

GOVERNMENT COLLEGE BIROHAR (JHAJJAR)

Summary of Lesson Plans of College Faculty for Academic Session 2024- 2025

Name of Assistant/Associate Professor: Manju Kumari

Class & Sem.: B.Sc Year, II Sem Subject: Phy (Physics) Renewable energy

Months	Topics/Chapters to be Covered
Jan 2025	
Feb 2025	Unit-1 Fossil fuels and alternate sources of energy, Fossil fuels and nuclear energy, their limitations, need of renewable energy, non-conventional energy sources, An overview of development in offshore wind energy, Tidal energy, wave energy, systems, Ocean thermal energy conversion, solar energy biomass, biochemical conversion, biogas generation, geothermal energy, Tidal energy, Hydroelectricity
March 2025	Unit 2 Solar energy: Solar energy, its importance, storage of solar energy, solar pond, non-convective solar pond, applications of solar pond and solar energy, solar water heater, flat plate collector, solar distillation, solar cooker, solar green houses, solar cell, absorption air conditioning, Need and characteristics of photovoltaic systems PV models and equivalent circuit and sun tracking system.
April 2025	Unit 3 Wind energy, Harvesting, Fundamentals of wind energy, wind turbines and different electrical machines in wind turbines Power electronic interfaces and grid interconnection topologies. Ocean energy, Potential against wind and solar wave characteristic and statistics wave energy devices Tide characteristic and statistics Tide Energy Technologies, ocean thermal energy, osmotic power, ocean Bio-mass Unit-4 Geothermal energy, Geothermal resources Geothermal technologies, Hydro energy

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Hydropower resources, Physics and characteristics of piezoelectric effect, materials and mathematical description of piezoelectricity, Human power, electromagnetic energy harvesting, Linear generator, physics mathematics model recent application, Carbon captured technologies cell, batteries and power consumption, environmental issue and Renewable sources of energy, sustainability

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Unit-IV

Skul

May
2025

Numerical differentiation and Integration, curve fitting, Principle of least square linear regression, Polynomial regression, Exponential and Geometric regression, Interpolation, Finite differences. Interpolation with equally spaced points Gregory - Newton's Interpolation formula for forward and backward interpolation solution of ODE first order differential equation using Euler, modified Euler and Runge - Kutta second order methods second order differential equation e.g. First order differential equation Radioactive decay curves in PC and LC using PC solver Revision 1 UT

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Feb
2025

Unit-I Introduction To Programming using Python: Program, Functions, Interpreters shell Indentation, Identifiers and Keywords, Literals, strings, Basic

operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment Operator, Bit wise

operator standard libraries in python, notion of class, object and method.

Unit-II Creating Python Programs: Identifiers and keywords, Literal, number and strings operators Expression Input/output

statements, Definition function, control structures Conditional statement, Loop control statements, break, continue and pass

exit function, default arguments, Mutable and immutable objects, Testing and debugging a program.

Unit-3 Data Types Integer and floating point

arithmetic, Fortran variable, Real and Integer variables,

Input and output statement, Formals Expression

Built in function, Executable and non-executable statements, Control statements Go To statement

Primitive if and logical if statements Flow

control truncation errors Round off errors,

April
2025

BSEC
GOVERNMENT COLLEGE BIROHAR (JHAJJAR)
 Summary of Lesson Plans of College Faculty for Academic Session 2024-2025

Name of Assistant/Associate Professor: MANJU KUMAR

Class & Sem.: BSc I, II Sem Subject: EEC, Computational Techniques in Physics

Months	Topics/Chapters to be Covered
Jan 2025	
Feb 2025	Unit-I Introduction To Programming using Python. Program, Functions, Interpreters shell Interactions, Identifiers and Keywords, Literals, strings, Basic operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment operator, Bit wise operator standard libraries in python, notation of class, object and method.
March 2025	Unit-II Creating Python Programs: Identifiers and keywords, Literal, number and strings operators Expression Input/output statements, Definition function, control structures conditional statement, loop control statements, break, continue and pass exit function, default arguments, Mutable and immutable objects, Testing and debugging a program.
April 2025	Unit-3 Data Types Integer and floating point arithmetic, Fortran variable, Real and Integer variables, Input and output statement, Formats Expression Built in function, Executable and non-executable statements, Control statements Go To statement Arithmetic IF and logical IF statements Flow charts, truncation errors Round off errors, propagation of errors Block IF statements, Do statement

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Electricity and Magnetism

GOVERNMENT COLLEGE BIROHAR (JHAJJAR)
Summary of Lesson Plans of College Faculty for Academic Session 2024-2025

Name of Assistant/Associate Professor: Maya Kumari

Class & Sem. B.T. & II sem Subject: DSE (Major)

Months	Topics/Chapters to be Covered
Jan-2025	
Feb 2025	<u>Unit-I</u> Electric field and Potential Scalars and Vectors, dot and cross product Triple vector product scalar and vector field Divergence of a vector Gradient of a scalar and its physical significance Integration of a vector Gauss divergence theorem and Stokes theorem Derivation of field E from potential as gradient derivation of Laplace and Poisson equation Electric flux Gauss law and its application to spherical shell uniformly charged infinite plane and uniformly charged charge wire mechanical force of charged surface energy per unit volume
March 2025	<u>Unit-II</u> Magnetic field, Biot Savart's law and its simple application Ampere's circuit law and its application Properties of B curl and divergence Vector potential Magnetic properties of matter Force on a dipole in an external field electric current in atom Electron spin and magnetic moment types of magnetic materials, Magnetization Vector (M) magnetic intensity (H) magnetic susceptibility and permeability Relation between B, H & M Electronic theory of dia and para-magnetism Domain theory of ferromagnetism Cycle of magnetization BH curve and hysteresis loop. Energy dissipation, Hysteresis loss and importance of hysteresis curve
April 2025	<u>Unit-III</u> Electromagnetic induction Faraday's laws of induction and Lenz law Self inductance Mutual inductance Energy stored in a magnetic field Maxwell equations and their derivations Displacement current Vector and scalar potential, boundary conditions at interface between two different media Propagation of electromagnetic wave Poynting vector and Poynting theorem

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DSC (MAYON)

Unit-IV

May
2025

Dc current circuits, Electric current and current density, Electrical conductivity and Ohm's law. Application of dc circuits Growth and decay of current in a circuit with C & R (b) R & L (c) C & L (d) LCR, Alternating circuits A resonance circuit, Phasor, complex Reactance and Impedance Analysis for RL, RC and LC circuit Series LCR circuit (1) Resonance (2) Power Dissipation (3) Quality Factor and (4) Band width parallel LCR circuit

Revision & UT

May-

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Summary of Lesson Plans of College Faculty for Academic Session 2024-2025

Name of Assistant/Associate Professor: MANJU KUMARI

Class & Sem.: B.Sc 2nd, 4th Subject: Physics, optics - II

Months	Topics/Chapters to be Covered
Jan 2025	Unit-I Interference by Division of amplitude and Fresnel's Diffraction - Interference by division of amplitude, colour of thin films, wedge shaped film, Newton's rings, Interferometer Michelson interferometer and its application to (I) standardisation of a meter II determination of wave length Fresnel's Diffraction: Fresnel's half period zones, zone plate, diffraction at a straight edge, rectangular slit and circular aperture
Feb 2025	Unit II Fraunhofer diffraction - Fraunhofer diffraction, one slit diffraction Two slit diffraction N-slit diffraction, plane Transmission grating spectrum, dispersive power of a grating, limit of resolution, Rayleigh's criterion, resolving power of telescope and a grating.
March 2025	Unit-III Polarization: Polarisation and Double Refraction: Polarisation by reflection, polarisation by scattering Malus law phenomenon of double refraction, Huygen's wave theory of double refraction (Normal and oblique incidence), Analysis of Polarised light, Nicol prism, Quarter wave plate and half wave plate, production and detection of plane polarised light (i) circularly polarised light (ii) elliptically polarised light optical activity Fresnel theory of rotation specific rotation, polarimeter
April 2025	Revision & U.T

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Name of Assistant/Associate Professor: MANTU KUMAR

Class & Sem.: B.Sc. I, sem. II Subject: Physics DSC Electricity and Magnetism

Months	Topics/Chapters to be Covered
Jan 2025	
Feb 2025	Unit-I Electric field: Conservative nature of electrostatic field, Electrostatic Potential, derivation of electric field E from potential as gradient, Laplace and Poisson equation. The uniqueness Theorem Gauss's Law Differential form of Gauss law and application of Gauss's law. Electrostatic energy of system of charges - Electrostatic energy of a charged sphere. Conductors in an electrostatic field Surface charge and Mechanical force on a conductor Energy per unit volume.
March 2025	Capacitance of a system of charged conductors. Parallel-plate capacitor Capacitance of an isolated conductor Methods of image and its application to simple electrostatic problems plane infinite sheet and sphere.
April 2025	Unit II Magnetic Field - Biot Savart's law and its simple application. straight wire and circular loop. current loop as a magnetic dipole and its dipole moment. Ampere's circuital law and its applications to (i) Solenoid and (ii) Toroid properties of B : curl and divergence Vector potential. Magnetic force on (i) point charge (ii) current carrying wire (iii) between current elements Torque on a current loop in a uniform B field. Unit III - Force on a dipole in an external field. Electric current in atoms. Electron spin and Magnetic moment, types of magnetic material, Magnetization vector (M) Magnetic intensity (H) Magnetic susceptibility and permeability Relations between B , H and M . dia and Paramagnetism Domain theory of ferromagnetism, cycle of magnetization B - H curve and hysteresis loop. Energy dissipation Hysteresis loss and importance

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