Govind Guru Tribal University, Banswara

Details of Discipline Centric Core and ElectiveCoursesfor freshers who will be admitted in the session 2023-24

(Separatesheet to beused for each discipline/subject)

Name of University: Govind Guru Tribal University, Banswara

Name of Faculty(ies) : PHYSICS

Name of Discipline/Subject:

Three-YearBachelorDegreeProgram								
					Credits			
#	Level	Semester	Type	Title	L+T		P	Total
1	5	I	DCC	Electricity & Magnetism	3	1	2	6
2	6	II	DCC	Mechanics	3	1	2	6
3	6	III	DCC	Optics	3	1	2	6
4	6	IV	DCC	Electronics	3	1	2	6
5	7	V	DSE	Thermo Dynamics	3	1	2	6
6	7	VI	DSE	Analog & Digital Electronics	3	1	2	6

Rajendra Prasad Agarwal
Registrar
Govind Guru Tribal University
Banswara (Rajasthan)

GOVIND GURU TRIBAL UNIVERSITY
BANSWARA

B.Sc.
Three Year Graduate Course
Semester I
PHYSICS
DCC
Electricity and Magnetism

Unit I

Electric Field and Potential

- Coulomb law, Gauss' theory, its integral and differential forms, line integral of Electric field, Electric field and potential due to an arbitrary charge distribution. Electrostatic energy, energy stored in an Electric field. Electric field and potential due to long charged wire, Spherical shell, sphere, disc, dipole.

Fields in Matter

- Moments of charge distributions, Polar and non-polar molecule, polarization vector, electric displacement vector, three electric vectors, dielectric susceptibility and permittivity, polarizability, Clausius-Mossotti relation. Magnetization, magnetic susceptibility, diamagnetic, paramagnetic and ferromagnetic substances, Hysteresis and B-H curve, Langevin's theories of Diamagnetism and paramagnetism, Weiss theory of ferromagnetism.

Unit II

Steady and Varying Currents

- Current density, Equation of Continuity, Ohm's law and electrical conductivity, LorentzDrude theory, Wiedmann-Frenz law, Kirchhoff's laws 10 15 and their applications, Transient current, Growth and decay of D. C. in L - R and L - C circuits, charging and discharging of a capacitor through a resistance.

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Magnetostatics

- Lorentz force, Bio-Savert's law, Ampere's law, Application of Biot-Savert law, magnetic field due steady current in a long straight wire, Interaction between two wires, field due a Helmholtz coil, solenoid and current loop, magnetic vector potential, permeability, Energy stored in Magnetic field.

Unit III

EMI and AC

- Faraday's laws of induction, Lenz's law, Electromotive force, Measurement of magnetic field, Eddy current, Mutual inductance, Self-inductance. Impedance, admittance and reactance, R-C, R-L and L-C circuits with alternating e.m.f. source, series and parallel L-C-R circuits, resonance and sharpness, Quality factor, Power in A. C. circuits, Choke coil.

Reference Books:

- E. M. Purcell: Electricity and Magnetism
- D. C Tayal: Electricity and Magnetism
- D. J. Griffiths: Introduction to Electrodynamics
- Richard P. Feynman: The Feynman Lectures on Physics, Vol. 2
- Kalra, Kakani: Electricity and Magnetism (Hindi)

Practical: Electricity and Magnetism

- Calibration of Voltmeter and Ammeter by Potentiometer
- Conversion of Galvanometer into Voltmeter and Ammeter
- Determination of Specific Resistance of Wire
- Variation of Magnetic Field along the axis of current carrying circular coil
- Feradays law of Electromagnetic Induction
- Comparison of Capacities by Ballistic Galvanometer
- Determination of Ballistic Constants
- Comparison of capacities by De Sauty's Bridge
- Anderson Bridge
- Study of RC circuit and determination of time constant
- Study of LCR circuit
- Determination of Self Inductance, Mutual Inductance
- Determination of Magnetic Field by Search Coil

Reference Books:

- S. L. Gupta and V. Kumar: Practical Physics
- Kalra, Kakani : Practical Physics (Hindi)
- N. Laxmi and V. Saraswat: Practical Physics (Hindi and English)

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BANSWARA

B.Sc.
Three Year Graduate Course
Semester II
PHYSICS
DCC
MECHANICS

Unit I

Vector Algebra

- Vectors Algebra Vector algebra. Scalar and vector products, scalar and vector triple products, Derivative of a vector with respect to a parameter, Del operator, gradient, divergence and curl, Gauss divergence theorem, Stokes curl theorem and Green's theorem, Line, surface and volume integral of a vector function.

Gravitation field and potential

- Gravitational field and potential, Gravitational potential energy, Gravitational field Intensity and potential due to a ring, a spherical shell, solid sphere and circular disc, gravitational self-energy, Inverse square law of forces, Kepler's laws of planetary motion. Satellite in a circular motion.

Unit II

Coordinate System

- Unit vectors, displacement, velocity, acceleration, area and volume elements in Cartesian, Spherical Polar coordinates and cylindrical coordinate systems

Special Theory of Relativity

- Constancy of speed of light. Postulates of Special Theory of Relativity. Length contraction. Time dilation. Relativistic addition of velocities.

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Conservation Laws

- Frames of reference, Concept of inertial and Non-inertial frames of references, Work energy theorem, Conservative and non-Conservative forces, Linear restoring force, Gradient of potential, Conservation of energy for the particle; Energy function, Concept of Centre of mass, Angular momentum and torque, Laws of conservation of total energy, total linear momentum and total angular momentum along with their examples.
- Variable Mass Problem and Rocket Motion, Twin Paradox, Coriolis force, Foucault Pendulum

Unit III

Dynamics of rigid bodies

- Translatory and Rotatory motion, Equation of motion for Rotating rigid body, angular momentum vector and moment of inertia, Theorem of parallel and perpendicular axes, Moment of inertia of a cylinder, rod, lamina, ring, disc, spherical shell, solid sphere, kinetic energy of rotation, rolling along a slope, Application to compound pendulum.

Properties of Matter

- Basic concept, Elastic constants and their Interrelations, torsion of cylinder, bending of beam, bending moment, Cantilever, shape of Girders/ rail tracks. Viscosity, Stokes's law, Posieuille's formula, Equation of continuity, Bernoulli's theorem, Surface tension and its molecular interpretation.

Reference Books:

- Halliday and Resnick: Physics Vol.1
- Berkeley Physics Course: Mechanics, Vol. 1
- D. S. Mathur: Mechanics
- Vimal Saraswat: Mechanics
- Kalra, Bhandari and Kakani: Mechanics (Hindi)

Practical: Mechanics

- Determination of g using Bar Pendulum
- To determine Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's method)
- Determination of moment of inertia of a Fly Wheel.
- Determination of rigidity modulus using torsional pendulum.
- Determination of elastic constants of a wire by Searle's method.
- To determine the Young's Modulus of a Wire by Cantilever Method.
- To determine the Young's Modulus by bending of beam.
- To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
- To determine the value of g using Kater's Pendulum.

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- Determination of surface tension of a liquid and the interfacial tension between two liquids using drop weight method.
- Determine viscosity by Stoke's method
- Viscosity of water by rotational viscometer
- Poisson ratio of rubber tubing
- Verification of parallel and perpendicular axes theorem
- Study of motion of a spring and to calculate Spring constant, g and unknown mass.

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