul> </li> </ol>	
<b>UNIT - I</b>	<b>CURVE FITTING</b> Principle of Least Squares - Method of Group Averages - Fitting a straight line linear regression - fitting a Parabola - Fitting an exponential curve.
<b>UNIT - II</b>	<b>SOLUTION OF NUMERICAL ALGEBRAIC, TRANSCENDENTAL AND DIFFERENTIAL EQUATION</b> Bisection Method - Methods of successive Approximations - Regulafalsi Method - Newton Raph son method - Euler’s Method - modified Euler’s Method - RungeKutta Method fourth order.
<b>UNIT - III</b>	<b>SIMULTANEOUS LINEAR ALGEBRAIC EQUATION</b> Gauss Elimination Method - Gauss Jordon Method - Computation of Inverse of a Matrix Using Gauss - Elimination Method - Method of Trian gularisation.
<b>UNIT - IV</b>	<b>NUMERICAL DIFFERENTIATION</b> Linear Interpolation: Newton Forward Interpolation Formula and Backward Interpolation formula. Interpolation with unequal intervals: Lagrange’s interpolation Formula (No Derivation) Hermit’s – Bessel’s Interpolating Polynomials..
<b>UNIT - V</b>	<b>NUMERICAL INTEGRATION</b> Trapezoidal - Simpson’s 1/3 Rule And 3/8 Rule - Practical Applications -Weddle’s Rule - Gaussian Quadrature Formula.
<b>TEXT BOOKS:</b> <ol style="list-style-type: none"> <li>1. Venkatraman, M.K. Numerical Methods in Science and Engineering, National Publishing, Company – Chennai (1977).</li> <li>2. Shastry, S.S. Introductory Methods of Numerical Methods – Prentice - Hall Ltd.</li> <li>3. Jain, Iyenger, S.R.K. And Jain R.K. Numerical Methods For Scientific And Engineering Computation – New Age Publishers.</li> <li>4. V. Rajaraman, Numerical Methods By, Prentice – Hall India Pvt Ltd (2003).</li> </ol>	
<b>REFERENCE BOOKS:</b> <ol style="list-style-type: none"> <li>1. B.D. Gupta, Numerical Analysis - Konark Pub .Ltd., Delhi (2001).</li> <li>2. S.Arulmurugam, Numerical Methods - New Gamma Publishing, Palamkottai. (2003)</li> <li>3. A.Singaravelu, Numerical Methods - Meenakshi Agency, Chennai (2004).</li> <li>4. P.Kandasamy, K. Thilagavathy, Calculus Of Finite Difference &amp; Numerical Analysis - S.Chand&amp; Company LTD., New Delhi-55. (2003).</li> </ol>	



**Teaching Learning Methods**  
Chalk and talk Lectures; seminar; ICT based presentations; Video Lectures; Group Discussions; Interactive activities; Mini – project; MCQs

**COURSE OUTCOMES:**

By the end of this course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	Understand the curve fitting by different methods.	K2
CO2	Acquire the knowledge of solving differential Equations using Numerical Methods.	K3
CO3	Study the method of solving the linear algebraic Equations.	K3
CO4	Explore various interpolating and Extrapolating Methods.	K2
CO5	Acquire knowledge of the Numerical Integration.	K5

**K1=Remember, K2=Understand, K3=Apply, K4=Analyze, K5=Evaluate**

Nature of Course			
Knowledge and skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

**Mapping Course Outcome with PO and PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	POS6	Score
CO1	4	3	2	3	4	4	4	4	3	3	2	3.3
CO2	4	4	3	4	3	4	3	4	3	4	3	3.5
CO3	4	3	3	3	4	4	4	3	3	3	1	3.2
CO4	3	4	1	4	3	4	3	4	3	3	3	3.2
CO5	4	4	2	4	4	3	4	4	3	4	3	3.5
Mean overall score												3.34

**Result: The core for this course is 3.34 (High relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}}$$

$$\text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER: R.VASANTHAKUMARI**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:3</b>	<b>COURSE CODE:U21PH3N1</b>
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. (CHEMISTRY) – III SEMESTER - NON CORE ELECTIVE - I</b> (For the candidates admitted from the year 2021-22 onwards) <b>ENERGY PHYSICS - I</b>	
<b>COURSE OBJECTIVES :</b> To make the Students to <ol style="list-style-type: none"> <li>1. To understand renewable and conventional energy system.</li> <li>2. To catogorise various forms of non-conventional energy.</li> <li>3. To understand the photo conversion energy.</li> <li>4. To analyse the types of solar stills.</li> <li>5. To understand the biomass energy and its applications.</li> </ol>	
<b>UNIT - I</b>	<b>CONVENTIONAL ENERGY SOURCES</b> Various forms of energy - Renewable and conventional energy system - Comparisons - Coal, oil and Natural Gas - Availability - Statistical details - Worlds reserve of commercial energy sources and their availability
<b>UNIT - II</b>	<b>NON- CONVENTIONAL ENERGY SOURCES</b> Renewable energy sources - Solar energy- Structure of the Sun - Nature of the radiation - Terrestrial radiation - Solar heaters - Domestic and commercial type - Crop driersDirect and indirect type - Space cooling– Solar cooker - Box type and Multi reflector type solar cooker
<b>UNIT - III</b>	<b>PHOTO CONVERSION:</b> Photovoltaic generation - Principle of Solar cell- Current Voltage characteristics - Types of solar cells - p-n Homo junction cell - p-n- Hetro junction cell - Gallium Arsenide solar cell - Indium Phosphide solar cell.
<b>UNIT - IV</b>	<b>WATER DESALINATION- SOLAR STILL:</b> Water desalination - Principle of solar distiller - Single slope basic solar still - Double slope solar still - Non symmetrical solar still - Symmetrical solar still - Performance of solar distillation - Solar pond - Merits and demerits of solar energy.
<b>UNIT - V</b>	<b>BIO MASS ENERGY:</b> Bio mass energy - Classification of bio mass energy - Photo synthesis - Bio mass conversion - Direct and indirect method - Gobar gas plants - Ethanol from wood - Merits and demerits
<b>TEXT BOOKS:</b> <ol style="list-style-type: none"> <li>1. G.D. RAI, Non-conventional energy sources - Khanna publishers, 2008.</li> <li>2. KARUPANNAN. K and SUGANTHI, Energy physics- PRIYA publication.</li> </ol>	
<b>REFERENCE BOOKS:</b> <ol style="list-style-type: none"> <li>1. G.D. RAI “Solar energy utilization”- Ed - V(1995).</li> <li>2. S.P. SAKHATURE, “Solar energy”- TATA MCGRAW Till publication company, Ed.,11, 1997.</li> <li>C.G. Agerwal, Solar energy.</li> </ol>	

**Teaching Learning Methods**

Chalk and talk Lectures; seminar; ICT based presentations; Video Lectures; Group Discussions; Interactive activities; Mini – project; MCQs

**COURSE OUTCOMES:**

By the end of this course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	To interpret renewable and conventional energy system	K2
CO2	Able to analyze various forms of non-conventional energy	K4
CO3	Ability to explain the photo conversion energy	K2
CO4	Able to classify the types of solar stills	K4
CO5	To illustrate the biomass energy and its applications	K3

**K1=Remember, K2=Understand,K3=Apply,K4=Analyze,K5=Evaluate**

Nature of Course			
Knowledge and skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

**Mapping Course Outcome with PO and PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	POS6	PSO7	PSO8	TOT	Score
CO1	3	3	2	-	3	3	3	3	3	2	3	3	2	33	2.5
CO2	3	3	3	3	-	2	3	3	2	3	3	2	2	32	2.4
CO3	3	2	-	3	1	2	3	2	2	3	1	2	1	25	1.9
CO4	3	3	3	1	2	3	3	3	3	-	3	2	2	31	2.9
CO5	3	2	3	2	2	3	2	2	3	2	2	2	2	30	2.3
	Mean overall score														2.4

**Result: The core for this course is 2.4 (High relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

Mean Score COs =  $\frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}}$       Mean overall score for COs =  $\frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$

**COURSE DESIGNER:**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT:3</b>		<b>COURSE CODE:U21PH4N2</b>	
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. (CHEMISTRY) – IV SEMESTER - NON CORE ELECTIVE - II</b> (For the candidates admitted from the year 2021-22 onwards) <b>ENERGY PHYSICS - II</b>			
<b>COURSE OBJECTIVES :</b>			
<ol style="list-style-type: none"> <li>1. To explain the different types of wind energy.</li> <li>2. To categorise various other energy sources.</li> <li>3. To understand the nuclear energy sources.</li> <li>4. To illustrate the various energy storage devices.</li> <li>5. To evaluate the impacts of non-conventional energy in various sectors.</li> </ol>			
<b>UNIT - I</b>	<b>WIND ENERGY</b> Wind energy - Calculating the power from the wind – Horizontal - Axis wind mill - Single blade wind mill - bicycle wheel wind mill - Horizontal axis wind mill - Dutch type - sail type - Vertical Axis wind mill- Performance of wind mill- Merits and demerits		
<b>UNIT - II</b>	<b>OTHER ENERGY SOURCES - I</b> Geothermal energy - Ocean Thermal Energy Conversion (OTEC) - open cycle - closed cycle - Tidal energy – Principle - Tidal power plants - Single basin system - One way cycle – Two way cycle - Merits and demerits.		
<b>UNIT - III</b>	<b>OTHER ENERGY SOURCES - II</b> Nuclear power - Fusion and Fission - Breeder reactor nuclear fusion - Basic principles of magneto- Hydro - Dynamics - Solar production of Hydrogen - Liquid hydrogen as a Fuel in future - Merits and demerits.		
<b>UNIT - IV</b>	<b>ENERGY STORAGE</b> Solar energy storage - Thermal, Electrical, Chemical, Mechanical - Hydrogen storage - compressed Gas storage - Liquid storage - underground storage - Storage as metal hydrides		
<b>UNIT - V</b>	<b>IMPACTS OF NON- CONVENTIONAL ENERGY</b> Conversions of energy - Patterns of energy consumption in domestic, Industrial, Transportation and Agricultural sectors - Conservation Principles - Energy crisis and possible solutions - Energy option for the developing countries - Impacts due to non - Conventional energy sources - Global warming.		
<b>TEXT BOOKS:</b>			
<ol style="list-style-type: none"> <li>1. G.D. RAI, Non conventional energy sources - Khanna publishers, 2008.</li> <li>2. KARUPANNAN. K and SUGANTHI, Energy physics- PRIYA publication.</li> </ol>			
<b>REFERENCE BOOKS:</b>			
<ol style="list-style-type: none"> <li>1. G.D. RAI “Solar energy utilization”- Ed – V (1995).</li> <li>2. S.P. SAKHATURE, “Solar energy”- TATA MCGRAW Till publication company, Ed., 11, 1997.</li> <li>3. C.G. Agerwal, Solar energy.</li> </ol>			

<b>Teaching Learning Methods</b> Lecture Method, ICT, Seminar, Assignment, Quiz, field visit
---

**COURSE OUTCOMES:**

By the end of this course, students will be able to

Course outcome No.	Course Outcome	Knowledge level
CO1	Understand the different types of wind energy.	K2
CO2	Able to categorize various other energy sources.	K4
CO3	Ability to explain the nuclear energy source.	K2
CO4	Able to classify the various energy storage devices.	K4
CO5	Can evaluate the impacts of non-conventional energy in various sectors.	K5

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6= Create**

<b>Nature of Course</b>			
Knowledge and skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

**Mapping Course Outcome with PO and PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	POS6	PSO7	PSO8	TOT	Score
CO1	3	3	2	-	3	3	3	3	3	2	3	3	2	33	2.5
CO2	3	3	3	3	-	2	3	3	2	3	3	2	2	32	2.4
CO3	3	2	-	3	1	2	3	2	2	3	1	2	1	25	1.9
CO4	3	3	3	1	2	3	3	3	3	-	3	2	2	31	2.9
CO5	3	2	3	2	2	3	2	2	3	2	2	2	2	30	2.3
	Mean overall score														2.4

**Result: The core for this course is 2.4 (High relationship)**

**Note:**

Strength level	Low	Medium	High
Value	1	2	3

**Value Scaling**

Mapping	1 - 33%	34 - 66%	67 - 100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1- 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score COs} = \frac{\text{Total of Value}}{\text{Total No. of POs \& PSOs}} \quad \text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of Cos}}$$

**COURSE DESIGNER:**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT: 3</b>	<b>COURSE CODE: U21PH1A1</b>
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. - I SEMESTER - ALLIED COURSE – I</b> <b>(FOR CHEMISTRY, MATHEMATICS &amp; GEOLOGY MAJOR)</b> (For the candidates admitted from the year 2021-22 onwards) <b>ALLIED PHYSICS – I</b>	
<b>COURSE OBJECTIVES</b> To make the Students to <ol style="list-style-type: none"> <li>1. Explore the basic laws governing the behaviour of matter in everyday life.</li> <li>2. Define the general parameters like force, velocity and acceleration.</li> <li>3. Acquire fundamental knowledge of thermodynamical laws and magnetism.</li> <li>4. Access the importance of ultrasonic and acoustic properties towards architectural developments</li> </ol>	
<b>UNIT - I</b>	<b>PROPERTIES OF MATTER</b> Elasticity: Hooks law - Elastic constants - Young’s modulus by non-uniform bending - Rigidity modulus by torsion pendulum - Surface Tension: Explanation of molecular theory - Surface tension of the liquid by drop weight method - Viscosity: Poiseuille’s formula - stream line motion - Turbulent motion - Critical velocity - Co-efficient of viscosity by Poiseuille’s method.
<b>UNIT- II</b>	<b>MECHANICS</b> Force - centripetal and centrifugal forces - Laws of friction - co-efficient of friction - Banking of curved tracks - Newton’s law of gravitation – Kepler’s laws of Planetary motion - Deduction of Newton’s law of gravitation from Kepler’s law - Centre of gravity - Centre of gravity of solid cone - Floation laws - Stability of floating bodies.
<b>UNIT- III</b>	<b>HEAT AND THERMODYNAMICS</b> Heat: Heat capacity - Entropy and Enthalpy - Thermal conductivity of a bad conductor by Lee’s Disc method - Newton’s law of cooling - Thermodynamic systems: Isothermal and adiabatic process - zero <sup>th</sup> , first, second laws of thermodynamics - solar constant – temperature of the sun - Angstrom pyroheliometer.
<b>UNIT- IV</b>	<b>MAGNETISM AND ELECTROMAGNETISM</b> Magnetic materials - Properties of dia, para, ferro and anti-ferro magnetic materials - Permeability and susceptibility - Laws of electromagnetic Induction – Biot-Savart law - Force acting on a conductor carrying current in magnetic field – Moving coil galvanometer - Eddy currents – applications.
<b>UNIT - V</b>	<b>SOUND</b> Laws of stretched strings - determination of frequency of alternating current by Sonometer- Architectural acoustics: - characteristics of musical sound and noise - Reverberation time - Sabine’s formula for reverberation time - Condition for good acoustics. Ultrasonics: Production of ultrasonic waves by Piezo-electric oscillator - applications of ultrasonics.
<b>TEXT BOOKS</b> <ol style="list-style-type: none"> <li>1. R.Murugesan, Allied Physics, S.Chand&amp; Co. Ltd., New Delhi, 1st edition, 2006.</li> <li>2. R. Murugesan, KiruthigaSivaprasath, Properties of Matter and Acoustics, S.Chand&amp; Co Ltd. 3rd Edition, Reprint 2013.</li> <li>3. R.Murugesan, Electricity and Magnetism, S.Chand&amp; Co. Ltd, reprint 2017.</li> </ol>	
<b>REFERENCE BOOKS</b> <ol style="list-style-type: none"> <li>1. Robert F.Kingsbury, Elements of Physics, 1st edition, Van Nostrand Company Inc.,London, 1966.</li> <li>2. Nelkon and Parker, Advanced Level Physics, CBS Publishers &amp; Distributors Pvt. Ltd.,7<sup>th</sup>edition, 2006.</li> <li>3. BrijLal and N.Subrahmanyam, Properties of Matter, 3rd Edition, S.Chand&amp; Co. Ltd.,2005.</li> <li>4. BrijLal&amp;N.Subrahmanyam, Heat Thermodynamics and Statistical Physics, S.Chand&amp;Co. Ltd., 2012.</li> </ol>	
<b>CHAIRMAN – BOS</b>	<b>CONTROLLER OF EXAMINATIONS</b>

<b>Teaching Learning Methods</b> Lecture by Board and Chalk , Problem Solving, Assignment and Seminars
<b>Evaluation Pattern</b> <b>Internal:</b> Weightage to CIA test II (5) + Model Examn (10) + Attendance (5) + Seminar (or) Assignment (5). Total <b>25 Marks</b> <b>External:</b> Part A (20) + Part B (25) +Part C (30) = Total <b>75 Marks</b>

**COURSE OUTCOMES**

By the end of this course, Students will be able to

Course Outcome No.	Course Outcome statement	Knowledge Level
CO1	Demonstrate the practical concepts of bending of beams, surface tension and viscosity through experimental setup	K5
CO2	Analyze the behaviour of fundamental concepts of mechanics	K4
CO3	Apply the fundamental thermodynamic properties and the associated laws to understand physical systems	K4, K5
CO4	Illustrate the effects of electric and magnetic field	K2
CO5	Explore the production and application of ultrasonic waves and develop knowledge of architectural acoustics	K5

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6= Create**

Nature of Course			
Knowledge and Skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

**MAPPING COURSE OUTCOME WITH PO AND POS**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	POS6	POS7	POS8	TOT	
CO1	3	3	3	3	3	3	3	3	3	3	3	2	2	37	2.8
CO2	3	3	3	2	2	3	2	3	2	3	2	3	2	33	2.5
CO3	3	3	2	3	2	3	2	3	2	3	2	2	2	32	2.4
CO4	3	3	2	2	2	3	3	3	3	2	3	2	2	33	2.5
CO5	3	3	2	2	3	3	3	3	3	3	3	2	2	35	2.6
Mean overall score															2.56

Result: The core for this course is 2.56 (High relationship)

Note:

Strength level	Low	Medium	High
value	1	2	3

**Values Scaling**

Mapping	1 – 33%	34 – 66%	67 -100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score of COs} = \frac{\text{Total of Value}}{\text{Total No. of Pos\& PSOs}}$$

$$\text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of COS}}$$

**COURSE DESIGNER:**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

**CREDIT:4**

**COURSE CODE : U21PH2A2P**

**GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005**

**B.Sc.– II SEMESTER – FIRST ALLIED COURSE – II  
(FOR CHEMISTRY, MATHEMATICS & GEOLOGY MAJOR)**

(For the candidates admitted from the year 2021-22 onwards)

**ALLIED PHYSICS – II – LAB**

**COURSE OBJECTIVES**

To make the Students to

1. Demonstrate basic experiments to study the properties of matter.
2. Illustrate the concept of sound and verify its theoretical values experimentally.
3. Demonstrate the behavior of light and heat; study its properties through practical experiments.
4. Apply the concepts of electricity to calibrate the voltmeter and ammeter.
5. Verify the truth tables using different logic functions.

List of Experiments (Any Fifteen)

**PROPERTIES OF MATTER**

1. Young's Modulus – Non Uniform Bending – Pin and Microscope.
2. Torsional Pendulum – Rigidity Modulus.
3. Surface tension and Interfacial Surface tension – Drop weight method.
4. Coefficient of Viscosity of liquid using graduated burette.

**HEAT & SOUND**

5. Specific heat capacity of liquid by cooling method.
6. Lee's Disc – Thermal Conductivity of a bad conductor.
7. EMF of thermocouple – Direct deflection method.
8. Sonometer – Verification of transverse laws.
9. Sonometer – Determination of AC frequency

**LIGHT**

10. Focal length of a concave lens.
11. Spectrometer – Grating – Normal incidence method.
12. Spectrometer – refractive index of solid prism.
13. Newton's Rings – Radius of curvature of a convex lens.

**ELECTRICITY**

14. Carey Foster's bridge – specific resistance.
15. Meter bridge – Determination of specific resistance.
16. Potentiometer – Low range voltmeter calibration.
17. Potentiometer – Calibration of ammeter.
18. Table galvanometer – Figure of merit

**ELECTRONICS**

19. Characteristics of a junction diode.
20. Construction of full wave rectifiers.
21. Basic logic gates - Verification of truth table using discrete Components

**REFERENCE BOOKS**

1. S.Balasubramanian, R.Ranganathan, M.N. Srinivasan, A Textbook of Practical Physics 2<sup>nd</sup> revised Edition, S. Chand and Sons Pvt, Ltd., 2017.
2. C.C.Ouseph, U.J.Rao, V.vijayendran, Practical Physics, 1st Edition, Viswanathan Sprinters and Publishers, Pvt, Ltd., 2015.
3. P.R.Sasikumar, Practical Physics – PHI Learning Pvt, Ltd., 2011.
4. S.P.Singh&PragathiPrakasam, Advanced Practical Physics. 2019.

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**



<b>Teaching Learning Methods</b> Hands on learning – Practical sessions
--

**COURSE OUTCOMES**

By the end of this course, Students will be able to

Course Outcome No.	Course Outcome statement	Knowledge Level
CO 1	Apply the concept of elastic nature of materials and surface Tension, Viscosity of liquid by various experimental set up	K5
CO 2	Demonstrate the principles of specific heat capacity and laws of vibration through various experimental procedures.	K4
CO 3	Apply the phenomenon of interference and the concept of refractive index with the use of suitable optical set up.	K4
CO 4	Develop the ability to design and connect simple electronic circuits and to collect and analyse the data using these circuits. To develop skills in using electronic instruments like volt meter and ammeter.	K5
CO 5	Analyze and design various digital electronic circuits.	K5

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6= Create**

**MAPPING COURSE OUTCOME WITH PO AND POS**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	POS6	POS7	POS8	TOT	
CO1	3	3	2	3	3	3	3	3	2	2	2	2	2	33	2.5
CO2	3	3	3	3	2	3	2	3	2	2	2	2	2	32	2.4
CO3	3	2	2	3	3	3	2	3	2	3	2	2	2	32	2.4
CO4	3	3	3	2	2	3	2	2	2	2	2	2	2	30	2.3
CO5	3	2	3	2	2	3	3	3	3	3	3	2	2	34	2.6
Mean overall score															2.44

Result: The core for this course is 2.4 (High relationship)

Note:

Strength level	Low	Medium	High
value	1	2	3

**Values Scaling**

Mapping	1 – 33%	34 – 66%	67 -100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score of COs} = \frac{\text{Total of Value}}{\text{Total No. of Pos\& PSOs}}$$

$$\text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of COS}}$$

**COURSE DESIGNER:**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

**CREDIT: 3****COURSE CODE: U21PH2A3****GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639 005****B.Sc. – II SEMESTER – FIRST ALLIED COURSE – III  
( FOR CHEMISTRY, MATHEMATICS & GEOLOGY MAJOR)**

(For the candidates admitted from the year 2021-22 onwards)

**ALLIED PHYSICS – III****COURSE OBJECTIVES**

To enable the students to

1. Acquaint with the optical properties of materials.
2. Analyze the behaviour of lasers, types and its applications.
3. Evaluate the properties of atoms and nuclear models on the basis of its structure.
4. Formulate basic knowledge of digital electronic circuits with practical applications.

**UNIT- I****OPTICS**

Laws of Reflection and Refraction - Refractive index of prism using spectrometer - Interference - Newton's rings – Determination of wave length of sodium light - Diffraction (definition only) - **Fiber optics**: Numerical aperture, acceptance angle – Total internal reflection - Fiber optics communication system - applications - Temperature sensor.

**UNIT-II****LASER PHYSICS**

Properties - Spontaneous and stimulated emission - Population inversion - Optical pumping - Condition for Laser action - Semiconductor laser - CO<sub>2</sub> laser - Nd-YAG laser - Applications of laser - Holography - Construction and Reconstruction.

**UNIT-III****ATOMIC AND NUCLEAR PHYSICS**

**Atomic physics**: Photo electric effect - Einstein photoelectric equation - Coupling schemes – LS & JJ couplings - Zeeman effect – Experiment - Stark effect (definition only) - **Nuclear Physics**: Nucleus – Nucleus size, charge – Particle detectors - Geiger Muller counter - Particle accelerators -Betatron.

**UNIT-IV****SEMICONDUCTORS AND OPTOELECTRONICS**

Intrinsic and extrinsic semiconductor – forward and reverse bias - Volt - Ampere Characteristics of P-N junction Diode - Zener diode - **Optoelectronic devices**: Photovoltaic cell - Solar cell – Phototransistor - LED and LCD – Construction, working and applications.

**UNIT-V****NUMBER SYSTEM AND DIGITAL ELECTRONICS**

Binary, Octal, Hexadecimal – Inter conversion - AND, OR, NAND, NOR, XOR, XNOR gates - DeMorgan's theorem - Laws of Boolean algebra - **Operation Amplifiers**: Ideal characteristics – Inverting - Non inverting op-amp - CMRR - Adder - Subtractor.

**TEXT BOOKS**

1. R.Murugesan, Allied Physics, 1<sup>st</sup> edition, S. Chand & Co. Ltd., New Delhi, 2006.
2. M. N Avadhanulu, N.Subrahmanyam, BrijLal, Text Book of Optics, S.Chand & Co. Ltd., 2012.
- G. Senthil Kumar, Engineering Physics – I, VRB Publishers Pvt. Ltd., 2013.
3. R.Murugesan, KiruthigaSivaprasath, Modern Physics, S.Chand & Co. Ltd., 2016.
4. V.Vijayendran, Introduction to Integrated Electronics, Viswanathan, S., Printers & Publishers Pvt. Ltd., 2009.

**REFERENCE BOOKS**

1. Nelkon and Parker, Principles of Physics, Heinemann International literature and text books, 7<sup>th</sup> revised edition, edition 2006.
2. Donald P Leach, Albert Paul Malvino, GoutamSaha, Digital Principles and Applications, 7<sup>th</sup> edition, Tata McGraw Hill Education Private Ltd., New Delhi, 2011.
3. Ancillary Physics, Kamalakannan and others, S. Viswanathan, 2000.
4. Engineering Physics, M. Arumugam, Anuradha Agencies, Publishers, 2010.
5. Allied Physics, G.Ravichandran, Padmapriya Publications, 2007.

**CHAIRMAN – BOS****CONTROLLER OF EXAMINATIONS**

**TEACHING METHODOLOGY:**

Lecture by Board and Chalk , Problem Solving, Assignment and Seminars

**COURSE OUTCOMES**

By the end of this course, Students will be able to

Course Outcome No.	Course Outcome statement	Knowledge Level
CO1	Demonstrate how light interacts with matter via studying dispersion through prism and to apply in designing optical useful day to day lives	K5
CO2	Discuss the properties of lasers, types and its applications	K4
CO3	Explain the properties of atoms and nuclear models on the basis of its structure	K4, K5
CO4	Exploration of semiconductor physics and its applications in day to day lives	K5
CO5	Apply the knowledge of digital electronic and logic gates in designing of various applications	K3, K4

**K1 = Remember, K2 = Understand, K3 = Apply, K4 = Analyze, K5 = Evaluate, K6= Create**

Nature of Course			
Knowledge and Skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

**MAPPING COURSE OUTCOME WITH PO AND POS**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	POS6	POS7	POS8	TOT	
CO1	3	3	3	3	3	3	3	3	2	3	3	2	2	36	2.7
CO2	3	2	3	2	2	3	3	3	3	2	2	2	2	32	2.4
CO3	3	3	2	3	2	3	2	3	3	2	3	2	2	33	2.5
CO4	3	2	2	2	2	3	3	3	3	2	3	2	2	32	2.4
CO5	3	3	2	2	3	3	3	3	3	2	2	2	2	33	2.5
<b>Mean overall score</b>															<b>2.5</b>

**Result: The core for this course is 2.5 (High relationship)****Note:**

Strength level	Low	Medium	High
value	1	2	3

**Values Scaling**

Mapping	1 – 33%	34 – 66%	67 -100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score of COs} = \frac{\text{Total of Value}}{\text{Total No. of Pos\& PSOs}}$$

$$\text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of COS}}$$

**COURSE DESIGNER:****CHAIRMAN – BOS****CONTROLLER OF EXAMINATIONS**

<b>CREDIT: 5</b>		<b>COURSE CODE: U21PH3A4</b>	
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. - III SEMESTER – SECOND ALLIED COURSE – I</b> <b>(FOR COMPUTER SCIENCE MAJOR)</b> (For the candidates admitted from the year 2021-22 onwards)			
<b>APPLIED PHYSICS - I</b>			
<b>COURSE EDUCATIONAL OBJECTIVES</b>			
<ol style="list-style-type: none"> <li>1. To study the statics and dynamics of solid bodies and liquids</li> <li>2. To understand their physical properties</li> <li>3. To solve problems in statics and dynamics.</li> </ol>			
<b>UNIT - I</b>	<b>CURRENT ELECTRICITY</b> Ohm's Law – Verification of Ohm's Law –Kirchoff's law – Applications of Kirchoff's law – Wheatstone's bridge – Metre bridge – Carey Foster's Bridge – Potentionmeter – Measurement of Current and Resistance - Calibration of low range Voltmeter.		
<b>UNIT - II</b>	<b>ALTERNATING CURRENT</b> AC circuits with double components – measurement of current and voltage – power in an AC Circuit – Power Factor (derivation) – Wattless current – Choke – Series and parallel resonant circuits – Impedance – Q factor – Selectivity and Sharpness of resonance.		
<b>UNIT- III</b>	<b>NUMBER SYSTEMS, CODES AND LOGIC GATES</b> Number Systems – Conversions – Binary, Addition, Subtraction, Multiplication, Division – 8421 Code – BCD Code – Excess 3 code – Gray code – Binary to Gray and Gray to Binary conversion – ASCII Code – Basic and Derivative Gates: AND, OR, NOT, NAND, NOR, EX-OR – NAND & NOR as Universal Gates.		
<b>UNIT- IV</b>	<b>BOOLEAN ALGEBRA, ARITHMETIC AND COMBINATIONAL LOGIC CIRCUITS</b> Basic laws of Boolean algebra, De Morgan's theorem – Verification of Boolean expression using Boolean laws – Half adder – Full adder – Half Subtractor – Full subtractor (using basic gates) – Encoder – Decimal to BCD encoder – Decoder – BCD to decimal decoder.		
<b>UNIT - V</b>	<b>SEMICONDUCTOR MEMORIES</b> Introduction – ROM using diodes and transistors – Rom in terms of digital circuits - Building memory of larger capacity - PROM - EPROM – EEPROM – ROM as a unit in microcomputers - RAM - Static RAM - Flip Flop as a RAM cell – Memory expansion – Memory Parameters.		
<b>BOOKS FOR STUDY:</b>			
<ol style="list-style-type: none"> <li>1. Narayanamurthy and Nagarathinam, Electricity and Magnetism.</li> <li>2. BrijLal and N .Subramaniam, Electricity and Magnetism - RatanPrakashanMandir, New Delhi 1995.</li> <li>3. Puri V.K., Digital Electronics circuits and systems, TATA Mcgraw hill publications, New Delhi, 2011.</li> <li>4. Vijayendran V &amp; Subramanian V, Introduction to Integrated Electronics, S Viswanath PVT LTD., Chennai 2012.</li> </ol>			
<b>BOOKS FOR REFERENCE:</b>			
<ol style="list-style-type: none"> <li>1. Murugesan R, Electricity and Magnetism, S Chand &amp; Company Ltd., 2015.</li> <li>2. Gotham W.H. Digital Electronics, Prentice Hall of India PVT., New Delhi, 1996.</li> <li>3. Sanjay D Jain, Applied Physics, Universities Press, Hyderabad, Telengana.</li> </ol>			
<b>CHAIRMAN – BOS</b>		<b>CONTROLLER OF EXAMINATIONS</b>	

<b>Teaching Learning Methods</b> Chalk and talk Lectures; seminar; ICT based presentations; Video Lectures; Group Discussions; Interactive activities; Mini – project; MCQs
<b>Evaluation Pattern</b> <b>Internal:</b> Weightage to CIA test II (5) + Model Examn (10) + Attendance (5) + Seminar (or) Assignment (5). Total <b>25 Marks</b> <b>External:</b> Part A (20) + Part B (25) +Part C (30) = Total <b>75 Marks</b>

<b>Nature of Course</b>			
Knowledge and Skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

### MAPPING COURSE OUTCOME WITH PO AND PSO

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	TOT	SCORE
CO1	4	3	2	2	3	3	3	3	2	4	29	2.7
CO2	3	2	4	2	2	2	3	4	2	3	27	2.7
CO3	2	3	4	2	2	1	2	4	3	3	27	2.7
CO4	4	3	2	1	4	2	3	3	3	1	26	2.6
CO5	2	4	3	3	2	3	2	2	4	3	28	2.8
<b>Mean overall score</b>												<b>2.7</b>

Result: The Score for this course is **2.7** (High relationship)

#### Note:

Strength level	Low	Medium	High
value	1	2	3

#### Values Scaling

Mapping	1 – 33%	34 – 66%	67 -100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score of COs} = \frac{\text{Total of Value}}{\text{Total No. of Pos \& PSOs}}$$

$$\text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of COS}}$$

**COURSE DESIGNER:**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

**CREDIT: 4**

**COURSE CODE: U21PH4A5P**

**GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005**

**B.Sc. - IV SEMESTER – SECOND ALLIED COURSE – II**

(For candidates admitted from the year 2021-22 onwards)

**(FOR COMPUTER SCIENCE MAJOR)**

**APPLIED PHYSICS – II – LAB**

**COURSE OBJECTIVES**

1. To illustrate the students different electronic circuit and their application in practice
2. To impart knowledge on assessing performance of electronic circuit through monitoring of sensitive parameters
3. To evaluate the use of computer based analysis tools to review performance of semiconductor device circuit.

**List of Experiments (Any Fifteen)**

1. Series and Parallel resonance circuit.
2. FET – Characteristics.
3. Transistor Characteristics – CE Configuration.
4. Transistor Characteristics – CB Configuration.
5. Bridge Rectifier and Zener controlled regulated power supply.
6. Field along the axis of a coil – Determination of BH value.
7. Field along the axis of a coil – M.
8. Potentiometer – Measurement of specific resistance.
9. Potentiometer – Ammeter Calibration.
10. Carey Foster's Bridge – Specific resistance.
11. Calibration of a thermistor and determination of its Energy gap.
12. R-C Coupled amplifier.
13. Hartley Oscillator using transistor.
14. Astable multivibrator using IC.
15. Adder and subtractor using op – amp.
16. Integrator and differentiator using op – amp.
17. Half adder and Halfsubtractor using gates.
18. NAND and NOR as universal building blocks.
19. Flip Flop using IC gates.
20. Verification of De Morgan's theorem.

**TEXT BOOKS**

1. Practical Physics, AnchalSrinivasa and R.K. Shukka , New age International Publishers , 2018, second Edition .
2. A text book of Physics Practical – Part I, Prof. C.C. Ouseph and Prof. V. Srinivasan, S.Visvanathan Publisher ,1990
3. A text book of Physics Practical – Part II, Prof. C.C. Ouseph and Prof. V.Srinivasan, S.Visvanathan, Publisher ,1996

**BOOKS FOR REFERENCE:**

1. Practical Physics , S.L.Gupta and V.Kumar , PragatiPrakashan- Meerut,1999, 23rd Edition
2. A Text book of Practical Physics, H.S.Aller and H.Moore, Mac millan and Co. Limited, 1941.
3. Practical Physics with viva –voce , S.P. Singh, PragatiPrakashan- Meerut,1999, 23rd Edition
4. Advanced level Practical Physics , M.Nelkon and J.M. Ogborn, Heinemann Educational Books Limited - London , 1967

**COURSE OUTCOME**

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

1. **Identify** relevant information to supplement to the analog electronic circuit course.
2. **Set up** testing strategies and select proper instruments to evaluate performance characteristics of electronic circuits.
3. **Choose** testing and experimental procedures on different types of electronic circuit and analyze their operation different operating conditions.
4. **Evaluate** possible causes of discrepancy in practical experimental observations in comparison to theory.
5. **Practice** different types of writing and instruments connections keeping in mind technical, Economical, safety issues.

**MAPPING COURSE OUTCOME WITH PO AND POS**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	POS6	POS7	POS8	TOT	SCORE
CO1	3	3	2	3	2	3	2	3	3	-	3	3	2	32	2.4
CO2	3	2	3	3	3	2	1	3	2	3	3	-	3	31	2.3
CO3	3	3	2	3	2	3	3	2	3	2	-	3	2	31	2.3
CO4	3	2	3	3	-	3	2	3	3	3	2	3	3	33	2.5
CO5	3	3	2	3	3	2	3	1	2	3	3	3	3	34	2.6
<b>Mean overall score</b>														<b>161</b>	<b>2.42</b>

**Result: The core for this course is 2.42 (High relationship)**

Note:

Strength level	Low	Medium	High
value	1	2	3

**Values Scaling**

Mapping	1 – 33%	34 – 66%	67 -100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0
Quality	Poor	Moderate	High

$$\text{Mean Score of COs} = \frac{\text{Total of Value}}{\text{Total No. of Pos\& PSOs}} \quad \text{Mean overall score for COs} = \frac{\text{Total of Mean Score}}{\text{Total No. of COS}}$$

**COURSE DESIGNER:**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT: 3</b>		<b>COURSE CODE: U21PH4A6</b>	
<b>GOVERNMENT ARTS COLLEGE(AUTONOMOUS), KARUR – 639 005</b> <b>B.Sc. – IV SEMESTER – SECOND ALLIED COURSE – III</b> (For the candidates admitted from the year 2021-22 onwards) <b>(FOR COMPUTER SCIENCE MAJOR)</b>  <b>APPLIED PHYSICS - III</b>			
<b>COURSE OBJECTIVES</b>			
<b>UNIT - I</b>	<b>SEMICONDUCTOR PHYSICS</b>	Theory of energy bands in crystals - Distinction between conductors, insulators and semiconductors-Intrinsic and Extrinsic Semiconductor – Hall effect in semiconductor - Zener diode – Tunnel diode – Backward diode – Breakdown voltage – avalanche Breakdown.	
<b>UNIT - II</b>	<b>TRANSISTORS</b>	Transistor: NPN & PNP-Transistor - DC characteristics of CE and CB configuration - Hybrid parameters-Function of Transistor as an amplifier and oscillator – FET-N-channel FET – performance Characteristics – FET amplifier.	
<b>UNIT- III</b>	<b>LASER</b>	Principle of laser - Properties- Stimulated emission - Population Inversion - Pumping- Nd:YAG Laser –CO2 Laser- Semiconductor laser - CD ROM.	
<b>UNIT - IV</b>	<b>OPTO-ELECTRONIC DEVICES LED</b>	Radiation Transition - Emission Spectra - Methods of excitation - Visible LED - Materials for LED - LED Configuration and performance - Photo Diode – Photo Transistor – Electronic Watches - Seven Segment display – LED.	
<b>UNIT - V</b>	<b>OPERATIONAL AMPLIFIER</b>	The basic Operational Amplifier - Inverting and Non Inverting Operational Amplifier - Differential Operational Amplifier - CMRR – Basic uses of Operational Amplifier-Sign and Scale changer and phase shifter - Adder - Subtractor - Comparator – Differentiator – AC Integrator.	
<b>BOOKS FOR STUDY:</b>			
<ol style="list-style-type: none"> <li>1. Jacob Millman, Micro Electronics McGraw Hill Publications, NewDelhi, 1985.</li> <li>2. Theraja, B.L., The fundamentals of Solid State Physics, Sultan Chand &amp; Co., Delhi, 2002.</li> <li>3. Mithal G.K. and Vanvasi, Pulse and Digital Electronics, Khanna Publications, NewDelhi, 2006.</li> </ol>			
<b>BOOKS FOR REFERENCE:</b>			
<ol style="list-style-type: none"> <li>1. Ramanan, Functional Electronics - TMH-1994.</li> <li>2. Milmann and Halkins, Electronic Devices and circuits, McGraw Hill - 1967.</li> <li>3. Sanjay D Jain, Engineering Physics, Universities, Preas, Hyderabad, Telengana 2012</li> </ol>			
<b>CHAIRMAN – BOS</b>		<b>CONTROLLER OF EXAMINATIONS</b>	



<b>Teaching Learning Methods</b>
Lecture method; ICT, Seminar, Quiz, Group Discussion.
<b>Evaluation Pattern</b>
<b>Internal:</b> Weightage to CIA test II (5) + Model Exam (10) + Attendance (5) + Seminar (or) Assignment (5). Total <b>25 Marks</b>
<b>External:</b> Part A (20) + Part B (25) +Part C (30) = Total <b>75 Marks</b>

<b>Nature of Course</b>			
Knowledge and Skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

**MAPPING COURSE OUTCOME WITH PO AND PSO**

Outcome	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	TOT	
CO1	2	4	2	2	3	3	3	3	2	4	28	2.8
CO2	3	2	4	2	3	2	3	4	2	3	28	2.8
CO3	2	3	4	2	2	3	2	2	3	3	27	2.7
CO4	4	3	2	1	4	2	3	3	2	1	25	2.5
CO5	2	4	3	3	2	3	2	2	4	3	28	2.8
<b>Mean overall score</b>												<b>2.72</b>

Result: The Score for this course is 2.72 (High relationship)

**Note:**

Strength level	Low	Medium	High
value	1	2	3

**Values Scaling**

Mapping	1 – 33%	34 – 66%	67 -100%
Scale	1	2	3
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0
Quality	Poor	Moderate	High

Mean Score of COs =  $\frac{\text{Total of Value}}{\text{Total No. of Pos\& PSOs}}$

Mean overall score for COs =  $\frac{\text{Total of Mean Score}}{\text{Total No. of COS}}$

**COURSE DESIGNER:**

**CHAIRMAN – BOS**

**CONTROLLER OF EXAMINATIONS**