DEPARTMENT OF PHYSICS

LEARNING OUTCOMES- BASED CURRICULAR FRAMEWORK (LOCF)

BACHELOR OF PHYSICS (Aided & SF)
2023-2026 BATCH

PROGRAMME LEARNING OUTCOMES-UG

At the end of the programme the students will

PLO1 : Have enhanced academic abilities, personal qualities and transferable skills
which will give them an opportunity to develop as responsible citizens.

PLO2 : Excel in the competencies and value required for leadership to serve a rapidly
evolving global community

PLO3 : Acquire sound knowledge in the concepts and significance of the various physical
phenomena.

PLO4 : Be able to apply the theories learnt and the skills acquired to solve real time
problems and to develop the interest to gauge the physical properties of materials.

PLO5 : Be able to effectively apply the core concepts through information technology

PLO6 : Be endowed with creative and analytical skills, to equip them to become
entrepreneurs and to find employability in core companies and software based
industries.

PROGRAMME SPECIFIC OUTCOMES

At the time of graduation the students will

PSO1 : Gain a wide spectrum of skills which will enable them to solve both theoretical and
experimental problems.

PSO2 : Acquire laboratory skills as per standards, and will proficiently handle the
electrical and electronic instruments.

PSO3 : Understand the importance of energy conservation.

PSO4 : A the skill to gauge the physical properties of materials.

PSO5 : Be able to make effective use of information technology

DEPARTMENT OF PHYSICS

CHOICE BASED CREDIT SYSTEM & OUTCOME BASED EDUCATION
SYLLABUS & SCHEME OF EXAMINATION
BACHELOR OF PHYSICS (B.Sc Physics) – 2023-2026 BATCH

Programme & Branch B.Sc Physics												
Scheme of Examination (Applicable to students admitted during the academic year *2023- 2024* onwards)												
Semester	Part	Subject Code	Title of the Paper		Instruction hrs/ week	Instruction hrs/ sem	Tutorial hrs	Duration of Examination	Examination marks			
									CA	ESE	Total	Credits
I	I	TAM2301/ HIN2301/ FRE2301	Language T/H/F Paper I	Lan	6	88	2	3	25	75	100	3
	II	ENG2301	English Paper I	Eng	6	88	2	3	25	75	100	3
	III		**Group A – Core**									
		PS23C01	Core Physics Paper I: Mechanics, Properties of Matter and Sound	CC	6	88	2	3	25	75	100	5
		PS23CP1	Core Physics Practical I	CC	3			-	-	-	-	-
			Group B – Allied - Paper I									
		CE23A03	Allied Chemistry Paper –I (offered to B.Sc Physics)	GE	4	58	2	3	25	75	100	4
		TH23A01	Mathematical Statistics- I	GE								
		CE23AP2	Allied Chemistry Practicals (offered to B.Sc Physics)	GE	3			-	-	-	-	-
	IV		**Non Tamil Students**									
		NME23B1	Basic Tamil I	AEC	2	28	2	2	100	-	100	2
		NME23A1	Advanced Tamil I	AEC	2	28	2	2	100	-	100	
			Students with Tamil as Language									
		NME23ES	Introduction to Entrepreneurship	AEC	2	30	-	-	100	-	100	2
II	I	TAM2302/ HIN2302/ FRE2302	Language T/H/F Paper II	Lan	6	88	2	3	25	75	100	3

Part	Code	Title	Type					CA	ESE	Total	
	ENG2302	English Paper II	Eng	5	73	2	3	25	75	100	3
III		**Group A – Core**									
	PS23C02	Core Physics Paper II Heat and Thermodynamics	CC	6	86	4	3	25	75	100	5
	PS23CP1	Core Physics Practicals – I	CC	3	45	-	3	25	75	100	4
		Group B – Allied - Paper I									
	CE23A03	Allied Chemistry Paper – II (offered to B.Sc Physics)	GE	5	73	2	3	20*	55*	75	4
	TH23A01	Mathematical Statistics- I	GE	6	88	2	3	25	75	100	5
	CE23AP2	Allied Chemistry Practicals (offered to B.Sc Physics)	GE	3	45	-	3	15#	35#	50	2
IV		**Non Tamil Students**									
	NME23B2	Basic Tamil II	AEC	2	-	-	-	100	-	100	Grade
	NME23A2	Advanced Tamil II (Outside Class Hours)									
	23PEPS1	Professional English for Physical Sciences	AEC	2	25	5	-	100	-	100	2
	NM23GAW	GENERAL AWARENESS		-	-	-	-	-	-	100	-

CC – Core Courses   **CA** – Continuous Assessment
GE – Generic Elective   **ESE** - End Semester Examination
AEC – Ability Enhancing Course

*CA Conducted for 25 converted to 20, ESE conducted for 75 converted to 55.
#CA Conducted for 25 converted to 15, ESE conducted for 75 converted to 55.

PS23C01	MECHANICS , PROPERTIES OF MATTER AND SOUND	Cate gory	L	T	P	Credit
			88	2	-	5

Preamble

To give the students fundamental ideas on conservation laws, rotational and vibrational motion of rigid bodies, elasticity, viscosity, surface tension and basics of sound.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand and define the laws involved in mechanics , properties of matter and sound	K2
CLO2	Analyse the behaviour of various bodies due to kinematic and dynamic forces acting on the body.	K4
CLO3	Apply the key evidence of the classical description of the properties of matter	K3
CLO4	Recall the principles and basic equations and apply them to unseen problems	K4
CLO5	Acquire problem solving skills on par with industry	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	M	M	S	S	S	S
CLO2	S	S	S	S	S	S
CLO3	S	S	S	S	S	S
CLO4	S	S	S	L	S	S
CLO5	S	M	M	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

Unit I   18 Hrs

Impact of elastic bodies and Friction

Conservation Laws - Collision- Impulse of a force – Fundamental principle of impact- Direct impact of two smooth spheres- loss of K.E due to direct impact of two smooth spheres-Oblique impact of a smooth sphere on a fixed smooth plane –oblique impact of two smooth spheres and loss of K.E due to oblique impact – friction – Laws of friction – angle of friction – cone of

friction – Experimental method for determining co-efficient of friction between two surfaces-Equilibrium of a body on a rough inclined plane acted upon by an External force.

Unit II   **18 Hrs**
Rigid Body Dynamics
Rigid body – rotational and vibrational motion – Torque – angular momentum-Angular impulse-moment of inertia – radius of gyration- dimensions and units of moment of inertia-Analogous parameters in translational and Rotational motion.
Simple Harmonic Motion
Composition of two simple harmonic motions in a straight line- Composition of two simple harmonic motions of equal time periods at right angles-Lissajous Figures – Experimental methods – Uses of Lissajous Figures

Unit III   **17 Hrs**
Elasticity
Elasticity - Three types of elastic moduli and relation between them – Poisson's ratio – Bending of beams – 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 – Koenig's method – 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 section girders.

Unit IV   **17 Hrs**
Viscosity and Surface tension
Viscosity – Poiseuille's formula for the flow of a liquid through a capillary tube- corrections-Poiseuille's method to determine the coefficient of viscosity of liquid- Ostwald's viscometer-variation of viscosity with temperature and pressure – Searle's viscometer (rotating cylinder method). Effect of temperature on brake oils in cars.

Surface tension- work done in increasing the area of the surface- work done in blowing a bubble- experimental determination of surface tension – Jaegar's method- Quincke's method-variation of surface tension with temperature - drop weight method- experimental determination of interfacial tension between water and kerosene.

Unit V   **18 Hrs**
Sound
Velocity of transverse waves along stretched string – Laws of transverse vibration of strings-Melde's experiment- Siren – Determinations of frequency of a tuning fork by revolving drum method and phonic stroboscopic method - Means of Lissajous method

Acoustics- Reverberation- Sabine's reverberation formula- Determination of absorption coefficient. **Ultrasonics**- properties- production- Galton whistle – Magnetostriction oscillator – Piezo-electric oscillator- detection and application.

Importance of Industry 4.0 in Physics.

Text Books

S.No	Authors	Title of the Book	Publishers	Year of Publication	Edition
1	Murugeshan.R	Mechanics and Mathematical Methods	S.Chand& Co Ltd, New Delhi	2006	Reprint
2	Mathur D.S	Mechanics	S. Chand &Co Ltd, New Delh	2012	2nd Edition
3	R.Murugesan	Properties of Matter	S.Chand and Company Pvt Ltd	2013	11th edition
4	Saighal.R.L	Textbook of Sound	S.Chand&Co Ltd	1998	2^{nd}Edition
5	P. Kaliraj, T. Devi	Higher Education for Industry 4.0 and Transformation to Education 5.0			

Reference Books

S.No	Authors	Title of the Book	Publishers	Year of Publication	Edition
1	Bhargava& Sharma	A Text Book of Mechanics	Ratan Prakashan Mandir	1990	7^{th}Edition
2	Brijlal Subramanyam	Properties of Matter	S. Chand and Company Pvt Ltd	1995	3rd Edition
3	Murugesan. R	Properties of matter, Sound and thermal physics	S. Chand & Co Ltd	2011	1st Edition

Pedagogy

Chalk and Talk lectures, Group Discussion, Seminar, Interaction, power point presentation, Weblinks, NPTEL Lectures.

Course Designers

1. Dr.M.Lavanya

PS21CP1	**CORE PRACTICALS I**	Category	L	T	P	Credit
			-	-	3hrs/week	-

Preamble

This course introduces students to the methods of experimental physics. Emphasis will be given on laboratory techniques such as accuracy of measurements and data analysis. The concepts that are learnt in the lecture sessions will be translated to the laboratory sessions thus providing a hands-on learning experience such as in measuring the basic concepts in properties of matter, Sound, Heat, Optics, Electricity and Magnetism.

Course Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1.	Apply knowledge of mathematics and physics fundamentals and an instrumentation to arrive solution for various problems.	K2
CLO2.	Understand the usage of basic laws and theories to determine various properties of the materials given.	K2
CLO3.	Understand the application side of the experiments	K2
CLO4.	Use standard methods to calibrate the given low range voltmeter and ammeter and to measure resistance of the given coil and various physical quantities.	K3
CLO5.	Use of basic laws to study the spectral properties and optical properties of the given prism.	K3

Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	S	S	L	L	L	L
CLO2	S	S	S	S	M	M
CLO3	S	S	S	S	M	M
CLO4	S	S	S	S	M	M
CLO5	S	S	S	S	M	M

S- Strong; M-Medium; L-Low

List of Experiments

1. Determination of Young's Modulus of the given rectangular beam by Non Uniform bending using Optic lever.
2. Determination of Young's Modulus of the given rectangular beam by Uniform bending using pin and microscope.
3. Determination of Rigidity modulus of the material of the given rod by using Static torsion apparatus.
4. Determination of Rigidity modulus of the material of the suspension wire using Torsion pendulum.
5. Determination of Moment of Inertia of the given disc by torsional oscillations.
6. Determination of frequency of AC mains using Sonometer.
7. Determination of Acceleration due to gravity using Compound pendulum.
8. Determination of thermal conductivity of the given bad conductor using Lee's disc method.
9. Determination of Refractive index of the given solid prism using Spectrometer
10. Determination of Refractive index of a liquid using hollow prism - Spectrometer
11. Determination of wavelength of prominent lines of mercury spectrum using grating by minimum deviation method using Spectrometer
12. Calibration of a low range voltmeter using Potentiometer
13. Calibration of a low range ammeter using Potentiometer
14. Determination of unknown resistance of the given coil of wire using potentiometer.
15. Determination of Moment of a magnet using deflection magnetometer by Tan C method.
16. Determination of B_H by measuring the field along the axis using deflection magnetometer.
17. Determination of Temperature co-efficient of resistance of a Thermistor using Wheatstone's bridge.
18. Determination of Spring Constant of different metals.
19. Determination of frequency of tuning fork using Melde's apparatus.
20. Determination of Planck's constant using different Leds.

Pedagogy:
Demonstration and practical sessions

Course Designers:
1. Dr. P. Meena
2. Dr. G. Praveena

PS23A01	ALLIED PHYSICS PAPER- I (For Chemistry)	Category	L	T	P	Credit
		III	58	2	-	4

Preamble

This paper introduces the students to the basic concepts of Elasticity, Rotational motion, Heat and thermodynamics, Sound, Optics, Atomic and Nuclear Physics

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Define the fundamental concepts of material properties, heat, sound, optics, atomic and nuclear physics	K1
CLO2	Demonstrate the practical concepts behind the optics, heat and sound through experimental setup	K2
CLO3	Apply the fundamental properties and the associated laws to understand physical systems	K2
CLO4	Analyze the thermo dynamical, optical properties of matter and to find its applications in various fields	K3

Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	S	S	S	M	L	L
CLO2	S	M	S	M	S	L
CLO3	S	M	S	L	M	S
CLO4	S	M	S	S	S	S
CLO5	S	M	S	M	S	M

S- Strong; M-Medium; L-Low

Syllabus

Unit – I   **11 Hrs**
Properties of Matter

Elasticity: Moduli of elasticity[1,2]- bending moment-expression – Young's modulus by uniform and non-uniform bending-theory and experiment[3]- I–section girders-Torsion pendulum-couple per unit twist-work done in twisting –determination of the rigidity modulus of the material of the wire.

Unit - II   **12 Hrs**
Transmission Of Heat

Conduction process: Thermal conductivity[4,5]- Rectilinear field along a bar- Measurement of Thermal conductivity of a bad conductor by Lee's disc method

Convection process: Lapse rate-stability of atmosphere- Green house effect

Radiation process: Solar constant- Pyroheliometer- solar energy and its applications (flat plate collector & solar cooker)[6,7,8,9,10] - concentration solar collector, Fresnel Lenses method.

Unit - III   11 Hrs

Thermodynamics, Sound:
Thermodynamics: Thermodynamic variables – Extensive and Intensive variables- Maxwell's Thermodynamic relation- Thermodynamic potential- Significance- relation of thermodynamics potentials with their variables

Ultrasonics: Piezo electric & Magnetostriction method – Principle- Construction – Working and Applications[11,12,13].

Unit - IV   12 Hrs
Optics:

Dispersion: Dispersive power-combination of prisms to produce   (i) deviation without dispersion (ii) dispersion without deviation-direct vision spectroscope.

Interference: Air wedge-determination of diameter of a wire-Newton's rings-determination of refractive of a liquid

Polarisation: Production, detection and analysis of different types of polarized light-quarter and half wave plates[14,15,16]

Unit - V   12 Hrs
Atomic Physics: Vector atom model[17] -Quantum numbers associated with vector atom model - Pauli's exclusion principle-excitation and ionization potential-experimental determination-**Franck and Hertz method[17].**

Particle   Physics: Elementary particles – classification[18]- particles and antiparticles-conservation laws and symmetry- Quark model.

Books for Study:

S. No	Authors	Title of the Book	Publishers	Year of Publication
1	Brijlal Subramanium	Heat and thermodynamics	S.Chand and Co, 16th Edition.	2012
2	Brijlal Subramanium & Hemne.P.S,	Heat thermodynamics and Statistical Physics	S.Chand and Co, 12th edition	2011
3	Brijlal Subramanium	Optics	S.Chand and Co, 21st Edition	2012

| 4 | Murugeshan R | Allied Physics | S.Chand and Co, 1st Edition | 1998 |

Books for Reference:

S. No	Authors	Title of the Book	Publishers	Year of Publication
1	Jayaprakash. N	Heat and thermodynamics	S Chand and Co, 16th Edition.	2012
2	Mathur D.S	Properties of Matter	S Chand and Co, 2nd Edition	1970
3	Murugesan R	Modern Physics	S.Chand and Co , 9th edition	2013

Pedagogy

Chalk and talk, PPT, Seminar, Group discussion, Interaction

Course Designers:
1. Mrs.S.Sowmya

References For E-**Content**:
1. https://youtu.be/qQhOYbztNIQ
2. https://youtu.be/gcI-bkr7ilg
3. https://youtu.be/7tr4qWPgP40
4. https://youtu.be/N5GAHntU_nQ
5. https://youtu.be/hDP6egLrsdM
6. https://youtu.be/nmsPcTzIkrw
7. https://youtu.be/rAhvvyQBUt0
8. https://youtu.be/TUaTNzZ00oM
9. https://youtu.be/tDB3zP9MEZc
10. https://youtu.be/wvl0QAQCJyc
11. https://youtu.be/4nbBAG-848c
12. https://youtu.be/nJXB0yD_wEw
13. https://youtu.be/K4Do_yWJt2k
14. https://youtu.be/HH58VmUbOKM
15. https://youtu.be/DjnDX28l4xA
16. https://youtu.be/iVYGOWAtZCQ
17. https://youtu.be/SQtOYCei-Pc
18. https://youtu.be/kykp-S8S5dU

		Category	L	T	P	Credit
PS23AP1	**ALLIED PHYSICS PRACTICALS** (For I BSc Chemistry Sem I and II and II BSc Mathematics Sem III and IV)	III	-	-	3 Hrs / we ek	3

Preamble

To enable the student to gain practical knowledge

Course Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO 1	Gain knowledge in the scientific methods and learn the process of measuring different Physical variables	K1
CLO 2	Educate The Basics Of Instrumentation, Data Acquisition And Interpretation of Results	K2
CLO 3	Enhance The Students Understand The Concepts In Materials Properties	K2
CLO 4	Have a deep knowledge of fundamentals of optics, electric circuits, magnetism and sound	K3

Mapping with Programme Outcomes

CLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	S	S	S	S	M	S
CLO2	S	S	S	S	S	S
CLO3	S	M	S	M	M	M
CLO4	S	M	M	S	M	S
CLO5	S	S	S	S	M	S

S- Strong; M-Medium; L-Low

List of Experiments
Any Eighteen

1. Young's Modulus –Non- Uniform bending –Pin and Microscope

2. Young's Modulus – Uniform bending – Optic lever

3. Rigidity modulus - Static torsion

4. Rigidity Modulus - torsional pendulum

5. Moment of inertia - torsional pendulum

6. Acceleration due to gravity - compound pendulum

7. Thermal conductivity of a bad conductor – Lee's disc method

8. AC frequency **-** Sonometer

9. Refractive index of solid prism - spectrometer

10. Refractive index of liquid-Hollow prism - spectrometer

11. Wave length- Grating - Minimum deviation method - Spectrometer

12. Low range Ammeter Calibration - Potentiometer

13. Low range Voltmeter Calibration - Potentiometer

14. Moment of a magnet in the Tan C position

15. Volt-Ampere characteristic of a p-n junction diode in the forward and reverse directions

16. Logic gates - Verification of the truth table

17. Characteristics of Zener diode

18. Closed loop gain of Operational Amplifier in Inverting mode

19. Closed loop gain of Operational Amplifier in Non Inverting mode.

Pedagogy

   Demonstration and Practical Sessions

Course Designers:

1. Mrs. T. Poongodi

PS23C02	**HEAT AND THERMODYNAMICS**	Category	L	T	P	Credit
		III	86	4	-	5

Preamble

The aim of this course is to acquire knowledge in heat transfer, entropy, production of low temperature and liquefaction of gases, thermal radiation and statistical thermodynamics.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1.	Understand the central concepts and basic idea on specific heat, entropy, quantum theory of radiation	K2
CLO2.	Apply the concepts of low temperature physics in liquefaction of gases	K3
CLO3.	Use the tools needed to formulate and solve problems in thermodynamical systems such as gases, heat engines etc	K3
CLO4.	Become familiarize with the concepts of thermodynamical potentials.	K3
CLO5.	Distinguish the particles based on the concepts and principles of Statistical Physics	K4

Mapping with ProgrammeLearning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	M	M	S	S	M	S
CLO2	S	S	S	S	M	S
CLO3	S	S	S	M	M	S
CLO4	S	S	S	S	L	S
CLO5	S	S	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

Unit I   **18 Hrs**

Kinetic theory of gases

Postulates of kinetic theory of gases – derivation of expression for pressure exerted by gas - Maxwell's Law of Distribution of Velocities(no derivation), Mean Free Path - Brownian motion – Langevin'stheory of Brownian motion – Einstein's theory of Brownian motion– degree's of freedom – Maxwell's law of equipartition of energy - van der Waal's equation of

state – critical constants –experimental determination of critical constants.

Quantum Theory of Specific Heat
Specific heat of solids - Dulong and Petits law and the deduction – failure of Dulong and Petit's law – Einstein's theory and its limitation – Debye theory of specific heat of solids – specific heat of gases – Variation of specific heat of diatomic gases with temperature – applications of high specific heat capacity of water.

Unit II   17 Hrs
Low Temperature Physics
Methods of production of low temperatures – Expression for temperature inversion – Principle of regenerative cooling - Joule Thomson effect – Porous plug experiment – its theory and result – Joule Thomson effect for perfect and real gases –Liquefaction of Hydrogen & Helium – Helium I and Helium II -Lamda point - super fluidity – adiabatic demagnetization – application in refrigerators and deep freezers.

Unit III   16 Hrs
Thermal Physics
Quantum theory of radiation- Planck's hypothesis – average energy of Planck's oscillator – Planck's radiation law and its experimental verification -Derivation of Planck's law– Derivation of Wein's law and Rayleigh-Jean's from Planck's law – Stefan's and Wein's displacement laws from Planck's law –Room heaters and radiators in cars - solar thermal system (water heater)

Unit IV   18 Hrs
Laws of Thermodynamics and Entropy
First law of thermodynamics and it's consequences – Isothermal and adiabatic processes – reversible, irreversible and quasi-static processes – second law and entropy - physical significance of entropy - Entropy of a perfect gas - Thermo dynamic potentials- internal energy (U)- Helmtzholtz function (F)- Gibb's function (G) and enthalpy (H) – significance of thermodynamic potentials - Maxwell's thermodynamics relation – the (T-dS) equation – Clapeyron's latent heat equation using Maxwell's thermodynamics relation – understanding entropy in steam engines.

Unit V   17 Hrs
Statistical Physics
Probability- Macrostate and microstate – phase space – thermodynamic probability – Ensembles – Kinds of Ensembles(concepts only) – Maxwell's Boltzmann distribution law-Maxwell's Boltzmann distribution in terms of temperature – quantum statistics – Bose Einstein distribution law – Fermi - Dirac distribution law – Comparison of three statistics.

Text Books

S. No	Authors	Title of the Book	Publishers	Year of Publication	Edition
1	Brijlal N Subrahmanyam P.S.Hemne	Heat Thermodynamics and Statistical Physics and applications	S. Chand	2012	3rd edition
2	R.Murugeshan Er. KiruthigaSivaprasath	Thermal Physics	S.Chand	2012	3rd edition

Reference Books

S. No	Authors	Title of the Book	Publishers	Year of Publication	Edition
1	A.B Gupta H.P. Roy	Thermal Physics	Arunabha Sen	2005	1st edition
2	Agrawal Prakash	Thermal Physics	PragatiPrakashan	2015	27th edition
3	Agrawal Prakash	Thermodynamics and Statistical Physics	PragatiPrakashan	2015	27th edition

Pedagogy

Chalk and talk, PPT, Seminar, Group discussion, Interaction,Weblinks, NPTEL Lectures.

Course Designers

1. Dr. G. Praveena

PS23A02	ALLIED PHYSICS PAPER- II (For Chemistry)	Category	L	T	P	Credit
		III	71	5	-	4

Preamble

This paper introduces the student to the basic concepts of AC Circuits, Magnetic materials, electronics and digital electronics

Course Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Explore the fundamental concepts of physics	K1
CLO2	Import knowledge about the importance of material properties, heat, sound, optics, atomic and nuclear physics.	K2
CLO3	Understand the energy involved in nuclear reaction	K2
CLO4	Carry out the practical by applying these concepts	K3
CLO5	Get depth knowledge of physics in day today life	K3

Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	S	S	S	M	L	L
CLO2	S	M	S	M	S	L
CLO3	S	M	S	L	M	S
CLO4	S	M	S	S	S	S
CLO5	S	M	S	M	S	M

S- Strong; M-Medium; L-Low

Syllabus

Unit – I   **14 Hrs**

Alternating currents:

Mean and RMS values of AC -Series and parallel resonant circuits-Power factor- power factor of an ac circuit containing resistance, inductance and capacitance -Transformer-

construction- working-losses

Unit – II   **14 Hrs**

Magnetic materials:

Magnetic Induction – Magnetization – Relation between the three magnetic vectors B, H and M – Magnetic susceptibility – Properties - diamagnetic – paramagnetic – ferromagnetic – anti ferromagnetism and ferrimagnetism – Electron theory of magnetism — Weiss's theory of ferromagnetism - energy loss in hysteresis – importance of hysteresis curves.

Unit – III   **14 Hrs**

Semiconductor Diodes: P and N type semiconductors - PN Junction Diode - Current Flow Mechanism in Forward and Reverse Biased Diode - Zener Diode and Voltage Regulation - Principle and structure of (1) LEDs (2) Photodiode (3) Solar cell - Transistor – Characteristics of CB, CE and CC Configuration – Transistor biasing – Voltage divider biasing.

Unit – IV   **14 Hrs**

Two - terminal Devices and their Applications: Rectifier Diode: Half- wave Rectifiers - Bridge Full-wave Rectifiers, Calculation of Ripple Factor and Rectification Efficiency - **Amplifiers:** Single stage amplifier (CE) **- Sinusoidal Oscillators:** Barkhausen's Criterion for self - sustained oscillations - RC Phase shift oscillator, determination of Frequency- Hartley oscillator.

Unit – V   **15 Hrs**

Digital Electronics:

Boolean algebra-DeMorgan's theorem-OR, AND, NOT, XOR NOR and NAND gates-NOR andNAND gates as universal building blocks-half adder, full adder-RS flip flop-JK flip flop Operational amplifier: Characteristics-virtual ground-summing point-inverting and non invertingamplifier-adder-subtractor.

Text Book

S.No	Authors	Title of the Book	Publishers	Year of Publication	Edition
1	R. Murugesan	Electricity and Magnetism	S.Chand and Co	2005	Revised Edition
2	V.K. Metha	Principles of electronics	S.Chand and Co	1980	1st Edition
3	Murugesan R	Allied Physics	S.Chand and Co	2005	1st edition

Reference Books

S.No	Authors	Title of the Book	Publishers	Year of Publication	Edition
1	V. Vijayendran	Introduction to Integrated Electronics	Viswanathan Publishers	2005	1st Edition

Pedagogy

Chalk and Talk lectures, Group Discussion, Seminar, Interaction, Power Point Presentation

Reference Links:
1. Mean and RMS values of AC - https://www.youtube.com/watch?v=qDHsokTcgck
2. Series & Parallel Resonant Circuits - https://www.youtube.com/watch?v=G8KLJjq1E2o
3. Transformer | Principle, Construction, Working and Efficiency - https://www.youtube.com/watch?v=i29dCoSGa38
4. Magnetization - https://www.youtube.com/watch?v=C-OoUvKXbLU&t=2s
5. Diamagnetic – paramagnetic – ferromagnetic - https://www.youtube.com/watch?v=wK7Jr1g4_ws
6. P and N type semiconductors - https://www.youtube.com/watch?v=5ZNeDxfgYAE
7. Different types of diodes - https://www.youtube.com/watch?v=-EqOEiEQGLI
8. Diode rectifier circuits - https://www.youtube.com/watch?v=Xmu31a-59vw
9. Single stage amplifier - https://www.youtube.com/watch?v=NEiVSbPYWNE
10. RC Phase Shift Oscillator - https://www.youtube.com/watch?v=Gvb4GIV5ig8
11. Hartley Oscillator - https://www.youtube.com/watch?v=3B_sBX_11Zw
12. Boolean Algebra and Logic gates - https://www.youtube.com/watch?v=JQBRzsPhw2w
13. Flip-flop - https://www.youtube.com/watch?v=LTtuYeSmJ2g
14. Operational amplifier - https://www.youtube.com/watch?v=jsKSfaFQ4d4

Course Designers

1. Dr. G. Praveena

PS23CP1	CORE PRACTICALS I	Category	L	T	P	Credit
			-	-	3hrs/week	4

Preamble

This course introduces students to the methods of experimental physics. Emphasis will be given on laboratory techniques such as accuracy of measurements and data analysis. The concepts that are learnt in the lecture sessions will be translated to the laboratory sessions thus providing a hands-on learning experience such as in measuring the basic concepts in properties of matter, Sound, Heat, Optics, Electricity and Magnetism.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1.	Apply knowledge of mathematics and physics fundamentals and an instrumentation to arrive solution for various problems.	K2
CLO2.	Understand the usage of basic laws and theories to determine various properties of the materials given.	K2
CLO3.	Understand the application side of the experiments	K2
CLO4.	Use standard methods to calibrate the given low range voltmeter and ammeter and to measure resistance of the given coil and various physical quantities.	K3
CLO5.	Use of basic laws to study the spectral properties and optical properties of the given prism.	K3

Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	S	S	L	L	L	L
CLO2	S	S	S	S	M	M
CLO3	S	S	S	S	M	M
CLO4	S	S	S	S	M	M
CLO5	S	S	S	S	M	M

S- Strong; M-Medium; L-Low

List of Experiments
(any 16)

1. Determination of Young's Modulus of the given rectangular beam by Non Uniform bending using Optic lever.
2. Determination of Young's Modulus of the given rectangular beam by Uniform bending using pin and microscope.
3. Determination of Rigidity modulus of the material of the given rod by using Static torsion apparatus.
4. Determination of Rigidity modulus of the material of the suspension wire using Torsion pendulum.
5. Determination of Moment of Inertia of the given disc by torsional oscillations.
6. Determination of frequency of AC mains using Sonometer.
7. Determination of Acceleration due to gravity using Compound pendulum.
8. Determination of thermal conductivity of the given bad conductor using Lee's disc method.
9. Determination of Refractive index of the given solid prism using Spectrometer
10. Determination of Refractive index of a liquid using hollow prism - Spectrometer
11. Determination of wavelength of prominent lines of mercury spectrum using grating by minimum deviation method using Spectrometer
12. Calibration of a low range voltmeter using Potentiometer
13. Calibration of a low range ammeter using Potentiometer
14. Determination of unknown resistance of the given coil of wire using potentiometer.
15. Determination of Moment of a magnet using deflection magnetometer by Tan C method.
16. Determination of B_H by measuring the field along the axis using deflection magnetometer.
17. Determination of Temperature co-efficient of resistance of a Thermistor using Wheatstone's bridge.
18. Determination of Spring Constant of different metals.
19. Determination of frequency of tuning fork using Melde's apparatus.
20. Determination of Planck's constant using different Leds.

Pedagogy:

Demonstration and practical sessions

Course Designers:

1. Dr. P. Meena
2. Dr. G. Praveena