

**Teerthanker Mahaveer University**  
**Faculty of Engineering**  
**B.Sc. (Hons.) Physics**

**Programme Outcome**

<b>PO-1</b>	:	Critical thinking: This is based on the assumption, thinking and actions. These assumptions are tested for accuracy & validity taking into consideration the ideas and decisions. These ideas may be collected from intellectual organization or personal from different prospectus.
<b>PO-2</b>	:	Effective communication: Effective communication an important tool to enhance the effectiveness of learning among the students. The speaking, reading & writing must be followed correctly.
<b>PO-3</b>	:	Social interaction: Social interaction also plays important role to reads the conclusion in group settings.
<b>PO-4</b>	:	Effective citizenship: This contributes in the national development and promptness to achieve the goals. It develops awareness through volunteering.
<b>PO-5</b>	:	Ethics: It has direct impact to recognize the different value systems. It gives proper understanding in different dimension for making decisions.
<b>PO-6</b>	:	Environment and sustainability: Essential to understand the environmental issues & sustainable development.
<b>PO-7</b>	:	Self directed & lifelong learning: Acquire the ability to engage in independent and lifelong learning in broad spectrum including socio technological changes.
<b>PO-8</b>	:	Problem analysis & Solving: Identify, formulate, research literature, and analyze complex basic sciences problems reaching substantiated conclusions using first principles of mathematics, natural sciences.
<b>PO-9</b>	:	Entrepreneurship: An Entrepreneurship cut across every sector of human life including the field of engineering, engineering entrepreneurship is the process of harnessing the business opportunities in engineering and turning it into profitable commercially viable innovation.
<b>PO-10</b>	:	Interpersonal skills: Interpersonal skills involve the ability to communicate and build relationships with others. Effective interpersonal skills can help the students during the job interview process and can have a positive impact on your career advancement.
<b>PO-11</b>	:	Technology savvy/usage: Being technology savvy is essentially one's skill to be smart with technology. This skill reaches far beyond 'understanding' the concepts of how technology works and encompasses the 'utilization' of such modern technology for the purpose of enhancing productivity and efficiency

### Programme Specific Outcome

<b>PSO-1</b>	:	Remembering the basic with sufficient contents of topic from classical, modern and contemporary areas of exciting development of physical sciences
<b>PSO-2</b>	:	Understanding the vast scope of physics as a theoretical and experimental science with application in solving most of the problem in nature spanning from 10 <sup>-15</sup> m to 10 <sup>26</sup> m in space and 10 <sup>-10</sup> eV to 10 <sup>25</sup> eV in energy dimension
<b>PSO-3</b>	:	Applying the classroom learning to perform basic laboratory experiments and relating the corresponding observation to explain the real life problems.
<b>PSO-4</b>	:	Analyzing the real life problems and to seek their solutions using one's own knowledge understanding related to Physics
<b>PSO-5</b>	:	Demonstrating subject related and transferable skills that are relevant to some of the physics related jobs and employment opportunities.
<b>PSO-6</b>	:	Creating a critical attitude and logical reasoning among students to make them able for applying knowledge of physics in diverse fields.

### Course Outcomes

<b>BAS166</b>	<b>CO1.</b>	Remembering of basic concepts of pendulums like Bar &Kater's pendulums and measuring the value of g.
	<b>CO2.</b>	Understanding of Kinematics of oscillating and bending bodies
	<b>CO3.</b>	Understanding and measuring the random errors in experiments.
	<b>CO4.</b>	Applying time period concepts to determine the acceleration due to gravity, moment of inertia & young modulus using bar, kater's pendulum, mass spring system, fly wheel & cantilever.
	<b>CO5.</b>	Applying Poiseuille's equation to determine coefficient of viscosity & sextant to determine the height of building.
	<b>CO6.</b>	Analyzing the mechanical processes in performing the experiments.
<b>BCS162</b>	<b>CO1.</b>	Understanding the concepts of execution to programs written in C language.
	<b>CO2.</b>	Applying to prepare programming solutions for specific problems.
	<b>CO3.</b>	Applying to prepare scalable solutions through functions.
	<b>CO4.</b>	Applying basic elements of a C program including arithmetic and logical operators, functions, control structures, and arrays
	<b>CO5.</b>	Analyzing basic mathematical problem and their solutions through programming
	<b>CO1.</b>	Solving complex problems using Criss cross method, base method and square techniques.

<b>TMUGA-101</b>	<b>CO2.</b>	Applying the arithmetical concepts of Average, Mixture and Allegation.
	<b>CO3.</b>	Evaluating the different possibilities of various reasoning based problems in series, Blood relation and Direction.
	<b>CO4.</b>	Operationalizing the inter-related concept of Percentage in Profit Loss and Discount, Si/CI and Mixture/Allegation
<b>BAS120</b>	<b>CO1.</b>	Remembering the concept of modern atomic structure, Periodicity of elements and Redox reactions.
	<b>CO2.</b>	Understanding the Schrodinger's wave equation to explain the origin of quantum numbers & standard electrode potential.
	<b>CO3.</b>	Understanding the theories of chemical bonding & Born Haber's cycle.
	<b>CO4.</b>	Applying theories of chemical bonding to know the characteristics of molecules.
	<b>CO5.</b>	Applying the relationship between Ionization potential and reactivity of metals, electron gain enthalpy and reactivity of non metals
<b>BAS117</b>	<b>CO1.</b>	Understanding the concepts of trigonometric functions, hyperbolic functions, inverse circular and inverse hyperbolic functions of complex quantities.
	<b>CO2.</b>	Understanding the concept of Successive differentiation and partial differentiation.
	<b>CO3.</b>	Understanding the concepts of envelopes, evolutes, curvature and asymptotes of curves in Cartesian and polar coordinates.
	<b>CO4.</b>	Applying the concept of Leibnitz's theorem for successive derivatives.
	<b>CO5.</b>	Applying the concept of tangent, normal and asymptotes to tracing of curves in Cartesian, parametric and polar coordinates.
<b>BAS168</b>	<b>CO1.</b>	Remembering & understanding the concept of Normality & Molarity.
	<b>CO2.</b>	Analyzing of carbonates, bicarbonates, hydroxides and free alkalies in acids base titrations.
	<b>CO3.</b>	Analyzing the strength of Fe(II) in the given sample
	<b>CO4.</b>	Analyzing of oxalic acid and sodium oxalate in given mixture by Oxidation-Reduction Titrimetric
	<b>CO5.</b>	Analyzing the hardness of a given sample of water.
<b>BAS173</b>	<b>CO1.</b>	Understanding the different coordinate systems of reference by plotting curves in a plane using its mathematical properties.
	<b>CO2.</b>	Understanding the graphs of polynomial in Physical Sciences.
	<b>CO3.</b>	Understanding the Matrix operations for quantum applications.

	<b>CO4.</b>	Analyzing complex numbers and their representations.
	<b>CO5.</b>	Analyzing the area of surfaces of revolution and the volume of solids by integrating over cross-sectional areas.
<b>BAS218</b>	<b>CO1.</b>	Understanding basic concept of electric fields, potentials and laws relating fields and potentials in different conditions.
	<b>CO2.</b>	Understanding the principles of Capacitors, field polarization, magnetic fields and the laws for magnetic field.
	<b>CO3.</b>	Applying the concept of fields and potential to study the properties of dielectric and magnetic materials like dielectric constant and susceptibilities.
	<b>CO4.</b>	Applying the concept of Ampere's law to find the field strength due to straight wire and circular loop solenoid, toroid and analyzing the network theorems.
	<b>CO5.</b>	Applying the concept of Faraday's law, Lenz's law to calibrate the self-inductance, mutual inductance, reciprocity theorem and ballistic Galvanometer
<b>BAS220</b>	<b>CO1.</b>	Remembering the concepts of optical phenomena like reflection, refraction, interference, diffraction & waves.
	<b>CO2.</b>	Understanding the principles of divisions of waves.
	<b>CO3.</b>	Applying the Fermat's principle to understand the optical phenomena.
	<b>CO4.</b>	Applying the concept of superposition of waves to draw the Lissajous Figures.
	<b>CO5.</b>	Applying the concept of diffraction phenomenon or using to single and multi-slit to find out the dispersive and resolving power of different optical devices like telescope, microscope and gratings.
	<b>CO6.</b>	Applying the concept of interference and diffraction phenomenon to Construct and reconstruct the holograms using two plane waves as well as zone plates.
<b>TMUGE201</b>	<b>CO1.</b>	Remembering & understanding the basics of English Grammar and Vocabulary.
	<b>CO2.</b>	Understanding the basics of Listening, Speaking & Writing Skills.
	<b>CO3.</b>	Understanding principles of letter drafting and various types of formats.
	<b>CO4.</b>	Applying correct vocabulary and grammar in sentence construction while writing and delivering presentations.
	<b>CO5.</b>	Analyzing different types of listening, role of Audience & Locale in presentation.

<b>TMU201</b>	<b>CO1.</b>	Understanding environmental problems arising due to constructional and developmental activities.
	<b>CO2.</b>	Understanding the natural resources and suitable methods for conservation of resources for sustainable development.
	<b>CO3.</b>	Understanding the importance of ecosystem and biodiversity and its conservation for maintaining ecological balance.
	<b>CO4.</b>	Understanding the types and adverse effects of various environmental pollutants and their abatement devices.
	<b>CO5.</b>	Understanding Greenhouse effect, various Environmental laws, impact of human population explosion, environment protection movements, different disasters and their management
<b>BAS268</b>	<b>CO1.</b>	Remembering the concepts of Network theorems.
	<b>CO2.</b>	Understanding the use of various electrical instruments for measuring the resistance, voltage, current and capacitance.
	<b>CO3.</b>	Applying the concepts of Thevenin theorem and Norton theorems to determine EMF & resistances for complex circuits.
	<b>CO4.</b>	Applying Rayleigh's method to determine self-inductance & low resistance of coils.
	<b>CO5.</b>	Applying the concepts of wheat stone's bridge to determine the resistance using potentiometer and Carey Foster's.
	<b>CO6.</b>	Analyzing the frequency response curve for series and parallel LCR circuits in determining the resonant frequency, impedance, and band width & quality factor
<b>BAS266</b>	<b>CO1.</b>	Remembering the concepts of optical properties and character of lights.
	<b>CO2.</b>	Understanding the concepts to measure the focal lengths of concave, convex lenses and mirrors.
	<b>CO3.</b>	Applying the concepts of Schuster's method for optical adjustment of spectrometer.
	<b>CO4.</b>	Analyzing the diffraction and interference patterns obtained from different optical instruments.
	<b>CO5.</b>	Analyzing the dispersive power to verify the prism materials
<b>TMUGA-201</b>	<b>CO1.</b>	Applying the arithmetical concepts in Ratio Proportion Variation.
	<b>CO2.</b>	Employing the techniques of Percentage; Ratios and Average in inter related concepts of Time and Work, Time Speed and Distance.
	<b>CO3.</b>	Identifying different possibilities of reasoning based problems of Syllogisms and Venn diagram.
	<b>CO4.</b>	Examining the optimized approach to solve logs and Surds

<b>BAS219</b>	<b>CO1.</b>	Understanding the concept of kinetic theory of gases and behavior of real gases.
	<b>CO2.</b>	Understanding the effect of solute and temperature on the physical properties of liquids.
	<b>CO3.</b>	Understanding the elements of symmetry, crystal structure of ionic Compounds.
	<b>CO4.</b>	Understanding the Ionization of electrolytes, theory of acid- base indicators, salt hydrolysis and buffer action.
	<b>CO5.</b>	Applying the concepts of Ionic Equilibria to determine the degree of ionization, ionization constant, solubility product and preparation of buffer solution.
<b>BAS231</b>	<b>CO1.</b>	Understanding basic concept of sets, relation, algebraic structure, Logic gates like countable set, equivalence relation, group, k-maps.
	<b>CO2.</b>	Understanding the basic concept of truth table, recurrence relation like tautology contradiction.
	<b>CO3.</b>	Applying the concept of relation to find out the equivalence relation, one-one, onto & into.
	<b>CO4.</b>	Applying the concept of relation to find out the equivalence relation, one-one, onto & into.
	<b>CO5.</b>	Applying the concept of truth table to find out the tautology, contradiction & contingency.
<b>BAS269</b>	<b>CO1.</b>	Understanding concept of viscosity, surface tension and calorimeter.
	<b>CO2.</b>	Understanding the heat capacity of calorimeter, enthalpy of ionization and neutralization of acids.
	<b>CO3.</b>	Analyzing the surface tension and Viscosity of aqueous solutions.
	<b>CO4.</b>	Analyzing the integral enthalpy of salt solutions.
	<b>CO5.</b>	Analyzing the kinetics of first and second order reactions.
<b>BAS271</b>	<b>CO1.</b>	Understanding simple program modules to implement single numerical methods and algorithms.
	<b>CO2.</b>	Applying to use basic flow controls ( if-else, for, while).
	<b>CO3.</b>	Applying Test program output for accuracy using hand calculations and debugging techniques
	<b>CO4.</b>	Applying multiple program modules into larger program packages
	<b>CO5.</b>	Analyzing the generate plots and export this for use in reports and presentations.
<b>BAS314</b>	<b>CO1.</b>	Remembering concepts of Black body radiation, Photoelectric effect and Compton scattering to learn the beginning of quantum mechanics.

	<b>CO2.</b>	Understanding Young's two slit interference of light into the two slit interference of particles (e.g. photon, electron, atom etc.)
	<b>CO3.</b>	Understanding the matter wave and deducing the Schrodinger wave equation.
	<b>CO4.</b>	Understanding the laws of radioactive decay including alpha-, beta and gamma decay, fission and fusion nuclear process.
	<b>CO5.</b>	Applying the Heisenberg's uncertainty principle to deduce the Size and structure of atomic nucleus and its relation with atomic weight.
	<b>CO6.</b>	Applying the Heisenberg's uncertainty principle to prove the impossibility of an electron being in the nucleus.
<b>BAS320</b>	<b>CO1.</b>	Remembering and understanding the laws of thermodynamics, entropy, and Maxwell's thermodynamic relations.
	<b>CO2.</b>	Understanding the Kinetic theory of gases-distribution of velocities, and molecular collisions in Physics.
	<b>CO3.</b>	Understanding the basics of real gases.
	<b>CO4.</b>	Applying the T-S diagram to understand phase transition processes
	<b>CO5.</b>	Applying Maxwell's thermodynamic relations to understand ideal and Van der Waal Gases, Energy equations, Change of Temperature during Adiabatic Process
<b>TMUGE301</b>	<b>CO1.</b>	Understanding knowledge of grammar to face competitive exams.
	<b>CO2.</b>	Understanding advance English language by using variety of words i.e. idioms and phrase in variety of sentences in functional context.
	<b>CO3.</b>	Understanding listening for effective communication.
	<b>CO4.</b>	Applying their English grammar knowledge in day to day context.
	<b>CO5.</b>	Applying writing and comprehensive skills in English.
	<b>CO6.</b>	Analyzing Comprehending & enriching their vocabulary through prescribed text.
<b>BAS364</b>	<b>CO1.</b>	Remembering the concepts of photo-electric effect, tunnelling effect and black body radiation.
	<b>CO2.</b>	Understanding & measuring the H-alpha emission line of Hydrogen atom and absorption lines in the rotational spectrum of Iodine vapour.
	<b>CO3.</b>	Understanding the concepts to measure the e/m by bar magnet and Millikan oil drop methods.
	<b>CO4.</b>	Understanding the concepts to measure wavelength & angular spread of laser sources
	<b>CO5.</b>	Analyzing the diffraction patterns from single, double slits.

	<b>CO6.</b>	Analyzing black body radiation, photo-detector and colour LED's in measuring the Planck's constant
<b>BAS365</b>	<b>CO1.</b>	Remembering the basic thermodynamical concepts involved in various experiments of thermal Physics
	<b>CO2.</b>	Applying the concepts of thermodynamics to measure the mechanical equivalent of heat and coefficient of thermal conductivity.
	<b>CO3.</b>	Applying Seeback effect in determining the thermo EMF of a thermocouple.
	<b>CO4.</b>	Applying the concepts of temperature dependence of resistance to find the temperature coefficient of resistances.
	<b>CO5.</b>	Analyzing the characteristics curve of the thermocouple and RTD.
<b>TMUGA-302</b>	<b>CO1.</b>	Applying the concepts of modern mathematics Divisibility rule, Remainder Theorem, HCF /LCM in Number System.
	<b>CO2.</b>	Relating the rules of permutation and combination, Fundamental Principle of Counting to find the probability.
	<b>CO3.</b>	Applying calculative and arithmetical concepts of ratio, Average and Percentage to analyze and interpret data.
	<b>CO4.</b>	Correlating the various arithmetic concepts to check sufficiency of data
<b>TMUGS-301</b>	<b>CO1.</b>	Utilizing effective verbal and non-verbal communication techniques in formal and informal settings
	<b>CO2.</b>	Understanding and analyzing self and devising a strategy for self growth and development.
	<b>CO3.</b>	Adapting a positive mindset conducive for growth through optimism and constructive thinking.
	<b>CO4.</b>	Utilizing time in the most effective manner and avoiding procrastination.
	<b>CO5.</b>	Making appropriate and responsible decisions through various techniques like SWOT, Simulation and Decision Tree.
	<b>CO6.</b>	Formulating strategies of avoiding time wasters and preparing to do list to manage priorities and achieve SMART goals.
<b>BAS321</b>	<b>CO1.</b>	Remembering the basic concepts and classification of hybridization, electronic displacement, haemolytic & hetrolytic fission in organic molecules and aromatic hydrocarbons.
	<b>CO2.</b>	Understanding the addition-elimination reactions & their mechanisms of alkenes and alkynes.
	<b>CO3.</b>	Understanding the nomenclature, structure and mechanisms of stereochemistry.
	<b>CO4.</b>	Understanding the electrophilic aromatic substitution reactions



		and mechanisms of aromatic hydrocarbons.
	<b>CO5.</b>	Applying the Fischer Projection, Newmann and Sawhorse Projection to calculate the stereochemistry of organic molecule and Hückel's rule to calculate the aromaticity.
<b>BAS331</b>	<b>CO1.</b>	Understanding finite differences and interpolation with equal intervals and Unequal Intervals.
	<b>CO2.</b>	Understanding introduction of operators and its properties.
	<b>CO3.</b>	Applying numerical solution of first order differential equation using Eulers, Picards and Runge Kutta methods and derivative using forward and backward difference interpolation.
	<b>CO4.</b>	Analyzing Lagrange's interpolation formula for unequal intervals.
	<b>CO5.</b>	Evaluating Numerical differentiation and Integration, Trapezoidal Formulae, Simpson's Rule, Weddle rule and Cote's formula.
<b>BAS366</b>	<b>CO1.</b>	Understanding the producer and mechanism for the synthesis of organic compounds.
	<b>CO2.</b>	Understanding the qualitative analysis of functional groups in organic compounds.
	<b>CO3.</b>	Applying chemical techniques for the detection of extra elements in the organic compounds.
	<b>CO4.</b>	Analyzing organic compounds containing functional groups.
	<b>CO5.</b>	Applying confirmation test to identify the compounds.
<b>BAS371</b>	<b>CO1.</b>	Remembering the finite differences, operators and its properties.
	<b>CO2.</b>	Understanding the concepts of methods of Numerical Analysis.
	<b>CO3.</b>	Applying numerical solution of first order differential equation using Eulers, Picards and Runge Kutta methods.
	<b>CO4.</b>	Applying Simpson's rule in logical operators and expressions using Matlab / Mathematica / Maple.
	<b>CO5.</b>	Analyzing Lagrange's interpolation formula for unequal intervals.
<b>BAS433</b>	<b>CO1.</b>	Understanding expansion of periodic functions in a series of sine and cosine functions and the determination of Fourier coefficients, power series method classification of partial-differential equation
	<b>CO2.</b>	Understanding special functions, Beta and Gamma functions and relation between them.
	<b>CO3.</b>	Understanding the theory of errors.
	<b>CO4.</b>	Applying Frobenius method and its applications to differential equations and solutions to partial differential equations using separation of variables.

	<b>CO5.</b>	Applying partial differential equation in solving the problems of rectangular, cylindrical and spherical symmetry for Wave and diffusion equations.
<b>BAS421</b>	<b>CO1.</b>	Understanding basic concepts of crystal structure and semiconductors.
	<b>CO2.</b>	Understanding the semiconductors on the basis of density of states.
	<b>CO3.</b>	Understanding the electron - hole pair generation and recombination on the basis of direct and indirect band gap transitions
	<b>CO4.</b>	Understanding the concept of scattering mechanism for the transport properties of semiconductor materials.
	<b>CO5.</b>	Applying the concepts of 1D, 2D & 3D photonic crystals in fabricating of semiconductor devices.
	<b>CO6.</b>	Analyzing the types of semiconductor using the concepts of Fermi level
<b>BAS434</b>	<b>CO1.</b>	Remembering the some of the early models of the atom.
	<b>CO2.</b>	Understanding Bohr's model of the hydrogen atom and its relation to de Broglie waves.
	<b>CO3.</b>	Understanding the basic mechanisms for production of X-rays & laser light.
	<b>CO4.</b>	Understanding the constructions and workings of various types of lasers.
	<b>CO5.</b>	Applying the L-S and J-J couplings to explain fine structures in Hydrogen and Alkali Atoms.
<b>TMUGE401</b>	<b>CO1.</b>	Remembering adequate knowledge of grammar and vocabulary through prescribed text to address competitive exams.
	<b>CO2.</b>	Understanding the value of listening to understand the basic content.
	<b>CO3.</b>	Understanding the usage of English grammar in day to day context.
	<b>CO4.</b>	Understating about the skills required in corporate world.
	<b>CO5.</b>	Applying writing and comprehensive skills in English.
	<b>CO6.</b>	Creating a simple proposal and report
<b>BAS473</b>	<b>CO1.</b>	Remembering the physical phenomenon of polarization and diffraction.
	<b>CO2.</b>	Applying the concepts of optical phenomena for understanding the mechanisms of various monochromatic sources.
	<b>CO3.</b>	Applying the spectrophotometer for verification of Beer's law.

	<b>CO4.</b>	Analyzing the V-I characteristics of LEDs, IR and P-N junction diode.
	<b>CO5.</b>	Analyzing the groove spacing of CD and DVD using reflection method
<b>TMUGA-402</b>	<b>CO1.</b>	Recognizing the rules of Crypt-arithmetic and relate them to find out the solutions.
	<b>CO2.</b>	Illustrating the different concepts of Height and Distance and Functions.
	<b>CO3.</b>	Employing the concept of higher level reasoning in Clocks, Calendars and Puzzle Problems.
	<b>CO4.</b>	Correlating the various arithmetic and reasoning concepts in checking sufficiency of data.
<b>TMUGS-401</b>	<b>CO1.</b>	Communicating effectively in a variety of public and interpersonal settings.
	<b>CO2.</b>	Applying concepts of change management for growth and development by understanding inertia of change and mastering the Laws of Change.
	<b>CO3.</b>	Analyzing scenarios, synthesizing alternatives and thinking critically to negotiate, resolve conflicts and develop cordial interpersonal relationships.
	<b>CO4.</b>	Functioning in a team and enabling other people to act while encouraging growth and creating mutual respect and trust.
	<b>CO5.</b>	Handling difficult situations with grace, style, and professionalism
<b>BAS434</b>	<b>CO1.</b>	Remembering the introduction & basic concepts of polymers.
	<b>CO2.</b>	Understanding the classification & properties of polymers.
	<b>CO3.</b>	Understanding the kinetics & mechanism of polymerization reaction.
	<b>CO4.</b>	Understanding the preparation & application of industrial & natural polymers.
	<b>CO5.</b>	Analyzing the molecular weight determination of polymers.
<b>BAS435</b>	<b>CO1.</b>	Understanding the concept of the probability, addition law of probability and multiplication law of probability with its applications.
	<b>CO2.</b>	Applying the concept of discrete and continuous random variable to calculate the moment and generating functions.
	<b>CO3.</b>	Analyzing the concept of mathematical expectation, addition and multiplication theorem of Expectation.
	<b>CO4.</b>	Analyzing the M.G.F,C.F and P.D.F of the discrete and continuous distributions.

	<b>CO5.</b>	Evaluating the concept of Probability distributions and its recurrence relation of the distribution.
<b>BAS471</b>	<b>CO1.</b>	Understanding the mechanical properties of Polymers.
	<b>CO2.</b>	Determination of molecular weight & hydroxyl number of polymers.
	<b>CO3.</b>	Estimation of the amount of HCHO in the given solution.
	<b>CO4.</b>	Synthesizing different types of industrial polymers.
	<b>CO5.</b>	Determination of hydroxyl number of a polymer using colorimetric method.
<b>BAS472</b>	<b>CO1.</b>	Understanding the concept of data analysis, general description, functions, menus and commands.
	<b>CO2.</b>	Understanding the different type of variables as well as computing new variables.
	<b>CO3.</b>	Understanding the concept of Descriptive analysis of data, creating & editing graphs.
	<b>CO4.</b>	Applying the Statistical test (Parametric & non parametric) for independent samples, paired samples.
	<b>CO5.</b>	Evaluating the correlation and regression analysis and cluster sampling.
<b>BAS520</b>	<b>CO1.</b>	Understanding the Maxwell's Equations, Poynting Theorem and Poynting Vector.
	<b>CO2.</b>	Understanding the boundary condition of EM wave at plane interface of two media and propagation of E.M waves in vacuum, isotropic media and Anisotropic Media.
	<b>CO3.</b>	Understanding production & detection of different polarized waves.
	<b>CO4.</b>	Applying the Maxwell equations, boundary conditions at plane interface of two media to derive the laws of reflection, refraction, Brewster law and Fresnel's formula.
	<b>CO5.</b>	Applying the boundary conditions, total internal reflections and Maxwell equations to understand the propagation of TE & TM modes in optical waveguide.
	<b>CO6.</b>	Analyzing the polarization of light from a given light using retarder and polarizer.
<b>BAS523</b>	<b>CO1.</b>	Understanding the measurement process in quantum mechanics using uncertainty principle.
	<b>CO2.</b>	Understanding square and delta potential and using them to explain contact potential and electron sharing in metals.
	<b>CO3.</b>	Understanding linear harmonic oscillator and its applications.

	<b>CO4.</b>	Applying Schrödinger equation to one and three dimensional problems.
	<b>CO5.</b>	Applying Schrodinger equation for understanding tunnelling and explaining in nuclear processes.
<b>BAS537</b>	<b>CO1.</b>	Understanding and learning of Complex analysis and integration of a function.
	<b>CO2.</b>	Understanding the Integral transform and its use to solve various physical problems, etc
	<b>CO3.</b>	Applying residues theorems to solve various integrals used in real physical phenomena.
	<b>CO4.</b>	Applying the Laplace transform in solving the different problems in Physics.
	<b>CO5.</b>	Applying Fourier transforms in solving various physical problems.
<b>BAS524</b>	<b>CO1.</b>	Remembering the Lorentz force to understand the Hall effect.
	<b>CO2.</b>	Understanding the physical significance in elementary of lattice dynamics, magnetic, dielectric and ferroelectric properties of matter, etc.
	<b>CO3.</b>	Understanding the physical properties of crystal structure like, lattice translation vectors, lattice with a basis unit cell.
	<b>CO4.</b>	Understanding the magnetic, dielectric and superconducting properties materials.
	<b>CO5.</b>	Applying the Bragg law to deduce the crystal structure of a material.
<b>BHM515</b>	<b>CO1.</b>	Understanding the importance of value education in life and method of self-exploration.
	<b>CO2.</b>	Understanding 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration.
	<b>CO3.</b>	Applying right understanding about relationship and physical facilities.
	<b>CO4.</b>	Analysing harmony in myself, harmony in the family and society, harmony in the nature and existence.
	<b>CO5.</b>	Evaluating human conduct on ethical basis.
<b>BAS567</b>	<b>CO1.</b>	Understanding the physical properties of solid/liquid materials.
	<b>CO2.</b>	Understanding working modes of transistors, Zener diode as a voltage regulator.
	<b>CO3.</b>	Applying the concepts of resonance in LC circuits in determining the dielectric constant of mica sheets
	<b>CO4.</b>	Applying in the measurements of Hall effect to use to distinguish types of charges, their mobilities and concentrations.
	<b>CO5.</b>	Applying Gouy's and Quinck's method in the determination of

		magnetic susceptibility of solid /liquids materials.
<b>BAS538</b>	<b>CO1.</b>	Understanding the basics of material science on the basis of atomic structure.
	<b>CO2.</b>	Understanding various defects in crystals.
	<b>CO3.</b>	Understanding the concepts of nucleation kinetics, growth of transformations in steel, and glass transition.
	<b>CO4.</b>	Applying the key concepts of elastic behaviour to understand the mechanical properties of materials.
	<b>CO5.</b>	Analyzing the various phase diagrams to understand its thermodynamical properties.
<b>BAS013</b>	<b>CO1.</b>	Remembering basics of nanoparticles, its classifications and synthesis.
	<b>CO2</b>	Understanding the concept of nanomagnetism, nanoelectronics and integrated systems.
	<b>CO3.</b>	Understanding the DOS in nanomaterials.
	<b>CO4.</b>	Applying the various techniques to characterize nanomaterials.
	<b>CO5.</b>	Applying the concepts of nanomaterials in developing CNTs, LEDs and Q-LEDs, SET.
<b>BAS635</b>	<b>CO1.</b>	Remembering the probability concepts to understand classical & quantum statistics.
	<b>CO2</b>	Understanding of different distribution laws such as, Maxwell Boltzmann (MB), Bose-Einstein (BE) & Fermi-Dirac (FD) Statistics.
	<b>CO3.</b>	Understanding the concepts of constraints the generalized coordinators & calculation of variations and action principle.
	<b>CO4.</b>	Applying the concepts of Calculus of Variation to find the Lagrange's equation for non-holonomic/ holonomic systems.
	<b>CO5.</b>	Applying the Lagrange's equation to find velocity dependent potential of electro-magnetic field.
	<b>CO6.</b>	Applying Lagrangian and Hamiltonian equations for Linear Harmonic oscillator, Simple pendulum & Atwood's machine.
<b>BAS621</b>	<b>CO1.</b>	Understanding the basic properties of nuclei, and the models to describe them.
	<b>CO2.</b>	Understanding the properties of nucleon-nucleon interactions, low energy neutron-proton scattering to show spin dependence of nuclear force.
	<b>CO3.</b>	Understanding the concepts and properties of nuclear decays processes.
	<b>CO4.</b>	Understanding the basics of elementary particles.
	<b>CO5.</b>	Analyzing the energy spectrum of nuclear decays.
	<b>CO6.</b>	Analyzing binding energy curves to explain the stability of nuclei.

<b>BHM615</b>	<b>CO1.</b>	Understanding the concepts and skills needed to run a business successfully.
	<b>CO2.</b>	Applying the steps of project formulation and market research.
	<b>CO3.</b>	Analyzing the techno economic feasibility of a project.
	<b>CO4.</b>	Analyzing various growth strategies in small scale industry.
	<b>CO5.</b>	Evaluating breakeven point, working capital requirements, and taxes.
<b>BAS636</b>	<b>CO1.</b>	Understanding basics of solar energy.
	<b>CO2.</b>	Applying methods Risk Management and to ensure safety and performance.
	<b>CO3.</b>	Analysing everything on Solar Modules, Optimizers (DC/DC converters), Junction Boxes, Inverters, Solar Meters, Learn all the fundamentals of Solar PV energy, Applications of Solar PV Systems, Advantages and Disadvantages of Solar photovoltaic energy.
	<b>CO4.</b>	Analysing Grid-Tie PV System, Calculating Solar Array size, Installing, Maintaining and Servicing of solar power plant.
	<b>CO5.</b>	Analysing the Power concepts & Units