

**BSc. PHYSICS**

**PROGRAMME AND  
COURSE OUTCOMES**

## BSc. Physics

### Programme Outcomes

<b>PO1</b>	Conceptual understanding of Physics and its practical applications and scope in the present world.
<b>PO2</b>	Analysing the theory part with practical experiments, interpretation of experimental results, finding out errors, suggestions to improve the errors.
<b>PO3</b>	Develop and construct practical model systems from their conceptual knowledge.
<b>PO4</b>	Acquire conceptual understanding of properties of matter, fundamentals of mechanics and their practical applications
<b>PO5</b>	Acquire knowledge about basics of thermodynamics and working of heat engines and their practical applications
<b>PO6</b>	Acquire the theoretical basis of electrodynamics, Magnetism, Super conductivity, Classical, Statistical and Relativistic Mechanics, Optics, Solid State Physics, Quantum Mechanics, Nano technology
<b>PO7</b>	Impart knowledge about the relevance of Industry Based Course and have attained hands-on training on experimental skills.
<b>PO8</b>	Distinguish Microscopic Macroscopic Systems and statistical distributions
<b>PO9</b>	Acquire conceptual understanding of Physics to General real-world situations.
<b>PO10</b>	Integrate the Quantum Mechanics to understand the fundamentals of other branches of Physics such as Vibrational, Raman, Electronic, Resonance Spectroscopy
<b>PO11</b>	Identify possible atomic and molecular energy levels and transitions and predict the existence of new elements
<b>PO12</b>	Develop an idea regarding X-rays, and different spectroscopic techniques
<b>PO13</b>	Acquire the knowledge of the basic idea about Electronics, Digital Electronics and working of different electronic components
<b>PO14</b>	Students will use the knowledge of electronics and communication to analyse the contemporary communication systems and to design the system
<b>PO15</b>	Apply the Lagrangian and Hamiltonian formalisms to solve various dynamical problems which involve constraints. Acquire knowledge about the concept of project, methodology in research and working of scientific institutions

## Course Outcomes

### Semester 1

<b>COURSE TYPE</b>	LANGUAGE COURSE I
<b>COURSE NAME</b>	LANGUAGE SKILLS
<b>COURSE CODE</b>	EN111.1
<b>CREDIT</b>	4
<b>HOURS</b>	5
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Master the language for personal and professional growth.
<b>CO2</b>	Acquire basic language skills through interactive classroom sessions.
<b>CO3</b>	Connect language with literature.

<b>COURSE TYPE</b>	ADDITIONAL LANGUAGE I
<b>COURSE NAME</b>	MALAYALAM POETRY
<b>COURSE CODE</b>	ML 1111.1
<b>CREDIT</b>	3
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Gaining an awareness of the historical development of Malayalam poetry.
<b>CO2</b>	The poetic taste and interest in poetry is developed.
<b>CO3</b>	A finer understanding of poetic elements emerges.
<b>CO4</b>	Ability to critically analyse poems.
<b>CO5</b>	Comparatively defining writing poems.
<b>CO6</b>	Preparing a poetry review.

<b>COURSE TYPE</b>	LANGUAGE COURSE I
<b>COURSE NAME</b>	HINDI KAHANI SAHITYA
<b>COURSE CODE</b>	HN 1111.1
<b>CREDIT</b>	3
<b>HOURS</b>	4

<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Recollect the main works of the representative story writers
<b>CO2</b>	Understand the craft of the different story writers
<b>CO3</b>	Analyze and evaluate the works of the story writers they studied
<b>CO4</b>	Understand how the resource language is used as a medium in creative writing

<b>COURSE TYPE</b>	LANGUAGE COURSE I
<b>COURSE NAME</b>	GRAMMAR, COMMUNICATION, POETRY, HISTORY OF SYRIAC LITERATURE
<b>COURSE CODE</b>	SR 1111.1
<b>CREDIT</b>	3
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	To communicate effectively
<b>CO2</b>	Understand the craft of constructing conversations
<b>CO3</b>	Articulation and expression of ideas
<b>CO4</b>	Understand and assimilate ideas in a text

<b>COURSE TYPE</b>	FOUNDATION COURSE I
<b>COURSE NAME</b>	WRITINGS ON CONTEMPORARY ISSUES
<b>COURSE CODE</b>	EN1121
<b>CREDIT</b>	2
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Sensitize students to the major issues in the society and the world.
<b>CO2</b>	Introduce and provide varied perspectives on contemporary issues.
<b>CO3</b>	Encourage critical and analytical skill.

<b>COURSE TYPE</b>	CORE COURSE I
<b>COURSE NAME</b>	BASIC MECHANICS AND PROPERTIES OF MATTER
<b>COURSE CODE</b>	PY 1141
<b>CREDIT</b>	2
<b>HOURS</b>	4

<b>COURSE OUTCOME</b>	
<b>CO1</b>	Correlate the knowledge gathered to the immediate experimental curriculum
<b>CO2</b>	Distinguish the dynamics of rigid bodies of different shapes
<b>CO3</b>	Explain the implications of conservation laws
<b>CO4</b>	Interpret the flavour of classical fields from oscillations and waves
<b>CO5</b>	Handle the known problems in elasticity, surface tension and viscosity in a more mathematically rigorous way

<b>COURSE TYPE</b>	COMPLEMENTARY COURSE I
<b>COURSE NAME</b>	CALCULUS AND SEQUENCES AND SERIES
<b>COURSE CODE</b>	MM 1131.1
<b>CREDIT</b>	3
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Designed to get a fairly decent coverage of calculus of one or more variables
<b>CO2</b>	Develop the idea of indefinite integral
<b>CO3</b>	Demonstrate the functions of two or more independent variables
<b>CO4</b>	Develop new structures based on given structures

<b>COURSE TYPE</b>	COMPLEMENTARY COURSE II
<b>COURSE NAME</b>	DESCRIPTIVE STATISTICS
<b>COURSE CODE</b>	ST 1131.2
<b>CREDIT</b>	2
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	

<b>CO1</b>	Various methods of collection of primary and secondary data, explain the concepts of statistical survey, present raw data using frequency tables.
<b>CO2</b>	Summarize data using various measures of central tendency, dispersion, skewness and kurtosis
<b>CO3</b>	Explain the concept of principle of least squares, fit various curves to the given data set and explain the concept of scatter diagram
<b>CO4</b>	Explain the concepts of correlation and calculate the correlation between two variables
<b>CO5</b>	Explain the concepts of regression, fit various regression equations to given data sets and identification of regression lines

## Semester 2

<b>COURSE TYPE</b>	LANGUAGE COURSE III
<b>COURSE NAME</b>	ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT
<b>COURSE CODE</b>	EN1121.1
<b>CREDIT</b>	5
<b>HOURS</b>	5
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Engage with a wide range of issues in environmental studies and disaster management.
<b>CO2</b>	Acquire values for environmental protection and conservation.
<b>CO3</b>	Recognise the ecological basis for regional and global environmental issues
<b>CO4</b>	Manage natural disasters and other emergency situations
<b>CO5</b>	Develop a critical vocabulary related to environmental studies and disaster management.

<b>COURSE TYPE</b>	LANGUAGE COURSE IV
<b>COURSE NAME</b>	ENGLISH GRAMMAR USAGE AND WRITING
<b>COURSE CODE</b>	EN1212.1
<b>CREDIT</b>	4
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Acquire good understanding of modern English grammar.
<b>CO2</b>	Write grammatically and idiomatically correct language.
<b>CO3</b>	Improve verbal communication skill.
<b>CO4</b>	Minimize mother tongue influence.

<b>COURSE TYPE</b>	LANGUAGE COURSE V
<b>SEMESTER</b>	II
<b>COURSE NAME</b>	LITERATURE OF PROSE
<b>COURSE CODE</b>	ML 1211.1
<b>CREDIT</b>	3
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Enables general awareness of major literary forms in Malayalam prose.
<b>CO2</b>	Researching and analysing the evolution of prose forms.

<b>CO3</b>	The imaginative ability to analyse texts is developed.
<b>CO4</b>	Comparatively observes the writing style of the writers.
<b>CO5</b>	Critical studies are prepared by analysing the content, language, socio-political perspective and aesthetic level of the writings.

<b>COURSE TYPE</b>	LANGUAGE COURSE V
<b>COURSE NAME</b>	KATHETAR HIDI GADYA VIDHAAYEIN
<b>COURSE CODE</b>	HN 1211.1
<b>CREDIT</b>	3
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Recollect the main works of the prescribed writers
<b>CO2</b>	Understand the forms of various prose writing in Hindi
<b>CO3</b>	Analyses & evaluate the prose forms prescribed, with respect to the craft and the relevance

<b>COURSE TYPE</b>	LANGUAGE COURSE V
<b>COURSE NAME</b>	GRAMMAR, COMMUNICATION, POETRY, HISTORY OF SYRIAC LITERATURE
<b>COURSE CODE</b>	SR 1211.1
<b>CREDIT</b>	3
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	To enrich vocabulary and conversational articulation
<b>CO2</b>	Understand the forms of various genres of writings in Syriac
<b>CO3</b>	Analyse and evaluate the history of Syriac literature

<b>COURSE TYPE</b>	CORE COURSE II
<b>COURSE NAME</b>	HEAT AND THERMODYNAMICS
<b>COURSE CODE</b>	PY 1241
<b>CREDIT</b>	2
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Compare thermal conductivity of various types of conductors and explain the radiation of heat.
<b>CO2</b>	Differentiate between various thermodynamic processes.



<b>CO3</b>	Judge the efficiency of engines by comparing the performance of various vehicles
<b>CO4</b>	Distinguish entropy and available energy in thermodynamics
<b>CO5</b>	Differentiate between various phase transitions

<b>COURSE TYPE</b>	COMPLEMENTARY COURSE III
<b>COURSE NAME</b>	APPLICATION OF CALCULUS AND VECTOR DIFFERENTIATION
<b>COURSE CODE</b>	MM 1231.1
<b>CREDIT</b>	3
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Compare and contrast the ideas of continuity and differentiability
<b>CO2</b>	Able to evaluate integrals of different types
<b>CO3</b>	Will be able to evaluate area and volume using double and triple integrals
<b>CO4</b>	Able to apply the concept of multivariable function to solve mathematical problems

<b>COURSE TYPE</b>	COMPLEMENTARY COURSE IV
<b>COURSE NAME</b>	PROBABILITY THEORY
<b>COURSE CODE</b>	ST 1231.2
<b>CREDIT</b>	2
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Explain different concepts of probability, definition of random and non-random experiments, sample space, events etc
<b>CO2</b>	Explain conditional probability, check independence of events
<b>CO3</b>	Explain Bayes theorem and its application
<b>CO4</b>	Distinguish between discrete and continuous random variables and concept of transformation of random variables in simple one-one function
<b>CO5</b>	Explain bivariate distribution and concept of marginal and conditional distributions
<b>CO6</b>	Explain the concept of expectation, mgf and characteristic function.

## Semester 3

<b>COURSE TYPE</b>	LANGUAGE COURSE VI
<b>COURSE NAME</b>	ENGLISH FOR CAREER
<b>COURSE CODE</b>	EN1311.1
<b>CREDIT</b>	4
<b>HOURS</b>	5
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Introduce students to the language skills required for appearing in career oriented competitive examinations.
<b>CO2</b>	Develop cognitive, logical, verbal and analytical skills necessary to succeed in competitive examinations.
<b>CO3</b>	Provide the pattern of questions based on common models of competitive tests.
<b>CO4</b>	Help students to prepare for and appear in competitive examinations.

<b>COURSE TYPE</b>	LANGUAGE COURSE VII
<b>COURSE NAME</b>	LANGUAGE AWARENESS AND CREATIVITY
<b>COURSE CODE</b>	ML 1311.1
<b>CREDIT</b>	4
<b>HOURS</b>	5
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Understanding the usage patterns of Malayalam language.
<b>CO2</b>	Acquiring the skill to use language correctly.
<b>CO3</b>	Gaining proficiency in elementary grammar lessons and self-assessment.
<b>CO4</b>	Gaining practical training in translation and conducting and evaluating translation essays.
<b>CO5</b>	Gaining insight into the creative lives of writers and observing them comparatively.
<b>CO6</b>	Creating new compositions.

<b>COURSE TYPE</b>	LANGUAGE COURSE VII
<b>COURSE NAME</b>	HINDI KAVITA SAAHITYA
<b>COURSE CODE</b>	HN 1311.1
<b>CREDIT</b>	4
<b>HOURS</b>	5

<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Appreciates ancient and modern Hindi poems.
<b>CO2</b>	Critically evaluates the contribution of Ancient and modern poets to the development of Hindi poetry
<b>CO3</b>	Elucidates key lines of poetry with reference to context.

<b>COURSE TYPE</b>	LANGUAGE COURSE VII
<b>COURSE NAME</b>	GRAMMAR, COMMUNICATION, PROSE, HISTORY OF SYRIAC PEOPLE IN INDIA
<b>COURSE CODE</b>	SR 1311.1
<b>CREDIT</b>	3
<b>HOURS</b>	5
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	To develop LSRW skills.
<b>CO2</b>	Critically evaluate the aesthetics of literature
<b>CO3</b>	Understands how past influences the present

<b>COURSE TYPE</b>	FOUNDATION COURSE II
<b>COURSE NAME</b>	ELECTRODYNAMICS
<b>COURSE CODE</b>	PY 1341
<b>CREDIT</b>	3
<b>HOURS</b>	5
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Identify the principles of electrostatics and apply it to the solutions of problems relating to electric field and electric potential, boundary conditions and electric energy density
<b>CO2</b>	Identify the principles of magnetostatics and apply it to the solutions of problems relating to magnetic field and magnetic potential, boundary conditions and magnetic energy density
<b>CO3</b>	Recognize the concepts related to Faraday 's law, induced emf and Maxwell's equations.
<b>CO4</b>	Compare the properties of electromagnetic waves in vacuum, and matter
<b>CO5</b>	Analyse the growth and decay of transient currents in different electrical circuits
<b>CO6</b>	Compare the properties of different ac circuits

<b>COURSE TYPE</b>	COMPLEMENTARY COURSE V
<b>COURSE NAME</b>	LINEAR ALGEBRA, PROBABILITY THEORY AND NUMERICAL SOLUTIONS
<b>COURSE CODE</b>	MM 1331.2
<b>CREDIT</b>	4
<b>HOURS</b>	5
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Understand the concepts of vector space and linear transformation
<b>CO2</b>	Explain the applications and the usefulness of the special functions
<b>CO3</b>	Understand the concept and apply appropriate methods for solving differential equations
<b>CO4</b>	Identify the vector fields and to calculate the line integrals along curve

<b>COURSE TYPE</b>	COMPLEMENTARY COURSE VI
<b>COURSE NAME</b>	PROBABILITY DISTRIBUTIONS AND STOCHASTIC PROCESSES
<b>COURSE CODE</b>	ST 1331.2
<b>CREDIT</b>	3
<b>HOURS</b>	5
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Describe the characteristics of different discrete and continuous distributions
<b>CO2</b>	Solve numerical problems related to statistical distributions
<b>CO3</b>	Explain the concepts of statistic, parameter and sampling distributions
<b>CO4</b>	Solve numerical problems related to sampling distributions
<b>CO5</b>	Describe the concept of combinatorial analysis
<b>CO6</b>	Explain concepts like stochastic processes, Markov chains, transition probability matrix, various types of states and random walk

## Semester 4

<b>COURSE TYPE</b>	LANGUAGE COURSE VIII
<b>COURSE NAME</b>	READINGS IN LITERATURE
<b>COURSE CODE</b>	EN 141.11
<b>CREDIT</b>	4
<b>HOURS</b>	5
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Familiarize with various genres of writing.
<b>CO2</b>	Able to effectively read and appreciate literature
<b>CO3</b>	Acquire critical thinking by reading between the lines

<b>COURSE TYPE</b>	LANGUAGE COURSE IX
<b>COURSE NAME</b>	LITERATURE OF VISUAL ARTS
<b>COURSE CODE</b>	ML 1411.1
<b>CREDIT</b>	4
<b>HOURS</b>	5
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Discovers and describes the richness and diversity of Kerala's visual arts.
<b>CO2</b>	Examining the evolution from composition to practice.
<b>CO3</b>	Kathakali, OttanTullal, Drama and Cinema art forms and the literary works based on them are evaluated together.
<b>CO4</b>	Critically enjoying the visual arts.
<b>CO5</b>	Writing Plays and Screen plays.
<b>CO6</b>	Leads the creative expression of arts such as acting, screen play writing, Play writing

<b>COURSE TYPE</b>	LANGUAGE COURSE IX
<b>COURSE NAME</b>	HINDI KAVITA SAAHITYA
<b>COURSE CODE</b>	HN 1411.1
<b>CREDIT</b>	4
<b>HOURS</b>	5
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Appreciate and evaluate one act plays with respect to craft and subject.
<b>CO2</b>	Understand the correct usages in Hindi and write grammatically correct sentences in Hindi.
<b>CO3</b>	Define parts of speech and identify the parts of speech in a given

	sentence.
<b>CO4</b>	Translate simple passages from English to Hindi.

<b>COURSE TYPE</b>	LANGUAGE COURSE IX
<b>COURSE NAME</b>	GRAMMAR, COMMUNICATION, PROSE, HISTORY OF SYRIAC PEOPLE IN INDIA
<b>COURSE CODE</b>	SR 1411.1
<b>CREDIT</b>	3
<b>HOURS</b>	5
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Enhance integral development through effective communication
<b>CO2</b>	Understand the correct usages in Syriac and write grammatically correct sentences.
<b>CO3</b>	Develop imagination by comprehending the aesthetics of literature.
<b>CO4</b>	To apply historical knowledge in solving present problems

<b>COURSE TYPE</b>	CORE COURSE III
<b>COURSE NAME</b>	CLASSICAL AND RELATIVISTIC MECHANICS
<b>COURSE CODE</b>	PY 1441
<b>CREDIT</b>	3
<b>HOURS</b>	5
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Recognize the mechanics of a single and a system of particles under different force fields
<b>CO2</b>	Solve different mechanical problems in classical mechanics using Lagrangian formalism
<b>CO3</b>	Generalize Hamiltonian mechanics to solve various problems in classical mechanics
<b>CO4</b>	Able to define phase space, microstate, microstate and ensemble
<b>CO5</b>	Learn to distinguish different statistical distributions and judge which distribution applies to a given system
<b>CO6</b>	Distinguish inertial and non- inertial frames of references
<b>CO7</b>	Understand the concept of Galilean and Lorentz Transformations and their applications

<b>COURSE TYPE</b>	COMPLEMENTARY COURSE VII
<b>COURSE NAME</b>	FOURIER SERIES , COMPLEX ANALYSIS AND PROBABILITY THEORY
<b>COURSE CODE</b>	MM 1431.1
<b>CREDIT</b>	4
<b>HOURS</b>	5
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Express the periodic functions in a series form
<b>CO2</b>	Understand Sequence, Series and power series representation of complex functions
<b>CO3</b>	Applied aspects of statistics

<b>COURSE TYPE</b>	COMPLEMENTARY COURSE VIII
<b>COURSE NAME</b>	STATISTICAL INFERENCE
<b>COURSE CODE</b>	ST 1431.2
<b>CREDIT</b>	3
<b>HOURS</b>	3
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Explain the concept of point estimation, desirable properties of good estimator and different methods of estimation.
<b>CO2</b>	Obtain point estimators for the parameters
<b>CO3</b>	Describe the concept of interval estimation and to solve problems related to interval estimation.
<b>CO4</b>	Describe the concept of hypotheses testing and different testing procedure
<b>CO5</b>	Solve numerical problems related to testing.
<b>CO6</b>	Explain the concept of ANOVA and to solve numerical problems.

<b>COURSE TYPE</b>	COMPLEMENTARY COURSE IX
<b>COURSE NAME</b>	Practical Using R
<b>COURSE CODE</b>	ST 1432.2
<b>CREDIT</b>	4
<b>HOURS</b>	3
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Use R built in functions to solve numerical problems associated with topics covered in various semesters

## Semester 5

<b>COURSE TYPE</b>	CORE COURSE V
<b>COURSE NAME</b>	QUANTUM MECHANICS
<b>COURSE CODE</b>	PY 1541
<b>CREDIT</b>	4
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Recognize the limitations of Classical Physics to explain certain physical phenomena
<b>CO2</b>	Identify the quantum mechanical concepts applicable to Physical systems
<b>CO3</b>	Apply the concepts of Quantum Mechanics to solve problems
<b>CO4</b>	Derive Equations of motion of Physical systems using quantum concepts

<b>COURSE TYPE</b>	CORE COURSE VI
<b>COURSE NAME</b>	STATISTICAL PHYSICS, RESEARCH METHODOLOGY AND DISASTER MANAGEMENT
<b>COURSE CODE</b>	PY 1542
<b>CREDIT</b>	4
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Able to define phase space, microstate, microstate and ensemble
<b>CO2</b>	Learn to distinguish different statistical distributions and judge which distribution applies to a given system
<b>CO3</b>	Have basic idea about the different types of research
<b>CO4</b>	Explain the difference between research methods and methodology
<b>CO5</b>	Explain the basic steps in a scientific research process
<b>CO6</b>	Develop scientific way of writing thesis/research report
<b>CO7</b>	Have a basic knowledge on Plagiarism and ethics in research



<b>COURSE TYPE</b>	CORE COURSE VII
<b>COURSE NAME</b>	ELECTRONICS
<b>COURSE CODE</b>	PY 1543
<b>CREDIT</b>	4
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Recognize the network theorems
<b>CO2</b>	Describe diode characteristics
<b>CO3</b>	Design power supply circuits by applying junction diodes
<b>CO4</b>	Design single stage transistor amplifiers, oscillators and operational amplifiers.
<b>CO5</b>	Understand the concept of modulation
<b>CO6</b>	Explain the working of special devices, FET, MOSFET, UJT

<b>COURSE TYPE</b>	CORE COURSE VIII
<b>COURSE NAME</b>	ATOMIC & MOLECULAR PHYSICS
<b>COURSE CODE</b>	PY 1544
<b>CREDIT</b>	4
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Recognize different atomic models, their significances, properties, merits and demerits
<b>CO2</b>	Distinguish between atomic and molecular spectra and their relevant uses
<b>CO3</b>	Understand the features of X- ray spectra
<b>CO4</b>	Recognize different spectroscopic techniques

<b>COURSE TYPE</b>	CORE PRACTICAL
<b>COURSE NAME</b>	PRACTICAL COURSE
<b>COURSE CODE</b>	PY 1645
<b>CREDIT</b>	2
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	

<b>CO1</b>	Understand how to use a spectrometer
<b>CO2</b>	Obtain a practical understanding of the refraction of light by a prism
<b>CO3</b>	Use basic laws to study the spectral and optical properties of the given prism and grating
<b>CO4</b>	Understand the working of different electrical circuits and use it to determine different physical quantities

<b>COURSE TYPE</b>	OPEN COURSE
<b>COURSE NAME</b>	ASTRONOMY AND ASTROPHYSICS
<b>COURSE CODE</b>	PY 1551.2
<b>CREDIT</b>	3
<b>HOURS</b>	3
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Differentiate between astronomy and astrophysics and understand the different branches, scientific methods and scope of astronomy
<b>CO2</b>	Understand earlier astronomical works and the different laws involved in astronomy
<b>CO3</b>	Understand planets and solar system objects and apply the laws of physics to describe their structure and characteristics.
<b>CO4</b>	Understand the evolution and properties of stars and galaxies and apply the different laws of physics to describe the structure and evolution of stars, galaxies and the universe

<b>COURSE TYPE</b>	PROJECT
<b>COURSE NAME</b>	PROJECT
<b>COURSE CODE</b>	PY 1647
<b>CREDIT</b>	3
<b>HOURS</b>	3
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Gain knowledge on a topic of choice.
<b>CO2</b>	Research and analyse the content or matter.
<b>CO3</b>	Assimilate and present the matter in specific model.

## Semester 6

<b>COURSE TYPE</b>	CORE COURSE IX
<b>COURSE NAME</b>	SOLID STATE PHYSICS
<b>COURSE CODE</b>	PY 1641
<b>CREDIT</b>	4
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Able to distinguish types of crystals according to their structure
<b>CO2</b>	Able to illustrate the concepts of unit cell and lattice of crystals
<b>CO3</b>	Able to discuss diffraction of X rays by crystals and to demonstrate its experimental techniques
<b>CO4</b>	Able to describe and evaluate mechanical, electrical and magnetic properties of metals
<b>CO5</b>	Learn to discuss and evaluate dielectric properties of materials
<b>CO6</b>	Able to discuss types of magnetic properties of materials
<b>CO7</b>	Learn to explain different physical characteristics of superconductors
<b>CO8</b>	Able to illustrate theoretical formulation of superconductors

<b>COURSE TYPE</b>	CORE COURSE - X
<b>COURSE NAME</b>	NUCLEAR AND PARTICLE PHYSICS
<b>COURSE CODE</b>	PY 1642
<b>CREDIT</b>	4
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Identify nuclear constituents and general properties of nuclei
<b>CO2</b>	Describe nuclear forces, phenomena of radioactivity & radiation hazards
<b>CO3</b>	Distinguish different nuclear models
<b>CO4</b>	Understand different types of nuclear reactions, fission & fusion energies and applications

<b>CO5</b>	Recognize different particle detectors and accelerators
<b>CO6</b>	Classify elementary particles and relate their properties

<b>COURSE TYPE</b>	CORE COURSE-XI
<b>COURSE NAME</b>	CLASSICAL AND MODERN OPTICS
<b>COURSE CODE</b>	PY 1643
<b>CREDIT</b>	4
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Explain the different basic phenomena of light such as Interference, Diffraction, Dispersion and Polarization
<b>CO2</b>	Differentiate between the two types of diffraction, viz., Fresnel and Fraunhofer diffraction
<b>CO3</b>	Apply diffraction theory in Rayleigh's criterion for resolution and in finding resolving power of diffraction grating
<b>CO4</b>	Distinguish between normal and anomalous types of dispersion and to derive region-specific dispersion formulae from the general dispersion relation
<b>CO5</b>	Understand the different methods for the production of plane polarized light and also the different rules governing polarization.
<b>CO6</b>	Have a good knowledge about the different types of polarizations, its theory and the production/analysis methods
<b>CO7</b>	Apply the concept of polarization in studying Nicol prism, quarter wave and half wave plates
<b>CO8</b>	Explain the basic constituents of a laser, different types and working
<b>CO9</b>	Obtain an idea about non-linear optical processes especially the different harmonic generations
<b>CO10</b>	Gain knowledge about the principle and different types of optical fibers
<b>CO11</b>	Understand the applications of optical fibers in different fields of science
<b>CO12</b>	Have knowledge on the principles of holography, its production and

	different types
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<b>COURSE TYPE</b>	CORE COURSE-XII
<b>COURSE NAME</b>	DIGITAL ELECTRONICS AND COMPUTER SCIENCE
<b>COURSE CODE</b>	PY 1644
<b>CREDIT</b>	4
<b>HOURS</b>	4
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Explain different number systems and their mathematical operations.
<b>CO2</b>	Differentiate different logic gates.
<b>CO3</b>	Summarize digital circuits and their functions.
<b>CO4</b>	Develop and compile programs in C++
<b>CO5</b>	Apply numerical methods to solve physical problems.

<b>COURSE TYPE</b>	CORE PRACTICAL
<b>COURSE NAME</b>	ADVANCED PHYSICS LAB
<b>COURSE CODE</b>	PY 1645
<b>CREDIT</b>	2
<b>HOURS</b>	2
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Understand how to use a spectrometer
<b>CO2</b>	Obtain a practical understanding of the refraction of light by a prism
<b>CO3</b>	Use basic laws to study the spectral and optical properties of the given prism and grating
<b>CO4</b>	Understand the working of different electrical circuits and use it to determine different physical quantities

<b>COURSE TYPE</b>	CORE PRACTICAL
<b>COURSE NAME</b>	ADVANCED PHYSICS LAB
<b>COURSE CODE</b>	PY 1646
<b>CREDIT</b>	2
<b>HOURS</b>	2
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Understand the working of PN junction diodes, Zener diodes and

	their applications
<b>CO2</b>	Understand the working of transistors and their applications
<b>CO3</b>	Understand the working of operational amplifiers and their circuits
<b>CO4</b>	Understand computational programming using Python and apply it to find the solution to different physical problems

<b>COURSE TYPE</b>	ELECTIVE COURSE
<b>COURSE NAME</b>	PHOTONICS
<b>COURSE CODE</b>	1661.3
<b>CREDIT</b>	3
<b>HOURS</b>	3
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Distinguish the different conduction mechanisms in semiconductors
<b>CO2</b>	Understand the working of LED
<b>CO3</b>	Recognize the basic features of semiconductor lasers
<b>CO4</b>	Understand the basics of photodetectors
<b>CO5</b>	Understand the electro-optic mechanism
<b>CO6</b>	Get idea about non- linear optical phenomena
<b>CO7</b>	Understand the basics of optical computing
<b>CO8</b>	Understand research methodology, ethics in research, report writing and plagiarism

<b>COURSE TYPE</b>	PROJECT
<b>COURSE NAME</b>	PROJECT
<b>COURSE CODE</b>	CH1646
<b>CREDIT</b>	4
<b>HOURS</b>	2
<b>COURSE OUTCOMES</b>	
<b>CO1</b>	Develop an aptitude for research in chemistry
<b>CO2</b>	Practice research methodology and literature search
<b>CO3</b>	Critically choose appropriate research topic and presentation