Bachelor of Science

PHYSICS, MATHEMATICS & COMPUTER SCIENCE (PMCS)

Programme Outcome

After completion of B.Sc. program in either Physical Sciences or Life Sciences the student will be able to:

PO1. Understand the basic concepts of science, its relevance to society and impact on the human race and environment.

PO2. Effectively communicate scientific ideas through electronic media, report writing and publication of articles.

PO3. Display the spirit of team work and collaboration towards building healthy inter personal relationships.

PO4. Demonstrate the ability for critical thinking and logical reasoning towards scientific research.

PO5. Exhibit self-confidence, high self-esteem and a sense of pride for themselves and the nation.

PO6. Acquire the ability to engage in self-learning and lifelong learning towards building resilience in the dynamic macro environment.

PO7. Recognize the ethical, cross-cultural and historical context of environmental issues and the links between human and natural systems.

PO8. Identify specific issues concerning the nation, critically evaluate and find solutions through application of knowledge of science.

Programme Specific Outcome

On Successful completion of PMCS, students will be able to:

PSO1. Design and conduct experiments in mechanics, electromagnetism, thermodynamics & quantum mechanics.

PSO2. Understand the relevance of nuclear physics and its application to find solutions to societal issues.

PSO3. Apply the knowledge of mathematics in analytical, computational and problem-solving skills in varied life situations.

PSO4. Demonstrate the ability to analyse and interpret data through application of computer science knowledge.

PSO5. Demonstrate the skills in design & development of software and hardware.

Course Outcome

On Successful completion of PMCS, students will be able to:

Semester I

PHYSICS

PHY.T1-1

CO1.1: To understand the mechanics of Newton's laws governing the macro particles.
CO1.2: To understand friction force and the factors that contributes to friction force.
CO1.3: To understand Kepler's law to describe the motion of planets and satellites in circular orbit, through the study of Gravitation law.
CO1.4: To differentiate between the streamline and turbulent flow of liquids and reason out the effects of liquids while flowing.
CO1.5: To find the surface tension of the liquid, Interfacial tension between two immiscible liquids
CO1.6: To understand simple principles of fluid flow and the equations governing fluid dynamics.
CO1.7: To understand the idea about centre of mass, phenomena of collisions and principle of Rocket
CO1.8: To understand the concept of a rigid body and its rotational motion.
CO1.9: To understand the theorem of parallel axes and perpendicular axes
CO1.10: To Write the expression for the moment of inertia about the given axis of symmetry for different uniform mass distributions
CO1.11: To understand the concepts of simple harmonic oscillation and compound Pendulum.
CO1.12: To understand the concept of coupled oscillators and to explain the energy transfer in coupled oscillators.
CO1.13: To understand principles of elasticity through the study of Young modulus and Rigidity Modulus.

Practicals

PHY.P1-1

- Students would perform basic experiments related to mechanics, properties of matter and oscillations such as bar pendulum, Torsional pendulum, coefficient of viscosity by poiseuille's method, interfacial tension between two immiscible liquids etc and also get

familiar with various measuring instruments which help them to realize the importance of accuracy of measurements.

MATHEMATICS

MAT.T1-1

CO1.1 Row reduced echelon form, normal form is introduced to help in solving the system of equations using matrix method supplemented with free mathematical software. The mathematical software helps the students in completing the projects/real world problem with ease.

CO1.2 The continuation of the chapter Differential calculus I from II PUC level, helps them to learn the differentiation at higher orders and the partial derivatives which help them to learn the basics concepts of higher mathematics.

CO1.3 The continuation of calculus to continuity, discontinuity, related topics through the mean value theorems their proofs, examples and verifying the same through the mathematical software like maxima and Scilab as a practical component. The introduction of Taylor's series and Maclurin's series completes the chapter.

C01.4 Introduction to Number theory gives us an experience of fun with numbers, their importance and rich heritage apart from a thorough understanding of the basic tools of pure mathematics that is groups introduced in the II Semester.

Practicals

MAT.P1-1

- Introducing the free open source soft-wares namely SCILAB and MAXIMA.
- To execute program using scilab for verifying the solutions worked out manually for the problems involving matrices under the chapter algebra.
- The above helps the students to use the software while solving real world problem.
- To execute program using maxima for verifying the solutions worked out manually for the problems under the chapter differential calculus

BSc. COMPUTER SCIENCE

CSC.T1-1: COMPUTER CONCEPTS AND C PROGRAMMING

CO-1.1 Ability to understand Computer hardware and software, High level languages, Problem analysis, structured programming. This helps them to know parts of a computer.

CO-1.2 Ability to understand basics of C programming language. This enables them to write simple programs.

CO-1.3 Ability to understand decision making in C language. This improves their logical thinking ability.

CO-1.4 Ability to understand Handling arrays, strings and writing functions. Enables them to handle set of data and repetitive jobs.

CO-1.5 Ability to understand the usage of structures and pointers. Gives the knowledge of some advanced features of C language.

Practicals

CSC.P1-1 : C PROGRAMMING PRACTICALS

- Enables students to draw flow-charts, write and execute programs in C language.
- This will enhance their logical thinking ability and analyzing capacity.
- Gives them sufficient knowledge of C Programming constructs.

Semester II

PHYSICS

PHY.T2-)

CO2.1: To understand the basic aspects of kinetic theory of gases, Maxwell-Boltzmann distribution law, Equipartition of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion and Brownian motion

CO2.2: To define different thermal processes and understand laws of thermodynamics and identify its outcomes.

CO2.3: To know the significance and Practical application of the thermodynamic laws

CO2.4: To Understand Reversible and irreversible process, working of a Carnot engine, and knowledge of calculating change in entropy for various process.

CO2.5: To realize the importance of the thermodynamic potentials, their physical interpretations and applications of Maxwell's relations.

CO2.6: To understand the concept of phase transition and describe the phase transitions in solids.

CO2.7: To derive Clausius-Clapeyron Equation

CO2.8: To explain the effect of change of pressure on the boiling point and melting point.

CO2.9: To understand the concept of Joule-Kelvin effect and derive the relation for Joule – Thomson co-efficient.

CO2.10: To understand adiabatic demagnetization and derive the relation for fall in temperature.

CO2.11: To understand the concept of Liquefaction of gases.

CO2.12: To understand the various experimental methods used for liquefaction of gases.

CO2.13: To understand the central concepts of Thermal conduction in solids.

CO2.14: To understand heat conduction in Sphere, slab and cylinder.
CO2.15: To understand different radiation laws and their applications.
CO2.16: To determine solar constant using Angstrom's Pyrheliometer.

Practicals

PHY.P2-2

- Students would gain practical knowledge about heat and radiation, thermodynamics, thermo emf, Thermistor etc. and perform various experiments such as determination of thermal conductivity of rubber, Stefan's constant, Newton's law of cooling, and Thermistor as a temperature sensor etc.

MATHEMATICS

MAT.T2-2

CO2.1 Introduction to the polar co-ordinates, helping them to look at the polar tangents, related things, helpful in tracing the curves. Visualizing the curves, and exploring the nature area, volume. etc. through the mathematical software is a matter of hands-on session to the students creating a research culture, which is a necessary in today's world.

CO2.2 The continuation of Integral calculus from II PUC level helps them to apply the awesome reduction formulae and enjoy the rate at which the example gets reduced so instantly. Visualizing the curves, and exploring the nature area, volume, etc. through the mathematical software is a matter of hands-on session to the students creating a research culture, which is a necessary in today's world.

CO2.3 Sequence of real numbers is an important concept in pure mathematics wherein they come across various types of sequences, their nature in different contexts, various theorems to help in discussing their nature. Later, this helps the students in learning the chapter series, of equal importance in pure mathematics.

CO2.4 The continuation of Differential equations from II PUC, intentionally introduced to like, learn, enjoy solving the types of first order differential equations, understand them by plotting graphs in mathematical software, termed as FOSS tools. The above chapter helps them in projects in mathematical biology and interpreting the real-world problem in interdisciplinary areas.

Practicals

MAT.P2-2

- Executing program using scilab to visualize the various cartesian and polar curves and their properties.
- Executing program using maxima for verifying the solutions worked out manually for the problems under the chapter sequences, differential calculus and differential equations.

BSc. COMPUTER SCIENCE

CSC.T2-2: DATA STRUCTURES

CO-2.1 Ability to understand basic data organization. This helps them in organizing the items in their real life also.

CO-2.2 Ability to understand basic operations like 'sort' and string handling. Helps to know how things can be sorted and arranged like a dictionary content.

CO-2.3 Ability to understand Linked lists, advantages, disadvantages and operations on them. Gives knowledge of linking, inserting and deleting items from a list, which can be connected to day-to-day problems also.

CO-2.4 Ability to understand 'stacks' and 'queues' advantages, disadvantages and their applications This concept can be applied to solve some mathematical equations.

CO-2.5 Ability to understand 'Graphs' and 'Trees', advantages, disadvantages and algorithms. Helps them gain knowledge of arranging items in tree and graph formats, with application to real life, like building a "family tree"

Practicals

CSC.P2-2 : DATA STRUCTURES PRACTICALS

- Enables them to build various Data structures and manipulate on them.
- Students will be able to differentiate between different data structures practically.
- This knowledge can be utilized in everyday activities also.

Semester III

PHYSICS

PHY.T3-3

CO3.1: To understand the working Principle of Multimeter, CRO and signal generators.
CO3.2: To acquire hands on skills in the usage of oscilloscopes, multimeters and signal generators.
CO3.3: To apply various network theorems such as Superposition, Thevenin's, and Norton's, Maximum Power Transfer, etc. and their applications in electronics, electrical circuit analysis, and electrical machines.
CO3.4: To calculate the magnetic forces that act on moving charges and the magnetic fields due to currents (Bio- Savart's and Ampere laws).
CO3.5: To describe the magnetic field produced by magnetic dipoles and electric currents.
CO3.6: To understand the geometrical representation of different operators.
CO3.7: To understand the fundamental theorem of divergence and Curl.
CO3.8: To understand the relevance of displacement current in the context of electromagnetic wave propagation.
CO3.9: To explain Maxwell laws to articulate the relationship between electric and magnetic fields.
CO3.10: To analyze AC circuits using Kirchhoff's laws and to build the circuits using resistor, capacitor and inductor and their combination.
CO3.11: To build Passive filters and understand its frequency response.
CO3.12: To understand the transient current response of CR, LC, CR and LCR circuits, which is essential in designing and understanding the working of electronic circuit.

Practicals
PHY.P3-3

- Students would gain practical knowledge about electricity and magnetism and perform measurements such as: Resistance, Voltage, Current, Power, frequency etc.

MATHEMATICS

MAT.T3-3

CO3.1 Group theory involves basic concepts of abstract mathematics and related concepts, a must for students inclined towards pure mathematics.
CO3.2 After the ode of first order in the previous semester , the third semester syllabus has higher order differential equations specially of order 2 and 3 to find the solutions in various types and explore the vastness of differential equations. To conclude, the simultaneous differential equations and their solutions, followed by total and simultaneous differential equations and their solutions.

CO3.3 Series of real numbers involves finding of the nature of series by various methods through several theorems and most fascinating summation of different series.

CO3.4 Introduction to basics of statistics. The interpretation of statistical data is studied through the concepts of correlation and regression. The above is also available as a lab component under the FOSS tool R – programming.

Practicals

MAT.P3-3

- Introducing the free open source software R and R studio.
- Executing program using scilab for verifying the solutions worked out manually for the problems under the chapter group theory.
- Executing program to verify the solutions worked out manually for the problems under the chapter series and differential calculus using maxima.
- Executing R programming for verifying the solutions worked out manually for the problems under Statistics.

BSc. COMPUTER SCIENCE

CSC.3-3: OPERATING SYSTEM AND UNIX

CO-3.1 Ability to understand Operating system, its importance and types. Enables them to know how a computer starts working. Also how OS handles multiple users and processes.

CO-3.2 Ability to understand how OS synchronizes multiple processes, avoiding deadlocks. If processes get deadlocked, how to resolve it. This can be applied in real life situations like vehicle traffic monitoring.

CO-3.3 Ability to understand how OS stores programs and processes in main and secondary memory. Helps in efficient usage of memory, minimizing the wastage.

CO-3.4 Ability to understand basic concepts of Unix OS. Enables to know some general commands and write simple shell scripts.

CO-3.5 Ability to code using Shell Programming, take logical decisions, handle repetitive steps. Also enables to send and receive electronic mails.

Practicals

CSC.P3-3 : UNIX PRACTICALS

- Gives knowledge of networking & client-server architecture.
- Students will know the use of general commands and utilities in UNIX.
- Will be able to execute shell programs.

- Enables them to send and receive e-mails.

Semester IV

PHYSICS

PHY.T4-4

CO4.1: To understand the Wave nature of light.
CO4.2: To understand Coherent sources and their production.
CO4.3: To understand the working of Biprism and calculate the thickness of the film.
CO4.4: To understand the Interference at thin films for reflected and transmitted light.
CO4.5: To understand the fundamentals of air wedge, Newton's rings and their applications.
CO4.6: To understand the construction and applications of Michelson's interferometer.
CO4.7: To understand the theory of rectilinear propagation.
CO4.8: To understand the construction of zone plate and compare Zone plate with lens.
CO4.9: To understand the theory of diffraction at straight edge.
CO4.10: To understand theory of single slit diffraction and grating.
CO4.11: To understand the concept and calculation of dispersive power and resolving power of grating and telescope.
CO4.12: To understand the difference between plane and spherical wave, longitudinal and transverse waves.
CO4.13: To understand the velocity of waves in a fluid medium.
CO4.14: To find velocity of sound waves using Newton's formula.
CO4.15: To understand the linear, circular and elliptical polarizations of electromagnetic waves.
CO4.16: To understand phase retardation plates and their uses.
CO4.17: To understand the concept of optical rotation, theories of optical rotation and their experimental rotation, calculation of angle of rotation and specific rotation.
CO4.18: To understand the properties of laser.
CO4.19: To understand the concept of spontaneous and stimulated emission.
CO4.20: To understand the principle and working of different type of lasers and their applications.
CO4.21: To distinguish between holography and photography.
CO4.22: To understand the principle and classification of optical fibers.
CO4.23: To understand the attenuation in optical fibers.
CO4.24: To understand the fundamentals of propagation of electromagnetic waves through optical fibers.

Practicals

PHY.P4-4

- Students would learn optical phenomena such as interference, diffraction, Polarization and perform experiments related to optical devices: grating, spectrometers etc.

MATHEMATICS

MAT.T4-4

CO4.1 Group theory incorporates, the further topics like order of an elements involved in understanding cyclic groups, theorems, variety of examples to understand the above said abstract concepts.

CO4.2 Analysing the curves, limits of integration through the sketches of the different curves to solve double and triple integration. They have their applications in finding the area, surface area and volume. The visualization of the above in mathematical software is commendable.

CO4.3 Integral theorems helps in connecting line integrals, surface integrals and volume integrals. Has wide applications in engineering mathematics.

CO4.4 Discrete and Continuation distributions are introduced to solve some simple problems. Students develop critical computing knowledge with statistics which helps them in taking up projects an internship in data analysis. The above is also available as a lab component under the FOSS tool R – programming.

Practicals

MAT.P4-4

- Executing program using scilab for problems under the chapter group theory.
- Executing program using maxima for verifying the solutions worked out manually for the problems under the chapter multiple integrals and integral theorem.
- Executing R programming for verifying the solutions worked out manually for the problems under Statistics.

BSc. COMPUTER SCIENCE

CSC.T4-4: DATABASE MANAGEMENT SYSTEMS AND SOFTARE ENGINEERING

CO-4.1 Ability to understand basic concepts of data, database and DBMS. Show the relationships data entities with the help of a diagram. Helps to organize things in real life systematically.

CO-4.2 Ability to understand RDBMS and carry out mathematical operations on them like UNION, JOIN etc. also helps in normalizing data for efficient usage of data.

CO-4.3 Ability to understand structured query language. Helps in searching data matching any given criteria. This is of great help when databases contain huge amount of data.

CO-4.4 Ability to understand Basics of software and software engineering. Gives students the basic requirements for developing a software.

CO-4.5 Ability to understand the requirements and quality of the product. Tells how to test the quality of products.

Practicals

CSC.P4-4 : DBMS PRACTICALS

- Gives ability to create databases and store data in them.
- Students will be able to add, delete and modify the database structure & contents.
- Will be able to retrieve data from multiple databases.
- Enables them to use various queries to extract the required data.

Semester V

PHYSICS

PHY.T5-5

CO5.1: To understand the concepts of microstate, macrostate, ensemble, phase space, entropy and thermodynamic probability.

CO5.2: To understand the basic postulates of statistical physics.

CO5.3: To Comprehend and articulate the connection as well as dichotomy between classical statistical mechanics and quantum statistical mechanics.

CO5.4: To calculate the macroscopic properties of degenerate photon gas using BE distribution law.

CO5.5: To understand Bose-Einstein condensation properties of liquid Helium.

CO5.6: To deduce Planck's law using Bose Einstein distribution law.

CO5.7: To understand the concept of Fermi energy, Fermi level, Fermi gas, Fermi sphere and derive expression for Fermi energy and electronic specific heat capacity in metals.

CO5.8: To know the main aspects of the inadequacies of classical mechanics and to understand historical development of quantum mechanics and ability to discuss and interpret experiments that reveal the dual nature of matter.
CO5.9: To explain inadequacy of Rutherford model, discrete atomic spectra from hydrogen like atoms and its explanation on quantum mechanical basis.
CO5.10: To explain how quantum mechanical concepts answer some of unanswered questions of Classical mechanics such as photoelectric effect, Compton scattering etc.
CO5.11: To understand the theory of quantum measurements, wave packets and uncertainty principle.
CO5.12: To demonstrate ability to apply wave-particle duality and uncertainty principle to solve physics problems.
CO5.13: To distinguish between metals, semiconductors and insulators based on band theory.
CO5.14: To explain the basic properties of semiconductors including the band gap, charge carrier concentration.
CO5.15: To explain the working, design considerations and applications of various semiconducting devices like Photodiode, solar-cells, LEDs.
CO5.16: To distinguish between the active, saturation and cut-off regions of a transistor.
CO5.17: To understand the construction and working of CE amplifier.
CO5.18: To draw hybrid equivalent circuit of CE amplifier.

PHY.T6-5

CO6.1: To comprehend astronomical scales and system of measurement of distances of stars.
CO6.2: To understand the basic parameters of stars like brightness, luminosity, magnitude.
CO6.3: To classify stars based on luminosity, brightness, size and temperature.
CO6.4: To calculate the pressure, temperature at the core and on surface of stars
CO6.5: To understand the Evolution of stars based on their masses and the properties of main sequence stars.
CO6.6: To understand seven crystal systems.
CO6.7: To distinguish between Continuous and characteristics x-ray
CO6.8: To derive the expression for Compton shift and inter planar spacing of the crystal planes.
CO6.9: To analyze the success and failure of free electron theory.
CO6.10: To understand the concept of thermal and electrical conductivity using classical free electron theory
CO6.11: To verify Ohms law using classical free electron theory
CO6.12: To understand the significance of Hall co-efficient.
CO6.13: To understand the basic idea about superconductors, their classifications and applications.
CO6.14: To understand the concept of Quantum confinement with examples.

CO6.15: To understand different synthesis method such as top down and bottom up approaches.
CO6.16: To understand the different characterization techniques such as SEM, TEM, AFM etc...
CO6.17: To understand distinct properties and applications of nano materials.
CO6.18: To explore different kinds of polarization and its effects on dielectric constant.
CO6.19: To understand the concept of Dielectric strength and breakdown.
CO6.20: To derive the expression for effective field experienced by a dipole inside the dielectric.
CO6.21: To understand different types of magnetic materials
CO6.22: To understand hysteresis loops and energy loss.
CO6.23: To distinguish between soft and hard magnetic materials

Practicals

PHY.P5-5

- Students would be able to understand and gain hands–on learning experience by performing the experiments related to statistical and semiconductor physics such as: study of macro and micro states using 3 dice; determine the value of pi using Monte Carlo method, determination of Planck's constant using LED, frequency response of CE amplifier, solar cell characteristics etc.

PHY.P6-5

- Students would be able to understand and gain hands –on learning experience by performing the experiments related to astrophysics and solid state physics such as: HR diagram, analysis of stellar spectra, sunspot analysis, semiconductor temperature sensor, determination of Fermi energy of a metal, analysis of X-ray diffraction pattern obtained by powder method to determine properties of crystals.

MATHEMATICS

MAT.T5-5

CO5.1 The definition of the algebraic structure ring, examples, theorems and concepts related to the same are studied. The above are vital concepts in abstract algebra have wide applications in various fields of science. The lab component in the above is an appreciable approach.

CO5.2 Introduction to different types of PDE, general form (Clairaut's equation). Solutions of Heat and wave equation and verifying the same with soft wares is a part of the lab component.

CO5.3 Improper integral throws light on beta and gamma functions which are very special, simple, easy to learn and apply while integrating a certain set of integrals. These integrals are also involved in Laplace transforms, which is a part of their syllabus for next sem. Also helps students to score better amidst the topic in pure mathematics.

MAT.T6-5

CO6.1 Differential calculus for scalar and vector fields helps in understanding the mathematical physics and hence an interdisciplinary approach trend is set for the students.

CO6.2 Fourier series and transforms helps us in understanding that the given function can be expressed as a sum of sine and cosine functions or one of them in a given interval. The plotting of the same and visualizing the graph in different angles is a practical component. Its applications are left to the students for topics of project. The Fourier transform are also a part of the conclusion of the chapter.

CO6.3 Mathematical modelling is introduced to highlight interdisciplinary approach to solve real world problem and interpret the same using mathematical software and promote research culture in students.

Practicals

MAT.P5-5

- Executing program using maxima for verifying the solutions worked out manually for the problems under the chapter rings & fields and partial differential equations**.**

MAT.P6-5

- Demonstration of differential calculus of scalar & vector fields and Fourier series and transformations using free software maxima.

BSc. COMPUTER SCIENCE

CSC.T5-5 JAVA PROGRAMMING

CO-5.1 Ability to understand OOPS concept and basics of JAVA Programming.

CO-5.2 Ability to understand main features of Java like classes, objects, Inheritance &Interfaces Also handling strings and operations on them.

CO-5.3 Ability to understand packages and handle errors. Helps in efficient re-usage of code, without duplicating. Steps to be taken in case of errors in the program.

CO-5.4 Ability to understand advanced features like Applet handling and file handling. Tells how a program can be made to respond for an event.

CSC.T6-5: VISUAL PROGRAMMING

CO-6.1 Ability to understand dot net platform and basics of Visual Programming

CO-6.2 Ability to understand features like Functions and Exception handling

CO-6.3 Ability to understand different basic controls in VB, which help in form designing. Enables to design form based interfaces in software development

CO-6.4 Ability to understand some advanced controls and Event handling

Practicals

CSC.P5-5 : JAVA PRACTICALS

- Gives ability to execute simple programs in Java.
- Students will be able to execute programs using OOP concept.
- Will be able to understand the packages, inheritance and interface concepts.
- Enables them to handle errors and exceptions.
- Enables them understand event handling and applet programming in Java.

CSC.6-5 : VISUAL PROGRAMMING PRACTICALS

- Gives ability to create VP applications.
- Students will be able to execute programs using .NET framework.
- Will be able to design form based applications required for any project.
- Enables them to connect front end to SQL server database.
- Enables them understand event handling and various form controls.
- Enables to create small graphical applications

Semester VI

PHYSICS

PHY.T7-6

CO7.1: To understand the concept of spatial quantization and spinning electron hypothesis

CO7.2: To understand different coupling schemes in multi electron systems.
CO7.3: To understand Stern-Gerlach experiment as a proof for the features of vector atom model.
CO7.4: To understand the influence of magnetic fields on atoms.
CO7.5: To understand molecular spectra.
CO7.6: To understand different types of scattering.
CO7.7: To understand quantum theory of Raman Effect and its applications.
CO7.8: To understand the Rutherford's theory of alpha scattering.
CO7.9: To understand the laws of radioactive decay.
CO7.10: To understand the characteristics of alpha spectrum.
CO7.11: To understand the types of beta decay and Pauli's neutrino hypothesis.
CO7.12: To understand the principle and working of different types of detectors and accelerators.
CO7.13: To understand different types of nuclear reactions.
CO7.14: To understand conservation laws in nuclear reactions.
CO7.15: To understand inertial and non inertial frame of reference.
CO7.16: To describe how fictitious forces arise in a non-inertial frame.
CO7.17: To describe special relativistic effects and their effects on the mass and energy of a moving object.
CO7.18: To appreciate the nuances of Special Theory of Relativity (STR).

PHY.T8-6

CO8.1: To understand the characteristics of Ideal and practical op-amps.
CO8.2: To understand the different configurations of op-amp.
CO8.3: To understand the different feedback mechanisms in amplifiers and oscillators.
CO8.4: To understand the frequency response of first order active filters.
CO8.5: To understand the difference between latches and flip-flops.
CO8.6: To construct and understand the working of different types of flip-flops using NAND and NOR gates.
CO8.7: To construct and understand the working of different types of counters.
CO8.8: To understand the different types of multi vibrators.
CO8.9: To Construct and understand the working of astable multivibrator using IC555.
CO8.10: To understand the central concepts of quantum mechanics.
CO8.11: To compute Eigen values, Eigen functions, momentum of atomic and subatomic particles using time independent 1-D Schrodinger's wave equation.
CO8.12: To understand the quantum mechanical tunneling.

CO8.13: To understand the Earth's atmosphere, its composition, effective temperature, greenhouse effect, hydrostatic equation and atmospheric thermodynamics.
CO8.14: To understand the importance of Coriolis force in atmospheric science.
CO8.15: To understand the propagation of mechanical waves in a medium.
CO8.16: To classify different types of waves based on Mach number.
CO8.17: To understand the construction and working of Reddy's tube to produce shock waves.

Practicals

PHY.P7-6

- Students would be able to understand and gain hands–on learning experience by performing the experiments related to atomic, molecular and Nuclear Physics such as: determination of Somerfield's fine structure constant, Characteristics of GM counter, Determination of half-life of radioactive source, Analysis of Raman rotational spectrum of Nitrogen molecule, Analysis of rotational vibrational spectrum of a diatomic molecule (HBr), Absorption spectrum of KMnO4, Verification of inverse square law using GM counter (with a radioactive source), Determination of mass absorption coefficient of gamma rays.

PHY.P8-6

- Students would be able to understand and gain hands –on learning experience by performing the experiments related to electronics and atmospheric physics such as: Estimation of height of the atmosphere using radiosonde data, op amp as inverting and non inverting amplifier, summing, differentiator and integrator circuits using opamps. Wein Bridge and Phase shift oscillator circuits using opamps.

MATHEMATICS

MAT.T7-6

CO7.1 The topic linear algebra has concepts of vector spaces, properties, examples, theorems, transformation, different types, examples, changing the transformation into matrices and vice versa. The same can be visualizes using the software maple (trial version). The above has applications in image processing.

CO7.2 Numerical methods involves forward differences, finite differences, interpolation, numerical differentiation, and integration. For certain examples where integration is not possible, numerical integrations are made use of in obtaining approximation solutions.

CO7.3 The numerical solutions of algebraic, transcendental and non - linear PDE by various methods and program for the same helps the students to do projects and motivates the young mind to the research culture and higher studies.

MAT.T8-6

CO8.1 The harmonic function and the transformation, help in solving a lot of problems in engineering mathematics and projects. The above also form a part of the lab component.
CO8.2 Mathematical methods involves the definition, properties, problems, and related concepts. Its application in solving differential equations of first order and second order involving is a part of the lab component.

Practicals

MAT.P7-6

- Solving algebraic and transcendental equations through the mathematical software scilab.
- Executing program using maxima for verifying the solutions worked out manually for the problems under the chapter linear algebra.

MAT.P8-6

- Executing program using maxima for verifying the solutions worked out manually for the problems under complex analysis and mathematical modelling.

BSc. COMPUTER SCIENCE

CSC.T7-6 WEB PROGRAMMING

CO-7.1 Ability to understand WWW and HTML, which is the base for creating web pages.
CO-7.2 Ability to understand basics of Java script
CO-7.3 Ability to use Java script and HTML
CO-7.4 Ability to Use cascading Style Sheets to beautify the web pages.

CSC.T8-6 COMPUTER NETWORKS

CO-8.1 Ability to understand Network, types and Architecture
CO-8.2 Ability to understand different layers networks and how data is transmitted between layers

CO-8.3 Ability to understand Channelizing and connecting devices. Method of giving IP-Addresses.

CO-8.4 Ability to understand Transporting the messages and files across the internet.

Practicals

CSC.P7-6 : WEB PROGRAMMING PRACTICALS

- Gives ability to execute HTML code.
- Students will be able to execute programs using Java Script.
- Will be able to create web pages using style sheets.

CSC.P8-6 : PROJECT

- Students will develop a mini project with the available facility.
- Creating mobile applications using Android.
- Platform used can be Linux or Windows.
- Students can use Lab infrastructure or can use their own laptops.
- Makes them acquainted with application development, which is relevant to present day needs.