Programme Specific Outcomes (PSOs)

On the successful completion of the Undergraduate programme, the students will be able to

PSO1 **Disciplinary Knowledge**	attain coherent understanding of the academic field of physics and strengthen its foundation for their future courses.
PSO2 **Communication Skills**	acquire specialized skills effectively through report writing, documentation, and oral presentation to disclose and convince the ideas and results confidently.
PSO3 **Problem Solving**	design and adapt experimental skills, problem solving abilities, calculation and analysis for real world challenges in physics.
PSO4 **Analytical Reasoning**	elucidate and recognize the importance of mathematical modelling and computing to analyze the complex issues in physical systems.
PSO5 **Research Skills**	perform independent and group activities to obtain the aspects of research and to exhibit presentation skills.
PSO6 **Digital Literacy**	utilize e-learning resources and digital tools for academic and research activities in physics.
PSO7 **Leadership and Teamwork**	develop entrepreneurial skills and professional requirements to improve decision making within diverse teams to achieve a common goal.
PSO8 **Moral and Ethical Awareness/Reasoning**	demonstrate righteous behaviour in work environment for contributing effectively to a wider community.
PSO9 **Multicultural Competence**	develop multidisciplinary perspectives through diverse applications of Physics.
PSO10 **Self-directed & Lifelong Learning**	motivate independent and continuous learning for professional development in the field of science.

Learning Outcomes - Based Curriculum Framework (LOCF)
(w.e.f 2024-2025)

Sem	Part	Course Code	Course Title	Hours /Wk.	Credits	Marks
1	I	24XXXXNNNN	Tamil/Hindi/French	3	2	30
	II	24ENG/ENS1203	English	3	2	30
	IIICC	24PHY/PHS1501	Introductory Physics	5	5	75
	IIICC	24PHY/PHS1503	Properties of Matter and Acoustics	5	5	75
	IIICC	24PHY/PHS1305	Practical – I	3	3	45
	IIIS	24MAT/MASNNNN	Offered by Maths Department	5	4	60
	IVNME	*24PHYNNNN*	*Non-Major Elective-I*	3	2	30
	IVAEC	*24PHY/PHS1200*	*Environmental Studies*	3	2	30
	V	*24XXXNNNN*	*NSS/NCC/PED/SLP/GMP/ GNS/LIB/ACH*			
			Total	**30**	**25**	**375**
2	I	24XXXXNNNN	Tamil/Hindi/French	3	2	30
	II	24ENG/ENS1204	English	3	2	30
	IIICC	24PHY/PHS1502	Heat, Thermodynamics and Statistical Physics	5	5	75
	IIICC	24PHY/PHS1504	Electricity, Magnetism and Electromagnetism	5	5	75
	IIICC	24PHY/PHS1306	Practical – II	3	3	45
	IIIS	24MAT/MASNNNN	Offered by Maths Department	5	4	60
	IVNME	*24PHYNNNN*	*Non-Major Elective-II*	3	2	30
	IVAEC	*24VAL/HVS/CHR1200*	*Value Education/Human Values Development/Christian Studies*	3	2	30
	V	*24XXXNNNN*	*NSS/NCC/PED/SLP/GMP/ GNS/LIB/ACH*		1	15
			Total	**30**	**25+1**	**375+15**
			Total	**30**	**26**	**390**

Part III

Supportive Courses offered to Non-Major Students (AIDED)

Sem	Course Code	Course Title	Hours/ Wk.	Credits	Marks
1	24PHY1381 24PHY1101	Allied Physics for Chemists – I Allied Practical for Chemists - I	3 2	3 1	45 15
2	24PHY1382 24PHY1102	Allied Physics for Chemists - II Allied Practical for Chemists - II	3 2	3 1	45 15
3	24PHY2381 24PHY2101	Allied Physics for Mathematics - I Allied Practical for Mathematics - I	3 2	3 1	45 15
4	24PHY2382 24PHY2102	Allied Physics for Mathematics – II Allied Practical for Mathematics - II	3 2	3 1	45 15

Supportive Courses offered to Non-Major Students (SF)

Sem	Course Code	Course Title	Hours/ Wk.	Credits	Marks
1	24PHS1371 24PHS1171	Ancillary Physics for Mathematics – I Ancillary Practical for Mathematics – I	3 2	3 1	45 15
2	24PHS1372 24PHS1172	Ancillary Physics for Mathematics – II Ancillary Practical for Mathematics – II	3 2	3 1	45 15
3	24PHS2371 24PHS2171	Ancillary Physics for Chemists – I Ancillary Practical for Chemists – I	3 2	3 1	45 15
4	24PHS2372 24PHS2172	Ancillary Physics for Chemists – II Ancillary Practical for Chemists – II	3 2	3 1	45 15
1	24PHS1473	Digital Logic Fundamentals	5	4	60

Generic Elective (Non-Major) Courses

Sem	Course Code	Course Title	Hours/ Wk.	Credits	Marks
5	24PHY/PHS3301 24PHY/PHS3303	Physics of Music/ Observational Astronomy	4	3	45
6	24PHY/PHS3302/ 24PHY/PHS3304	Biophysics / Digital Photography	4	3	45

Part IV

Non-Major Electives (NME)

Sem	Course Code	Course Title	Hours/ Wk.	Credits	Marks
1	24PHY/PHS1205	Physics in everyday life	3	2	30
2	24PHY/PHS1206	Wonders of Sky	3	2	30

Skill Enhancement Courses (SEC)

Sem	Course Code	Course Title	Hours/ Wk.	Credits	Marks
3	24PHY/PHS2201	Home Electrical Installation	3	2	30
4	24PHY/PHS2202	Arduino based Robotics	3	2	30
5	24PHY/PHS3201	CCTV Installation and Maintenance	3	2	30

Mapping with POs

Dept	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
PHY	3	3	3	3	3	3	3	2	3	3
PHS	3	3	3	3	3	3	3	2	3	3

Mapping of Courses with PSOs

Courses	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
24PHY/PHS1501	3	3	3	3	3	3	3	2	2	2
24PHY/PHS1503	3	3	3	3	2	3	3	2	2	3
24PHY/PHS1305	3	2	3	3	3	3	3	2	3	3
24PHY/PHS1200	3	3	2	2	3	3	3	3	3	3
24PHY/PHS1502	3	2	3	3	2	3	3	3	3	3
24PHY/PHS1504	3	3	3	3	2	3	2	2	3	3
24PHY/PHS1306	3	2	3	3	3	3	3	2	3	3
24PHY/PHS2501	3	2	3	3	2	3	2	3	3	3
24PHY/PHS2503	3	3	2	2	2	3	3	3	2	2
24PHY/PHS2605	3	2	3	3	3	3	3	2	3	3
24PHY/PHS2502	3	3	3	3	2	3	2	2	3	3
24PHY/PHS2504	3	3	3	3	2	3	2	2	3	3
24PHY/PHS2606	3	2	3	3	3	3	3	2	3	3
24PHY/PHS3401	3	2	3	2	2	2	2	2	2	3

24PHY/PHS3403	2	3	3	3	3	3	3	3	3	3
24PHY/PHS3405	3	2	3	3	3	3	3	2	3	3
24PHY/PHS3607	3	2	3	3	3	3	3	2	3	3
24PHY/PHS3407/ 24PHY/PHS3409	3	3	2	2	2	3	2	3	2	3
24PHY/PHS3402	3	2	3	3	3	2	2	2	3	3
24PHY/PHS3404	3	2	3	3	2	3	2	2	3	3
24PHY/PHS3406	3	3	3	3	3	3	2	2	2	3
24PHY/PHS3608	2	3	3	2	3	3	2	3	2	3
24PHY/PHS3408/ 24PHY/PHS3410	3	2	3	2	3	2	2	2	2	3
24PHY/PHS3266	2	3	2	3	2	2	2	3	2	3
Average	2.8	2.5	2.8	2.5	2.5	2.8	2.5	2.3	2.6	2.9

Mapping of Courses with POs

Courses	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
24PHY1381	2	3	3	3	3	3	3	3	3	3
24PHY1101	3	2	3	3	3	3	3	2	3	3
24PHS1371	2	3	3	3	3	3	3	3	3	3
24PHS1171	3	2	3	3	3	3	3	2	3	3
24PHS1473	2	2	2	2	2	2	1	1	2	2
24PHY/PHS1205	2	3	3	3	3	3	3	3	3	3
24PHY1382	2	3	3	3	3	3	3	3	3	3
24PHY1102	3	2	3	3	3	3	3	2	3	3
24PHS1372	2	3	3	3	3	3	3	3	3	3
24 PHS1172	3	2	3	3	3	3	3	2	3	3
24PHY/PHS1206	3	2	2	2	2	1	1	2	2	2
24PHY2381	2	3	3	3	3	3	3	3	3	3
24PHY2101	3	2	3	3	3	3	3	2	3	3
24PHS2371	2	3	3	3	3	3	3	3	3	3
24PHS2171	3	2	3	3	3	3	3	2	3	3
24PHY/PHS2201	3	3	3	3	2	3	3	2	3	3
24PHY2382	2	3	3	3	3	3	3	3	3	3
24PHY2102	3	2	3	3	3	3	3	2	3	3
24PHS2372	2	3	3	3	3	3	3	3	3	3
24PHS2172	3	2	3	3	3	3	3	2	3	3
24PHY/PHS2202	3	3	3	3	3	3	3	3	3	3
24PHY/PHS3301/ 24PHY/PHS3303	3	2	2	2	2	2	2	2	2	2
24PHY/PHS3201	3	3	3	3	3	3	2	2	2	3
24PHY/PHS3255	2	2	2	3	2	3	3	3	3	3
24PHY/PHS3302/ 24PHY/PHS3304	3	2	2	2	2	2	2	1	2	2
Average (PHY)	2.6	2.5	2.8	2.8	2.7	2.8	2.7	2.4	2.8	2.8
Average (PHS)	2.6	2.5	2.7	2.8	2.7	2.7	2.6	2.3	2.7	2.8

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24PHY/PHS 1501	Introductory Physics	Core	5	5

This course helps the students to get an overview of Physics before learning their core courses and serves as a bridge between the school curriculum and the degree program.

Course Outcomes:

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

CO1: apply concept of vectors to understand concepts of physics and solve problems.
CO2: explain different forces present in nature.
CO3: quantify energy in different process and relate momentum, velocity and energy.
CO4: differentiate the types of motions they would encounter.
CO5:demonstrate properties of materials and connect them with real life.

Unit I: VECTORS, SCALARS, UNITS AND DIMENSIONS (15 Hours)

Vectors, scalars – examples for scalars and vectors from physical quantities – addition, subtraction of vectors – resolution and resultant of vectors – units and dimensions – standard physics constants – demonstrations and examples.

Unit II: TYPES OF FORCES (15 Hours)

Fundamental forces of nature - Different types of forces–gravitational, electrostatic, magnetic, electromagnetic, nuclear –mechanical forces like, centripetal, centrifugal, friction, tension, cohesive, adhesive force – demonstrations and real life examples.

Unit III: FORMS OF ENERGY (15 Hours)

Different forms of energy – conservation laws of momentum, energy – types of collisions – angular momentum – alternate energy sources – demonstrations and real life examples.

Unit IV: TYPES OF MOTION AND OSCILLATION (15 Hours)

Types of motion– linear, projectile, circular, angular, simple harmonic motions – satellite motion – banking of a curved roads – stream line and turbulent motions – wave motion – comparison of light and sound waves – free, forced, damped oscillations - demonstrations and real life examples.

Unit V: PROPERTIES OF MATERIALS (15 Hours)

Surface tension – shape of liquid drop – angle of contact – viscosity – lubricants – capillary flow – diffusion – real life examples– properties and types of materials in daily use - conductors, insulators – thermal and electric insulators-demonstrations and real life examples.

Learning Resources:

Text Books

1. D.S. Mathur,*Elements of Properties of Matter*, S.Chand & Co., 2010.
2. Brijlal and N. Subrahmanyam, *Properties of Matter*, S.Chand & Co., 2003.

References

1. Halliday, Resnick and Krane, *Physics Volume I*, 5th edition, John Wiley, 2002.
2. H.R. Gulati, *Fundamental of General Properties of Matter*, 5thedition, S.Chand & Co., 1977.

Websites/ e-Learning Resources

1. http://hyperphysics.phy-astr.gsu.edu/hbase/permot2.html
2. https://science.nasa.gov/ems/
3. https://eesc.columbia.edu/courses/ees/climate/lectures/radiation_hays/

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3
Average	2.8	2.8	3	2.8	2.8	3	3	2	2.4	2.2

Strong – 3, Medium – 2, Low – 1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24PHY/PHS 1503	Properties of Matter and Acoustics	Core	5	5

This course will provide information which is of practical value to both the physicist and the engineers. It gives us information about the internal forces which act between the constituent parts of the substance.

Course Outcomes:

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

CO1: relate elastic behavior in terms of moduli of elasticity and working of torsion pendulum.
CO2: explain concept of bending of beams and analyze the expression and quantify it.
CO3: describe the dynamics of fluids and provide solution to engineering problems.
CO4: analyze simple harmonic motions mathematically and apply them.
CO5:explain the importance of constructing buildings with good acoustics and apply their knowledge of ultrasonics in real life and medical field.

Unit I: ELASTICITY (15 Hours)

Hooke's law – stress-strain diagram – elastic constants –Poisson's ratio – relation between elastic constants and Poisson's ratio – work done in stretching and twisting a wire – twisting couple on a cylinder – rigidity modulus by static torsion– torsional pendulum (with and without masses).

Unit II: BENDING OF BEAMS (15 Hours)

Cantilever– expression for Bending moment – expression for depression at the loaded end of the cantilever– oscillations of a cantilever – expression for time period – experiment to find Young's modulus – non-uniform bending– experiment to determine Young's modulus by Koenig's method – uniform bending – expression for elevation – experiment to determine Young's modulus using microscope.

Unit III: FLUID DYNAMICS (15 Hours)

Pressure and density, variation of pressure at rest, Pascal's and Archimedes principle, Surface tension, Fluid flow, Streamlines and equations of continuity, Bernouli's equation.Applications of Bernouli's equations, Viscosity, Poiseuille's formula –corrections – terminal velocity and Stoke's formula– variation of viscosity with temperature.

Unit IV: WAVES AND OSCILLATIONS (15 Hours)

Simple Harmonic oscillator, Simple Harmonic Motion (SHM) – differential equation of SHM – graphical representation of SHM,– composition of two SHM in a straight line and at right angles – Lissajous's figures- free, damped, forced vibrations –resonance and Sharpness of resonance - Types of waves, Travelling waves, Wave in a stretched string, Energy in wave motion, Principle of superposition, interference of waves, standing waves and resonance.

Unit V: ACOUSTICS OF BUILDINGS AND ULTRASONICS (15 Hours)

Properties of sound waves, Travelling sound waves, Speed of the sound, Intensity of sound – decibel – loudness of sound – reverberation – Sabine's reverberation formula – acoustic intensity - factors affecting the acoustics of buildings - Vibrating systems and sources, Doppler effect - *Ultrasonic waves*: production of ultrasonic waves – Piezoelectric crystal method – magnetostriction effect – application of ultrasonic waves.

Learning Resources:

Text Books

1. Brijlal and N. Subrahmanyam, *Properties of Matter*, S.Chand and Co., 2003.
2. Halliday, Resnick and Krane, *Physics Volume I*, 5th edition, Wiley India, 2002.
3. Brijlal and N.Subrahmanyam, *A Text Book of Sound*, 2nd edition,Vikas Publishing House, 1995.

References

1. R. Murugesan, *Properties of Matter*, S. Chand and Co., 2012
2. C.J. Smith, *General Properties of Matter*, Orient Longman Publishers, 1960.
3. H.R. Gulati, *Fundamental of General Properties of Matter*, 5thedition, R. Chand and Co., 1977.
4. A.P French, *Vibration and Waves*, MIT Introductory Physics, Arnold-Heinmann India, 1973.
5. D.R. Khanna and R.S. Bedi, *Textbook of Sound*, Atma Ram & sons, 1969,

Websites/ e-Learning Resources

1. https://www.biolinscientific.com/blog/what-are-surfactants-and-how-do-they-work
2. http://hyperphysics.phy-astr.gsu.edu/hbase/permot2.html
3. https://www.youtube.com/watch?v=gT8Nth9NWPM
4. https://www.youtube.com/watch?v=m4u-SuaSu1s&t=3s
5. https://www.biolinscientific.com/blog/what-are-surfactants-and-how-do-they-work
6. https://learningtechnologyofficial.com/category/fluid-mechanics-lab/
7. http://nptel.ac.in/courses/112104026/

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	3	2	3	3	2	2	3
CO2	3	3	3	3	2	3	3	2	3	3
CO3	3	3	3	3	3	3	3	3	2	3
CO4	3	3	3	3	3	3	3	3	2	3
CO5	3	3	3	3	2	3	3	2	3	3
Average	3	3	3	3	2.4	3	3	2.4	2.4	3

Strong – 3, Medium – 2, Low – 1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24PHY/PHS 1305	Practical –I	Core	3	3

The objective of this course is to set up experiments to verify theories, quantify, analyze and able to do error analysis and correlate results.

CourseOutcomes:
Attheend ofthe course,students willbe ableto
CO1:performhands-on training in measuring physical quantities.
CO2:relatewiththerespectivetheoreticalconcepts.
CO3:recordandprocessthemeasurements.
CO4:performdataanderroranalysis.
CO5:explain thesignificanceoftheexperiment.

List of Experiments: (Any8experiments)

1. Determination of moment of inertia of an irregular body.
2. Verification of parallel axes theorem on moment of inertia.
3. Verification of perpendicular axes theorem on moment of inertia.
4. Error Analysis (Simple Pendulum and UV method)
5. Precise Linear Measurements (Screw Gauge and Vernier calipers)
6. Determination of radius of a capillary tube using travelling microscope.
7. Determination of rigidity modulus with and without mass using Torsional pendulum.
8. Determination of g and radius of gyration using compound pendulum.
9. Determination of co-efficient of viscosity by Stokes' method – terminal velocity.
10. Determination of viscosity by Poiseullie's flow method.
11. Determination of Young's modulus by uniform bending – load depression graph.
12. Determination of moment of inertia and g using Bifilar pendulum.
13. Determination of Young's modulus by stretching of wire with known masses.
14. Verification of Hook's law by stretching of wire method.
15. Determination of Young's modulus by non-uniform bending – scale and telescope.
16. Determination of Young's modulus by cantilever – load depression graph.
17. Determination of Young's modulus by cantilever – oscillation method.
18. Determination of Young's modulus by Koenig's method – (or unknown load)
19. Determination of rigidity modulus by static torsion.
20. Determination of Y, n and K by Searle's double bar method.
21. Determination of surface tension and interfacial surface tension by drop weight method.
22. Determination of critical pressure for streamline flow.
23. Determination of Poisson's ratio of rubber tube.
24. Determination radius of capillary tube by mercury pellet method.

Learning Resources:

References

1. Gupta and Kumar, *Practical Physics Volume 1*, PragatiPrakasan, 2014.
2. Gupta and Kumar, *Practical Physics Volume 2*, PragatiPrakasan, 2014.
3. S.P Singh,*Advanced Practical Physics, Volume 1*, PragatiPrakasan, 2017.
4. S.P Singh,*Advanced Practical Physics, Volume 2*, PragatiPrakasan, 2017.

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	2	2	2	3	2	2	2	1	2	3
CO2	2	2	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	2	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	2	2	2	2
Average	2.6	2.4	2.8	3	2.8	2.8	2.6	2.4	2.6	2.8

Strong – 3, Medium – 2, Low – 1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24PHY/PHS 1200	Environmental Studies	AEC	3	2

This course enables the student to understand the importance of conservation energy, the physical nature of the eco system, biodiversity, various sources of pollution, and the cause of global warming.

Course Outcomes:

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

CO1: identify renewable and non-renewable energy resources.
CO2: preserve the ecosystem for future generation.
CO3: classify the bio-geography at global, national and local levels.
CO4: examine various types of pollutions and their impacts.
CO5: ascertain human health from environmental problems.

Unit I: RENEWABLE ENERGY AND NON- RENEWABLE ENERGY RESOURCES (9 hours)

Renewable energy and non-renewable energy sources - Worlds reserve of commercial energy sources and their availability – Various forms of energy –fossil fuel availability – applications – merits and demerits - Solar energy – direct and indirect form.

Unit II: ECOSYSTEM (9 Hours)

Ecosystem / Biodiversity and its conservations – concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – Energy flow in the ecosystem – food chain, food webs and ecological pyramids. Introduction, types, characteristics features, structure and functions of pond ecosystem, forest ecosystem, Grass land ecosystem and Desert ecosystem.

Unit III: BIO-GEOGRAPHICAL CLASSIFICATION (9 Hours)

Bio-geographical classification of India – values of biodiversity – biodiversity at global, national and local levels – India as a mega diversity nation – Hot spots of biodiversity – conservation of biodiversity.

Unit IV: POLLUTION (9 Hours)

Pollution and environmental impacts: Fossil fuels and the environment – impacts due to non-conventional energy sources – Greenhouse effect – CFC – global warming and ozone depletion – Air pollution – effects – criteria of pollutants. Pollution and meteorology – Indoor air quality – water pollution – Noise pollution – Thermal pollution – nuclear hazards – acid rain – solid waste management – role of an individual in prevention of pollution – disaster management.

Unit V: ENVIRONMENTAL ETHICS (9 Hours)

Social issues / Human population and the environment –Water conservation assessment of risks – Environmental ethics – waste land reclamation – Environmental protection Act (Air Act, Water Act, Wildlife protection Act, Forest Conservation Act) – Environmental auditing – Public awareness.

Learning Resources:

Text Books

1. Dr. Raman Sivakumar, *Introduction to Environmental Science and Engineering*, 2005.
2. ErachBharucha, *Text Book of Environmental Studies for Under Graduate Courses*, Universities Press, 2005.

References

1. S.P. Sukhatme, *Solar Energy*, 2nd edn, Tata McGraw-Hill Publishing Company Limited, 2004.
2. M.N. Rao, H.V.N. Rao, *Air Pollution*, McGraw-Hill Publishing Company Limited, 1993.
3. Gilbert. M. Masters, *Introduction to Environmental Engineering and Science*, Prentice Hall of India Private Limited, New Delhi, 1994.
4. P.D. Sharma, *Ecology and Environment*, 7thEdn, Rastogi Publications, 2005.

Websites/ e-Learning Resources

1. https://www.wri.org
2. https://www.treehugger.com
3. https://www.nationalgeographic.com/environment
4. https://www.greenpeace.org
5. https://www.nacwc.nic.in

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	2	2	3	3	3	3	3	3
CO2	3	3	2	1	3	3	3	3	2	3
CO3	3	2	1	2	3	3	3	3	2	3
CO4	3	2	2	2	2	3	3	3	3	2
CO5	3	3	2	2	3	3	3	3	3	3
Average	3	2.6	1.8	1.8	2.8	3	3	3	2.6	2.8

Strong – 3, Medium – 2, Low – 1

CourseCode	Nameof theCourse	Category	Hours/Wk.	Credits

24PHY1381	AlliedPhysics forChemists –I	Supportive	3	3

The objective of this course is to impart basic principles of Physics that wouldbe helpful for students who have taken undergraduate programs other than Physics. This course helps to understand the basics of waves, ultrasonic's, properties of matter, heat, electricity, magnetism and digital electronics.

CourseOutcomes:

Attheend ofthe course,students willbe ableto

CO1:identify the types of motion and demonstrate itmathematically.

CO2: explain the behavior of materials andconnectdroplettheorywith corona transmission.

CO3:describe the concept of heatto interpret the flow of temperature.

CO4:apply the concept of electricity and magnetism to analyze various circuits.

CO5:interpretthe reallife solutionsusing digital electronics.

UnitI:WAVES,OSCILLATIONSANDULTRASONICS (9 Hours)

Simple harmonic motion (SHM) – composition of two SHMs at right angles(periods in the ratio 1:1) – Lissajous figures – uses – laws of transverse vibrations of strings – determinationofACfrequencyusingsonometer(steelandbrasswires)–ultrasound–production – piezoelectric method – application of ultrasonics: medical field – lithotripsy,ultrasonography– ultrasonic imaging-ultrasonicsindentistry–physiotheraphy,ophthalmology-advantagesofnoninvasivesurgery–ultrasonics ingreenchemistry.

UnitII:PROPERTIESOFMATTER (9 Hours)

Elasticity: elastic constants – bending of beam – theory of non- uniform bending – determinationofYoung'smodulusbynon-uniformbending–energystoredinastretchedwire - torsion of a wire – determination of rigidity modulus by torsional pendulum – *Viscosity*:streamline and turbulent motion – critical velocity – coefficient of viscosity – Poiseuille'sformula– comparisonofviscosities–burettemethod-*Surfacetension*:definition –moleculartheory – droplets formation–shape, size and lifetime – COVID transmission through droplets,saliva– drop weight method– interfacial surfacetension

UnitIII:HEATANDTHERMODYNAMICS (9 Hours)

Joule-Kelvineffect–Joule-Thomsonporousplugexperiment–theory–temperatureofinversion– thermodynamicsystem–thermodynamicequilibrium–lawsofthermodynamics–heat engine – Carnot's cycle – efficiency – entropy –change of entropy in reversible andirreversibleprocess.

UnitIV:ELECTRICITYANDMAGNETISM (9 Hours)

Potentiometer–principle–measurementofthermoemfusingpotentiometer–magneticfield due to a current carrying conductor – Biot-Savart's law – field along the axis of the coilcarryingcurrent–peak,averageandRMSvaluesofaccurrentandvoltage– powerfactorandcurrent values in an AC circuit – types of switches in household and factories– Smart wifiswitches-fusesandcircuitbreakersinhouses.

UnitV:DIGITALELECTRONICSANDDIGITALINDIA (9 Hours)

Logic gates, OR, AND, NOT, NAND, NOR , EXORlogic gates – universal buildingblocks – Boolean algebra – De Morgan's theorem – verification – overview of Governmentinitiatives: software technological parks under MeitY, NIELIT- semiconductor laboratoriesunderDept.ofSpace–anintroductiontoDigitalIndia.

LearningResources:

TextBooks

1. R.Murugesan,*AlliedPhysics*,S.Chand &Co,NewDelhi,2001.
2. BrijlalandN.Subramanyam,*WavesandOscillations*,VikasPub.House,1994.
3. BrijlalandN.Subramaniam,*Properties ofMatter*,S. Chand &Co., NewDelhi, 1994.
4. J.B.RajamandC.L.Arora,*HeatandThermodynamics*, 8th edition,S.ChandandCo., New Delhi, 1976.
5. R.Murugesan,*Opticsand Spectroscopy*,S.Chand &Co,NewDelhi,2005.
6. A.Subramaniyam,*AppliedElectronics*,2nd edition, NationalPubCo.,Chennai,2001.

References

1. Resnick,HallidayandWalker,*FundamentalsofPhysics*, 11thedition,JohnWilleyandSons, Asia Pvt.Ltd.,Singapore, 2018.
2. V.R.KhannaandR.S.Bedi,*TextbookofSound*, 1st edition.KedharnaathPublish&Co,Meerut,1998.
3. N.S.KhareandS.S.Srivastava,*ElectricityandMagnetism*,10th edition,AtmaRam&Sons,New Delhi, 1983.
4. D.RKhannaandH.R.Gulati, *Optics*,S.Chand &Co.Ltd.,NewDelhi,1979.
5. V.K.Metha, *Principlesof electronics*,6th edition,S.Chandand company,2004.

Websites/e-LearningResources:

1. https://youtu.be/M_5KYncYNyc
2. https://youtu.be/ljJLJgIvaHY
3. https://youtu.be/7mGqd9HQ_AU
4. https://youtu.be/h5jOAw57OXM
5. https://learningtechnologyofficial.com/category/fluid-mechanics-lab/
6. https://www.youtube.com/watch?v=gT8Nth9NWPM
7. https://www.biolinscientific.com/blo g/what-are-surfactants-and-how-do-they-work

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	3	3	3	3	3
CO2	2	3	3	3	2	3	3	3	3	2
CO3	2	3	3	3	3	2	3	3	3	3
CO4	3	3	3	3	3	3	3	2	3	3
CO5	2	3	3	3	3	3	3	3	3	3
Average	2.4	3	3	3	2.8	2.8	3	2.8	3	2.8

Strong – 3, Medium – 2, Low – 1

CourseCode	Nameof theCourse	Category	Hours/Wk.	Credits

24PHY1101	AlliedPracticalsforChemists – I	Supportive	2	1

The objective of this course is to set up experiments to verify theories, quantify, analyze and able to do error analysis and correlate results.

CourseOutcomes:
Attheend ofthe course,students willbe ableto
CO1:performhands-on training in measuring physical quantities.
CO2:relatewiththerespectivetheoreticalconcepts.
CO3:recordandprocessthemeasurements.
CO4:performdataanderroranalysis.
CO5:explain thesignificanceoftheexperiment.

List of Experiments: (Any8experiments)

1. Determination of Young'smodulusbynon-uniformbendingusingpin andmicroscope.
2. Determination of Young'smodulusbynon-uniformbendingusingopticlever,scale andtelescope
3. Determination of Rigiditymodulus bystatictorsionmethod.
4. Determination of Rigiditymodulus bytorsional oscillationswithoutmass.
5. Determination of SurfacetensionandinterfacialSurfacetensionby dropweight method
6. Comparisonofviscosities oftwo liquids– burettemethod
7. Determination of Specificheatcapacityof aliquid–half timecorrection.
8. Verificationoflaws oftransversevibrations usingsonometer.
9. Calibrationoflow range voltmeter usingpotentiometer.
10. Determinationofthermoemfusingpotentiometer.
11. Verificationoftruthtablesofbasiclogic gatesusingICs.
12. VerificationofDeMorgan'stheoremsusinglogicgateICs.
13. Useof NANDasuniversal buildingblock.
14. Error Analysis (Simple pendulum & UV method)
15. PreciseLinearMeasurements(ScrewGauge&VernierCalipers).
16. Usageof TravellingMicroscope– Radius of theCapillarytube.
17. Determination of Coefficientofthermal expansion(Light&Telescope)
18. Determination of 'g' andRadiusofGyration using compoundPendulum
19. Specificheat capacityofLiquid using Newton's LawofCooling
20. Determination of Thermo EMF using Thermocouple
21. Measurementofviscosityofliquidsatdifferenttemperatures.
22. Measurement of ultrasonic velocityin binaryliquids

Learning Resources:
References
1. Gupta and Kumar, *Practical Physics Volume 1*, PragatiPrakasan, 2014.
2. Gupta and Kumar, *Practical Physics Volume 2*, PragatiPrakasan, 2014.

3. S.P Singh,*Advanced Practical Physics, Volume 1*, PragatiPrakasan, 2017.
4. S.P Singh,*Advanced Practical Physics, Volume 2*, PragatiPrakasan, 2017.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	2	2	3	2	2	2	1	2	3
CO2	2	2	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	2	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	2	2	2	2
Average	2.6	2.4	2.8	3	2.8	2.8	2.6	2.4	2.6	2.8

Strong – 3, Medium – 2, Low – 1

CourseCode	Nameof theCourse	Category	Hours/Wk.	Credits

24PHS1371	AncillaryPhysics forMathematics –I	Supportive	3	3

The objective of this course is to impart basic principles of Physics that wouldbe helpful for students who have taken undergraduate programs other than Physics. This course helps to understand the basics of waves, ultrasonic's, properties of matter, heat, electricity, magnetism and digital electronics.

CourseOutcomes:

Attheend ofthe course,students willbe ableto

CO1:identify the types of motion and demonstrate itmathematically.

CO2: explain the behavior of materials andconnectdroplettheorywith corona transmission.

CO3:describe the concept of heatto interpret the flow of temperature.

CO4:apply the concept of electricity and magnetism to analyze various circuits.

CO5:interpretthe reallife solutionsusing digital electronics.

UnitI:WAVES,OSCILLATIONSANDULTRASONICS (9 Hours)

Simple harmonic motion (SHM) – composition of two SHMs at right angles(periods in the ratio 1:1) – Lissajous figures – uses – laws of transverse vibrations of strings – determinationofACfrequencyusingsonometer(steelandbrasswires)–ultrasound–production – piezoelectric method – application of ultrasonics: medical field – lithotripsy,ultrasonography– ultrasonic imaging-ultrasonicsindentistry–physiotheraphy,ophthalmology-advantagesofnoninvasivesurgery–ultrasonics ingreenchemistry.

UnitII:PROPERTIESOFMATTER (9 Hours)

Elasticity: elastic constants – bending of beam – theory of non- uniform bending – determinationofYoung'smodulusbynon-uniformbending–energystoredinastretchedwire - torsion of a wire – determination of rigidity modulus by torsional pendulum – *Viscosity*:streamline and turbulent motion – critical velocity – coefficient of viscosity – Poiseuille'sformula– comparisonofviscosities–burettemethod-*Surfacetension*:definition –moleculartheory – droplets formation–shape, size and lifetime – COVID transmission through droplets,saliva– drop weight method– interfacial surfacetension

UnitIII:HEATANDTHERMODYNAMICS (9 Hours)

Joule-Kelvineffect–Joule-Thomsonporousplugexperiment–theory–temperatureofinversion– thermodynamicsystem–thermodynamicequilibrium–lawsofthermodynamics–heat engine – Carnot's cycle – efficiency – entropy –change of entropy in reversible andirreversibleprocess.

UnitIV:ELECTRICITYANDMAGNETISM (9 Hours)

Potentiometer–principle–measurementofthermoemfusingpotentiometer–magneticfield due to a current carrying conductor – Biot-Savart's law – field along the axis of the coilcarryingcurrent–peak,averageandRMSvaluesofaccurrentandvoltage– powerfactorandcurrent values in an AC circuit – types of switches in household and factories– Smart wifiswitches-fusesandcircuitbreakersinhouses.

UnitV:DIGITALELECTRONICSANDDIGITALINDIA (9 Hours)

Logic gates, OR, AND, NOT, NAND, NOR , EXORlogic gates – universal buildingblocks – Boolean algebra – De Morgan's theorem – verification – overview of Governmentinitiatives: software technological parks under MeitY, NIELIT- semiconductor laboratoriesunderDept.ofSpace–anintroductiontoDigitalIndia.

LearningResources:

TextBooks

1. R.Murugesan,*AlliedPhysics*,S.Chand &Co,NewDelhi,2001.
2. BrijlalandN.Subramanyam,*WavesandOscillations*,VikasPub.House,1994.
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4. J.B.RajamandC.L.Arora,*HeatandThermodynamics*(8th edition),S.Chand&Co.,NewDelhi, 1976.
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1. Resnick,HallidayandWalker,*FundamentalsofPhysics*(11th edition),JohnWilleyandSons, Asia Pvt.Ltd.,Singapore, 2018.
2. V.R.KhannaandR.S.Bedi,*TextbookofSound*,1st Edn.KedharnaathPublish&Co,Meerut,1998.
3. N.S.KhareandS.S.Srivastava,*ElectricityandMagnetism*,10th Edn.,AtmaRam&Sons,New Delhi, 1983.
4. D.RKhannaandH.R.Gulati, *Optics*,S.Chand &Co.Ltd.,NewDelhi,1979.
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3. https://youtu.be/7mGqd9HQ_AU
4. https://youtu.be/h5jOAw57OXM
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6. https://www.youtube.com/watch?v=gT8Nth9NWPM
7. https://www.biolinscientific.com/blo g/what-are-surfactants-and-how-do-they-work

CO-PO mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	3	3	3	3	3
CO2	2	3	3	3	2	3	3	3	3	2
CO3	2	3	3	3	3	2	3	3	3	3
CO4	3	3	3	3	3	3	3	2	3	3
CO5	2	3	3	3	3	3	3	3	3	3
Average	2.4	3	3	3	2.8	2.8	3	2.8	3	2.8

Strong – 3, Medium – 2, Low – 1

CourseCode	Nameof theCourse	Category	Hours/Wk.	Credits

24PHS1171	AncillaryPracticalsforMathematics –I	Supportive	2	1

The objective of this course is to set up experiments to verify theories, quantify, analyze and able to do error analysis and correlate results.

CourseOutcomes:
Attheend ofthe course,students willbe ableto
CO1:performhands-on training in measuring physical quantities.
CO2:relatewiththerespectivetheoreticalconcepts.
CO3:recordandprocessthemeasurements.
CO4:performdataanderroranalysis.
CO5:explain thesignificanceoftheexperiment.

List of Experiments: (Any8experiments)

1. Determination of Young'smodulusbynon-uniformbendingusingpin andmicroscope
2. Determination of Young'smodulusbynon-uniformbendingusingopticlever,scale andtelescope
3. Determination of Rigiditymodulus bystatictorsionmethod.
4. Determination of Rigiditymodulus bytorsional oscillationswithoutmass
5. Determination of SurfacetensionandinterfacialSurfacetensionusing dropweight method
6. Comparisonofviscosities oftwo liquidsusing burettemethod
7. Determination of Specificheatcapacityof aliquidusinghalf timecorrection.
8. Verificationoflaws oftransversevibrations usingsonometer.
9. Calibrationoflow range voltmeter usingpotentiometer.
10. Determinationofthermoemfusingpotentiometer.
11. Verificationoftruthtablesofbasiclogic gatesusingICs.
12. VerificationofDeMorgan'stheoremsusinglogicgateICs.
13. Useof NANDasuniversal buildingblock.
14. Error Analysis (Simple pendulum & UV method)
15. PreciseLinearMeasurements(ScrewGauge&VernierCalipers).
16. Determination of radius of thecapillarytube using TravellingMicroscope
17. Determination of Coefficientofthermal expansion (Light&Telescope)
18. Determination of 'g' andRadiusofGyration using CompoundPendulum
19. Determination of specificheat capacityofliquid using Newton's LawofCooling
20. Determination of thermo EMF using Thermocouple
21. Measurementofviscosityofliquidsatdifferenttemperatures.
22. Measurement of ultrasonic velocityin binaryliquids

Learning Resources:
References

1. Gupta and Kumar, *Practical Physics Volume 1*, PragatiPrakasan, 2014.
2. Gupta and Kumar, *Practical Physics Volume 2*, PragatiPrakasan, 2014.
3. S.P Singh,*Advanced Practical Physics, Volume 1*, PragatiPrakasan, 2017.

4. S.P Singh,*Advanced Practical Physics, Volume 2*, PragatiPrakasan, 2017.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	2	2	3	2	2	2	1	2	3
CO2	2	2	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	2	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	2	2	2	2
Average	2.6	2.4	2.8	3	2.8	2.8	2.6	2.4	2.6	2.8

Strong – 3, Medium – 2, Low – 1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24PHS1473	Digital Logic Fundamentals	Supportive	5	4

The aim of this course is to understand the basic concepts of digital logic and the design of basic logic circuits. It also helps the student to learn combinational and sequential circuits. At the end of the course, students will be able to

Course Outcomes:

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

CO1: perform conversion between number systems and do arithmetic calculations.
CO2:explain logic gates, solve Boolean algebra and simplify circuits using K-map.
CO3: analyze and construct combinational Logic Circuits.
CO4: compare various types of flip flops and counters for data storage
CO5: acquire knowledge on shift Registers, Ring and Johnson's counters.

Unit I: NUMBER SYSTEMS (15 Hours)

Digital Concepts: Introduction, Decimal numbers, Binary numbers, Decimal to binary conversions, Binary arithmetic, 1's and 2's complements of Binary numbers, Signed numbers, Arithmetic operations. Hexadecimal numbers, Octal numbers, Digital codes, Binary coded decimal (BCD).

Unit II: BUILDING BLOCKS (15 Hours)

Logic Gates: Positive and negative logic, NOT gate, AND gate, OR gate, NAND gate, NOR gate, EX-OR and EX-NOR gates. Boolean Algebra: Boolean operations, logic expressions, rules and laws of Boolean algebra, De Morgan's theorems, Boolean analysis of logic circuits, Simplification using Boolean algebra, Standard forms, SOP and POS Expressions, Karnaugh map techniques SOP & POS (up to 4 variables).

Unit III: COMBINATIONAL LOGIC CIRCUITS (15 Hours)

Combinational Logic Circuits: Implementation, Universal property of NAND and NOR gates, Half adder, Full adder, Parallel binary adder, Comparators, Decoders, BCD to 7-segment decoder, Encoders, Code converters, Multiplexers and Demultiplexers, Parity generators and Checkers.

Unit IV: SEQUENTIAL LOGIC CIRCUITS (15 Hours)

Sequential Logic Circuits: SR Lathes, Gated S-R latch, gated D latch, Flip - Flops: Edge triggered flip flops, Master Slave flip flops, Applications Counters: Asynchronous counters, Decade Asynchronous counters, Synchronous counters, synchronous Decade counters, up/down synchronous counter, Applications.

Unit V: SHIFT REGISTER AND COUNTERS (15 Hours)

Shift Register: serial in - serial out, serial in - parallel out, parallel in - serial out, parallel in parallel out configurations. Ring counter, Johnson's counter.

Learning Resources:

Text Book

1. Thomas L. Floyd & RP Jain, "*Digital Fundamentals*", 10th Edition, Pearson Edition, 2018.

References

1. P. Malvino and Leach, "*Digital Principles and Applications*", McGraw Hill Int., 4th Edition, 2017
2. R. P. Jain," *Modern Digital Electronics*", Tata McGraw Hill Pub. Company, 3rd Edition, 2018.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	1	2	1	1	2	1	1	1	2
CO2	2	1	3	2	2	2	1	1	1	2
CO3	2	2	2	1	2	2	1	1	2	2
CO4	3	2	3	2	2	2	1	1	2	2
CO5	2	2	2	2	1	2	1	1	2	2
Average	2.2	1.6	2.4	1.6	1.6	2	1	1	1.6	2

Strong – 3, Medium – 2, Low – 1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24PHY/PHS 1205	Physics in Everyday Life	NME	3	2

This course enable the students to know where all physics principles have been put to use in daily life and appreciate the concepts with a better understanding also to know about Indian scientists who have made significant contributions to Physics.

Course Outcomes:

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

CO1:recognize the physics principles involved in day to day life.
CO2:explain the uses of lenses for correcting vision and camera.
CO3:describe the physics behind the working of home appliances.
CO4:explain the use of solar energy for various applications.
CO5: know about the Indian scientists and their contributions.

Unit I: MECHANICAL OBJECTS (9 Hours)

Springscales – bouncing balls –roller coasters – bicycles –rockets and space travel.

Unit II: OPTICAL INSTRUMENTS AND LASER (9 Hours)

Vision corrective lenses – polaroid glasses – UV protective glass – polaroid camera – color photography – holography and laser.

Unit III: PHYSICS OF HOME APPLIANCES (9 Hours)

Bulb – fan – hair drier – television – air conditioners – microwave ovens – vacuum cleaners**.**

Unit IV: SOLAR ENERGY (9 Hours)

Solar constant – General applications of solar energy – Solar water heaters – Solar Photo – voltaic cells – General applications of solar cells.

Unit V: INDIAN PHYSICIST AND THEIR CONTRIBUTIONS (9 Hours)

C.V.Raman, HomiJehangirBhabha, Vikram Sarabhai, Subrahmanyan Chandrasekhar, Venkatraman Ramakrishnan, Dr. APJ Abdul Kalam and their contribution to science and technology.

Learning Resources:

Text Books

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

CO-PO Mapping

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

CO3	2	3	3	3	3	2	3	3	3	3
CO4	3	3	3	3	3	3	3	2	3	3
CO5	2	3	3	3	3	3	3	3	3	3
Average	2.4	3	3	3	2.8	2.8	3	2.8	3	2.8

Strong – 3, Medium – 2, Low – 1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24PHY/PHS 1502	Heat, Thermodynamics and Statistical Physics	Core	5	5

This course provides a brief explanation of transmission of heat in good and bad conductors. Relate the laws of thermodynamics, entropy in everyday life and explore the knowledge of statistical mechanics and its relation.

Course Outcomes:

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

CO1: identify the relationship between heat capacity, specific heat capacity and acquire knowledge on low temperature physics.

CO2:derive the efficiency of Carnot's engine and discuss the implications of the laws of thermodynamics in diesel and petrol engines.

CO3: analyze the performance of thermodynamic systems viz efficiency by problems.

CO4: discuss different parameters related to heat and analyze various modes of heat transfer.

CO5:develop statistical interpretation of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac by applying quantum particles such as photon and electron.

Unit I: CALORIMETRY AND LOW TEMPERATURE PHYSICS (15 Hours)

Calorimetry*:* Specific heat capacity – specific heat capacity of gases C_P & C_V– Meyer's relation – Joly's method for determination of C_V – Regnault's method or determination of C_P.Low Temperature Physics:Joule-Kelvin effect – porous plug experiment – Joule-Thomson effect – Boyle temperature – temperature of inversion – liquefaction of gas by Linde's Process – adiabatic demagnetisation.

Unit II: THERMODYNAMICS - I (15 Hours)

Zeroth law and first law of thermodynamics – P-V diagram – heat engine –efficiency of heat engine – Carnot's engine, construction, working and efficiency of petrol engine and diesel engines – comparison of engines.

Unit III: THERMODYNAMICS - II (15 Hours)

Second law of thermodynamics –entropy of an ideal gas – entropy change in reversible and irreversible processes – T-S diagram –thermodynamical scale of temperature – Maxwell's thermodynamical relations –Clasius-Clapeyron's equation (first latent heat equation) – third law of thermodynamics – unattainability of absolute zero – heat death.

Unit IV: HEAT TRANSFER (15 Hours)

Modes of heat transfer: conduction, convection and radiation. *Convection*: Sea breeze, land breeze**.** *Conduction:* Thermal conductivity – determination of thermal conductivity of a good conductor by Forbe's method – determination of thermal conductivity of a bad conductor by Lee's disc method. *Radiation:* Black body radiation (Ferry's method) – distribution of energy in black body radiation – Wien's law and Rayleigh Jean's law –Planck's law of radiation – Stefan's law – deduction of Newton's law of cooling from Stefan's law.

Unit V: STATISTICAL MECHANICS (15 Hours)

Definition of phase-space – micro and macro states – ensembles –different types of ensembles – classical and quantum Statistics – Maxwell-Boltzmann statistics – expression for distribution function – Bose-Einstein statistics – expression for distribution function – Fermi-Dirac statistics –expression for distribution function – comparison of three statistics.

Learning Resources:

Text Books

1. Brijlal& N. Subramaniam, *Heat and Thermodynamics*, S. Chand & Co., 2000.
2. Narayanamoorthy& Krishna Rao, *Heat*, Triveni Publishers, Chennai, 1969.
3. V.R. Khanna & R.S. Bedi, 1st Edition, *Text book of Sound*, Kedharnaath Publish & Co, Meerut, 1998.
4. Brijlal and N. Subramanyam, *Waves and Oscillations*, Vikas Publishing House, New Delhi, 2001.
5. M. Ghosh, *Text Book of Sound*, S. Chand & Co, 1996.
6. R. Murugeshan&KiruthigaSivaprasath, *Thermal Physics*, S. Chand & Co., 2007.

References

1. J.B. Rajam& C.L. Arora, *Heat and Thermodynamics*, 8th edition, S. Chand & Co. Ltd., 1976.
2. D.S. Mathur, *Heat and Thermodynamics*, Sultan Chand & Sons, 2004.
3. Gupta, Kumar, Sharma, *Statistical Mechanics*, 26thEdition, S. Chand & Co., 2013.
4. Resnick, Halliday and Walker, *Fundamentals of Physics*, 6th Edition, 2010.
5. Sears, Zemansky, Hugh D. Young, Roger A. Freedman, *University Physics with Modern Physics*,15th Edition, Pearson, 2021.

Websites/ e-Learning Resources

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

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	2	2	3	2	3	2	3	3	2
CO2	3	2	3	2	2	3	3	3	3	3
CO3	3	3	3	3	3	2	3	3	2	3
CO4	3	3	2	2	3	2	3	3	3	3
CO5	3	2	3	3	2	3	2	2	3	2
Average	3	2.4	2.6	2.6	2.4	2.6	2.6	2.8	2.8	2.6

Strong – 3, Medium – 2, Low – 1

CourseCode	Nameof theCourse	Category	Hours/Wk.	Credits
24PHY/PHS1504	Electricity,Magnetism and Electromagnetism	Core	5	5

Thiscourseappraisesthestudentsregardingtheconceptsofelectrostatics,electrodynamicsand Maxwellequations andenables theiruseinvarious situations.

Course Outcomes:

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

CO1: explain the concept of Coulomb's and Gauss's laws and their applications.

CO2:apply the magnetic effects of current to various gadgets.

CO3: compare and relate electricity and magnetism.

CO4: interpret the concepts of magnetic induction and classify magnetic materials.

CO5: construct the basic equations of electro-magnetism and describe the propagation of electromagnetic waves.

UnitI:CAPACITORSANDTHERMOELECTRICITY (15hours)

Electriccharge–Coulomb'slaw-Electricfieldlines-Gausslaw-Electricpotential - Introduction to Dielectrics – Capacitors - Spherical and cylindrical capacitors - capacitorsconnected in series and parallel – parallel plate capacitors with and without dielectrics-Energy storage in an electric field – Dielectrics and Gauss's law – Laws of thermoemf –Seebackeffect– Peltiereffect– Thomsoneffect –Thermocouple.

UnitII:MAGNETICEFFECTSOFCURRENT (15hours)

Magnetic force on a current carrying wire - magnetic force on a moving charge –magnetic force on circulating charges –Magnetic field of a current and Biot-Savart law –Magnetic induction due to straight wire, circular coil and solenoid – Force on a currentelementbymagneticfield– Forcebetweentwoinfinitelylongconductors-Ampere'scircuitallaw–differentialform– Magneticinductionduetotoroid–Applications:Helmholtz tangentgalvanometer–movingcoil galvanometer.

UnitIII:MAGNETISMANDELECTROMAGNETICINDUCTION (15 hours)

Magnetic induction (B) - Faraday's law of magnetic induction – Lenz's law – Selfinduction – Coefficient of self inductance of solenoid – Mutual inductance – Coefficient ofmutual inductance between two coaxial solenoids –Magnetism – Magnetic dipole – AtomicandNuclearmagneticmoments-Magnetization(M)–RelationbetweenB,HandM-Magnetic susceptibility – Magnetic permeability –Magnetic materials- B –H curve –Hysteresis – Energylossduetohysteresis–Importanceof hysteresiscurves.

UnitIV:TRANSIENTAND ALTERNATINGCURRENTS (15 hours)

Inductance (L) – Growth and decay of current in a circuit containing resistance andinductance – Energy storage in a magnetic field – Growth and decay of charge in a circuitcontaining resistance and capacitor–Growthand decay of charge inLCR circuit– LCRseriesandparallelcircuits – resonancecondition – Qfactor– power factor.

UnitV:MAXWELL'SEQUATIONSANDELECTROMAGNETICWAVES (15 hours)

Displacement current, Maxwell's equations in vacuum, material media – physicalsignificance of Maxwell's equations – Generation of EM waves – Travelling waves andvelocityof light– Poyntingvector–Intensityofelectromagneticwave.

Learningresources:

Textbooks

1. Halliday,ResnickandKrane, *PhysicsVolumeII*,Vth edition,JohnWiley, 2002.
2. Murugeshan.R.,*ElectricityandMagnetism*,8thEdn,S.Chand andCo,NewDelhi,2006.
3. SehgalD.L.,ChopraK.L,SehgalN.K.,*ElectricityandMagnetism*,SultanChandandSons, New Delhi, 2020.
4. M.NarayanamurthyandN.Nagarathnam,*ElectricityandMagnetism*,4thEdition, NationalPublishingCo., Meerut, 2005.

References

1. BrijlalandSubramanian,*ElectricityandMagnetism*,6thEdn., Ratan andPrakash,Agra, 1966.
2. Brijlal,N.SubramanyanandJivanSeshan,*MechanicsandElectrodynamics*,Eurasia PublishingHouse(Pvt.) Ltd.,New Delhi, 2005.
3. David J. Griffiths, *Introduction to Electrodynamics*, Prentice-Hall of India, New Delhi, 2003.

Websites/e-Learningresources

1. https://www.edx.org/course/electricity
2. https://www.udemy.com/courses/electricity
3. https://www.edx.org/course/magnetism
4. http://www.hajim.rochester.edu/optics/undergraduate/courses.html

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	3	3	3	2	2	2	2	2	2	3
CO2	3	2	3	3	2	2	2	2	2	3
CO3	3	3	3	3	2	3	2	2	3	3
CO4	3	3	3	3	3	3	2	3	3	3
CO5	3	3	3	3	3	3	2	3	3	3
Average	3	2.8	3	2.8	2.4	2.6	2	2.4	2.6	3

Strong – 3, Medium – 2, Low – 1

CourseCode	Nameof theCourse	Category	Hours/Wk.	Credits
24PHY/PHS 1306	Practical –II	Core	3	3

The objective of this course is to set up experiments to verify theories, quantify, analyze and able to do error analysis and correlate results.

CourseOutcomes:
Attheend ofthe course,students willbe ableto
CO1:performhands-on training in measuring physical quantities.
CO2:relatewiththerespectivetheoreticalconcepts.
CO3:recordandprocessthemeasurements.
CO4:performdataanderroranalysis.
CO5:explain thesignificanceoftheexperiment.

List of experiments (Any8experiments)

1. Determination of specific heat capacity of solid.
2. Determination of thermal conductivity of good conductor by Searle's method.
3. Determination of thermal conductivity of bad conductor by Charlaton's method.
4. Determination of thermal conductivity of bad conductor by Lee's disc method.
5. Determination of specific heat by Newton's law of cooling.
6. Determination of coefficient of thermal expansion of a metallic rod using light and telescope.
7. To verify the laws of sound using sonometer.
8. To verify the laws of transverse vibration using Melde's apparatus.
9. Calibration of low range voltmeter using potentiometer.
10. Determination of capacitance using Desauty's bridge and B.G./Spot galvanometer/head phone.
11. Determination of field along the axis of a current carrying circular coil. (M and B_H)
12. Determination of Latent heat of a vaporization of a liquid.
13. Determination of Stefan's constant for Black body radiation.
14. Verification of Stefan's-Boltzmans law.
15. Determination of thermal conductivity of rubber tube.
16. Frequency determination using Helmholtz resonator.
17. Determination of Velocity of sound through a wire using Sonometer.
18. Determination of velocity of sound using Kundts tube.
19. Determination of frequency of an electrically maintained tuning fork
20. Comparison of mass per unit length of two strings using Melde's apparatus.
21. Determination of Frequency of AC using Sonometer.

Learning Resources:
References

1. Gupta and Kumar, *Practical Physics Volume 1*, PragatiPrakasan, 2014.
2. Gupta and Kumar, *Practical Physics Volume 2*, PragatiPrakasan, 2014.
3. S.P Singh,*Advanced Practical Physics, Volume 1*, PragatiPrakasan, 2017.
4. S.P Singh,*Advanced Practical Physics, Volume 2*, PragatiPrakasan, 2017.

CO-PSO Mapping

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	2	2	2	3	2	2	2	1	2	3
CO2	2	2	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	2	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	2	2	2	2
Average	2.6	2.4	2.8	3	2.8	2.8	2.6	2.4	2.6	2.8

Strong – 3, Medium – 2, Low – 1

CourseCode	Nameof theCourse	Category	Hours/Wk.	Credits
24PHY1382	AlliedPhysics forChemists – II	Supportive	3	3

The objective of this course is to impart basic principles of Physics that wouldbe helpful for students who have taken undergraduate programs other than Physics. It helpstogain knowledge

inoptics,modernphysics, concepts of relativity and quantum physics, semiconductor physics, and electronics.

CourseOutcomes:

Attheend ofthe course,students willbe ableto

CO1: explain the concepts of interference, diffraction and polarization basedon wavepatterns.

CO2: outlinethebasicfoundationofdifferentatommodelsandvariousexperimentsestablishing quantumconcepts.

CO3: explain the properties of nucleus, nuclear models and nuclear processes like fission and fusion.

CO4: describe the concepts of relativity and relate this with current research in this field.

CO5: summarize the working of semiconductor devices and other practical devices.

UnitI:OPTICS (9Hours)

Interference–interferenceinthinfilms–colorsofthinfilms–airwedge–determination of diameter of a thin wire by air wedge – diffraction – diffraction of light vssound–normalincidence– experimentaldeterminationofwavelengthusingdiffractiongrating (no theory) – polarization – polarization by double reflection – Brewster's law –opticalactivity– application in sugar industries.

UnitII:ATOMIC PHYSICS (9 Hours)

Atom models – Bohr atom model– mass number – atomic number – nucleons –vector atom model – various quantum numbers – Pauli's exclusion principle – electronicconfiguration – periodic classification of elements – Bohr magneton – Stark effect –Zeemaneffect (elementary ideas only) – photo electric effect – Einstein's photoelectric equation – applicationsofphotoelectric effect:solar cells,solar panels,opto electricdevices.

UnitIII:NUCLEAR PHYSICS (9 Hours)

Nuclearmodels–liquiddropmodel–magicnumbers–shellmodel–nuclearenergy– mass defect – binding energy – radioactivity – uses – half life – mean life - radio isotopesand uses –controlled and uncontrolled chain reaction – nuclear fission – energy released infission – chain reaction – critical reaction – critical size- atom bomb – nuclear reactor –breeder reactor – importance of commissioningPFBR in our country – heavy water disposal,safety of reactors: seismic and floods–introduction to DAE,IAEA– nuclear fusion –thermonuclearreactions– differences betweenfission and fusion.

UnitIV:INTRODUCTIONTO RELATIVITYAND GRAVITATIONALWAVES (9 Hours)

Frameofreference–postulatesofspecialtheoryofrelativity–Galileantransformationequations– Lorentztransformationequations–derivation– lengthcontraction- timedilation–twinparadox– mass-energyequivalence–introductionongravitationalwaves, LIGO, ICTS opportunitiesatInternationalCentreforTheoreticalSciences.

UnitV:SEMICONDUCTORPHYSICS (9 Hours)

p-n junction diode – forward and reverse biasing – characteristic of diode – Zenerdiode– characteristicofZenerdiode–voltageregulator–fullwavebridgerectifier–constructionandworking– advantages(nomathematicaltreatment)–USBcellphonecharger–introduction to e-vehiclesand EVchargingstations.

LearningResources:

TextBooks

1. R.Murugesan,*AlliedPhysics*,S.Chand&Co,NewDelhi,2005.
2. K.ThangarajandD.Jayaraman,*AlliedPhysics*,PopularBookDepot,Chennai,2004.
3. BrijlalandN.Subramanyam,*TextbookofOptics*,S.Chand&Co,NewDelhi,2002.
4. R.Murugesan,*ModernPhysics*,S.Chand&Co,NewDelhi,2005.
5. A.Subramaniyam,*AppliedElectronics*,2nd Edn., NationalPublishingCo.,Chennai,1997.

References

1. ResnickHallidayandWalker,*FundamentalsofPhysics*,11th Edn.,JohnWilleyand Sons,Asia Pvt. Ltd., Singapore, 2018.
2. D.R.KhannaandH.R.Gulati., *Optics*,S.Chand &Co.Ltd.,New Delhi,1979.
3. A.Beiser,*ConceptsofModernPhysics*,TataMcGrawHillPublication,NewDelhi,1997.
4. ThomasL.Floyd,*DigitalFundamentals*,11th Edn.UniversalBookStall,NewDelhi,2017.
5. V.K.Metha,*Principlesofelectronics*,6th Edn.S.ChandandCompany,NewDelhi,2004.

Websites/e-LearningResources

1. https://www.berkshire.com/learning-center/delta-p-facemask/
2. https://www.youtube.com/watch?v=QrhxU47gtj4
3. https://www.youtube.com/watch?time_continue=318&v=D38BjgUdL5U&feature=emb_logo
4. https://www.youtube.com/watch?v=JrRrp5F-Qu4
5. https://www.validyne.com/blog/leak-test-using-pressure-transducers/
6. https://www.atoptics.co.uk/atoptics/blsky.htm
7. https://www.metoffice.gov.uk/weather/learn-about/weather/optical-effects

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	3	3	3	3	3
CO2	2	3	3	3	2	3	3	3	3	2
CO3	2	3	3	3	3	2	3	3	3	3
CO4	3	3	3	3	3	3	3	2	3	3
CO5	2	3	3	3	3	3	3	3	3	3
Average	2.4	3	3	3	2.8	2.8	3	2.8	3	2.8

Strong – 3, Medium – 2, Low – 1

CourseCode	Nameof theCourse	Category	Hours/Wk.	Credits
24PHY1102	AlliedPracticals forChemists– II	Supportive	2	1

The objective of this course is to set up experiments to verify theories, quantify, analyze and able to do error analysis and correlate results.

CourseOutcomes:
Attheend ofthe course,students willbe ableto
CO1:performhands-on training in measuring physical quantities.
CO2:relatewiththerespectivetheoreticalconcepts.
CO3:recordandprocessthemeasurements.

CO4:performdataanderroranalysis.
CO5:explain thesignificanceoftheexperiment.

List of Experiments: (Any8experiments)

1. Determinationof RadiusofcurvatureoflensbyformingNewton'srings
2. Determinationof Thicknessof awireusingairwedge
3. Determinationof Wavelengthofmercurylinesusingspectrometer and grating
4. Determinationof Refractiveindexofmaterial ofthelens byminimum deviation
5. Determinationof Refractiveindexofliquid usingliquidprism
6. Determinationof ACfrequencyusingsonometer
7. DeterminationofSpecificresistanceofawireusingPO box
8. Determinationof Thermalconductivityof poorconductorusingLee'sdisc
9. Determinationoffigure ofmerittable galvanometer
10. DeterminationofEarth'smagneticfieldusingfield alongtheaxisof acoil
11. CharacterizationofZenerdiode
12. ConstructionofZenerregulator
13. ConstructionofAND, OR,NOTgates usingdiodes and transistor
14. Realization of NORgateasauniversalbuildingblock
15. Determinationof SurfaceTension–CapillaryRise
16. Melde'sApparatus – laws of transverse vibrations.
17. Determinationof Specificheat Capacity–Method ofmixtures
18. JunctionDiodeCharacteristics
19. Construction of OP-AMP–Inverting&Non-invertingamplifier

Learning Resources:
References

1. Gupta and Kumar, *Practical Physics Volume 1*, PragatiPrakasan, 2014.
2. Gupta and Kumar, *Practical Physics Volume 2*, PragatiPrakasan, 2014.
3. S.P Singh,*Advanced Practical Physics, Volume 1*, PragatiPrakasan, 2017.
4. S.P Singh,*Advanced Practical Physics, Volume 2*, PragatiPrakasan, 2017.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	2	2	3	2	2	2	1	2	3
CO2	2	2	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	2	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	2	2	2	2
Average	2.6	2.4	2.8	3	2.8	2.8	2.6	2.4	2.6	2.8

Strong – 3, Medium – 2, Low – 1

CourseCode	Nameof theCourse	Category	Hours/Wk.	Credits
24PHS1372	AncillaryPhysics forMathematics –II	Supportive	3	3

The objective of this course is to impart basic principles of Physics that wouldbe helpful for students who have taken undergraduate programs other than Physics. It helpstogain knowledge inoptics,modernphysics, concepts of relativity and quantum physics, semiconductor physics, and electronics.

CourseOutcomes:
Attheend ofthe course,students willbe ableto
CO1: explain the concepts of interference, diffraction and polarization basedon wavepatterns.

CO2: outlinethebasicfoundationofdifferentatommodelsandvariousexperimentsestablishing quantumconcepts.

CO3: explain the properties of nucleus, nuclear models and nuclear processes like fission and fusion.

CO4: describe the concepts of relativity and relate this with current research in this field.

CO5: summarize the working of semiconductor devices and other practical devices.

UnitI:OPTICS (9Hours)

Interference–interferenceinthinfilms–colorsofthinfilms–airwedge–determination of diameter of a thin wire by air wedge – diffraction – diffraction of light Vssound–normalincidence–experimentaldeterminationofwavelengthusingdiffractiongrating (no theory) – polarization – polarization by double reflection – Brewster's law –opticalactivity– application in sugar industries.

UnitII:ATOMIC PHYSICS (9 Hours)

Atom models – Bohr atom model– mass number – atomic number – nucleons –vector atom model – various quantum numbers – Pauli's exclusion principle – electronicconfiguration – periodic classification of elements – Bohr magneton – Stark effect –Zeemaneffect (elementary ideas only) – photo electric effect – Einstein's photoelectric equation – applicationsofphotoelectric effect:solar cells,solar panels,opto electricdevices.

UnitIII:NUCLEAR PHYSICS (9 Hours)

Nuclearmodels–liquiddropmodel–magicnumbers–shellmodel–nuclearenergy– mass defect – binding energy – radioactivity – uses – half life – mean life - radio isotopesand uses –controlled and uncontrolled chain reaction – nuclear fission – energy released infission – chain reaction – critical reaction – critical size- atom bomb – nuclear reactor –breeder reactor – importance of commissioningPFBR in our country – heavy water disposal,safety of reactors: seismic and floods–introduction to DAE,IAEA– nuclear fusion –thermonuclearreactions– differences betweenfission and fusion.

UnitIV:INTRODUCTIONTO RELATIVITYAND GRAVITATIONALWAVES (9 Hours)

Frameofreference–postulatesofspecialtheoryofrelativity–Galileantransformationequations–Lorentztransformationequations–derivation– lengthcontraction- timedilation–twinparadox–mass-energyequivalence–introductionongravitationalwaves, LIGO, ICTS opportunitiesatInternationalCentreforTheoreticalSciences.

UnitV:SEMICONDUCTORPHYSICS (9 Hours)

p-n junction diode – forward and reverse biasing – characteristic of diode – zenerdiode–characteristicofzenerdiode–voltageregulator–fullwavebridgerectifier–constructionandworking–advantages(nomathematicaltreatment)–USBcellphonecharger–introduction to e-vehiclesand EVchargingstations.

LearningResources:

TextBooks

1. R.Murugesan,*AlliedPhysics*,S.Chand&Co,NewDelhi,2005.
2. K.ThangarajandD.Jayaraman,*AlliedPhysics*,PopularBookDepot,Chennai,2004.
3. BrijlalandN.Subramanyam,*TextbookofOptics*,S.Chand&Co,NewDelhi,2002.
4. R.Murugesan,*ModernPhysics*,S.Chand&Co,NewDelhi,2005.
5. A.Subramaniyam,*AppliedElectronics*,2nd Edn., NationalPublishingCo.,Chennai,1997.

References

1. ResnickHallidayandWalker,*FundamentalsofPhysics*,11th Edn.,JohnWilleyandSons,Asia Pvt. Ltd., Singapore, 2018.
2. D.R.KhannaandH.R.Gulati,.*Optics*,S.Chand &Co.Ltd.,New Delhi,1979.
3. A.Beiser,*ConceptsofModernPhysics*,TataMcGrawHillPublication,NewDelhi,1997.
4. ThomasL.Floyd,*DigitalFundamentals*,11th Edn.UniversalBookStall,NewDelhi,2017.
5. V.K.Metha,*Principlesofelectronics*,6th Edn.S.ChandandCompany,NewDelhi,2004.

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2. https://www.youtube.com/watch?v=QrhxU47gtj4
3. https://www.youtube.com/watch?time_continue=318&v=D38BjgUdL5U&feature=emb_logo
4. https://www.youtube.com/watch?v=JrRrp5F-Qu4
5. https://www.validyne.com/blog/leak-test-using-pressure-transducers/
6. https://www.atoptics.co.uk/atoptics/blsky.htm
7. https://www.metoffice.gov.uk/weather/learn-about/weather/optical-effects

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	3	3	3	3	3
CO2	2	3	3	3	2	3	3	3	3	2
CO3	2	3	3	3	3	2	3	3	3	3
CO4	3	3	3	3	3	3	3	2	3	3
CO5	2	3	3	3	3	3	3	3	3	3
Average	2.4	3	3	3	2.8	2.8	3	2.8	3	2.8

Strong – 3, Medium – 2, Low – 1

CourseCode	Nameof theCourse	Category	Hours/Wk.	Credits
24PHS1172	AncillaryPracticals forMathematics– II	Supportive	2	1

The objective of this course is to set up experiments to verify theories, quantify, analyze and able to do error analysis and correlate results.

CourseOutcomes:
Attheend ofthe course,students willbe ableto
CO1:performhands-on training in measuring physical quantities.
CO2:relatewiththerespectivetheoreticalconcepts.
CO3:recordandprocessthemeasurements.
CO4:performdataanderroranalysis.
CO5:explain thesignificanceoftheexperiment.

List of Experiments: (Any8experiments)

1. Determination of RadiusofcurvatureoflensbyformingNewton'srings

2. Determination of Thicknessof awireusingairwedge
3. Determination of Wavelengthofmercurylinesusingspectrometer and grating
4. Determination of Refractiveindexofmaterial ofthelens byminimum deviation
5. Determination of Refractiveindexofliquid usingliquidprism
6. Determinationof ACfrequencyusingsonometer
7. Determination of SpecificresistanceofawireusingPO box
8. Determination of Thermalconductivityof poorconductorusingLee'sdisc
9. Determinationoffigure ofmerittable galvanometer
10. DeterminationofEarth'smagneticfieldusingfield alongtheaxisof acoil
11. CharacterizationofZenerdiode
12. ConstructionofZenerregulator
13. ConstructionofAND, OR,NOTgates usingdiodes and transistor
14. Realization of NORgateasauniversalbuildingblock
15. Determination of SurfaceTension–CapillaryRise
16. Melde'sApparatus – laws of transverse vibration
17. Determination of Specificheat Capacity–Method ofmixtures
18. JunctionDiodeCharacteristics
19. Construction of OP-AMP–Inverting&Non-invertingamplifier

Learning Resources:

References

1. Gupta and Kumar, *Practical Physics Volume 1*, PragatiPrakasan, 2014.
2. Gupta and Kumar, *Practical Physics Volume 2*, PragatiPrakasan, 2014.
3. S.P Singh,*Advanced Practical Physics, Volume 1*, PragatiPrakasan, 2017.
4. S.P Singh,*Advanced Practical Physics, Volume 2*, PragatiPrakasan, 2017.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	2	2	3	2	2	2	1	2	3
CO2	2	2	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	2	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	2	2	2	2
Average	2.6	2.4	2.8	3	2.8	2.8	2.6	2.4	2.6	2.8

Strong – 3, Medium – 2, Low – 1

Course Code	Name of the Course	Category	Hours/Wk.	Credits
24PHY/PHS 1206	Wonders of Sky	NME	3	2

This course enable the students to understand the omnipresent Gravitation, motion, distance, size, mass, luminosity of the heavenly bodies. Quantitative discussion with physics involved is also given. An overall view of the structure and organization of the universe is picturized.

Course Outcomes:

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

CO1: describe the development of early astronomy and coordinate systems.
CO2: elucidate occurrence of seasons, eclipses and the solar system.
CO3: interpret stellar magnitudes and explain the evolution and final stages of star.
CO4: classify types of telescopes and their uses.
CO5: discuss the origin of universe and laws governing it.

Unit I: HISTORY OF ASTRONOMY (9 Hours)

Early history of Astronomy - Development of nature philosophy - constellations – celestial sphere – coordinate systems – birth of Modern Astronomy.

Unit II: BASICS OF ASTRONOMY (9 Hours)

Kepler's laws –-Newtonian laws and universal law of gravitation – seasons – eclipses – tides - precession – solar family - terrestrial planets and Jovian planets.

Unit III: SPECTRAL CLASSES AND STELLAR EVOLUTION (9 Hours)

Stellar distance – magnitudes of star light—stellar classification - evolution stages of stars – main sequence stars – end stages of stars - other mysterious objects –Comets.

Unit IV: OBSERVATIONAL ASTRONOMY (9 Hours)

Astronomical observations – Light and telescopes -Types of telescopes - reflector type -refractor type – IR and UV telescopes - classes of galaxies.

Unit V: ORIGIN OF UNIVERSE (9 Hours)

Cosmological principle – Hubble's law - the big bang – expanding universe – steady state universe – evidences for Einstein's gravitation.

Learning Resources:

Text Books

1. William Kaufmann, *Astronomy: The Structure of the Universe*, McMillan Publishing Co.inc, New York, 1999.
2. Pasachoff, Brooks/Cole, *Astronomy: From the earth to the Universe*, Thomson Learning, 2002.

Reference

1. George O. Abell, *Exploration of the Universe*, Saunders College Publishing. 1986.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	2	2	2	1	1	1	1	1
CO2	3	3	2	2	2	1	1	1	1	2
CO3	2	2	2	2	2	1	1	2	1	2
CO4	3	2	1	2	2	1	1	1	2	1
CO5	2	3	2	2	2	1	1	2	2	2
Average	2.6	2.4	1.8	2	2	1	1	1.4	1.4	1.6

Strong – 3, Medium – 2, Low – 1