B.Sc Physics Syllabus I-IV Sem

Course Title : **Mechanics (Meekaniyat)**
Course Code : BSPH101CCT

Scheme of Instruction
Total Duration : 60 Hr
Periods /Week : 4
Credits : 4
Instruction Mode : Lecture

Scheme of Examination
Maximum Score : 100
Internal Evaluation : 30
End Semester : 70
Exam Duration : 3 Hrs

Course Objectives:
Course Outcomes:

Unit	Course Content	Instruction Hours
1	**Vectors:** Vector algebra. Scalar and vector products. Derivatives of a vector with respect to a parameter. **Laws of Motion:** Frames of reference. Newton's Laws of Motion. Dynamics of System of Particles. Centre of Mass.	15
2	**Ordinary Differential Equations:** First order homogeneous differential equations. second order homogeneous differential equations with constant coefficients. **Momentum and Energy:** Conservation of momentum. Work and energy. Conservation of angular momentum. **Rotational Motion:** Angular velocity and angular momentum. Torque. Conservation of angular momentum.	15
3	**Gravitation:** Newton's Law of Gravitation. Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant). Kepler's Laws (statement only). Satellite in circular orbit and applications. Geosynchronous orbits. Weightlessness. Basic idea of global positioning system (GPS) **Oscillations:** Simple harmonic motion. Differential equation of SHM and its solutions. Kinetic and Potential Energy, Total Energy and their time averages. Damped oscillations.	15
4	**Elasticity:** Hook's Law – Stress-strain diagram – Elastic moduli-Relation between elastic constants – Poisson's Ratio-Expression for Poisson's ratio in terms of elastic constants – Work done in stretching and work done in twisting a wire – Twisting couple on a cylinder – Determination of rigidity modulus by static torsion – Torsional pendulum – Determination of Rigidity modulus and moment of inertis – q, □ and □ by Searles method. **Special Theory of Relativity:** Constancy of speed of light. Postulates of Special Theory of Relativity. Length contraction. Time dilation. Relativistic addition of velocities.	15
Examination and Evaluation Pattern: Continuous evaluation through assignments, internal examination and semester end examination which can contain multiple choice type questions, problem solving and long answer type questions.		

Text Books and References :	
1.	Elements of Mechanics - K.Rama Reddy, S.Raghavan and D.V.N.Sarma
2.	Mechanics by Kittel (Berkely Vol - I)
3.	Mechanics by Mathur
4.	Physics – Resnick & Halliday (Latest edition) (5th & 6th)
5.	Unified Physics – Vol-I - S.L.Gupta & Sanjeev Gupta
6.	Unified Physics _ Vol-I - Agrawal & Agrawal
7.	Common core physics – Vol-I - Vikas
8.	University Physics – W.Sears, N.Zemansky, D.Young (6^{th} edition)

Course Title : **Mechanics Lab**
Course Code : BSPH150CCP

Scheme of Instruction
Total Duration : 60 Hr
Periods /Week : 4
Credits : 2
Instruction Mode : Lab

Scheme of Examination
Maximum Score : 50
Internal Evaluation : 15
End Semester : 35
Exam Duration : 3 Hrs

Course Objectives:
The objective of the lab is to teach students the use of concepts and fundamentals of the concerned course title and verification of the laws and principles by doing some practical experiments.

Course Outcomes:
The outcome would be that the students will learn the effective use of the concepts and fundamentals learnt in the theory and practical sessions.

List of Experiments

1. Fly Wheel
2. Bifilar Pendulum
3. Compound Pendulum
4. Frequency of A.C. Sonometer
5. Torsional Pendulum
6. Volume Resonator
7. Y – By Non- Uniform Bending
   (Or Double Cantilever Method

Examination and Evaluation Pattern:
The students will have to submit the Lab record book. At the end of the semester, through a 3 hour examination, the students will be tested on their skills in performing the experiment allotted to the student followed by a short viva-voce.

Course Title : **Electricity and Magnetism**
Course Code : BSPH201CCT

Scheme of Instruction
Total Duration : 60 Hr
Periods /Week : 4

Scheme of Examination
Maximum Score : 100
Internal Evaluation : 30

Credits : 4 End Semester : 70
Instruction Mode : Lecture Exam Duration : 3 Hrs

Course Objectives:
Course Outcomes:

Unit	Course Content	Instruction Hours
1	**Vector Analysis:** Review of vector algebra (Scalar and Vector product), gradient, divergence, Curl and their significance, Vector Integration, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors (statement only). **Electrostatics:** Electrostatic Field, electric flux, Gauss's theorem of electrostatics. Applications of Gauss theorem- Electric field due to point charge, infinite line of charge, uniformly charged spherical shell and solid sphere, plane charged sheet, charged conductor.	15
2	**Electrostatics-I:**Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere. Calculation of electric field from potential. Capacitance of an isolated spherical conductor. Parallel plate, spherical and cylindrical condenser. Energy per unit volume in electrostatic field. Dielectric medium, Polarisation, Displacement vector. Gauss's theorem in dielectrics. Parallel plate capacitor completely filled with dielectric.	15
3	**Magnetism:** Magnetostatics: Biot-Savart's law and its applications- straight conductor, circular coil, solenoid carrying current. Divergence and curl of magnetic field. Magnetic vector potential. Ampere's circuital law. Magnetic properties of materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. Brief introduction of dia-, para-and ferromagnetic materials. **Electromagnetic Induction:** Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils. Energy stored in magnetic field.	15
4	**Maxwell`s equations and Electromagnetic wave propagation**: Equation of continuity of current, Displacement current, Maxwell's equations, Poynting vector, energy density in electromagnetic field, electromagnetic wave propagation through vacuum and isotropic dielectric medium, transverse nature of EM waves, polarization.	15

Examination and Evaluation Pattern: Continuous evaluation through assignments, internal examination and semester end examination which can contain multiple choice type questions, problem solving and long answer type questions.	
Text Books and References :	
1.	D.J. Griffiths, Introduction to Electrodynamics, 3rd Edn, 1998, Benjamin Cummings.
2.	Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education
3.	Electricity and Magnetism, J.H. Fewkes & J. Yarwood. Vol. I, 1991, Oxford Univ. Press.
4.	Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House
5.	University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole. 12

Course Title : **Electricity and Magnetism Lab**
Course Code : BSPH250CCP

Scheme of Instruction		Scheme of Examination	
Total Duration	: 60 Hr	Maximum Score	: 50
Periods /Week	: 4	Internal Evaluation	: 15
Credits	: 2	End Semester	: 35
Instruction Mode	: Lab	Exam Duration	: 3 Hrs

Course Objectives:
The objective of the lab is to teach students the use of concepts and fundamentals of the concerned course title and verification of the laws and principles by doing some practical experiments.

Course Outcomes:
The outcome would be that the students will learn the effective use of the concepts and fundamentals learnt in the theory and practical sessions.

List of Experiments:
1. To use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, and (d) checking electrical fuses.
2. To study the Characteristics of a Series RC Circuit.
3. To study the a series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor
4. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q
5. To verify the Thevenin and Norton theorem
6. To verify the Superposition, and Maximum Power Transfer Theorem

Reference Books:

1. Advanced Practical Physics for students, B.L.Flint & H.T.Worsnop, 1971, Asia Publishing House.

2. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.

3. Engineering Practical Physics, S.Panigrahi & B.Mallick,2015, Cengage Learning India Pvt. Ltd.

4. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers

Examination and Evaluation Pattern:
The students will have to submit the Lab record book. At the end of the semester, through a 3 hour examination, the students will be tested on their skills in performing the experiment allotted to the student followed by a short viva-voce.

Course Title : **Waves and Optics (Moujaen aur Ilm-Manazir)**
Course Code : BSPH301CCT

Scheme of Instruction		Scheme of Examination	
Total Duration	: 60 Hr	Maximum Score	: 100
Periods /Week	: 4	Internal Evaluation	: 30
Credits	: 4	End Semester	: 70
Instruction Mode	: Lecture	Exam Duration	: 3 Hrs

Course Objectives:
Course Outcomes:

Unit	Course Content	Instruction Hours
1	**Superposition of Two Collinear Harmonic oscillations**: Linearity and Superposition Principle. (1) Oscillations having equal frequencies and (2) Oscillations having different frequencies (Beats). **Superposition of Two Perpendicular Harmonic Oscillations**: Graphical and Analytical Methods. Lissajous Figures with equal an unequal frequency and their uses. **Waves Motion- General**: Transverse waves on a string. Travelling and standing waves on a string. Normal Modes of a string. Group velocity, Phase velocity. Plane waves. Spherical waves, Wave intensity.	15
2	**Sound:** Simple harmonic motion - forced vibrations and resonance - Fourier's Theorem - Application to saw tooth wave and square wave - Intensity and loudness of sound - Decibels - Intensity levels – musical notes - musical scale. Acoustics of buildings: Reverberation and time of reverberation - Absorption coefficient - Sabine's formula - measurement of reverberation time - Acoustic aspects of halls and auditoria. **Wave Optics:** Electromagnetic nature of light. Definition and Properties of wave front. Huygens Principle.	15
3	**Interference:** Interference: Division of amplitude and division of wavefront. Young's Double Slit experiment. Lloyd's Mirror and Fresnel's Biprism. Phase change on reflection: Stokes' treatment. Interference in Thin Films: parallel and wedge-shaped films.	15

	Fringes of equal inclination (Haidinger Fringes); Fringes of equal thickness (Fizeau Fringes). Newton's Rings: measurement of wavelength and refractive index **Michelson's Interferometer:** Idea of form of fringes (no theory needed), Determination of wavelength, Wavelength difference, Refractive index and Visibility of fringes.	
4	**Diffraction:** Fraunhofer diffraction: Single slit; Double Slit. Multiple slits & Diffraction grating. Fresnel Diffraction: Half-period zones. Zone plate. Fresnel Diffraction pattern of a straight edge, a slit and a wire using half-period zone analysis. **Polarization:** Transverse nature of light waves. Plane polarized light – production and analysis. Circular and elliptical polarization.	15
Examination and Evaluation Pattern: Continuous evaluation through assignments, internal examination and semester end examination which can contain multiple choice type questions, problem solving and long answer type questions.		
Text Books and References :		
1.	Fundamentals of Optics, F A Jenkins and H E White, 1976, McGraw-Hill.	
2.	Principles of Optics, B.K. Mathur, 1995, Gopal Printing.	
3.	Fundamentals of Optics, H.R. Gulati and D.R. Khanna, 1991, R. Chand Publication.	
4.	University Physics. FW Sears, MW Zemansky and HD Young 13/e, 1986. Addison-Wesley.	

Course Title : **Waves and Optics Lab**
Course Code : BSPH350CCP

Scheme of Instruction
Total Duration : 60 Hr
Periods /Week : 4
Credits : 2
Instruction Mode : Lab

Scheme of Examination
Maximum Score : 50
Internal Evaluation : 15
End Semester : 35
Exam Duration : 3 Hrs

Course Objectives:
The objective of the lab is to teach students the use of concepts and fundamentals of the concerned course title and verification of the laws and principles by doing some practical experiments.

Course Outcomes:
The outcome would be that the students will learn the effective use of the concepts and fundamentals learnt in the theory and practical sessions.

List of Experiments:
1. To investigate the motion of coupled oscillators
2. To determine the Frequency of an Electrically Maintained Tuning Fork by Melde's Experiment and to verify $\lambda 2$ – T Law.

3. To study Lissajous Figures
4. To determine the Refractive Index of the Material of a given Prism using Sodium Light.
5. To determine Dispersive Power of the Material of a given Prism using Mercury Light
6. To determine the value of Cauchy Constants of a material of a prism.
7. To determine the Resolving Power of a Prism.
8. To determine wavelength of sodium light using Newton's Rings.
9. To determine the wavelength of Laser light using Diffraction of Single Slit.

Reference Books:

 Advanced Practical Physics for students, B.L. Flint & H.T. Worsnop, 1971, Asia Publishing House.

 Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers

 A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.

Examination and Evaluation Pattern :

The students will have to submit the Lab record book. At the end of the semester, through a 3 hour examination, the students will be tested on their skills in performing the experiment allotted to the student followed by a short viva-voce.

Course Title : **Thermal Physics**
Course Code : BSPH401CCT

Scheme of Instruction		Scheme of Examination	
Total Duration	: 60 Hr	Maximum Score	: 100
Periods /Week	: 4	Internal Evaluation	: 30
Credits	: 4	End Semester	: 70
Instruction Mode	: Lecture	Exam Duration	: 3 Hrs

Course Objectives:
Course Outcomes:

Unit	Course Content	Instruction Hours
1	**Kinetic theory of gases** Fundamental assumptions of kinetic theory of gases, Maxwell's distribution law of velocities, Average, most probable and root mean square speeds of molecules, Experimental verification of Maxwell's law by Miller-Kush method, Law of equipartition of energy, Mean free path, transport phenomenon, Viscosity of gases, thermal conductivity. **Statistical Mechanics** Introduction to statistical Mechanics, statistical equilibrium, (probability qualitative), probability theorems in statistical thermo dynamics, Maxwell Boltzmann distribution law(statement and expression only), Conditions for application of Max well – Boltzmann distribution law, Quantum statistics, phase – space, (Statement and expression only), Fermi-dirac distribution law, Bose-Einstein distribution law (statement and expression only), Comparison between the three laws or statistics, comparison	15

	between BOSONS and FERMIONS.	
2	**Laws of thermodynamics** Introduction to Laws of thermodynamics, Reversible and irreversible processes, carnot's cycle, efficiency of carnots engine, Reversibility of carnots cycle, co-efficient of performance of a refrigerator, second law of thermonynamics, clausius and Kelvin-planck statements of the second law. Carnot's theorem, thermodynamic scale of temperature, Concepts of entropy, clausius theorem, entropy change in a reversible process, Second law in terms of entropy, law of degradation of energy, entropy and unavailable energy, entropy and disorder. **Applications of Laws of thermodynamics** Change of entropy in irreversible processes, thermal conduction, free expansion, isothermal process, TS diagram, Carnot's cycle on TS diagram, Third law of thermodynamics – Nernest theorem	15
3	**Thermodynamic Potentials** Definitions of thermodynamic potentials, Maxwell's equations, T ds and energy equations, Clausius-clapeyron equation and its applications, Joule-Kelvin effect, expression for Joule-Kelvin Coefficient, Specific heats relations, reversible cell. **Low Temperature Physics** Characteristics of first and second order phase transitions, Methods of producing low temperatures, Liquefaction of gases using Joule Kelvin effect, Liquefaction of Helium, Adiabatic demagnetization, Working of refrigerator and Air-conditioning machines . Effects of chloro and fluoro carbons on ozone layer. Global warming and green house effect.	15
4	**Quantum theory of radiation** Black body, Fery's black body – distribution of energy in the spectrum of black body radiation, weins displacement and distribution law, Rayleigh jeans law – Quantum theory of radiation Planck, hypothesis, Planck's law, Derivation of Wein's law and Rayleigh Jeans law from Planck's law. **Measurement of radiation** Measurement of radiation, Types of pyrometers, Disappearing filament optical pyrometer, Polarizing pyrometer, solar constant. Determination of solar constant using Angstrom pyroheliometer, Temperature of Sun.	15
Examination and Evaluation Pattern: Continuous evaluation through assignments, internal examination and semester end examination which can contain multiple choice type questions, problem solving and long answer type questions.		
Text Books and References :		
1.	Heat ad thermodynamics – Zemansky	
2.	Physics-Resnick & Halliday (new edition)(5^{th} & 6^{th})	
3.	Thermodynamics and statistical physics – sharma and sarkar	
4.	Thermodynamics statistical physics & kinetics- Satya prakash, J.P.Agrawal	

5.	Thermodynamics and optics – S.L.Gupta & Sanjeev Gupta	
6.	Common core physics-II Year – Vikas	
7.	University physics – W. Sears, N. Zemansky,D. Young	
8.	Modern Physics by R.Murgeshan & Kiruthiga sivaprasath.	
9.	Under graduate physics Vol – I - AB Bhattacharya & R. Bhattacharya	

Course Title : **Thermal Physics Lab**
Course Code : BSPH450CCP

Scheme of Instruction		Scheme of Examination	
Total Duration	: 60 Hr	Maximum Score	: 50
Periods /Week	: 4	Internal Evaluation	: 15
Credits	: 2	End Semester	: 35
Instruction Mode	: Lab	Exam Duration	: 3 Hrs

Course Objectives:
The objective of the lab is to teach students the use of concepts and fundamentals of the concerned course title and verification of the laws and principles by doing some practical experiments.

Course Outcomes:
The outcome would be that the students will learn the effective use of the concepts and fundamentals learnt in the theory and practical sessions.

List of Experiments:
1. Measurement of Planck's constant using black body radiation.
2. To determine Stefan's Constant.
3. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method.
4. To determine the temperature co-efficient of resistance by Platinum resistance thermometer.
5. To record and analyze the cooling temperature of an hot object as a function of time using a thermocouple and suitable data acquisition system
6. To calibrate Resistance Temperature Device (RTD) using Null Method/Off-Balance

Reference Books:

 Advanced Practical Physics for students, B.L.Flint & H.T.Worsnop, 1971, Asia Publishing House.
 Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
 A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
 A Laboratory Manual of Physics for Undergraduate Classes, D.P. Khandelwal, 1985, Vani Publication.

Examination and Evaluation Pattern:

The students will have to submit the Lab record book. At the end of the semester, through a 3 hour examination, the students will be tested on their skills in performing the experiment allotted to the student followed by a short viva-voce.

Course Title : **Electrical Circuits and Network Skills**
Course Code : UGPH301SET

Scheme of Instruction		Scheme of Examination	
Total Duration	: 30 Hrs	Maximum Score	: 50
Periods /Week	: 2	Internal Evaluation	: 15
Credits	: 2	End Semester	: 35
Instruction Mode	: Lecture	Exam Duration	: 2 Hrs

Course Objectives:
Course Outcomes:

Unit	Course Content	Instruction Hours
1	**Basic Electricity Principles:** Voltage, Current, Resistance and Power, Ohms law, Series, Parallel and Series-Parallel combinations. AC Electricity and DC Electricity. Familiarization with multimeter, voltmeter and ammeter. **Understanding Electrical Circuits:** Main electric circuit elements and their combination. Rules to analyze DC sourced electrical circuits. Current and voltage drop across the DC circuit elements. Single-Phase and three-phase alternating current source. Rules to analyze AC sourced electrical circuits. Real, imaginary and complex power components of AC source. Power factor. Saving energy and money.	07
2	**Electrical Drawing and Symbols:** Drawing symbols. Blueprints, Reading Schematics. Ladder diagrams. Electrical Schematics. Power circuits, Control circuits. Reading of circuit schematics. Tracking the connections of elements and identify current flow and voltage drop. **Generators and Transformers:** DC power sources. AC/DC generators. Inductance, capacitance and impedance. Operation of transformers.	07
3	**Electric Motors:** Single-phase, three-phase & DC motors. Basic design. Interfacing DC or AC sources to control heaters & motors. Speed & power of ac motor. **Solid State Devices:** Resistors, inductors and capacitors. Diode and rectifiers. Components in Series or in Shunt. Response of inductors and capacitors with DC or AC sources.	07
4	**Electrical Protection:** Relays, fuses and disconnect switches. Circuit breakers. Overload devices. Ground-fault protection. Grounding and isolating. Phase reversal, Surge protection. Interfacing DC or AC sources to control elements (relay protection device). **Electrical Wiring:** Different types of conductors and cables. Basics of wiring-Star and delta connection. Voltage drop and losses across cables and conductors. Instruments to measure current, voltage, power in DC and AC circuits. Insulation, solid and standard cable, cable trays, splices, wirenuts, crimps, terminal blocks, split bolts and solder.	09

	Preparation of extension board.	
Examination and Evaluation Pattern: Continuous evaluation through assignments, internal examination and semester end examination which can contain multiple choice type questions, problem solving and long answer type questions.		
Text Books and References :		
1.	A text book in Electrical Technology – B.L.Theraja – S.Chand & Co.	

Course Title : **Computational Physics Skills**
Course Code : UGPH401SET

Scheme of Instruction		Scheme of Examination	
Total Duration	: 30 Hrs	Maximum Score	: 50
Periods /Week	: 2	Internal Evaluation	: 15
Credits	: 2	End Semester	: 35
Instruction Mode	: Lecture	Exam Duration	: 2 Hrs

Course Objectives:
Course Outcomes:

Unit	Course Content	Instruction Hours
1	**Introduction:** Importance of computers in Physics, paradigm for solving physics problems for solution. Usage of linux as an Editor. Algorithms and Flowcharts: Algorithm: Definition, properties and development. Flowchart: Concept of flowchart, symbols, guidelines, types. Examples: Cartesian to Spherical Polar Coordinates, Roots of Quadratic Equation, Sum of two matrices, Sum and Product of a finite series, calculation of sin (x) as a series, algorithm for plotting (1) lissajous figures and (2) trajectory of a projectile thrown at an angle with the horizontal. **Scientific Programming:** Some fundamental Linux Commands (Internal and External commands). Development of FORTRAN, Basic elements of FORTRAN: Character Set, Constants and their types, Variables and their types, Keywords, Variable Declaration and concept of instruction and program. Operators: Arithmetic, Relational, Logical and Assignment Operators. Expressions: Arithmetic, Relational, Logical, Character and Assignment Expressions. Fortran Statements: I/O Statements (unformatted/formatted), Executable and Non-Executable Statements, Layout of Fortran Program, Format of writing Program and concept of coding, Initialization and Replacement Logic. Examples from physics problems.	09
2	**Control Statements:** Types of Logic (Sequential, Selection, Repetition), Branching Statements (Logical IF, Arithmetic IF, Block IF, Nested Block IF, SELECT CASE and ELSE IF Ladder statements), Looping Statements (DO-CONTINUE, DO-ENDDO, DOWHILE, Implied and Nested DO Loops), Jumping Statements (Unconditional GOTO, Computed GOTO, Assigned GOTO) Subscripted Variables	06

	(Arrays: Types of Arrays, DIMENSION Statement, Reading and Writing Arrays), Functions and Subroutines (Arithmetic Statement Function, Function Subprogram and Subroutine), RETURN, CALL, COMMON and EQUIVALENCE Statements), Structure, Disk I/O Statements, open a file, writing in a file, reading from a file. Examples from physics problems.	
3	**Scientific word processing:** Introduction to LaTeX: TeX/LaTeX word processor, preparing a basic LaTeX file, Document classes, Preparing an input file for LaTeX, Compiling LaTeX File, LaTeX tags for creating different environments, Defining LaTeX commands and environments, Changing the type style, Symbols from other languages. Equation representation: Formulae and equations, Figures and other floating bodies, Lining in columns- Tabbing and tabular environment, Generating table of contents, bibliography and citation, Making an index and glossary, List making environments, Fonts, Picture environment and colors, errors.	09
4	**Visualization:** Introduction to graphical analysis and its limitations. Introduction to Gnuplot. importance of visualization of computational and computational data, basic Gnuplot commands: simple plots, plotting data from a file, saving and exporting, multiple data sets per file, physics with Gnuplot (equations, building functions, user defined variables and functions), Understanding data with Gnuplot	06
Examination and Evaluation Pattern: Continuous evaluation through assignments, internal examination and semester end examination which can contain multiple choice type questions, problem solving and long answer type questions.		
Text Books and References :		
1.	Introduction to Numerical Analysis, S.S. Sastry, 5th Edn., 2012, PHI Learning Pvt. Ltd.	
2.	Computer Programming in Fortran 77". V. Rajaraman (Publisher:PHI).	
3.	LaTeX–A Document Preparation System", Leslie Lamport (Second Edition, Addison-Wesley, 1994).	
4.	Gnuplot in action: understanding data with graphs, Philip K Janert, (Manning 2010)	
5.	Schaum's Outline of Theory and Problems of Programming with Fortran, S Lipsdutz and A Poe, 1986Mc-Graw Hill Book Co.	
6.	Computational Physics: An Introduction, R. C. Verma, et al. New Age International Publishers, New Delhi(1999)	
7.	A first course in Numerical Methods, U.M. Ascher and C. Greif, 2012, PHI Learning	
8.	Elementary Numerical Analysis, K.E. Atkinson, 3rd Edn., 2007, Wiley India Edition.	