B.Sc. PHYSICS
SEMESTER – I & II

Syllabus for – UG B.Sc. Programmes
Course – CBCS

DETAILED CURRICULUM:
Core Course – PHYSICS
PHY-CC -101 (Theory)
PHY-CC -102 (Practical)

- The course content has been designed on **Semester pattern**
- There shall be **01 Theory** paper having **05 Units**. (4 lectures in a week set up by departments)
- There shall be **02 Practicals** 6 lectures) in a week set up by departments
- There shall be **01 Theory paper** of **70 marks** and 2.30 hours duration in University Examination
- There shall be **01 Practical Paper (one experiment from each section i.e. two experiment)** of 10**0 marks** and 04:00 hours duration in University Examination
- **There shall be Continuous Internal Evaluation of 30 Marks for theory course.**

Course Type	Paper No.	Title of Paper	Total Marks EXT.+ INT* = TOTAL	Passing Standards EXT.+ INT= TOTAL	Total Teaching Hours (in 15weeks)	Credits
Core Course Theory -101	Paper PHY-CC- 101	Vector and Classical Mechanics, Interference and Diffraction, Properties of Matter and Simple Harmonic Motion, Diode Circuit and Network Theorem, X-Ray	70+ 30* = 100	28+12* =40 marks	60 hrs	04
Core Course Practical -102	Paper PHY-CC– 102	PRACTICAL PHYSICS-1	EXT 100	40 marks	90 hrs	06
	TOTAL		**170+30= 200**		**150 hrs**	**10**

B.Sc. PHYSICS
SEMESTER – I

Credit: 04

Syllabus for – UG. B.Sc. Programmes Course – CBCS

Course No – PHY.-CC – 101 (Theory)

Title of the Paper: Vector and Classical Mechanics, Interference and Diffraction, Properties of Matter and Simple Harmonic Motion, Diode Circuit and Network Theorem, X-Ray

Marking Scheme:

Semester End Examination:	70
Internal Examination:	30
TOTAL	**100**

Unit	Detailed Syllabus	Teaching Hours	Marks/ Weight
Unit-1	**Vector and Classical Mechanics** • Surface area as vector • Scalar triple product • Geometrical interpretation of scalar triple product • Rotational behavior of scalar triple product • Vector triple product • Multi vectors product • Reciprocal vector • Newton's Laws of motion • Mechanics of a particle • Equation of motion of a particle a) Motion under constant force b) Motion under a force which depends on time only c) Motion under a force dependent on distance only d) Motion of a particle subjected to a resistive force • Examples	12 hrs	14 marks
Unit-2	**Interference and Diffraction** • Condition of interference • Interference by thin film • Interference due to transmitted light • Interference by variable thickness (wedge-shaped) film • Types of interference : Wave front division and Amplitude division • Wave front division: Fresnel Bi-prism • Amplitude division: Newton's ring • Fresnel's Assumptions • Fresnel Half Period Zones and Rectilinear propagation of light • Positive and Negative Zone plate • Fraunhoffer diffraction at a single slit • Intensity distribution in diffraction pattern of a single slit in fraunhoffer diffraction • Examples	12 hrs	14 marks

Unit-3	**Properties of Matter and Simple Harmonic Motion** • Definition of stress and strain • Hooke's law and elastic constant • Strain energy • Restoring couple- required to produce torsion and elastic wire with derivation • Relation between isothermal and adiabatic elasticities of gases • Searl's relation between elastic constant and derivations • Characteristics of simple harmonic motion • Graphical Method: Composition of two linear simple harmonic motions in the same direction and at right angles with each other • Analytical Method: Composition of two linear simple harmonic motions in the same direction and at right angles with each other • Lissaious figures • Compound pendulum and derivation of time period • Examples	12 hrs	14 marks
Unit-4	**Diode Circuit and Network Theorem** • The Half wave Rectifier • The Fullwave Rectifier • The Bridge Rectifier • Types of Filter • Super-Position Theorem • Norton's Theorem • Thevenin's Theorem • Examples	12 hrs	14 marks
Unit-5	**X-Ray** • Origin of X-ray • Properties of X-ray • Wave nature of x –ray • Laue spot • Bragg's law • Bragg Spectrometer • Absorption of X-ray • Application of X-ray • Compton effect • Examples	12 hrs	14 marks
		60 hours	**70 marks**

B.Sc. PHYSICS
SEMESTER – I

Credit: 06

Syllabus for – UG. B.Sc. Programmes Course – CBCS

Course No – PHY.-CC - 102

Title of the Paper: Physics Practical

Marking Scheme:	Semester End Examination:	100
	TOTAL	**100**

DETAILED CURRICULUM FOR PRACTICAL

Teaching Hours: 06 hours per week
Credits: 06

Detailed Syllabus for Physics practical

SECTION A(General Physics)

1 To determine Young's modulus of a given wire.
2 To determine expansion coefficient of pressure of constant volume air thermometer and to determine absolute zero temperature and atmospheric pressure.
3 To determine moment of inertia of body with different shapes using bi-filler suspension.
4 Calibration of spectrometer with help of prism spectra.
5 To determine wavelength of sodium light using Newton's ring.
6 To determine refractive index of liquid by using liquid lens method.
7 To determine 'g' by bar pendulum .

SECTION B(Electricity and Magnetism)

1. To determine wattage and temperature of a given lamp.
2. To verify tangent's law using tangent galvanometer.
3. To determine low resistance using projection method.
4. To determine magnetic moment and pole strength using deflection magnetometer.
5. To study bridge rectifier.
6. To determine Impedance of coil using series L-R ac circuit.
7. To study characteristics of thermistor.

***Students have to prepare their Practical journals of Physics for Laboratory work and they have to submit certified journals in the University practical exams. Students are not allowed in the laboratory without certified journals in the University practical* examination.**

References Books

1) Mathematical physics by H.K.Das &Dr. Rama Verma
2) Mathematical physics by Rajput
3) Nirav college physics paper :101
4) Nirav college physics paper :102
5) Introduction to classical mechanics by R.G.Takwale & P.S. Puranik
6) Classical Mechanics & Properties of Matter by A.B.Gupta
7) A textbook of optics by Dr. N. Subrahmanyam & Brij Lal
8) Optics by Singh & Agarwal
9) Properties of matter by D.S.Mathur
10) Electricity and Magnetism by D.N.Vasudev
11) Electric circuit analysis by Soni & Gupta
12) Electricity and Magnetism by R.Murugeshan
13) Nirav college physics paper :202
14) Modern physics by Murugeshan
15) Modern physics by Basier
16) Engineering physics by Dr. M.N. Avadhanulu (S.CHAND'S) Advanced practical physics by Chauhan And Singh
17) B.Sc. Practical Physics by C L Arora
18) Practical Physics by Kumar and Gupta

B.Sc. PHYSICS
SEMESTER – II

Core Course - PHYSICS
PHY-CC-201(Theory)
PHY-CC-202(Practical)

- The course content has been designed on **Semester pattern**
- There shall be **01 Theory** paper having **05 Units** (4 lectures in a week set up by departments)
- There shall be **02 Practical** (6 lectures) in a week set up by departments
- There shall be **01 Theory paper** of **70 marks** and 2.30 hours duration in University Examination
- There shall be **01 Practical Paper (one experiment from each section i.e. two experiments)** of 10**0 marks** and 04:00 hours duration in University Examination
- **There shall be Continuous Internal Evaluation for theory course of 30 Marks**

Course Type	Paper No.	Title of Paper	Total Marks EXT.+ INT* = TOTAL	Passing Standards EXT.+ INT= TOTAL	Total Teaching Hours (in 15weeks)	Credits
Core Course Theory -201	**Paper PHY-CC–201**	Thermodynamics and entropy, Magnetism and Solid State Physics, AC Bridge and DC Circuit, Modern Physics and Radioactivity, Relativity	70 + 30* = 100	28 + 12* = 40 marks	60 hrs	04
Core Course Practical -202	**Paper PHY-CC–202**	PRACTICAL PHYSISC-2	EXT 100	40 marks	90 hrs	06
	TOTAL		**170+30= 200**		**150 hrs**	**10**

B.Sc. PHYSICS
SEMESTER – II

Teaching Hours: 04 hours
Credit: 04

Syllabus for – UG. B.Sc. Programmes Course – CBCS

Course No – PHY.-CC – 201 (Theory)

Title of the Paper: Thermodynamics and Entropy, Magnetism and Solid State Physics, AC Bridge and DC Circuit, Modern Physics and Radioactivity, Relativity

Marking Scheme:

Semester End Examination:	70
Internal Examination:	30
TOTAL	**100**

Unit	Detailed Syllabus	Teaching Hours	Marks/ Weight
Unit-1	**Thermodynamics and entropy** • Zeroth,first and second law of thermodynamics • Specific heat of gases • Application of first law of thermodynamics • Adiabatic equation of perfect gas • Carnot's theorem • Thermodynamic scale of temperature • Identity of perfect gas and absolute scale of temperature • Change of entropy in reversible and irreversible process • Principle of increase of entropy and disorder • Third law of thermodynamics in terms of entropy • Temperature – Entropy diagram • Calculation of entropy for a perfect gas and stream • Impossibility of attaining the absolute zero • Maxwell's relations • Derivation of Clausius - Claperon equation of a gas • Examples	12 hrs	14 marks
Unit-2	**Magnetism and Solid State Physics** • Classification of Magnetic Materials: Diamagnetic, Paramagnetic, Ferromagnetic • Magnetic Properties of materials • Langevin's theory for diamagnetic materials(Classical) • Hysteresis loop for ferromagnetic substances • Ferromagnetic domains • Tangent law • The concept of lattice • Primitive cell and unit cell • 7 crystal systems and 14 Bravis lattice • Elementary crystal structures: Nacl, ZnS, Diamond, H.C.P. • Atomic packing factors • Examples	12 hrs	14 marks

Unit-3	**AC Bridge and DC Circuit** • A.C. Bridge introduction and general Bridge balance equation • De-sautty Bridge • Maxwell Bridge i. Induction bridge ii. LC bridge • Anderson Bridge • R.L. Circuit in series growth and decay • R.C. circuit in series growth and decay • Series LCR circuit and its analysis and condition of oscillation • Quality factor • Examples	12 hrs	14 marks
Unit-4	**Modern Physics and Radioactivity** • Thermal radiation • Black body radiation • Planck's radiation law • Rayleigh – Jeans law • Wien's law and Wien's Displacement law • De Broglie hypothesis • Uncertainty principle • Laws of Disintegration : Activity and its units , Half-life , Average life (Mean) • Radioactive series • Law of successive Disintegration • Radioactive Equilibrium: 1) Permanent or secular equilibrium 2) Transient equilibrium • Examples	12 hrs	14 marks
Unit-5	• **Relativity** • Frame of reference • Newtonian Relativity • Galilean transformation equations • The Ether hypothesis and the Michelson-Morley experiment with result • Postulates of special theory of relativity • The Lorentz transformation equations • Length contraction and Time dilation • Mass energy equivalence ($E=mc^2$) • Examples	12 hrs	14 marks
		60 hours	**70 marks**

B.Sc. PHYSICS
SEMESTER – II

Credit: 06

Syllabus for – UG. B.Sc. Programmes Course – CBCS

Course No – PHY.-CC - 202

Title of the Paper: Practical Physics-2

Marking Scheme:	Semester End Examination:	100
	TOTAL	**100**

DETAILED CURRICULUM FOR PRACTICAL

Teaching Hours: 06 hours per week
Credits: 06

	Detailed Syllabus for Physics
	SECTION A(General Physics)
1	To determine temperature coefficient of thermal conductivity by Lee's method.
2	To determine wavelength of mercury spectral lines with the help of grating method.
3	To determine Poisson's ratio of rubber tube.
4	To study resonator to determine unknown frequency of tuning fork.
5	To determine Melde's tuning fork frequency and to verify laws of vibrating string.
6	To determine radius of curvature of a given lens and refractive index of glass using optical lever method.
7	To determine moment of inertia of a disk using Tortional pendulum.
	SECTION B (Electricity and Magnetism)
1	To determine resistivity of electrolyte using Koholaraus bridge.
2	To determine ratio of magnetic moments of two bar magnets using vibration magnetometer.
3	To determine resistance of galvanometer and Leclance cell using P.O.Box Kelvin-Mens methods.
4	To study magnetic field of coil using Stuart gee galvanometer.
5	To determine self-inductance of a given coil using Anderson bridge.
6	To determine ratio of capacity of two capacitors using desauty bridge.
7	To study parallel resonance of L.C.R. circuit.
	***Students have to prepare their Practical journals of Physics for Laboratory work and they have to submit certified journals in the University practical exams. Students are not allowed in the laboratory without certified journals in the University practical* examination.**

References Books

1. Thermodynamics and statistical physics by J.P. Agarwal
2. Electricity and Magnetism by D.N.Vasudev
3. Electricity and Magnetism by R.Murugeshan
4. Elements of Solid State Physics by S.O.Pillai
5. Nirav college physics
6. Electricity and Electronics by D.C.Tayal
7. Electric circuit analysis by Soni & Gupta
8. Nirav college physics paper :102
9. Modern physics by Murugeshan
10. Modern physics by Basier
11. Modern physics by Aruldas & P Rajagopal
12. Introduction to Nuclear and Particle Physics By V.K.Mittal & R.C. verma
13. Advanced practical physics by Chauhan And Singh
14. B.Sc.Practical Physics by C L Arora
15. Practical Physics by Kumar and Gupta