Master of Science in Physics

(I – IV Semester)

SYLLABUS

With Effect From

2025-26 and onwards…

DEPARTMENT OF STUDIES IN

PHYSICS

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REVISED SYLLABUS

Distribution of Courses/Papers in Postgraduate Programme I Semester as per Choice Based Credit System (CBCS) Proposed for
PG Program in Physics

M.Sc. I – SEMESTER

Paper code	Paper& Title	Credit	Teaching Hours/Week			Duration of exam (SEE) (Hrs)	Marks		Total
			L	T	P		Internal	SEE	
HCT 1.1	Mathematical Methods of Physics	4	4	-	-	3	20	80	100
HCT 1.2	Classical Mechanics	4	4	-	-	3	20	80	100
HCT 1.3	Atomic, Molecular & Optical Physics	4	4	-	-	3	20	80	100
	Softcore(Choose any one)								
SCT 1.1	Electronics	4	4	-	-	3	20	80	100
SCT 1.2	Nanoscience								
HCP 1.1	Atomic, Molecular & Optical Physics Lab	4	-	-	8	3	20	80	100
SCP 1.1	Electronics Lab	4	-	-	8	3	20	80	100
		24	-	-	-	-	120	480	600

REVISED SYLLABUS

Department Name: Physics

Semester - I

Course Title: Mathematical Methods of Physics	**Course Code:**HCT1.1
Total Contact Hours: 60 Hours	**No. of Credits:** 04
Internal Assessment Marks: 20	**Duration of SEE :**03 Hours
SEE Marks: 80	

Course Outcomes (COs):

At the end of the course, students will be able to:
1. Solve differential equations of first & second orders.
2. Apply different transforms to solve mathematical problems of interest in science and engineering.
3. Solve different physical problems which contain complex variables.
4. Apply integral transforms to solve mathematical problems of interest in physics.
5. Formulate and express a physical law in terms of tensors, and simplify it by use of coordinate transforms.

Unit -115 hours
Differentialequations: Ordinarydifferentialequations:Firstorderhomogeneousandnon-homogeneousequationswithvariablecoefficients.Secondorderhomogeneous and non-homogeneous equations with constant and variablecoefficients.
Specialfunctions: Legendre functions: Legendre polynomials, Rodrigue's formula generatingfunctionandrecurrencerelations,orthogonalityof Legendreequations. Besselfunctions:Besselfunctionsofthefirstkindrepresentationrelationsorthogonality. Hermitefunctions:Hermitepolynomials,generatingfiverecurrencerelations,orthogonality. Laguerrefunctions:LaguerreandassociatedLaguerrepolynomials,recursionrelations, orthogonality.
Complexanalysis: Complex Numbers, Functions of a complex variable, Properties of analytic functions, Cauchy's integral theorem, singularities of an analytic function,Cauchy'sresiduetheorem,evaluation ofdefiniteintegrals.

Unit 215 hours
Fourierseries: Fourier'stheorem.CosineandSineseries.Changeofinterval.Complex form of Fourier series. Fourier integral. Extension to manyvariables. **Fourier transforms:** Introduction, Properties, Fourier transform of a derivative, Fourier transform of functions of two and three variables, Finite Fourier transforms, Somephysical applications.
Laplacetransforms: Introduction, Properties, Laplace transform of the derivative of a function,periodicfunction and some special functions, Inverse Laplace Transform-Properties and Evaluation, Convolution Theorem.

Unit 315 hours
Linear Algebra: Scalar Products, real & Complex Vector Space, Metric Spaces, linear operator, algebra of linear operators, Norms, Infinite dimensional Vector Space, Hilbert Space.**Matrices**: Cayley-Hamiltonian Theorem, matrix representation of operators, Unitary &Hermitian matrices, diagonalization of matrices, Eigen values & Eigen vectors.
Vectoranalysis: Cartesian and curvilinear coordinate systems; Review of vectoralgebra; vectordifferentiationandintegration;Line,surfaceandvolumeintegrations, some examples; Gauss and Stoke's theorems.

Unit 4	**15 hours**
Grouptheory: Groups,subgroups,classes,Homomorphismandisomorphism,Grouprepresentation, Reducible and irreducible representations, Character of arepresentation,charactertables.Constructionofrepresentations,Representations of groups and quantum mechanics, Lie groups, The threedimensional rotation group SO(3), The special unitary groups SU(2) andSU(3), The irreducible representations of SU(2), Representations of SO(3)fromthoseofSU (2)	
Tensors: Coordinate transformation in linear spaces, definition and types oftensors,ContravariantandCovarianttensors,symmetricandantisymmetrictensors.Tensoralgebra:Equality,additionandsubtraction,tensormultiplication,outerproduct;contractionofindices,innerproduct,quotienttheorem,Kroneckerdelta,metrictensor,Christoffel symbols.	

Prescribed books
1. Mathematical Physics by Satya Prakash, S Chand and Sons, New Delhi, 2019.
2. Mathematical Methods for Physicist, George Arfken and Hans J Academic press San Diego, 1995.

References:
1. Advanced Engineering Mathematics by H.K. Dass, S Chand and Company Ltd., 2013.
2. Mathematical Physics by B. D. Gupta, 3rd Ed, Vikas Publishing House Pvt. Ltd. 2004.
3. Advanced Engineering Mathematics, Erwin Kreyszig, 10th Edition, 2011.
4. Linear Algebra – Seymour Lipschutz, Schaum Outlines Series, 4th Edition, 2009.

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REVISED SYLLABUS

Department Name: Physics

Semester - I

Course Title: Classical Mechanics	**Course Code:** HCT1.2
Total Contact Hours: 60 Hours	**No. of Credits:** 04
Internal Assessment Marks: 20	**Duration of SEE :** 03 Hours
SEE Marks: 80	

Course Outcomes (COs):

At the end of the course, students will be able to:

1. Solve the problems of motion of particle in a central force field.
2. Develop the knowledge of quantitative and qualitative methods for understanding moving coordinate systems and motion of a rigid body.
3. Organize the importance of Lagrangian concepts of motion.
4. Describe the Variational Principle, Hamilton's equation of motion and Poisson brackets.
5. Interpret the concepts of elastic scattering, inelastic scattering and small oscillations.

Unit -1	15 hours

Review of Newtonian mechanics: Newton's law's of motion, Mechanics of single particle and system of particles: Conservation of linear momentum, energy and angular momentum (quantitative).

Motion in a Central Force Field: Equivalent one body problem (quantitative), Motion in a central force field (quantitative),, General features of the motion (qualitative), Motion in an inverse square law force field (qualitative), Equation of the Orbit (quantitative), Nature of the orbits, Kepler's laws of planetary motion (Deduction of third law).

Moving Coordinate systems: Rotating coordinate systems, Coriolis force, Motion on the Earth (qualitative), Effect of coriolis force on freely falling particle (quantitative).

Unit -2	15 hours

Motion of a Rigid body: Euler's Theorem, Angular Momentum and Kinetic energy (quantitative), Inertia Tensor, Euler's equations of motion (quantitative), Torque free motion (quantitative), Euler's angles (qualitative), motion of symmetric top (quantitative), Nutational Motion (quantitative).

Lagrangian Formulation

Constraints and its types, generalized co-ordinates, D' Alembert's principle (expression for Virtual displacement, generalised velocity, virtual work, generalized force), Lagrangian equation of motion (quantitative) and its importance, Symmetries and the laws of conservation, cyclic co-ordinates, Velocity dependent potential of electromagnetic field, Rayleigh dissipation function, Simple applications.

Unit -3	15 hours

Hamilton's Formulation

Configuration space, Basics of Variational principle, Hamilton's Principle, Hamilton's equations of motion (qualitative) and some applications, Phase space.

Canonical transformation, Condition for transformation to be canonical, Poisson Brackets, Canonical equations in terms of Poisson Bracket notation, Hamiltonian-Jacobi equations, Numericals.

Unit -4	15 hours

Two body Collisions and Small Oscillations

Elastic Scattering: Laboratory and centre of mass systems (quantitative), Kinematics of elastic scattering in laboratory systems, Inelastic Scattering, Cross section (quantitative), Rutherford formula (quantitative).

Theory of small oscillations, General case of coupled oscillations, Eigenvectors and Eigen frequencies, The orthogonality of eigenvectors, Normal coordinates, Small oscillations of particles on string.

References:

1. Classical Mechanics by H Goldstein, Third Edition, Pearson India, 2011.
2. Introduction to Classical Mechanics by R G Takwale and P S Puranik, Tata McGraw-Hill, 1979.
3. Classical Mechanics by N C Rana and P S Joag, Tata McGraw, 1991.
4. Classical Mechanics by J. C. Upadhyaya, Himalaya Publishing House, 2014.
5. Classical Dynamics of particles and systems by J. B. Marian, Academic Press, New York, 1965

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REVISED SYLLABUS

Department Name: Physics
Semester - I

Course Title: Atomic, Molecular & Optical Physics	**Course Code:**HCT1.3
Total Contact Hours: 60 Hours	**No. of Credits:** 04
Internal Assessment Marks: 20	**Duration of SEE :**03 Hours
SEE Marks: 80	

Course Outcomes (COs):

At the end of the course, students will be able to:

1. Apply the concepts of atomic physics to analyse and interpret spectra of atoms.
2. Apply the concepts of molecular physics to analyse and interpret spectra of molecules.
3. Apply the concepts of laser physics to understand the laser systems and their applications.

Unit -1	15 hours

Atomic Physics

Brief review of early atomic models of Bohr and Sommerfeld, Spectrum of hydrogen, Rydberg atoms (brief treatment), Quantum states of an electron in an atom, Spin orbit interaction – Expression for term shift, Hydrogen fine structure, Spectrum of helium – ortho and para states.

Fine structure in alkali spectra, Hyperfine structure – Isotope and nuclear spin effects. Zeeman effect – Types, Magnetic interaction energy, Zeeman splitting in Sodium D-lines, Paschen-Back effect – Magnetic interaction energy, Paschen-Back splitting in Sodium D-lies, Stark effect – Types, Stark effect in hydrogen – weak and strong fields,

Coupling Schemes : Coupling schemes: LS and jj coupling – Expression for interaction energy, multiplets splitting and Lande interval rule

Unit -2	15 hours

Rotational and Vibrational spectroscopy

Rotational/microwave Spectra: Types of molecules based on rotation, Rotational spectra of rigid diatomic molecule, Intensities of spectral lines, Effect of isotopic substitution, Spectrum of non-rigid rotator, Instrumentation for rotational spectroscopy – Microwave spectrometer, Chemical analysis by microwave spectroscopy, Microwave radiation for microwave oven (qualitative).

Vibrational/infrared spectra: Vibrating molecule as a simple harmonic oscillator, Anharmonic oscillator, Diatomic vibrating rotator, Analysis by infrared techniques, Instrumentation for Vibrational spectroscopy – infrared spectrum

Unit -3	15 hours

Raman and Electronic Spectroscopy

Raman Spectra: Classical and Quantum Theories of Raman effect, experimental technique, Pure rotational Raman spectra of linear& symmetric top molecules, Raman activity of vibrations, Rule of mutual exclusion, Vibrational Raman spectra. Comparison of infrared and Raman spectroscopy. Applications of Raman spectroscopy (qualitative).

Electronic Spectra: Born-Oppenheir approximation, Vibrational coarse structure: progressions, Intensity of Vibrational-Electronic spectra: Franck-Condon principle, Rotational fine structure of Electronic-Vibration transitions, Dissociation and predissociation, Chemical analysis by electronic spectroscopy, Instrumentation for electronic spectroscopy: UV-Vis spectrometer (single and double beam). Jablonski diagram - fluorescence and phosphorescence, Selection rules.

Unit 4	15 hours

Optical Physics

Coherence of light - spatial and temporal coherence, Characteristics of a laser beam, Laser light versus ordinary light, Induced absorption, spontaneous and stimulated emissions, Einstein's coefficients, Population inversion and methods, Metastable states, Beer's law – attenuation of light, Theory of amplification of light – Gain coefficient, Threshold condition for light amplification, Requisites of laser system – active medium, energy source & optical resonant cavity, Three level lasers versus Four Level lasers with examples, Laser Systems: (a) Nd-YAG Laser (b) Carbon Dioxide Laser (c) Excimer Laser (d) Dye Lasers (e) Free-Electron Laser, Applications of Laser (qualitative): (a) Holography (b) Defense – Ranging (c) Laser Cooling (d) Isotope separation (e) Eye Surgery: LASIK.

Prescribed books

1. Concepts of Modern Physics by Arthur Beiser, Shobhit Mahajan and S Rai Choudhury, McGraw Hill Education, 7th Edition, 2015.
2. Atomic and Molecular Spectra by Raj Kumar, Kedar Nath Ram Nath (KNRN) Publishers, 5th Edition – Reprint 2019.

References:

1. Introduction to Atomic Spectra by H.C. White, McGraw-Hill Education / Asia, 1963.
2. Concepts of Atomic Physics by S.P. Kuila, New Central Book Agency (P) Ltd. (NCBA), Kolkata, January 2018.
3. Fundamentals of Molecular Spectroscopic by C N. Banwell and E. M. McCash, Tata McGraw-Hill Publishing Co., Ltd., New Delhi, 5th Edition, 2008.
4. Molecular Spectra by Herzberg Gerhard, D.Van Nostrand Company Inc., Vol.I, 2005.
5. Laser Fundamentals by William T. Silfvast, Cambridge University Press, 2nd Edition, 2004.

REVISED SYLLABUS

Department Name: Physics
Semester - I

Course Title: Electronics	Course Code:SCT1.1
Total Contact Hours: 60 Hours	No. of Credits: 04
Internal Assessment Marks: 20	Duration of SEE :03 Hours
SEE Marks: 80	

Course Outcomes (COs):

At the end of the course, students will be able to:

1. Explain basic working principles and governing equations of electronic devices.
2. Design and analyse the electronic circuits.
3. Apply the knowledge for the development and design of new methods to determine semiconductor parameters and devices.

Unit -1	15 hours

Transistor

Transistor action, configurations (CE, CB & CC) and relation between α & β. BJT transistor modelling, Hybrid equivalent model, Voltage divider bias, CE and Emitter follower configurations, Frequency response. Hybrid model equivalent circuit concept. Concept of feedback criteria for oscillation. Oscillator operation, Phase shift oscillator, Wein-bridge oscillator, FET amplifiers: FET small signal model, Biasing of FET, Common drain common gate configurations, Operational characteristics of MOSFET.

Unit -2	15 hours

Operational Amplifier: Basic Information of Op-Amp, Characteristics of an ideal operational amplifier - comparison with 741, IC Op-Amp 741, open loop Op-Amp configurations – Differential, inverting and non-inverting amplifiers (qualitative). Op-Amp as a feedback amplifier – negative feedback, feedback configurations, voltageseries feedback amplifiers – closed loop voltage gain, input & output impedance, bandwidth and voltage follower, differential amplifiers.

Applications of an Operational Amplifier:

Linear Applications – DC & AC amplifiers, Summing, Scaling, Averaging amplifiers, Ideal and Practical Differentiator, Integrator, V-I and I-V convertors. Non- Linear Applications- Comparators, Wave generators, 555 timer - Astable & Monostable Multivibrator, Schmitt Trigger – IC 741 & 555 timer.

Unit -3	15 hours

Digital Electronics

Boolean operations and expressions, Boolean analysis of logic gates, simplification of Boolean expression. Karnaugh map: two, three and four variable map, product of sums (POS) and sum of products (SOP) simplification. Families of logic gates, implementation of Boolean expressions. Logic gates: AND, OR, NAND and NOR gates, AND-OR and NAND-NOR implementation of Boolean expression, Logic gate operation with pulse waveforms

Unit -4	15 hours

Sequential and Conversion circuit

Latches flip flop, RS and JK flip-flops, The Master-Slave JK Flip-Flop, D and T flipflops. Counters - Binary Ripple Counters, Synchronous Binary counters, counters based on Shift Registers, introduction to A/D and D/A conversion circuits, filtering and sampling, quantisation, quantization error, flash converter and dual slop converter, conversion errors. Binary weighted converter, R-2R ladder converter, characteristic properties. Introduction to microprocessor.

References :

1. Physics of Semiconductor Devices by S M Sze, Kwok K Ng John Wiley 3rd Ed. 2007.
2. Microelectronics, J Millman and Arvin Grabel, Mc Graw Hill 2nd Edition 1987.
3. Introduction to electronics, K J M. Rao. Oxford 1976.
4. Integrated electronics, Milmann and Halkias. Mc Graw Hill 1991.
5. Electronic Fundamentals and Application, J D Ryder. Ed. Rev 1966.
6. Basic Electronics B L Theraja S Chand 1st Ed. 1985.
7. Op-Amps and Linear Integrated Circuits, R Gayakwad, PHI Publications, 2000.
8. Operational Amplifiers and Linear IC's, F Robert Coughlin, F Frederick, PHI, 1994.
9. Digital Principles and Applications, A P Malvino and D Leach, TMH 1991.
10. Digital fundamentals, Thomas L Floyd, 8th edition, Pearson Education 2003.

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REVISED SYLLABUS

Department Name: Physics
Semester - I

Course Title: Nanoscience	**Course Code:**SCT 1.2
Total Contact Hours: 60 Hours	**No. of Credits:** 04
Internal Assessment Marks: 20	**Duration of SEE :**03 Hours
SEE Marks: 80	

Course Outcomes (COs):

At the end of the course, students will be able to:

1. To get brief introduction about the nanomaterials and nanotechnology. Also understand the size and shape dependent on the physical properties of materials at nanoscale.
2. Gain knowledge about the importance of size distribution, size selectivity, self-assembly on properties of nanoscale materials. Understand various nanofabrication techniques used to synthesis nanomaterials.
3. Analyze the advantages of using nanotechnology for various electronic applications.
4. Understand molecular recognition, molecular encapsulation, nanocomposites, nanoreactors, nano porous materials for catalysis and smart applications.
5. Gain knowledge about nanomedicine, targeted drug delivery, diagnosis and treatment. Understand bio-inspired, biomimicking and bio-compatible nano-materials.

Unit -1	**15 hours**

Nanomaterials: Introduction, history of nanomaterials, concepts of nanoscience & nanotechnology, importance of nanotechnology. Physics of nanomaterials – size and surface effects, variation of density of states, classification of nanomaterials – Shape & intrinsic - zero dimensional, one-dimensional & two-dimensional nanostructures. Size and shape dependent properties of nanomaterials and societal implications. Metal nanocrystals.

Metal and Semiconductors Nanomaterials: Plasmons, Surface Plasmon Resonance (SPR) - Gold, silver & iron nanoparticles. Quantum Dots, Quantum wires and Quantum wells - importance. Variation of energy gap with particle size. Organic capping, core shell structures and self-assembly-Intermolecular forces

Unit -2	**15 hours**

Metal and Semiconductors Nanomaterials; Properties Nanomaterials: Melting Point and Heat Capacity, Electronic and Optical properties- (Quantum Confinement of Superlattices and Quantum Wells – Dielectric Constant of Nanoscale Silicon – Doping of a Nanoparticle – Excitonic Binding and Recombination Energies – Capacitance in a Nanoparticle) and Magnetic properties.

Methods for Preparation of Nanomaterials: Top-down and Bottom-up approaches: Solution growth and gas phase techniques chemical vapor deposition (CVD), ion sputtering, laser ablation, and chemical precipitation. Carbon Nanoclusters: Introduction, Fullerene, Graphene and carbon nanotubes (CNT) – properties and applications - Solar cells, composite materials, sensors.

Unit -3	**15 hours**

Nanoelectronics devices

Advantages of nano electrical and electronic devices, micro and nano-electromechanical systems – sensors, actuators, optical switches, bio-MEMS diodes and nano-wire transistors - data memory lighting and displays, filters (IR blocking) – quantum optical devices – batteries - fuel cells and photo-voltaic cells – electric double layer capacitors – lead-free solder – nanoparticle coatings for electrical products

Unit -4	**15 hours**

Nanotechnology for Nanomedical

Drug deliveries, drug delivery system, nanoparticle in drug deliveryavailable applications, nanotechnology future application understanding for treatment. Manufacture of nanoparticles, nanopowder and nanocrystals, targeting ligands applications of nanoparticle in drug delivery, cancer treatment, tissue regeneration, growth and repair, impact of drug discovery and development.

References:

1. Nanolithography and patterning techniques in microelectronics, David G. Bucknall, Wood head publishing 2005
2. Transport in Nanostructures, D.K. Ferry and S.M. Goodmick, Cambridge university press 1997.
3. Optical properties of solids, F. Wooten, Academic press 1972
4. Micro and Nanofabrication, Zheng Cui, Springer 2005
5. Nanostructured materials, Jackie Y. Ying, Academic press 2001
6. Nanotechnology and nanoelectronics, W.R, Fahrner, Springer 2005
7. Hand book of Nanoscience, Engineering, and Technology, William A. Goddard, CRC press 2003.
8. Nanoelectronics and Information Technology, Rainer Waser, WileyVCH 2003.
9. The MEMS Handbook Frank Kreith, CRC press 2002.
10. Charles P. Poole, Jr., Frank J. Owens, "Introduction to nano technology", Wiley, 2003.
11. Gunter Schmid, "Nanoparticles: From Theory to Applications", WileyVCH Verlag GmbH & Co., 2004.

REVISED SYLLABUS

Department Name: Physics

Semester - I

Course Title: Atomic, Molecular & Optical Physics Lab	**Course Code:** HCP1.1
Total Contact Hours: 60 Hours	**No. of Credits:** 04
Internal Assessment Marks: 20	**Duration of SEE :** 04 Hours
SEE Marks: 80	

Course Outcomes (COs):

At the end of the course, students will be able to:

1. Design experiments to study atomic spectra of atoms.
2. Analyse spectra of molecules.
3. Use laser light to determine properties of light.

List of Experiments

1. Wavelength of sodium light using Michelson's Interferometer.
2. Determination of doublet separation by using Michelson's Interferometer.
3. Determination of Rydbereg constant using diffraction grating and hydrogen discharge tube.
4. Study of absorption spectrum of iodine vapour and determination of force constant.
5. Talbot bands.
6. Constant deviation Spectrometer.
7. Verification of Hartman's formula.
8. Study of Zeeman effect
9. Study of Stark effect
10. Analysis of rotational spectrum
11. Analysis of Vibrational spectrum
12. Verification of Beer's law.
13. Temporal and spatial coherence of laser light.
14. Wavelength of Laser light by single slit diffraction method.
15. Wavelength of Laser light by double slit interference method.
16. Diffraction halos (Lycopodium powder particle size determination).
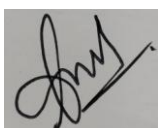17. Ultrasonic velocity in liquids using Spectrometer / spectral shift.

Note:

1. Minimum of EIGHT experiments must be carried out.
2. Experiments may be added as and when required with the approval of BoS.

References:

1. University Practical Physics by D.C. Tayal, Himalaya Publishing House, First Millenium Edition, 2000.
2. Advanced Practical Physics for students by B.L. Flint and H.T. Worsnop, Asia Publishing House, 1971.
3. A Text Book of Practical Physics, I. Prakash & Ramakrishna, Kitab Mahal, 11th Edition, 2011.
4. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, Heinemann Educational Publishers, 4th Edition, 1985.

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REVISED SYLLABUS

Department Name: Physics
Semester - I

Course Title: Electronics Lab	**Course Code:**HCP12
Total Contact Hours: 60 Hours	**No. of Credits:** 04
Internal Assessment Marks: 20	**Duration of SEE :**04 Hours
SEE Marks: 80	

Course Outcomes (COs):
At the end of the course, students will be able to:
1. Use Cathode Ray Oscilloscope for electrical measurements.
2. Design electrical/electronic devices using diodes/transistors and analyse their characteristics.
3. Design electronic circuits using OP-AMP and analyse their characteristics.
4. Design electronic circuits using logic gates/ICs and analyse their characteristics.

List of Experiments

1. Studies on Cathode Ray Oscilloscope: DC/AC voltages and frequencies of sine and square signals, Unknown frequencies using Lissageous figures.
2. Full-wave bridge rectifier using diodes: Design and study the performance of CR, L and π type filters.
3. Study of Fixed Bias and Voltage divider bias configuration for CE transistor.
4. Study of Astable multivibrator using transistors: Frequency studies.
5. To design inverting amplifier using Op-amp (741, 351) & to study its mathematical operations.
6. To design non-inverting amplifier using Op-amp (741, 351) & study frequency response.
7. Design and study frequency response Weinbridge Oscillator using Op-Amp.
8. Design and construction of Logic gates using diodes and transistor and verify their truth table.
9. Construction of Karnaugh map for three and four variables.
10. (a) To convert Boolean expression into logic circuit & design it using logic gate ICs.
    (b) To minimize a given logic circuit.
11. Flip-Flop: Design of JK and RS flip flop circuit using IC 7412and study the truth table.
12. Study of A/D and D/A conversion circuits.

Note:
1. Minimum of EIGHT experiments must be carried out.
2. Experiments may be added as and when required with the approval of BoS.

Reference Books:
1. Electronic devices and circuit Theory by R.Boylstead and Nashalsky, Pearson, 10th Edition, 2009.
2. Digital Principles and Applications, A P Malvino and D Leach, TMH 1991.
3. Operational amplifiers and linear IC's by F.Robert Coughlin and Frederick F Driscoll.
4. Instrumental Methods of Analysis : (6th Edition) H.H. Willard, L.L.Merrit, J.A. Dean & F.A. Settle, J.K. Jain for CBS Publishers (1986).

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