

**GOVT. GHANSHYAM SINGH GUPT P.G. COLLEGE BALOD, DIST-
BALOD (C.G.)
COURSE OUTCOMES, PROGRAMME OUTCOME, PRPGRAMME SPECIFIC
OUTCOME
(CO.S, PO.S & PSO.S)**

DEPARTMENT OF PHYSICS

Objective of the Programme:

- To know about the fact and principles of science and its application, consistent with the stage of cognitive development.
- To acquire the skills and understand the method of processes that lead to generation and validation of scientific knowledge.
- To develop a historical and developmental perspective of science.
- To relate science education to environment, local as well as global and appreciate the issues at the interface of science, technology and society.
- To acquire the requisite theoretical knowledge and practical technological skill to enter the world of work.
- To nurture the natural curiosity, aesthetic sense and creativity in science and technology.
- To imbibe the values of honesty, integrity, cooperation, concern for life and preservation of environment.
- To cultivate scientific temper, objectivity and critical thinking.

**B.Sc. (Bachelor of Science)
Year First, Second, Third**

Programme outcomes:

- After successful completion of three year degree program in physics a student should be able to;

PO-1. Demonstrate, solve and an understanding of major concepts in all disciplines of physics.

PO-2. Solve the problem and also think methodically, independently and draw a logical conclusion.

PO-3. Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the result of physic experiment.

PO-4. Create an awareness of the impact of physics on the society, and development outside the scientific community.

PO-5. To inculcate the scientific temperament in the student and outside the scientific community.

PO-6. Use modern techniques, decent equipments and phonics software's.


Programme specific outcomes:

PSO-1. Gain the knowledge of physics through theory and practical's.

PSO-2. Understand good laboratory practices and safety.

PSO-3. Develop research oriented skill.

PSO-4. Make aware and handle the sophisticate instruments/equipments.


**Assistant Professor
& H.O.D.
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PG, College Balod**

COURSE TITLE: (Paper I-Paper code 0793) Mechanics, Oscillations and Properties of matter.

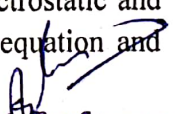
➤ **COURSE OUTCOMES :-**

- Understand laws of motion, reference frames, and its applications i.e. projectile motion, simple harmonic oscillator, rocket motion, elastic and collision.
- Understand the idea of conservation of angular momentum, central forces and the effective potential.
- Understand the application of central force to the stability of circular orbits, Kepler's laws of planetary motion, orbital precession and Rutherford scattering
- Understand the dynamic of rotating, object i.e. rigid bodies, angular velocity the moment of inertia, parallel axis theorem, the inertia tensor, the motion of rigid bodies. Non – inertial frames :pseudo forces, example involving the centrifugal force and coriolis force.
- Understand the basics of material properties like, elasticity, elastic constants and their relation, torsion of a cylinder, bending of a beam, cantilever, beam supported at its end and loaded in the middle.
- Understand the basics of motion of fluid which includes streamlined and turbulent flows, equation of continuity, critical velocity, flow of a liquid through a capillary tube capillaries in series and parallel, stoke's formula.

COURSE TITLE:- (Paper II-Paper code 0794) ELECTRICITY, MAGNETISM AND ELECTROMAGNETIC THEORY

➤ **COURSE OUTCOMES:**

- Know the vocabulary and concepts of physics as it applies to : principles of Electric Field, Gauss's law, Electric Potential, Capacitance and Dielectrics, Current and Resistance, Direct Current Circuits, Magnetic Fields, Sources of Magnetic Fields, Faraday's law, Inductance, Alternating Current Circuits, and Electromagnetic Waves.
- Understand the relationship between electrical charge, electrical field, electrical potential and magnetism.
- Be able to use electromagnetic theory and principles in a wide range of applications.
- Learn a variety of advanced mathematical methods and computer techniques.
- Develop skill to solve numerical problems on it.
- Solve mathematical problems involving electric and magnetic forces, fields, and various electro-magnetic devices and electric circuits.
- Develop explicit problem- solving strategies that emphasize qualitative analysis steps to describe and clarify the problem.
- Gain confidence in their ability to apply mathematical methods to understand electro-magnetic problems to real- life situations.
- Ability to define and derive expression for the energy both for the electrostatic and magneto static fields, and derive Poynting's theorem from Maxwell's equation and physical interpret.


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- Ability to describe and make calculation of plane electromagnetic waves in homogeneous media, including reflexion of such waves in plane boundaries between homogeneous media.
- Understanding of electrodynamics and relativity.

➤ **Lab outcomes :**

- Understand physical characteristics of SHM and obtaining solution of the oscillator using experiment.
- Use both analytical mathematics and numerical method to explore the subjects mentioned above. In particular you should be able to analyse experiment oscillator or wave phenomena, such as sound, using suitable methods.
- Use lissajous figures to understand simple harmonic vibration of same frequency and different frequency.
- Solve wave equation and understand significance of transverse waves.
- Solve wave equation of a longitudinal vibration in bars free at one end and also fixed at both the ends.
- Obtain boundary conditions of a longitudinal vibration in bars free at one end and also fixed at both the ends.
- Gain knowledge an applications of transverse and longitudinal waves.

B.Sc. Second Year

COURSE TITLE:- (PAPER-I) THERMODYNAMICS, KINETIC THEORY AND STATISTICAL PHYSICS

➤ **COURSE OUTCOMES:**

After studying the chapter, the student will be able to understand.

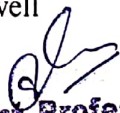
- Laws of Thermodynamics, transport phenomena and maxwell's expression of velocity.
- Carnot's theorem and reversible and irreversible process.
- Entropy- reversible and irreversible process, temp-entropy diagram.
- Joule -Thomson Effect porous plug experiment.
- Basic laws – Stefan's fourth power law, Rayleigh jeans law, plank's law, black body radiation, specific heat of gases- variation of specific heat of diatomic gases.
- Familiarize in depth about statistical distribution and have basic ideas about Maxwell's Boltzman, Bose – Einstein and Fermi Dirac statistical and their applications.

COURSE TITLE:- (Paper II) WAVES, ACOUSTICS AND OPTICS

➤ **COURSE OUTCOMES:**

After studying the chapter, the student will be able to understand

- Solve wave equation and understand significance of transverse waves.
- Solve wave equation of a longitudinal vibration in bars free at one end and also fixed at both the ends.
- Use Lissajous figures to understand simple harmonic vibration of same frequency and different frequencies.
- Understand the concept of mechanics, acoustics and the properties of


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- To have developed the idea of interference, diffraction and polarization and to solve problems related to the phenomena.
- Understand about different laser systems and its application.

➤ **LAB OUTCOMES:**

- Student would gain practical knowledge about heat and radiation, Thermodynamics, thermo emf, RTD etc. and perform various experiments.
- The practical knowledge of wave motion doing experiments: tuning fork, electric vibration. they would also learn optical phenomena such as interference, diffraction and dispersion and do experiments related to optical devices: prism, grating, spectrometers.

B.Sc. Third Year

COURSE TITLE: (Paper I-Paper code 0893) Relativity, Quantum mechanics, Atomic molecular and nuclear physics.

➤ **Course outcomes:**

- Know the Cartesian, Spherical polar and cylindrical co-ordinate systems.
- To understand the Special theory of Relativity.
- Discuss the Michelson – Morley Experiment.
- To obtain the series Solution by Frobenius method.
- Study the generating function for Legendre, Hermite Polynomials.
- Understand De – Broglie hypothesis and uncertainty principle.
- Derive schrodinger's time dependent and independent equation .
- Solve the problems using schrodinger's steady state equation.
- Get knowledge of rigid rotator.
- Understand different operator in Quantum Mechanics.
- To know the Rutherford experiment of atom, to understand molecular spectra of atom , to study the Raman Spectra. To study the Zeeman effect, to understand the quantum numbers.
- Know the properties of nuclear likes binding energy, magnetic dipole moment and electric quadruple moment.
- To understand the concept of radioactivity and decays law.
- To study achievement of Nuclear Model of physics and its limitations.
- To give an extended knowledge about nuclear reactions such as nuclear fission and fusion
- To understand the basic concept of particle physics.

COURSE TITLE: (Paper II- Paper code -0894) Solid State Physics, Solid State Devices and Electronics.

➤ **Course outcomes:**

- Know the principle of structures determination by diffraction.
- To understand the principles and techniques of x- rays diffraction.
- Know the fundamental principles of semiconductors and be able to estimate the charge carrier mobility and density.
- To give an extended knowledge about magnetic properties like diamagnetic, paramagnetic, ferromagnetic, ferrites and superconductors.
- Understand the basic concept of force between atoms and bonding between molecules.
- Understand of diffraction experiment and reciprocal lattice.
- Understand crystal vibrations: phonon heat capacity and thermal conductivity.


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- Understand free electron Fermi gas: density of states, Fermi level and electrical conductivity.
- Understand electronic in periodic potential: energy bands theory classification of metals, semiconductors and insulators.
- Understand semiconductors: band gap, effective masses, charge carrier distributions, doping, PN junction.
- Understand metals: Fermi surface, temperature dependence of electrical conductivity.
- Understand the relationship between conductor and insulators and super conductivity.
- Understand the properties of matter and classification polarization.
- Understand the properties of semiconductors.
- Understand the relationship between semiconductor devices and understand the application of semiconductor device.
- Know the special purpose diode.
- To study the transistor amplifier.
- To understand the FET, JFET, MOSFET.
- To study the operational amplifier and their types.
- To know the timer IC-555 and its classification.
- To study the regulated power supply.
- To understand the sequential logic circuits.

➤ **Lab outcomes:**

- Understand the application of diode, npn transistor, OP-AMP and logic gates.
- Understand half adder and full adder
- Understand tunnel diode characteristics. (V-I)
- Understand optical components and systems.
- Understand and choose, different models for light.
- Ability to calculate light level and ray paths in optical systems.
- Understand the operating principle of some important types of optical instruments.

➤ **SCOPE OF B.SC. PHYSICS:**

1. B.Sc. physics paves a strong ground for student for further studies in physics concentrated courses. It also trains graduates to get entry – level jobs in the private or government sector.
2. Candidates who study B.Sc. physics degree also gain expertise in lab work through practical session and training programmes which help them excel at the workplace.
3. Student who are creative and have an interest in physics and relevant subject can pursue B.Sc. physics course. It is a good option for those who wish to study, explore and experiment in fields related to physics. They can implement their imagination in understanding the scientific phenomena and discover methodologies for the benefit of mankind.
4. After completion of B.Sc. physics course candidates can go for higher education or they can get a job in a relevant field. Check various options available for higher education and job opportunities for B.Sc. physics candidates.

➤ **HIGHER EDUCATION AFTER B.SC. PHYSICS:**

After the completion of B.Sc. degree course, student can pursue higher studies from top educational and research institutes in India.

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Candidates can appear in national level entrance tests through which they can take admission in top institutes like IIT.

Here is a list of entrance examinations for higher education after B.sc physics: IIT JAM, JEST, TIFER GS.

➤ JOB ROLES FOR B.SC PHYSICS GRADUATES :

There are various job roles that b.sc physics candidates can opt after the completion of studies. here is the list of some of the job roles available :

PHYSICIST: A physicist is a person who studies and discovers the interaction of matter and energy. They perform experiments and investigate the theories of physics to reach a conclusion.

Usually, a PHD holder in physics becomes a Physicist. However, B.sc physics are also eligible to work as a research assistant or technician in a similar field. for growth and secure job as a physicist, the candidate must go for higher studies in physic like M.sc or PHD.

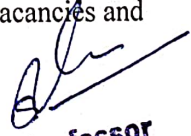
PHYSICS LECTURER: A candidate with sound knowledge in a physics subject can join an institute or academy as a lecturer. It is a decent job role and candidates can expect a good salary as a lecturer. Further, they can pursue master's degrees for growth in the career.

LAB ASSISTANT: Candidates who hold a B.Sc. physics can work as a lab assistant in various firms, clinics or laboratories or institutes. Such professionals handle technical equipment and act as a helping hand for their supervisors.

Subject matter expert (SME): B.Sc. physics graduates can work as a subject matter expert in various organisations. Such candidates are responsible to creates content as per the requirement of the client. They are responsible to create effective and format based content as specific.

RESEARCHER: Candidates who hold a B.Sc physics degree can apply for researcher or scientist posts at top organisations in India like DRDO, BARC, ISRO, NTPC, BHIL etc.

TECHNICIAN: various private organisations hire candidates with B.Sc. physics degree for technical support /technician jobs. Candidates can look for vacancies and apply for the same .7


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