Syllabus for Two Years M. Sc. (Applied Physics)

(2016 Admission Batch)

Post Graduate Department of Applied Physics

C. V. Raman College of Engineering

(Autonomous status under section 2(f) of UGC, ACT 1956)

Under Biju Patnaik University of Technology

M.Sc. 1st year First semester (Theory)				M.Sc. 1st year Second semester (Theory)			
Code	**Subject**	**Contact Hours**	**Credit (L-T-P)**	**Code**	**Subject**	**Contact Hours**	**Credit (L-T-P)**
PH51101	Classical Mechanics	50	4 (3-1-0)	PH51106	Condensed Matter Physics	50	4 (3-1-0)
PH51102	Mathematical Physics	50	4 (3-1-0)	PH51107	Quantum Mechanics -II	50	4 (3-1-0)
PH51103	Classical Electrodynamics	50	4 (3-1-0)	PH51108	Statistical Mechanics	50	4 (3-1-0)
PH51104	Quantum Mechanics -I	50	4 (3-1-0)	PH51109	Numerical methods and Computational Techniques	40	3 (2-1-0)
		Total	16			Total	15
Practical /Sessional				**Practical /Sessional**			
PH51205	Electromagnetism and Optics Lab		6 (0-0-6)	PH51210	Numerical methods and Computational Techniques Lab		3 (0-0-3)
				PH51211	General Physics		6 (0-0-6)
		Grand Total	**22**		**Grand Total**		**24**

Description of subject Code PHXXXXX from left: (for ex:PH51101)
1st two places: Name of BOS (Physics –PH)
3rd place X- Year of study, M.SC. 1st year-5, M.Sc. 2nd year-6
4th place X-Professional Core-1, Elective-2, Seminar/Dissertation/Viva-3
5th place X- Theory -1, Lab-2,Seminar-3, Dissertation-4, Viva-5
Last two places: Subject Sl. No.(01,...............,11)

DETAILS OF SYLLABUS:

FIRST SEMESTER

PH51101 (CLASSICAL MECHANICS) **Marks-100**

UNIT-I **(10 Hours)**

Mechanics of a system of particles:

Inertial and Non-inertial frames of reference, Lagrangian Formulation, Velocity dependent potentials and Dissipation Function, Conservation theorems and Symmetry properties, Homogeneity and Isotropy of space and Conservation of linear and Angular momentum, Homogeneity of time and Conservation of energy.

UNIT-II **(10 Hours)**

Hamiltonian Formulation:

Calculus of variations and Euler Lagranges equation, Brachistochrone problem, Hamiltons principle, Extension of Hamiltons principle to nonholonomic systems, Legendre transformation and the Hamilton equations of motion, Physical significance of Hamiltonian, Derivation of Hamiltons equations of motion from a variational principle, Rouths procedure, Variation, Principle of least action.

UNIT III **(10 Hours)**

Canonical transformations:

Canonical Transformation, Types of generating function, Conditions for Canonical Transformation, Integral invariance of Poincare, Poissons theorem, Poisson and Lagrange bracket, Poisson and Lagrange Brackets as canonical invariant, Infinitesimal canonical Transformation and conservation theorems, Liouvilles theorem.

UNIT-IV **(10 Hours)**

Hamilton -Jacobi Theory:

Hamilton - Jacobi equation for Hamiltons principal function, Harmonic oscillator and Kepler problem by Hamilton - Jacobi method , Action angle variables for completely separable system, Kepler problem in Action angle variables , Geometrical optics and wave mechanics.

Small oscillation:

Problem of small oscillations , Example of two coupled oscillator , General theory of small oscillations, Normal coordinates and Normal modes of vibration , Free vibrations of a linear tri-atomic molecule.

UNIT-V **(10 Hours)**

Rigid body motion:

The independent of coordinates of a rigid body, orthogonal transformations , The Eulers angles , The Cayley-Klein parameters, Eulers theorems on the motion of a rigid body, infinitesimal rotations , rate of change of a vector, The Coriolis Force.

Rigid body dynamics:

Angular Momentum and kinetic energy of motion about a point: The Inertia Tensor and momentum of Inertia, Eigenvalues of Inertia Tensor and the principal axis transformation. The heavy symmetrical top with one point fixed, Elementary idea about non-linearity and chaos.

BOOKS:

1. Classical Mechanics -H. Goldstein
2. Classical Mechanics - Landau and Lifshitz
3. Classical Mechanics - Corben & Stehle
4. Analytical Mechanics -L. Hand and J. Finch

5. Classical Mechanics -J.C. Upadhyaya
6. Analytical Dynamics - Whitaker

PH51102 (MATHEMATICAL PHYSICS) Marks-100

Unit-I (12 Hours)

Complex analysis: Line integral of complex function, Cauchy's integral theorem, Cauchy's integral formula, Taylor's Series and Laurent's series, Calculus of Residues: Cauchy's Residue theorem, Zeroes and Singularities of complex functions, simple poles, Evaluation of definite integrals, Generalised functions, Dirac's -delta function ; Representation by Gaussian function, Integral representation, Relation to Step function.

Unit-II (12 Hours)

Differential equations: Linear ordinary differential equations of first & second order: singularities of differential equations and their classification, Power series method and Frobenius extended power series method of solving differential equations.

Special functions: Solution of Bessel, Legendre, Laguerre, Hermite, Hypergeometric and confluent Hypergeometric equations and their properties, Generating functions, Recurrence relations and Rodrigues Formula.

Unit-III (10 Hours)

Partial Differential equations: Partial differential equations (Laplace, wave and heat equations in two and three dimensions), Greens function, Solution of inhomogeneous partial differential equation by Green function method. Fourier series, Fourier and Laplace transforms.

Unit-IV (8 Hours)

Tensor analysis: Contravariant, Covariant and Mixed Tensors, Addition and subtraction of Tensors. Direct product, Inner product and Contraction of Tensors, Levi-Civita Tensor, Metric Tensor, Christoffel symbol.

Unit-V (8 Hours)

Groups and Group representation: Definition of groups, Finite groups, Example from solid state physics, Sub groups and classes, Group Representation, Characters, Infinite groups and Lie groups, Lie algebra, Application, Irreducible representation of SU(2),SU(3)and O(3).

BOOKS:

1. Mathematical methods of physics - J. Mathews & R.L. Walker.
2. Mathematical methods of physics - Arfken and Weber.
3. Mathematical methods for physicists - Dennery & Krzywicki.
4. Mathematical methods of physics - H. K. Das
5. Mathematical methods of physics - Dr. Rama verma (S. Chand)
6. Mathematical methods of physics - Satyaprakash (S. Chand)
7. Mathematical methods of physics - Binoy Bhattacharya. (NCBA Publication)
8. Introduction to Tensor calculus - Goreux S. J.
9. Mathematical methods of physics - Dettman J.W.

PH51103 (CLASSICAL ELECTRODYNAMICS) **Marks – 100**

UNIT – I **(12 Hours)**

Maxwell's Equations and Conservation laws:
Introduction to Electromagnetism, Maxwell's equations in free space and linear isotropic media, boundary conditions on the fields at interfaces, Poisson's equation and Laplace's equation, Vector and scalar potentials, Lorentz and Coulomb Gauge, Gauge invariance, Lorentz invariance of Maxwell's equation, , Poynting's theorem and conservation of energy and momentum.

UNIT – II **(14Hours)**

Electromagnetic waves: Plane electromagnetic waves in non conducting medium, Electromagnetic waves in conductors, Solution of the wave equation by Green's function formalism, Reflection and refraction of electromagnetic waves at a plane surface between dielectrics, Linear and circular polarisation, Polarisation by reflection, Group velocity, Frequency dispersion characteristics of dielectrics, conductors and plasma, Kramer-Kronig Relation.

Waveguides: TE and TM modes in dielectric slab waveguides, cylindrical cavities and wave guide, modes in rectangular waveguide, resonant cavities.

UNIT – III **(8 Hours)**

Radiation Systems: Fields and radiation of a localized oscillating source: electric and magnetic dipole fields and radiation, center fed linear antenna with sinusoidal current, scattering by a small dielectric sphere in long wavelength limit, Rayleigh Scattering.

UNIT – IV **(8 Hours)**

Radiations by moving charges: Lienard - Wiechert potential and field due to a point charge, Field of a moving charge, Radiated power from an accelerated charge at low velocities, Larmour's power formula, Angular distribution of radiation from an accelerated charge, Thomson scattering of radiation.

UNIT – V **(8 Hours)**

Relativistic Electrodynamics: The four vector notation, Lorentz transformation of particle kinematics, covariant formulation of Maxwell's equations, electromagnetic field tensor, covariant definitions of electromagnetic energy and momentum, transformation of electromagnetic field components.

BOOKS:

1. Introduction to Electrodynamics - A. Z. Capri and P.V.Panat, Narosa Publishing House.
2. Classical electricity & Magnetism- Panofsky and Phillips, Addison Wesley.
3. Classical Electrodynamics - J.D. Jackson, John & Wiley Sons Pvt. Ltd, New York, 2004.
4. Introduction to Electrodynamics - D.J. Griffiths, Pearson Education Ltd., New Delhi,1991.
5. Classical Electromagnetic Radiation - J.B. Marion, Academic Press, New Delhi, 1995.
6. Classical Theory of Electrodynamics - L.D. Landau and E.M. Lifshitz, Addison,Wesley.
7. Classical Electricity and Magnetism - Wolfgang K. H. Panofsky and Melba Phillips, Dover Publications.
8. Foundations of Electromagnetic Theory - John R. Reitz, F. J. Milford, R. W. Christy, Narosa Publishing House
9. Principles' of Electromagnetics - Matthew N. O. Sadiku, Oxford University Press
10. Electromagnetic Field Theory Fundamentals - B. Guru, H. Hiziroglu, Cambridge University Press

PH51104 (QUANTUM MECHANICS-I) **Marks-100**

Unit-I **(8 Hours)**

General principle of Quantum mechanics: Linear vector space formulation: Linear vector space (LVS) and its generality. Vectors: Scalar product, Metric space, Basis vectors, Linear independence, Linear superposition of general quantum states, Completeness and Orthogonal relation, Schmidt's orthonormalisation procedure, Dual space, Bra and Ket vectors, Hilbert space formalism for quantum mechanics.

Unit-II **(12Hours)**

Operator: Linear, Adjoint, Hermitian, Unitary, Inverse, Antilinear operators, Noncommutativity and uncertainty relation, Complete set of compatible operators, Simultaneous Measurement, Projection operator, Eigenvalue and Eigen vector of linear, Hermitian, Unitary operators, Matrix representation of vectors and operators, Matrix elements, Eigen value equation and Expectation value, Algebraic result on Eigen values, Transformation of basis vectors, Similarity transformation of vectors and operators, Diagonalisation, Vectors of LVS and wave function in co-ordinate, Momentum and Energy representations.

Unit-III **(10 Hours)**

Quantum Dynamics: Time evolution of quantum states, Time evolution of operators and its properties, Schrodinger picture, Heisenberg picture, Dirac/Interaction picture, Equation of motion, Operator method of solution of 1D Harmonic oscillator, Time evolution and matrix representation of creation and annihilation operators, Density matrix.

Unit-IV **(12Hours)**

Rotation and orbital angular momentum:

Rotation matrix, Angular momentum operators as the generation of rotation, Components of angular momentum L_x, L_y, L_z and L^2 and their commutator relations, Raising and lowering operators (L_+ and L_-), L_x, L_y, L_z and L^2 in spherical polar co-ordinates, Eigen value and Eigen function of L_z, L^2(operator method), Spherical harmonics, matrix representation of of L_+, L_- and L^2, Spin angular momentum: Spin 1/2 particle, Pauli spin matrices and their properties Eigen values and Eigen function, Spinor transformation under rotation.

Addition of angular momentum:

Total angular momentum (J), Eigen value problem of J_z and J^2, Angular momentum matrices, Addition of angular momenta and C.G. Coefficients, Angular momentum states for composite system in the angular momenta (1/2,1/2) and(1,1/2).

UNIT-V **(8 Hours)**

Motion in Spherical symmetric Field:

Hydrogen atom, Reduction to one dimensional one body problem, Radial equation, Energy Eigen value and Eigen function, Degeneracy, Radial probability distribution.

Free particle problem:

Incoming and outgoing spherical waves, Expansion of plane waves in terms of spherical waves, Bound states of a 3-D square well, Particle in a sphere.

BOOKS:

1. Quantum Mechanics - S. Gasiorowicz
2. Quantum Mechanics - J. Sakurai
3. Quantum Mechanics - R. Shankar
4. Quantum Mechanics - S.N. Biswas
5. Quantum Mechanics - A. Das

6. Quantum Mechanics - A. Ghatak and S. Lokanathan
7. Advanced Quantum Mechanics - P. Roman
8. Quantum Mechanics (Non Relativistic theory) - L.D. Landau and E. M. Lifshitz
9. Elementary Theory of Angular Momentum - M.E. Rose
10. Principles of Quantum Mechanics - P.A.M. Dirac
11. Quantum Mechanics Concepts and Applications - Nouredine Zettili
12. Introduction to Quantum Mechanics- David J. Griffith

PH51205 (ELECTROMAGNETISM AND OPTICS LAB) Marks-100

1. Determination of wavelength of monochromatic light by Michelson's Interferometer.
2. Determination of thickness of air film between half silvered plates by Febryparot Interferometer.
3. Analysis of elliptically polarized light Babinet Compensator.
4. Verification of Brewster's law.
5. Study of polarization using Malus law.
6. Magnetic field measurement by current carrying coil.
7. Determination of charge of electron by Milikans oil drop experiment.
8. Existence of discrete energy level by Frank Hertz experiment.
9. Determination of B-H curve of a given Ferromagnet.
10. Measurement of Inductance and Capacitance by Maxwell's L/C Bridge.

SECOND SEMESTER

PH51106 (CONDENSED MATTER PHYSICS) Marks-100
Unit-I (8 Hours)

Crystal structure:
Bravais lattices (crystalline periodicity and unit cells), Miller Indices, Reciprocal lattice and Brillouin zones, Crystal diffraction and the structure factor, Crystal imperfection: Point defects line defects and planer (stacking) faults.
Unit-II (12 Hours)

Lattice dynamics:
Phonons and lattice vibrations, Vibrations of monoatomic and diatomic lattices, dispersion, Optics & acoustic modes, Quantum of lattice vibrations and phonon, Phonon momentum, Inelastic scattering of neutron and photons by phonons, Thermal properties of insulators Lattice heat capacity, Debye & Einstein model, Anharmonic Crystal interactions, Thermal conductivity & thermal expansion.
Free electron Fermi gas:
Free electron gas in three dimensions, Heat capacity of electron gas, electrical and thermal conductivity of metals (Drude model).

Unit-III (12Hours)
Band theory and Semiconductor Physics:
Electrons in periodic potential, Bloch theorem, Kronig Penney model, Origin of band gap, Distinction between metals, insulators and intrinsic semiconductors, Effective mass of electrons and concept of holes, Density of states and Fermi-Dirac distribution function for electrons and holes, Thermal equilibrium, Equilibrium distribution of electrons & holes:

derivation of n and p from density of states and Fermi-Dirac distribution function for electrons and holes, Fermi level and carrier concentrations, The np product and the intrinsic carrier concentration. General theory of n and p, Carrier concentrations at extremely high and low temperatures: complete ionization, partial ionization and freeze-out. Energy-band diagram and Fermi-level, Variation of E_F with doping concentration and temperature,

Unit-IV **(10 Hours)**

Dielectrics: Introduction, Review of basic formulae, Dielectric constant and displacement vector -different kinds of polarization-local electric field-Lorentz field-Clausius-Mossatti relation- expressions for electronic, ionic and dipolar polarizability, Ferroelectricity and Peizo electricity.

Magnetism: Review of basic formulae -classification of magnetic materials-Langevin theory of diamagnetism, para-magnetism and Ferromagnetism –domains-Weiss molecular field theory (classical)-Heisenberg exchange interaction theory-. Antiferro-magnetism and ferrimagnetism.

Unit-V **(8 Hours)**

Superconductivity:

Experimental survey, Meisners effect, Type-I & Type-II superconductors, Thermodynamics of superconductors, London theory, Josephson's effect, Basic concepts of cooper pairing in BCS theory, Ginz-Landau Theory, Applications of superconductors, High T_c superconductors and recent theories.

BOOKS:

1. Introduction to solid state physics- C. Kittel
2. Solid state physics- Ashcroft and Mermin
3. Principles of condensed matter physics- P.M. Chaikin and T.C. Lubensky
4. Solid state physics- A.J. Dekker
5. Solid state physics- O.E. Animaler
6. Quantum theory of solid State -J.Callaway
7. Solid state physics- C.G. Kuper, 8. Solid state physics -David W. Snoke (LPE Publication)
9. Solid state physics- Dan Wei (Cengauge Learning)
10. Solid State physics -A. Omar (Pearson)
11.Semiconductor Physics and Devices (Basic Principles) – Donal A Neamen (Tata McGraw-Hill)

PH51107 (QUANTUM MECHANICS-II) **Marks-100**

Unit-I **(10 Hours)**

Approximation Method for stationary states:

Rayleigh Schrodinger Method for Time-independent Non degenerate Perturbation theory, First and second order correction, perturbed harmonic oscillator, Anharmonic oscillator, The stark effect, Quadratic Stark effect and polarizability, Degenerate perturbation theory, Removal of Degeneracy.

Unit-II **(10 Hours)**

Hydrogen Atom: Parity selection rule, Linear stark effect of hydrogen atom, Spin orbit Coupling, Relativistic correction, Fine structure of Hydrogen like atom, Normal and anomalous Zeeman effect, The strong- field Zeeman effect, The weak-field Zeeman effect and Lande's g-factor. Elementary ideas about field quantization and particle processes

Unit-III **(10 Hours)**

Variational Methods:

General formalism, Validity of WKB approximation method, Connection Formulas, Bohr quantisation rule, Application to Harmonic oscillator, Bound states for potential well with one rigid wall and two rigid walls, Tunnelling through potential Barrier, Cold emission, Alpha decay and Geiger Nuttall relation.

Unit-IV **(10 Hours)**

Time dependent perturbation Theory:

Transition probability, Constant and harmonic perturbation, Fermi golden rule and Electric dipole Radiation and Selection Rule, Spontaneous emission Einstein's A, B - co-efficient, Basic principle of laser and Maser

Unit-V **(10 Hours)**

Scattering Theory:

Scattering amplitude and Cross section, Born approximation, Application to Coulomb and Screened Coulomb potential, Partial wave analysis for elastic and inelastic Scattering. Effective range and Scattering length, Optical theorem, Black Disc Scattering, Hard sphere Scattering, Resonance Scattering from square well potential

BOOKS:

1. Quantum Mechanics - S. Gasiorowicz
2. Quantum Mechanics - J. Sakurai
3. Quantum Mechanics - R. Shankar
4. Quantum Mechanics - S.N. Biswas
5. Quantum Mechanics - A. Das
6. Quantum Mechanics - A. Ghatak and S. Lokanathan
7. Advanced Quantum Mechanics - P. Roman
8. Quantum Mechanics (Non Relativistic theory) - L.D. Landau and E. M. Lifshitz
9. Elementary Theory of Angular Momentum -M.E. Rose
10. Principles of Quantum Mechanics -P.A.M. Dirac

PH51108 (STATISTICAL MECHANICS)
Marks-100

UNIT-I **(10 Hours)**

Classical statistical mechanics:

Binomial Distribution of probability, Variance, Mean Value, Poisson's Distribution, Fluctuation, Variance, Mean Value, Gaussian Distribution, Variance, Mean Value and applications, Basic principles and application of classical statistical mechanics, Liouvilles theorem, Micro canonical Ensemble , Review of thermodynamics , Equi-partition theorem, Classical ideal gas , Gibbs paradox.

UNIT-II **(10 Hours)**

Canonical ensemble and Grand canonical ensemble:

Canonical ensemble and energy fluctuation, Grand canonical ensemble and density fluctuation, The chemical potential, Equivalence of canonical and grand canonical ensemble.

UNIT-III **(12 Hours)**

Quantum statistical mechanics:

The density matrix, Ensembles in quantum mechanics, Ideal gas in microcanonical and grand canonical ensemble, Equation of state for ideal Fermi gas , Theory of white dwarf stars, Landau Diamagnetism, de Hass van Alphen effect, Ideal Bose gas, photons and Planck's law, Statistics of photon and phonon gas, Bose- Einstein condensation.

UNIT-IV **(12 Hours)**

Phase Transition:

Thermodynamics description of Phase Transitions, Phase Transitions of second kind, Landau theory of phase transition beyond mean field, Gaussian fluctuation and Ginzberg criteria, Discontinuity of specific heat , Change in symmetry in Phase a transition of second kind.

UNIT-V **(8 Hours)**

Ising model: Definition of the Ising model, equivalence of Ising model to other models, One dimensional Ising model.

BOOKS:

1. Statistical physics - K. Huang
2. Statistical physics - R.K. Pathria
3. Statistical physics - F. Mohling
4. Elementary statistical physics - C.Kittel
5. Statistical physics - Landau and Lifsitz
6. Physics Transitions & Critical Phonomena H.E. Stanly
7. Thermal Physics- C. Kittel
8. Fundamental of statistical & thermal physics- F. Reif
9. Fundamental of statistical mechanics – B. B. Laud

PH51109 (NUMERICAL METHODS AND COMPUTATIONAL TECHNIQUES)

Marks-100

UNIT-I **(8 Hours)**

Root Finding: Errors and approximations in Numerical Computation, significant digits, Numerical solution of algebraic and transcendental equations by simple iteration method, Bisection method, Regula-falsi method (method of false position), Newton-Raphson method .

UNIT-II **(8 Hours)**

Systems of Equations: Solution of simultaneous linear system of equations by Cramer's Rule, Gauss- elimination method, Gauss-Jordan method, Matrix inversion by Gauss-Jordan method, Iterative method for solving linear equations by Gauss-Jacobin and Gauss-Seidel method, Methods for solution of Eigen value problems.

UNIT-III **(8 Hours)**

Interpolation: Newton's forward and backward interpolation formulae, Lagrange's interpolation formula, Newton's divided difference formula, Inverse interpolation.

UNIT-IV **(8 Hours)**

Numerical Differentiation and Integration: Newton's forward and backward interpolation formula, Numerical integration by Trapezoidal rule, Simpson's rule, Gaussian quadrature formulae (2-point,3-point and 4-point), Numerical solution of ordinary differential equation using Taylor Series method, Euler method, Modification of Euler's method, Picard's method, Runge-Kutta method of order two and four,

UNIT-V **(8 Hours)**

Computational Methods:

Introduction to Unix, C/C++ Programming, Fortran and MATLAB, Latex, Elementary treatment of Monte Carlo Method, Solutions to Nonlinear Equations.

BOOKS:

1. S. Rajasekaran, "Numerical methods in Science and Engineering: a practical approach", S. Chand and company Ltd., New Delhi.
2. T. Veerarajan and T. Ramachandran, "Theory and problems in Numerical methods", Tata McGraw-Hill Publications, New Delhi.
3. J. H. Mathews, "Numerical methods for Mathematics, Science and Engineering", PHI publication
5. Atkinson K. E., "Numerical Analysis" John Wiley (Asia)
5. Chapra S. C. and Canale R. P., "Numerical Methods for Engineers", Tata McGraw Hill Press
6. W. H., Teukolsky S. A., Verlling W. T. and Flannery B. P., "Numerical Recipes in C++", Cambridge
7. Wong S. S. M. "Computational Methods in Physics", World Scientific
8. Introduction to MATLAB 7.4, William J Palm III, Tata Mc Graw-Hill Publications, New Delhi.
9. Computer Programming in Fortran 77, V. Rajaraman, Phi Learning.
10. Balagurusamy : "C Programming" Tata McGraw-Hill
11. Y. Kanitkar – "Let us C" BPB Publisher
12. C. Xavier –"Fortran 77 and Numerical Methods", New Age International (P) Ltd. Publishers
13. Rudra Pratap-"Getting Started With Matlab: A Quick Introduction For Scientists And Engineers "

PH51210 (NUMERICAL METHODS AND COMPUTATIONAL TECHNIQUES LABORATORY)

Mark 100

Programming Language with Fortran / C/ Matlab:

1. To find the largest or smallest of a given set of numbers
2. To generate and print first hundred prime numbers
3. Sum of an AP series, GP series, Sine series and Cosine series
4. Factorial of a number

5. Transpose of a square matrix
6. Matrix multiplication and addition
7. Evaluation of log and exponentials
8. Solution of quadratic equation
9. Division of two complex numbers
10. To find the sum of the digits of a number
11. Numerical solution of simple algebraic equation by Newton-Raphson Methods
12. Solution of ordinary differential equation by Runge-Kutta Method
13. Numerical integration: Trapezoidal methods, Simpson's method
14. Solution of a transcendental equation
15. Solution of simultaneous linear system of equations Gauss-Jordan method

PH51211 (GENERAL PHYSICS LABORATORY) Marks-100

1. Young's modulus of glass by Cornu's method.
2. Determination of magnetic susceptibility of a paramagnetic solution using Quinck's tube method.
3. Determination of magnetic susceptibility of a paramagnetic solution using Gouy's method.
4. Measurement of dielectric constant by plate capacitor.
5. Calibration of an oscilloscope.
6. Determination of Hall coefficient by Hall's apparatus.
7. Determination of Charge to Mass Ratio of the Electron (e/m) by Thomson's experiment.
8. Study of Hydrogen Spectra (Balmer Series) and determination of Rydberg's constant by constant deviation spectrometer
9. Determination of Surface tension of liquid by capillary rise method and verify Jurin's law.
10. Determination of thermal conductivity of material by Lee's Disc method.