



LINGAYA'S VIDYAPEETH

SESSION: 2022-25

Three Years B.Sc. Honours Programme

PHYSICS

Vision, Mission and Core Values of the Vidyapeeth

VISION OF VIDYAPEETH

Traditionally believing that God is the Source of all Truth, Goodness and Beauty, Lingaya's Vidyapeeth, wishes to develop in students a wisdom that translates academic achievements into responsible citizenship, sincere professional service and a deep respect for life and beauty in God's Creation and Recreation.

MISSION OF VIDYAPEETH

- To impart knowledge and skills in the field of Engineering/ Technology, Management, Education, Science & Arts and related areas;
- To dedicate itself for improvement of social and economic status and enhancement of the quality of life for all;
- To strive for maximizing human welfare through education;
- To produce effective knowledge workers, practitioners and educators who will be guided by vision, compassion, knowledge, discipline, discovery with deep respect for human values;
- To provide an individual engineering and other professional COURSE experience for each student;
- To develop critical thinking, analytical ability and creative skills;
- To supplement the curricula, team work, leadership, communication skills, project management, social concerns and ethics and
- To establish interaction with industries for Technology, Research & Development.

In line with above vision and mission statements, Lingaya's Vidyapeeth has the following special characteristics:

- Lingaya's Vidyapeeth is an Institution for providing a student with opportunity for allround development and education with the aim of effective living as a good citizen.
- It has special strength in the field of Engineering and Technology with emphasis onpractice and problem solving skills.
- Its activities and course curriculum concentrate on design, self-COURSE and research, which are the unique features of the Vidyapeeth.
- The primarily value of knowledge and skill imparted by Lingaya's Vidyapeeth resides in its utility in creating an infrastructure for the physical welfare of the general public,in sustaining good health of individual and the community.
- Lingaya's Vidyapeeth facilitates and promotes creativity and critical thinking capabilities in its students.
- The education in Lingaya's Vidyapeeth enhances the inherent capacity of a studentwith honesty, courage and fairness.

SCHOOL OF BASIC AND APPLIED SCIENCES LINGAYAS VIDYAPEETH

VISION OF SCHOOL

To be a School committed to promote Science and research exploration and education for attracting young talented students to contribute effectively in augmenting the national pool for scientific development who are responsible citizens and sincere professionals with the deep knowledge.

MISSION OF SCHOOL

1. To strive to maximize human welfare through the understanding the different phenomena of science with advance scientific development.
2. To develop and maintain state-of-the-art infrastructure and research facilities to enable create, apply and disseminate knowledge.
3. To create inter-disciplinary research environment and
4. To prepare students who are capable to take up their future educational and career challenges.

Vision and Mission of Department of Physics

School of Basic and Applied Sciences , LV

VISION OF DEPARTMENT

To be a department dedicated to promoting multidisciplinary Physical science and research activities, as well as education for interesting young brilliant students, in order to efficiently contribute to augmenting the local and national pool of responsible people and genuine professionals with deep expertise.

MISSION OF DEPARTMENT

1. To encourage young minds and help them to explore their strengths in both theory and experimental work of physical sciences
2. To prepare our graduate to understand the Physical analysis to apply in other disciplinary approach.
3. To explore applications of Physical sciences in engineering, material sciences and engage in collaborative research in a multidisciplinary environment.
4. The Physics Department is dedicated to producing competitive and professional graduates in multi-Disciplinary areas.

PROGRAM EDUCATIONAL OBJECTIVES (PEO)

PEO1: To produce graduates who excel in the competencies and values required for leadership to serve a rapidly evolving global community

PEO2: To motivate the students to pursue PG courses in reputed institutes

PEO3: To kindle the interest for research in students.

PEO4: To acquire placement in educational institutions, engineering and industrial firms.

Mapping of PEOs with Mission Statements

PEO Statements	Department Mission 1	Department Mission 2	Department Mission 3	Department Mission 4
PEO1	3	2	1	1
PEO2	1	2	3	2
PEO3	2	3	2	1
PEO4	2	1	2	3

- 🕒 Programme Outcome (PO)
- 🕒 Programme Specific Outcome (PSO)
- 🕒 Course Outcome (CO)
- 🕒 CO-PO Mapping
- 🕒 CO-PSO Mapping

Department of Physics **Programme Outcomes (PO)**

PO No.	Upon completion of B.Sc. Physics Degree programme, the graduates will be able to
PO-1	Acquire the knowledge related to academics with facts and figures related to various subjects in pure sciences such as Physics, Chemistry, Mathematics, etc. Which will enhance their learning
PO-2	Define the basic laws and to understand the basic concepts, fundamental principles, and the scientific theories related to various Scientific phenomena and their relevancies in the day-to-day life.
PO-3	Apply and understand the theories which describe the physical phenomenon learnt and the skills acquired to solve real time problems.

PO-4	Acquire a wide range of problem solving skills, both analytical and computational and to apply them.
PO-5	Develop skills of observations and drawing logical inferences from the Scientific experiments.
PO-6	Realize how interdisciplinary knowledge and skills acquired through Generic Elective or Ability or Skill enhancement courses helps in providing better solutions and new ideas for the sustainable developments and to solve day –to-day scientific problems

Programme Specific Outcomes (PO)

PSO No.	Upon completion of B.Sc. Physics Degree programme, the graduates will be able to	Mapping
PSO-1	Enhance their academic abilities, personal qualities and transferable skills which will give them an opportunity to develop as responsible citizens.	PO-10, PO-4, PO-9
PSO-2	Define the basic laws involved in Physics and their related examples	PO-3, PO-2
PSO-3	Understand the concepts and significance of the various physical phenomena and their applications	PO-1, PO-2
PSO-4	Carry out experiments in the laboratory to understand the laws and concepts of Physics.	PO-5, PO-6

Scheme of Studies B.Sc Hons. (Physics)

School: School of Basic and Applied Sciences								Batch: 2022-2025					
Department: Physics								Year: 1 st					
Course: B.Sc. Hons. Physics								Semester: 1 st					
S N	Category	Course Code	Course Name	Periods			Credits	Evaluation Scheme					Subject Total Marks
				L	T	P		Theory			Practical		
								ABQ	MS E	ES E	IP	EXP	
1	PCC	BS-101	Electricity and Magnetism	3	1	0	4	15	25	60	-	-	100
2	GE	BS-103	Algebra	3	1	0	4	15	25	60	-	-	100
3	GE	BS-105	Inorganic Chemistry	3	1	0	4	15	25	60	-	-	100
4	PCC	BS-151	Physics Laboratory-I	0	0	3	2				40	60	100
5	GE	BS-155	Chemistry Laboratory-I	0	0	3	2				40	60	100
6	AECC	HSS-107	English and Communication Skills	2	0	0	2	15	25	60	-	-	100
Total---->				12	3	6	18	60	100	240	80	120	600

School: School of Basic and Applied Sciences								Batch: 2022-2025					
Department: Physics								Year: 1 st					
Course: B.Sc. Hons. Physics								Semester: 2 nd					
S	Cate	Course	Course Name	Periods			Credit	Evaluation Scheme					Subject

N	Category	Code					s	Theory			Practical		Total Marks
				L	T	P		ABQ	MS E	ES E	IP	EX P	
1	PCC	BS-102	Statistical Physics	3	1	0	4	15	25	60	-	-	100
2	GE	BS-104	Calculus	3	1	0	4	15	25	60	-	-	100
3	GE	BS-106	Organic Chemistry	3	1	0	4	15	25	60	-	-	100
4	PCC	BS-152	Physics Laboratory-II	0	0	3	2				40	60	100
5	GE	BS-156	Chemistry Laboratory-II	0	0	3	2				40	60	100
6	AEC	CE-108	Environmental Science & Ecology	2	0	0	2	15	25	60	-	-	100
			Total---->	12	3	6	18	60	100	240	80	120	600



School: School of Basic and Applied Sciences								Batch: 2022-2025					
Department: Physics								Year: 2 nd					
Course: B.Sc. Hons. Physics								Semester: 3 rd					
S N	Category	Course Code	Course Name	Periods			Credits	Evaluation Scheme					Subject Total Marks
				L	T	P		Theory			Practical		
								ABQ	MS E	ES E	IP	EX P	
1	PCC	BPH-201	Mathematical Physics-I	4	0	0	4	15	25	60	-	-	100
2	PCC	BPH-203	Waves and Optics	4	0	0	4	15	25	60	-	-	100
3	PCC	BPH-205	Mechanics	4	0	0	4	15	25	60	-	-	100
4	PCC	BPH-207	Thermal physics	4	0	0	4	15	25	60	-	-	100
5	SEC	BPH-209	Renewable energy and energy harvesting	2	0	0	2	15	25	60	-	-	100
6	PCC	BPH-251	Mathematical Physics lab -I	0	0	4	2				40	60	100
7	PCC	BPH-253	Wave optics lab	0	0	4	2				40	60	100
8	PCC	BPH-255	Mechanics Lab	0	0	4	2				40	60	100
9	PCC	BPH-257	Thermal Physics Lab	0	0	4	2				40	60	100
			Total---->	18	0	16	26	75	125	300	160	360	900

School: School of Basic and Applied Sciences								Batch: 2022-2025					
Department: Physics								Year: 2 nd					
Course: B.Sc. Hons. Physics								Semester: 4 th					
S N	Category	Course Code	Course Name	Periods			Credits	Evaluation Scheme					Subject Total Marks
				L	T	P		Theory			Practical		
								ABQ	MS E	ES E	IP	EX P	

1	PCC	BPH-202	Mathematical Physics-II	4	0	0	4	15	25	60	-	-	100
2	PCC	BPH-204	Elements of modern physics	4	0	0	4	15	25	60	-	-	100
3	PCC	BPH-206	Analog system and applications	4	0	0	4	15	25	60	-	-	100
4	PCC	BPH-208	Digital system and applications	4	0	0	4	15	25	60	-	-	100
5	SEC	BPH-210	Applied optics	2	0	0	2	15	25	60	-	-	100
6	PCC	BPH-252	Mathematical Physics Lab-II	0	0	4	2				40	60	100
7	PCC	BPH-254	Elements of modern physics lab	0	0	4	2				40	60	100
8	PCC	BPH-256	Analog system and application lab	0	0	4	2				40	60	100
9	PCC	BPH-258	Digital system and application lab	0	0	4	2				40	60	100
Total---->				18	0	16	26	75	125	300	160	360	900

School: School of Basic and Applied Sciences								Batch: 2022-2025					
Department: Physics								Year: 3 rd					
Course: B.Sc. Hons. Physics								Semester: 5 th					
S N	Cate - gory	Course Code	Course Name	Periods			Credit s	Evaluation Scheme					Subject Total Marks
				L	T	P		Theory			Practical		
								AB Q	MS E	ES E	IP	EX P	
1	PCC	BPH-301	Mathematical Physics-III	4	0	0	4	15	25	60	-	-	100
2	PCC	BPH-303	Quantum Mechanics and applications	4	0	0	4	15	25	60	-	-	100
3	PCC	BPH-305	Solid State Physics	4	0	0	4	15	25	60	-	-	100
4	DSE	BPH-307	Physics of devices and communications	4	0	0	4	15	25	60	-	-	100
5	DSE	BPH-309	Nuclear and particle physics	5	1	0	6	15	25	60	-	-	100
6	PCC	BPH-351	Mathematical Physics Lab-III	0	0	4	2				40	60	100
7	PCC	BPH-353	Quantum Mechanics and applications Lab	0	0	4	2				40	60	100
8	PCC	BPH-355	Solid State Physics Lab	0	0	4	2				40	60	100
9	DSE	BPH-357	Physics of devices and communications lab	0	0	4	2				40	60	100
Total---->				21	1	16	30	75	125	300	160	240	900

School: School of Basic and Applied Sciences								Batch: 2022-2025					
Department: Physics								Year: 3 rd					
Course: B.Sc. Hons. Physics								Semester: 6 th					
S N	Cate- gory	Course Code	Course Name	Periods			Credit s	Evaluation Scheme					Subject Total Marks
				L	T	P		Theory			Practical		
								AB Q	MS E	ES E	IP	EX P	
1	PCC	BPH-302	Electromagnetic theory	4	0	0	4	15	25	60	-	-	100
2	DSE	BPH-304	Experimental Techniques	4	0	0	4	15	25	60	-	-	100
3	DSE	BPH-306	Nano materials and applications	4	0	0	4	15	25	60	-	-	100
4	PCC	BPH-352	Electromagnetic theory lab	0	0	4	2				40	60	100
5	DSE	BPH-354	Experimental Techniques Lab	0	0	4	2				40	60	100
6	DSE	BPH-356	Nanomaterials and applications lab	0	0	4	2				40	60	100
7	PROJ	BPH-358	Project	0	0	12	6					100	100
Total---->				12	0	24	24	45	75	180	120	280	700

Abbreviations:

PCC: Programme Core Course

AECC: Ability Enhancement Compulsory Course

AEC: Ability Enhancement Course

SEC: Skill Enhancement Course

GE: Generic Elective

DSE: Discipline Specific Elective

PROJ: Project

ABQ: Assignment Based Quiz

MSE: Mid Semester Examination

ESE: End Semester Examination

IP: Internal Practical

EXP: External Practical

L: Lecture

T: Tutorial

P: Practical

Subject Name ELECTRICITY AND MAGNETISM (Semester I)	L T P	Cr.
	3+1+0	4

OBJECTIVES: Learn the mathematical methods to solve the problems involving electric potential and fields.

CO No.	Upon completion of this course, the students will be able to:	PSO addressed	Cognitive level
CO-1	Master the mathematical tools to find electric potential and fields.	1,2	Remembering
CO-2	Learning of important theorems as Gauss theorem	1,3	Understanding
CO-3	Calculating the electric fields around conductors	1,2	Evaluate
CO-4	The use of Coulomb's law and Gauss' law for the electrostatic force.	2,2	Analyze
CO-5	Apply the principles of algebra and trigonometry to Gaussian surface and Amperian loop.	3,1	Applying

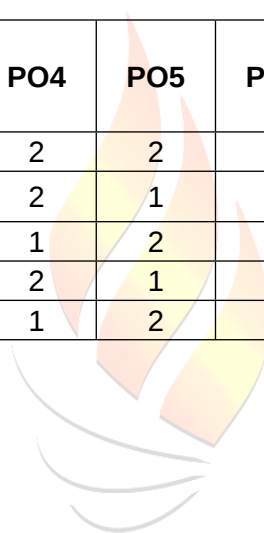
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	3	1	0	2	2	1	1	2	3	1
CO2	3	2	2	2	1	1	1	3	2	1
CO3	3	3	2	1	2	2	1	2	1	2
CO4	3	2	1	2	1	1	2	2	1	2
CO5	2	1	2	1	2	1	3	1	2	3

Subject Name PHYSICS LABORATORY-I (Semester I)	L T P	Cr.
	0+0+3	2

CO No.	Upon completion of this course, the students will be able to:	PSO addressed	Cognitive level
CO-1	Create basic ideas of measuring instruments.	1	Create

CO-2	Determine the Young's modulus of the materials using pin and microscope, scale and telescope.	4	Evaluate
CO-3	Determine the acceleration due to gravity using compound pendulum.	1,4	Evaluate
CO-4	Determine the AC frequency of sonometer.	4	Evaluate
CO-5	Compute the Dispersive power of prism.	3,4	Application

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	3	1	0	2	2	1	1	2	3	1
CO2	3	2	2	2	1	1	1	3	2	1
CO3	3	3	2	1	2	2	1	2	1	2
CO4	3	2	1	2	1	1	2	2	1	2
CO5	2	1	2	1	2	1	3	1	2	3



Subject Name STATISTICAL PHYSICS (Semester II)	L T P	Cr.
	3+1+0	4

CO No.	Upon completion of this course, the students will be able to:	PSO addressed	Cognitive level
CO-1	Understanding of basics of Statistical Physics.	1,3	Understanding
CO-2	Use of the Maxwell- Boltzmann statistics	1,4	Remembering
CO-3	Use of the Bose-Einstein and Fermi-Dirac Statistics.	1,4	Analyze
CO-4	Understanding the ensembles.	2,3	Evaluate, Understanding
CO-5	Applying BE, MB statistics to derive planck's law, Black body radiation for photons.	3	Analysis

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	2	2	1	2	1	3
CO2	3	2	2	2	2	1	2	2	1	1
CO3	3	2	2	2	2	3	2	3	1	2
CO4	2	2	1	1	3	1	3	3	1	1
CO5	2	2	2	1	1	3	2	3	1	2

Subject Name	L T P	Cr.
PHYSICS LABORATORY-II (Semester II)	0+0+3	2

CO No.	Upon completion of this course, the students will be able to:	PSO addressed	Cognitive level
CO-1	Determine the Young's modulus using cantilever	3	Evaluate
CO-2	Find the moment of inertia and rigidity modulus using Torsional pendulum.	3,4	Remembering
CO-3	Define perpendicular axes theorem using Bifilar pendulum.	2,3	Remembering
CO-4	Determine the coefficient of viscosity using Stoke's method.	2,4	Application
CO-5	Determine the surface tension of a liquid.	4,3	Evaluate

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	2	2	1	2	1	3
CO2	3	2	2	2	2	1	2	2	1	1
CO3	3	2	2	2	2	3	2	3	1	2
CO4	2	2	1	1	3	1	3	3	1	1
CO5	2	2	2	1	1	3	2	3	1	2

Subject Name	L T P	Cr.
Mathematical Physics-I	4-0-0	4

CO No.	Upon completion of this course, students will be able to:	PSO Mapped	Cognitive level
CO-1	Summarize the Vector operations in curvelinear Co-Ordinates.	1, 3	understanding
CO-2	Understand special functions to solve the Legendre and Hermite differential equations.	2,4	Understanding
CO-3	Analyse the Laplace and Fourier Transforms of Sine and Cosine functions.	2,4	Analyze
CO-4	Recall the concepts of Group symmetry of a equilateral triangle and equilateral square	1,4	Remembering
CO-5	Relate the characters of a representation with character tables for C_{2V} & C_{3V}	3,4	Understanding

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	2	2	2	1	1	3	2
CO2	3	2	2	2	2	1	2	2	2	3
CO3	2	2	2	1	1	2	2	2	1	3
CO4	3	2	1	2	2	1	1	1	1	2
CO5	2	1	2	1	1	2	2	1	3	3

Subject Name	L T P	Cr.
Waves and Optics	4-0-0	4

Objectives: The course aims to introduce the basic concepts required for a mathematical description of oscillations and waves, and to provide expertise for solving the differential equations which arise in simple mathematical models for oscillations and waves.

CO No.	Upon completion of this course, the students will be able to:	PSO addressed	Cognitive level
CO-1	Discuss the significance of interference with many experiments such as airwedge , Newton's rings Michelson's interferometer.	1,3,4	Create
CO-2	Distinguish between Fraunhofer and Fresnel diffraction.	3	Analyze
CO-3	Apply their skills to find the wavelength of spectral lines using Plane diffraction grating.	3,4	Application
CO-4	Distinguish the methods of polarisation by reflection and double refraction.	3,5	Analyze
CO-5	Construct Nicol prism and know the polarization of light using QWP.	4,3	Create

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3	2	3	1	1	1	3	2
CO2	2	1	1	2	2	3	2	2	2	3
CO3	2	2	3	2	2	2	2	2	1	3
CO4	3	3	2	3	3	3	1	1	1	2
CO5	3	2	1	1	1	1	2	1	3	3

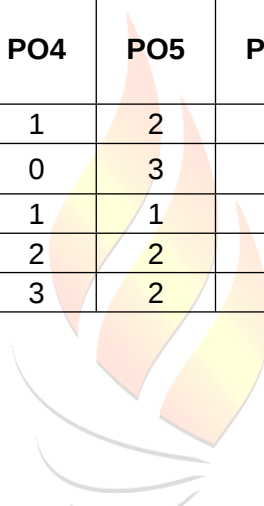
Subject Name	L T P	Cr.
Mechanics	4-0-0	4

Objectives: To acquire skills allowing the student to identify and apply formulas of optics and wave physics using course literature.

CO No.	Upon completion of this course, the students will be able to:	PSO addressed	Cognitive level
CO-1	Recall the characteristics Wave optics	1,4	Remembering
CO-2	To understand and analyze Fundamentals of Dynamics, Galilean transformations, Centrifugal force, inertial- Non Inertial Frames	1,4	Analyze

CO-3	To Evaluate and understand Special Theory of Relativity and Lorentz Transformations. Simultaneity and order of events. Lorentz contraction. Time dilation. Relativistic transformation of velocity etc.	3	Evaluate
CO-4	To analyze Work Energy and Collisions: Law of conservation of Energy. Elastic and inelastic collisions between particles	1,3	Analyze
CO-5	Magnetic & superconducting properties: Effect of magnetic field (Meissner effect), Langevin's theory for diamagnetic material,	4	Understanding

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	0	2	0	1	2	3	0	2	0	2
CO2	2	2	0	0	3	1	0	2	1	0
CO3	3	3	3	1	1	3	3	3	3	1
CO4	2	3	0	2	2	2	2	3	2	2
CO5	1	2	3	3	2	0	3	1	3	2



Subject Name	L T P	Cr.
	Thermal Physics	4-0-0

Objectives: The objective of this course is to develop a working knowledge of the laws and methods of thermodynamics and elementary statistical mechanics and to use this knowledge to explore various applications.

CO No.	Upon completion of this course, the students will be able to:	PSO addressed	Cognitive level
1	Define the laws of thermodynamics.	2	Remembering
2	Illustrate the working of heat engines such as Carnot engine, Petrol engine, Diesel engine. Explain Lees Disc experiment and calculate the thermal conductivity by experiment. Explain the significance of Clausius- Clapeyron equation.	1,3	Understanding
3	Determine the concept of entropy and explain its physical significance.	3	Evaluate
4	Apply the concepts of thermodynamics into the applications such as Thermopile, Steam power plant, Refrigerator, Ice plant Air conditioning systems.	3, 4	Application

5	Formulate Maxwells thermodynamic relations .	2	Creating
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Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	1	0	3	2	2	1	1	1	2	1
CO2	1	2	2	2	2	2	2	2	3	1
CO3	1	2	3	1	3	3	3	3	1	2
CO4	2	0	3	2	2	3	3	2	2	2
CO5	0	0	2	3	2	2	2	3	1	3

Subject Name	L T P	Cr.
Renewable energy & Energy Harvesting	4-0-0	4

CO No.	Upon completion of this course, students will be able to:	PSO addressed	Cognitive level
CO-1	Compare the conventional energy sources, their prospects and limitations with renewable ones	PSO-3	Understanding
CO-2	Assess the availability of sources such as Coal, Oil and Petrol and their merits and demerits and List the types of wind machines and advantages and disadvantages of wind energy	PSO-3	Evaluating
CO-3	Summarize the use of solar energy and the various components used in the energy production.	PSO-3	Understanding
CO-4	Recall the concepts of Photosynthesis and biogas generation.	PSO-3	Remembering
CO-5	Explain the features of geothermal energy.	PSO-4	Understanding

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	2	1	2	2	1	1	2
CO2	3	2	2	3	2	3	0	0	1	0
CO3	2	2	2	1	2	1	1	0	3	1
CO4	3	2	1	2	1	1	2	2	3	0
CO5	2	2	3	1	2	2	3	2	1	3

Subject Name	L T P	Cr.
Mechanics Lab	0-0-4	2

CO No.	Upon completion of this course, the students will be able to:	PSO addressed	Cognitive level
CO-1	Determine the Young's modulus using cantilever	3	Evaluate
CO-2	Find the moment of inertia and rigidity modulus using Torsional pendulum.	3,4	Remembering
CO-3	Define perpendicular axes theorem using Bifilar pendulum.	2,3	Remembering
CO-4	Determine the coefficient of viscosity using Stoke's method.	2,4	Application
CO-5	Determine the surface tension of a liquid.	4,3	Evaluate

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	2	1	2	2	1	1	2
CO2	3	2	2	3	2	3	0	0	1	0
CO3	2	2	2	1	2	1	1	0	3	1
CO4	3	2	1	2	1	1	2	2	3	0
CO5	2	2	3	1	2	2	3	2	1	3

Subject Name	L T P	Cr.
Mathematical Physics-II	4-0-0	4

Objectives: The emphasis of the course is on applications in solving problems of interest to physicists. Students are to be examined based on problems, seen and unseen.

CO No.	Upon completion of this course, students will be able to:	PSO Mapped	Cognitive level
CO-1	After undergoing this course, the students will be able to Understand how to expand a function in a Fourier series.	1,3	Understanding
CO-2	Solve differential equation using power law expansion (so called Frobenius method).	3,4	Remembering
CO-3	Solve partial differential equation under different physical conditions	4	Understanding
CO-4	Apply probability and various distribution functions in Physics	3,4	Apply
CO-5	Relate the characters of a representation with character tables	3,4	Create

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	3	1	3	2	2	1	3	1	3	0
CO2	2	3	2	3	2	0	2	1	3	3
CO3	3	1	2	1	2	1	1	1	0	3
CO4	3	2	1	2	1	2	2	2	3	3
CO5	2	2	2	1	3	0	3	2	3	3

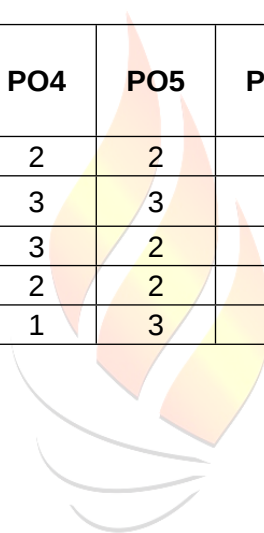
Subject Name	L T P	Cr.
Elements of Modern Physics	4-0-0	4

Objectives: Students will apply understanding and skill related to the principles and concepts of modern physics essential for graduate school and/or professional employment in the field.

CO No.	Upon completion of this course, students will be able to:	PSO Mapped	Cognitive level
CO-1	To study and describe Planck's constant and light as a collection of photons; Blackbody Radiation: Quantum theory of Light; Photo-electric effect and Compton scattering.	1,3	Understanding
CO-2	To understand Heisenberg uncertainty principle (Uncertainty relations involving Canonical pair of variables): Derivation from Wave Packets	3,4	Remembering

CO-3	To understand the concept of modern quantum physics for quantum computing.	4	Understanding
CO-4	To apply understanding of nuclear physics and laws for Fission and fusion, Nuclear Bomb, Nuclear reactor	3,4	Apply
CO-5	Determine the various properties of nucleus and the nuclear forces	3,4	Create

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	2	2	1	2	1	2	3
CO2	3	3	2	3	3	0	1	2	3	2
CO3	2	3	2	3	2	2	2	3	1	2
CO4	3	2	3	2	2	2	1	1	2	2
CO5	3	2	2	1	3	2	2	1	1	2



Subject Name	L T P	Cr.
Analog Systems and Applications	4-0-0	4

Objectives: Ability to apply knowledge of mathematics, science and engineering to the solution of complex engineering problems Strong b Ability to design and conduct experiments, analyze, interpret data and synthesize valid conclusions.

CO No.	Upon completion of this course, students will be able to:	PSO Mapped	Cognitive level
CO-1	To understand the concept, design and circuit of Semiconductor Diodes	PSO-1,4	Rememberin g
CO-2	To apply the knowledge of semiconductor and Two-terminal Devices in designing circuits and their characterization process	PSO-3,4	Understandi ng
CO-3	To analyze circuit, process and design of Amplifiers	PSO-2,3	Understandi ng
CO-4	To evaluate network, accuracy and resolution of Op-Amps	PSO-2,3	Analyze
CO-5	Ability to apply knowledge of electronic circuits, design and electronic engineering to the solution of complex engineering problems	PSO-3,4	Apply

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	1	3	3	3	3	0	1	2	3	0
CO2	2	2	3	1	1	1	3	1	1	2
CO3	2	1	3	1	3	1	0	1	0	3
CO4	2	3	1	1	0	2	1	2	3	3
CO5	0	0	0	0	0	0	3	0	0	0

Subject Name	L T P	Cr.
Digital Systems and Applications	4-0-0	4

Objectives: In particular, students will be able to explain the elements of digital system abstractions such as digital representations of information, digital logic, Boolean algebra.

CO No.	Upon completion of this course, students will be able to:	PSO addressed	Cognitive level
CO-1	students will be able to explain the elements of digital system abstractions such as digital representations of information, digital logic, Boolean algebra.	2,3	Analyze
CO-2	To understand basic concepts of circuit and designs of Data processing circuits, Explain the working of different types of Register and Counters	1,4	Create
CO-3	To analyze Shift registers, Illustrate the basic logic operations of NOT, AND, OR, NAND, NOR, and XOR gates.	3	Analyze
CO-4	To apply fundamental knowledge to give brief about Intel 8085 Microprocessor Architecture. Design D/A and A/D converters and verify their applications in various circuits.	3	Application
CO-4	To create truth tables of Gates and circuits and analyze Difference between Analog and Digital Circuits. Binary Numbers. Decimal to Binary and Binary to Decimal Conversion, To understand and apply the concept of multiplexer and demultiplexer.	4	Create
CO-5	To analyze and Describe the functionality of clock circuits and Flip flops for different decoders.	3	Analyze

Subject Name	L T P	Cr.
Mathematical Physics-III	4-0-0	4

Objectives: The course aims to demonstrate the utility and limitations of a variety of powerful calculation techniques and to provide a deeper understanding of the mathematics underpinning theoretical physics.

CO No	Upon completion of this course, students will be able to:	PSO addressed	Cognitive level
CO-1	To understand the basic concepts of physics on the basis of mathematical models	PSO-3,4	Understanding
CO-2	To understand expression for the advancement of mathematical physics	PSO-4	Analyse, Evaluate
CO-3	Solve partial differential equations with appropriate initial or boundary conditions with Green function techniques	PSO-2	Application
CO-4	Have confidence in solving mathematical problems arising in physics by a variety of mathematical techniques	PSO-4	Understand
CO-5	To understand special relativity	PSO-1,2	Understand, Evaluate

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	2	2	0	2	1	3	3
CO2	3	3	2	1	3	1	0	0	1	3
CO3	3	1	3	3	2	2	0	2	1	0
CO4	2	2	2	3	3	1	0	0	0	2
CO5	2	1	1	1	2	3	3	3	0	1

Subject Name	L T P	Cr.
Quantum Mechanics & Applications	4-0-0	4

Objective: This course develops concepts in quantum mechanics such that the behavior of the physical universe can be understood from a fundamental point of view. It provides a basis for further study of quantum mechanics. Content will

include: Review of the Schrodinger equation, operators, eigenfunctions, compatible observables, infinite well in one and three dimensions, degeneracy; Fourier methods and momentum space; Hermiticity; scalar products of wave functions, completeness relations, matrix mechanics; harmonic oscillator in one and three dimensions; sudden approximation; central potentials, quantization of angular momentum, separation of radial and angular variables, spherical harmonics, hydrogen atom, spin.

CO No.	Upon completion of this course, students will be able to:	PSO addressed	Cognitive level
CO-1	Interpret the wave function to understand symmetric and asymmetric types.	PSO-4	Understanding
CO-2	Apply the fundamental postulates of Quantum Mechanics to derive Schrodinger's time dependent and independent wave equations	PSO-3	Applying
CO-3	Identify different operators with their eigen values and eigen functions	PSO-2	Applying
CO-4	Analyze quantum mechanical system by finding eigenvalues and eigenvectors.	PSO-4	Analysing
CO-5	Solve the Schrodinger equation for a particle in a box and square potential barrier	PSO-3	Applying

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	1	0	2	1	1	3	3	1	2	1
CO2	3	3	0	1	0	0	3	0	1	2
CO3	2	1	0	3	3	3	2	1	2	1
CO4	3	0	1	1	0	3	3	1	0	0
CO5	0	0	0	0	0	0	0	0	0	0

Subject Name	L T P	Cr.
Solid State Physics	4-0-0	4

Objectives: The aim of this course is to give you an extended knowledge of the principles and techniques of solid-state physics. The course covers the physical understanding of matter from an atomic viewpoint. Topics covered include the structure, thermal and electrical properties of matter. Fundamental theories in solid state physics are introduced and then extended to show the irrelevance to important applications in current -day technology, industry, and research. The course has a theoretical lecture component and makes extensive use of examples and exercises to illustrate the material.

CO No.	Upon completion of this course, students will be able to:	PSO addressed	Cognitive level
CO-1	Explain the structure of crystals by knowing the crystal lattice and lattice Parameters and Classify the crystals into different types based on the structure	PSO-4	Understanding
CO-2	List the crystal imperfections using Bragg's X-ray spectrometer and different crystal methods	PSO-2	Understanding
CO-3	Analyse the effect of electric polarization, their types and impact of temperature on polarization	PSO-3	Analysing
CO-4	Describe Clausius – Mosotti relation and its use to determine dielectric constants for dielectric materials and ferroelectric materials	PSO-3	Analysing
CO-5	Classify the magnetic materials based on Langevin's theory, Weiss's theory and Study and analyze the applications of superconductors, BCS theory and London theory	PSO-3	Apply

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	1	2	0	3	1	2	2	0	2	1
CO2	3	1	3	3	2	1	3	2	2	2
CO3	1	2	2	0	0	2	1	3	1	1
CO4	2	1	3	2	1	0	3	2	0	2
CO5	1	1	1	1	2	0	2	3	3	0

Subject Name	L T P	Cr.
Physics of Devices and Communication	4-0-0	4

Objectives: To understand the basic working of electronic devices and Linear Integrated Circuits. To give an emphasis to the student to know the various semiconductor devices and its working. To give clear understanding of various fabrication techniques of electronic devices. To introduce the basic building blocks of linear integrated circuits.

CO No.	Upon completion of this course, students will be able to	PSO addressed	Cognitive level
CO-1	To understand the basic working of electronic devices and Linear Integrated Circuits	1,4	Understanding
CO-2	To give an emphasis to the student to know the various semiconductor devices and its working	3	Create

CO-3	To give clear understanding of various fabrication techniques of electronic devices.	4	Evaluate
CO-4	To introduce the basic building blocks of linear integrated circuits	1,3	Analyze
CO-5	To measure and analyze Fundamentals Electronics and Bio-Medical Measurements	3,4	Evaluate & analyze

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	2	0	0	1	2	1	3	2	3	3
CO2	1	0	2	2	1	1	0	1	3	3
CO3	2	1	3	1	3	2	2	1	1	3
CO4	3	2	1	3	1	2	3	2	3	2
CO5	1	2	2	3	1	3	1	2	3	3

Subject Name	L T P	Cr.
Nuclear & Particle Physics	4-0-0	4

Objectives: Introduce students to the fundamental principles and concepts governing nuclear and particle physics and have a working knowledge of their application to real-life problems. Provide students with opportunities to develop basic knowledge and understanding of scientific phenomena, facts, laws, definitions, concepts, theories, scientific vocabulary, terminology, conventions, scientific quantities and their determination.

CO No.	Upon completion of this course, students will be able to:	PSO Mapped	Cognitive level
CO-1	Introduce students to the fundamental principles and concepts governing nuclear and particle physics and have a working knowledge of their application to real-life problems.	3,4	Understanding
CO-2	To Understand and analyze Structure of Nuclei and Radioactivity , Describe the Nuclear structure, concept of Binding energy, Nuclear forces and Nuclear stability.	4	Remembering
CO-3	To Evaluate and explain Nuclear Reactions Nuclear Models and Accelerators	2	Create
CO-4	To demonstrate and apply knowledge of Detectors of Nuclear Radiations	4	Creative
CO-5	To study and evaluate the existence of a nuclear elementary particles.	1	Evaluate

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	2	2	3	2	1	0	0	1	3	2
CO2	2	3	2	1	2	2	2	0	1	1
CO3	1	2	1	2	1	3	1	3	1	1
CO4	1	3	1	0	0	1	3	3	1	3
CO5	2	2	3	3	2	2	2	0	1	2



Subject Name	L T P	Cr.
Electro-Magnetic Theory	4-0-0	4

OBJECTIVE: Main objective to study this course is to have a clean understanding of electromagnetic theory.

CO No.	Upon completion of this course, the students will be able to:	PSO addressed	Cognitive level
CO-1	Define the fundamental concepts of Vector and Scalar Potentials. Gauge Transformations	2,3	Remembering
CO-2	Explain the theorems related to ideal voltage source and current source & Maxwell Equations	1,3	Understand
CO-3	Explain EM Wave Propagation in Unbounded Media & EM Wave in Bounded Media	1,4	Understand
CO-4	To Evaluate Polarization of Electromagnetic Waves	1,2	Evaluation and Analysis
CO-5	Apply Wave Guides & Optical Fibers	1,2	Applications

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
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CO1	1	2	2	3	1	1	0	1	3	1
CO2	1	0	1	2	2	1	2	3	3	2
CO3	3	2	3	1	1	3	0	2	3	1
CO4	2	1	1	2	1	3	3	1	2	3
CO5	1	1	2	3	2	2	1	2	1	1

Subject Name	L T P	Cr.
Experimental techniques	4-0-0	4

Objective: Main objective to study this course is to have a clean understanding of experimental techniques.

CO No.	Upon completion of this course, students will be able to:	PSO addressed	Cognitive level
CO-1	To understand the concept of measurement, Accuracy, precision and Significant figures	1,3	Understand
CO-2	To analyze and evaluate Periodic and aperiodic signal, Fluctuations and Noise in measurement system.	2,3	Analyze
CO-3	To discuss, and describe Transducers & industrial instrumentation (working principle, efficiency, applications)	2,4	Evaluate
CO-4	To Compare analog and digital instruments, Digital LCR bridge	2	analyze
CO-5	To study and evaluate Characteristics of vacuum: Gas law, Mean free path. Application of vacuum. Vacuum system- Chamber	4	Create

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	2	2	1	3	2	3	1
CO2	3	2	3	2	1	0	1	3	3	2
CO3	2	2	2	3	3	2	3	3	1	3
CO4	3	2	3	2	2	2	0	3	1	2
CO5	2	2	2	1	1	2	2	3	0	3

Subject Name	L T P	Cr.
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Nano-Materials and Applications	4-0-0	4

OBJECTIVE: Main objective to study this course is to have a clean understanding of nano-materials and technology.

CO No.	Upon completion of this course, students will be able to:	PSO addressed	Cognitive level
CO-1	Understand various methods, various nanoparticles like bucky balls, CNTs, MWCNTs and synthesis of nanomaterials	PSO-1	Understanding
CO-2	Analyze the nano materials by characterization techniques	PSO-4	Analyzing
CO-3	Discuss various applications of quantum dots, nanocrystals	PSO-3	Creating
CO-4	Apply nanotechnology to medicine and biology	PSO-3	Applying
CO-5	Apply nanotechnology to environmental implications such as pollution prevention, water purification and water desalination etc.,	PSO-3,1	Applying

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	2	1	3	0	1	0	3	0	1	1
CO2	3	1	3	0	0	3	2	0	2	3
CO3	3	1	3	2	3	1	2	1	3	0
CO4	1	1	0	0	2	3	0	1	3	2
CO5	1	0	3	1	1s	1	1	1	3	1

Subject Name	L T P	Cr.
Dissertation/ Project	0-0-12	6

OBJECTIVE: Main objective to study this course is to have a clean understanding of writing project.

1. Identification of a research Topic, reading of relevant literature, Summary of National and International Scenario of course taught.
2. Understanding of the unsolved and unresolved problems in the literature, framing of objectives for dissertation.
3. Assessment about the feasibility of identified objectives within available resources, and fine tuning of objectives for future work.

4. Experimental / computational analysis, data analysis and writing of report.
5. Writing of manuscript and Poster making for presentation in scientific conferences or publication in Journal based on above work.

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	1	3	2	0	1	0	3	0	3	2
CO2	2	2	3	0	0	3	2	0	2	3
CO3	3	1	3	2	3	1	2	1	1	1
CO4	3	1	1	0	2	3	0	1	3	2
CO5	2	1	3	1	1	1	1	1	1	3

