

B.Sc. Physics
Semester II
Thermal Physics and Sound
Subject Code: PC1721
Teaching Plan

Unit	Modules	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment/ Evaluation
I	Kinetic theory of Gases					
	1	Kinetic model – Expression for the pressure exerted by a gas. Kinetic energy per unit volume of a gas	2	To understand the concept of kinetic theory of gases.	Lecture Discussion with PPT illustration	Evaluation through short test Multiple choice questions
	2	Relation between molar specific heat and degrees of freedom Specific heats of mono and diatomic gases	2	To examine the concept of specific heats of mono and diatomic gases.	Lecture discussion with illustration	Formative assessment I
	3	Mean free path – Expression for mean free path. Transport phenomena – Viscosity	3	To recall the phenomena of viscosity.	Lecture discussion	
	4	Thermal conductivity – Self diffusion Maxwell’s velocity distribution law	2	To analyze the concept of thermal conductivity.	Lecture discussion	
II	Laws of Thermodynamics					
	1	Thermodynamic systems Zeroth law of thermodynamics – Internal energy First law of thermodynamics – Application of First law of thermodynamics	3	To interpret the principle of first law of thermodynamics.	Lecture Illustration	Short test Quiz Assignment Formative assessment I,II
	2	Specific heat of a gas - Isothermal process–	3	To outline the different types	Lecture discussion	

		Isochoric process – Isobaric process Adiabatic process– Work done during an Isothermal process - Work done during an Adiabatic process Reversible and irreversible process		of thermodynamic processes.		
	3	Carnot's cycle - Second law of thermodynamics Concept of entropy - Change in entropy in a reversible process - Change in entropy in an irreversible process The T-S diagram - Third law of thermodynamics	3	To summarize the second and third law of thermodynamic s and their applications.	Lecture Illustration	
III	Thermodynamic Potentials and Transmission of heat					
	1	Maxwell's Thermodynamic relations- Application of Maxwell's Thermodynamic relations Specific heat equation – Joule Thomson cooling Joule Thomson coefficient – Clausius Clapeyron's Equation The TdS equations	5	To derive Maxwell's Thermodynamic relations, Joule Thomson coefficient and interpret their applications.	Lecture with PPT Illustration	Formative assessment II
	2	Coefficient of thermal conductivity Lee's disc method for bad conductors Convection – Black body Stefan Boltzmann law - Derivation of Stefan's law and Newton's law of cooling from Stefan's law Specific heat capacity by Newton's law of cooling.	4	To have practical knowledge on determining the coefficient of thermal conductivity and specific heat capacity.	Question- answer session Lecture	Formative assessment II
IV	Waves and Oscillations					
	1	Simple harmonic motion – Differential equation of motion	3	To illustrate simple harmonic	Lecture Discussion	Formative

		executing S.H.M Solution of the differential equation of motion – Composition of two S.H.M. along the same direction and at right angles Lissajous figure		motion.		assessment III
	2	Free, Forced and Resonant Vibrations Vibrating Systems: Modes of vibration – stationary vibrations in strings Sonometer: Laws of transverse vibration of strings A.C frequency by sonometer Melde's string.	6	To acquire skills to do experiments by sonometer and Melde's string.	Lecture Discussion	
V	Acoustics and Ultrasonics					
	1	Ultrasonic production -Magnetostriction method Piezoelectric method Detection of ultrasonic waves	3	To compare the methods of ultrasonic production.	Lecture with PPT	Short test Formative assessment III
	2	Thermal method – Piezoelectric crystal method Kundt's tube method Application of ultrasonic waves: Depth of sea, sonar	3	To interpret the applications of ultrasonic waves for determining the depth of sea.	Brain storming session. Lecture Illustration	
	3	Introduction to Acoustics – Classification of sound Reverberation - Absorption coefficient Sabine's formula Factors affecting the architectural acoustics and their remedies	3	To classify sound and to examine the architectural acoustics.	Lecture with PPT Illustration	

Course instructor:

Dr. M.Priya Dharshini

Head of the Department

Dr.S.Mary Delphine

Semester : II /IV

Name of the Course : Allied Physics II

Subject code : AP1721/AP1741

Teaching Plan

Unit	Section	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment / Evaluation
I	Thermal Physics					
	1	Conduction in solids, Thermal conductivity, Lee's disc method- Experiment to determine the thermal conductivity -	2	To understand the basic concepts of conduction mode of heat transfer	Illustration and lecture	Evaluation through: quiz, short questions
		Relation between thermal and electrical conductivities- Widemann – Franz law.	1	To derive the relation between electrical conductivity and thermal conductivity	Illustration and theoretical derivation	Multiple choice, questions ,
	2	Convection: Newton's law of cooling, Determination of specific heat capacity of liquid	2	To define convection mode of heat transfer and study its application	Illustration, theoretical derivation and Practical	Deriving theoretical Formulas
	3	Radiation: Distribution of energy in the spectrum of black body – Results.	3	To understand radiation mode of heat transfer and black body radiation	Lecture and theoretical derivation	Problem solving Formative assessment
II	Current Electricity					
	1	Ohms law- Electrical conductivity - Kirchoff's law - Wheatstone's bridge – condition for balance	3	To understand the basic concepts and features related to Current Electricity	Illustration, Theoretical formulation Problem Solving	Evaluation through: quiz, short test
	2	Carey Foster's Bridge – Measurement of specific resistance – Determination of temperature coefficient of resistance	3	To determine temperature coefficient of resistance using Carey-Foster bridge	Lecture , Theoretical formulation Practical demonstration	Assignment on applications. Problem Solving
	3	Potentiometer - calibration of voltmeter and ammeter.	2	To understand the concept of calibrating voltmeter and ammeter using potentiometer.	Lecture , Illustration, Theoretical formulation Practical	Formative assessment
III	Electromagnetism					
	1	Electromagnetic Induction – Faraday's laws – Lenz's law	3	To understand the basic concepts and features related to	Lecture , Illustration, Theoretical	Evaluation through: quiz, short

				Electromagnetism	formulation	questions
	2	Self-inductance – mutual inductance – Experimental determination of mutual inductance- Coefficient of coupling	2	To apply laws of electromagnetic induction and be able to calculate self- and mutual inductance.	Lecture , Illustration,	Multiple choice, questions ,
	3	Alternating current – Mean, RMS, peak - A.C. Circuits – LCR in series.	3	To understand the basic concepts of alternating current	Illustration, Theoretical formulation Practical	Deriving theoretical formulas Formative assessment
IV	Semi conductor Electronics					
	1	Semiconductors – pn junction diode	2	To understand the basic concepts and features related to Semiconductor	Lecture , Demonstration, theoretical formulation	Evaluation through: quiz, short questions
	2	Half wave and full wave rectifier – Bridge rectifier	2	To analyse the different type of rectifiers	Lecture , Demonstration, theoretical formulation	Multiple choice, questions ,
	3	Zener diode - Regulated power supply	2	To understand the concept of using zener diode as voltage regulator	Lecture , Demonstration, theoretical formulation	Deriving theoretical formulas
		Transistor – CE Configuration	2	To understand the basic concepts and features related to transistor	Lecture , Demonstration, theoretical formulation	Formative assessment
V	Digital Electronics					
	1	Number systems- decimal –binary – Conversion of Decimal Number into Binary Number- binary addition, subtraction, multiplication and division	4	To understand the basic concepts and features related to binary and decimal number system	Illustration, Theoretical formulation	Evaluation through: quiz, Deriving theoretical Formulas
	2	Logic gates – OR, AND, NOT, XOR, NAND and NOR gates – truth tables – NAND and NOR as Universal gates	4	To get thorough knowledge on logic gates	Lecture , Demonstration, theoretical formulation	Assignment on applications Formative

Course instructor: Dr. R. Krishna Priya, Ms. M. Abila Jeba Queen, Ms. P.Aji Udhaya

Head of the Department: Dr.S.Mary Delphine

Semester: IV

Name of the Course : ANALOG SYSTEM AND APPLICATIONS

Subject code : PC1741

Teaching Plan

Unit	Modules	Topics	Lecture hours	Learning outcome	Pedagogy	Assessment /Evaluation
I	Semiconductor diodes and transistors					
	1	Semiconductor materials – Intrinsic semiconductors – Extrinsic semiconductors, N-type semiconductor – P-type semiconductor	2	Identify the different types of semiconductor materials	Illustration, Descriptive lecture	Evaluation through: quiz, short questions Descriptive answers Formative assessment
	2	P-N Junction , P-N Junction without external voltage, P-N junction with forward bias and reverse bias, V-I characteristics of a P-N junction diode – Static and dynamic resistance of a diode	3	Understand the structure and functioning of a P-N junction diode under various operating conditions	Descriptive lecture. Practical demonstration	Evaluation through: quiz, short questions
	3	Half wave rectifier , Bridge Rectifier, Calculation of ripple factor and rectification efficiency , Filters (π filter), Zener diode , Voltage regulator	3	Understand the working of rectifiers, filters and voltage regulators	PPT Illustration, Descriptive lecture. Practical demonstration	Descriptive answers Formative assessment
	4	Junction transistor- structure, working, transistor, Amplifying action – Three configurations, Transistor characteristics (CE configuration only).	3	Understand the structure ,working and amplification action of a junction transistor	Descriptive lecture. Practical demonstration	
II	Transistor amplifier					

	1	Transistor biasing, selection of operating point, Bias stabilization ,Fixed bias and Voltage divider bias	3	Understand the concept of biasing and the different types of biasing	Descriptive lecture.	Evaluation through: quiz, Problem solving	
	2	Single stage transistor amplifier, Development of transistor AC equivalent circuit method, h-parameter equivalent circuit	3	Analyse single stage transistor using AC equivalent circuit and h parameter method	Descriptive lecture. Practical demonstration	short questions Descriptive answers	
	3	Analysis of a single state CE amplifier using hybrid models , Input and output impedance, current-voltage and power gain	3	Analyse the working of a single stage transistor and arrive at relation for various related parameters	Descriptive lecture. Theoretical formulation	Assignment Formative assessment	
III	Feedback in Amplifiers						
	1	Concept of feedback in amplifiers, Types of feedback, Voltage gain of amplifier	3	Understand the concept and types of feedback in amplifiers	PPT Illustration, Descriptive lecture.	Evaluation through: quiz,	
	2	Effect of negative feedback on gain stability, distortion and noise,input and output impedance and bandwidth	4	Explain the advantages of negative feedback	Descriptive lecture. Theoretical formulation	short questions Descriptive answers	
	3	Amplifier circuits with negative feedback, RC coupled amplifier without bypass capacitor, Emitter follower	3	Apply the concept of feedback in different practical circuits	Descriptive lecture. Theoretical formulation , Practical demonstration	Formative assessment	
IV	Oscillator						
	1	Need for an oscillator, Generating sine wave using tuned oscillator circuit, Frequency of oscillations in LC circuit	3	Understand the principle and working of oscillators	Descriptive lecture, Theoretical formulation	Evaluation through: quiz,	
	2	Positive feedback in amplifier (Barkhausen criterion), Starting voltage , LC oscillators, Hartley and Colpitts oscillators	4	Explain about the internal circuitry and working of various types of	Theoretical formulation , Practical demonstration	short questions Descriptive	

				oscillators		answers
	3	Basic principle of RC oscillators – RC phase shift oscillator, Wien bridge oscillator, crystal oscillator	4	Identify the different construction and circuit design of oscillators	Descriptive lecture. Theoretical formulation, Practical demonstration	Assignment Formative assessment
V	Operational amplifier					
	1	Parameters of a general and Ideal operational amplifier	3	Understand the basic parameters, operations and features of Opamp	Descriptive lecture. Theoretical formulation	Evaluation through: quiz,
	2	Inverting and Non-inverting amplifier, Difference and Summing amplifier, Log and antilog amplifiers,	4	Identify the use of Opamp in various circuits	Descriptive lecture. Theoretical formulation, Practical demonstration	short questions Descriptive answers
	3	Opamp as Voltage follower, Integrator, Differentiator, Comparators and Schmitt trigger	4	Apply the Opamp for different applications	Descriptive lecture. Theoretical formulation, Practical demonstration	Formative assessment

Course instructor: Dr. V. Shally

Head of the Department: Dr. S. Mary Delphine

Semester : II

Name of the Course: Physics Every day - II

Subject code: PNM172

Teaching Plan

Unit	Modules	Description	Lecture hours	Learning outcome	Pedagogy	Assessment /Evaluation
I	Electronics					
	1	Electronic devices Analog signals ,digital signals	2	To differentiate Analog and digital signals .	Lecture, PPT	Quiz test, Formative assessment (I)
	2..	Tape recording Radio transmission Radio receiver	2	Understand the principle and working of Tape recording Radio transmission Radio receiver	Lecture, PPT	

	3.	Television Remote control Telephone	2	Explain the principle and working of Television Remote control Telephone	Lecture, PPT	
	4.	The physics of cell phones What computers do Compact discs.	2	To know about computer	Lecture, PPT, Demonstration	
II	Energy use today					
	1	Fossil fuels Energy form water	2	Understand fuels and energy from water	Lecture, PPT,	Quiz test, Formative assessment (I)
	2	Geothermal energy Solar energy Wind energy	3	To differentiate different energy sources	Lecture, PPT, Group discussion	
	3	Biomass Energy from organic materials Secondary source of energy	2	Understand different energy sources	Lecture, PPT	
	4	Electricity – How Electricity is generated? The transformer Measuring electricity.	2	Understand the principle of electricity	Lecture, PPT	
III	Nuclear Energy and Medical Physics					
	1	Nuclear radiation Radioactive decay Nuclear reaction	2	Recall various concepts in nuclear physics	Lecture, PPT	Quiz test, Formative assessment (II)
	2	Types of radiation Detection and measurement of Radioactivity Nuclear energy	3	Differentiate different types of radiation	Lecture, PPT	
	3	Radiation and you Uses of Radioisotopes Nuclear medicine	2	Recall various concepts in nuclear physics	Lecture, PPT, Group discussion	
	4	What is Endoscopy? Electrocardiography (ECG) Electroencephalogram Blood pressure apparatus.	2	Understand the principles and applications of medical instruments	Lecture, PPT, Demonstration	
IV	Matter and the Universe					

	1	Theories of matter Quantum theories Theory of everything	2	Understand the theories in physics	Lecture, PPT, Group discussion	Quiz test, Formative assessment (II & III)
	2	The Big Bang Stars The solar system Planets	2	Recall various concepts in physics	Lecture, PPT, Group discussion	
	3	Mercury-venus- Earth-mars-jupiter Saturn-uranus-neptune-pluto- Comets-galaxis-	3	Distinguish different heavenly bodies	Lecture, PPT, Group discussion	
	4	Solar eclipses What causes the seasons The expanding universe.	2	Explain the expansion of universe	Lecture, PPT, Group discussion	
V	How things work?					
	1.	Pendulum clock Watch Electric bell	3	Explain the physical principles used in instruments.	Lecture, PPT, Demonstration	Quiz test, Formative assessment (II&III) Assignment
	2..	Incandescent lamp Fountain pen Ballpoint pen	2	Explain the physical principles.	Lecture, PPT, Demonstration	
	3.	Xerography Microwave oven Pressure cooking Relay	2	Explain the physical principles used in instruments.	Lecture, PPT, Demonstration	
	4.	Iron box Fan How laser works? Application	2	Explain the physical principles used in instruments.	Lecture, PPT, Demonstration	

Course instructor: Dr. C.Nirmala Louis,

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