GOVT. DR. INDRAJEET SINGH COLLEGE, AKALTARA DISTT. JANJGIR-CHAMPA (C.G.)

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College Code- 3003

PROGRAMME OUTCOMES, PROGRAMME SPECIFIC OUTCOMES AND COURSE OUTCOMES

DEPARTMENT OF PHYSICS

PROGRAM- BSc, PHYSICS

PROGRAM OUTCOME

1. Students will demonstrste proficiency in mathematics and the mathematical concepts needed for proper understanding of physics.
2. Students will demonstrate knowledge of classical mecanics, electromagnetism, quantum mecanics, and thermal physics and be able to apply this knowledge to analize variety of physical phenomena.
3. Students will show that they have learned laboratory skill, enabling them to take measurements in physics laboratory and analize the measurements to draw valid conclusions.
4. Students will be capable of oral and written scientific communication and willprove that they can think critically and work independently.

PROGRAM SPECIFIC OUTCOME

1. Understand the core concept of physics subject.
2. Acquire analytical and logical skill for higher education.
3. Excel in experimental and theoretical physics.
4. Trained to take up jobs in applied fields.
5. Confident to take up competitive examinations.

COURSE OUTCOME

SN	NAME OF COURSE	YEAR/SEMESTER	NAME OF SUBJECT/PAPER	COURSE OUTCOME
1	BSc.	Part-1, Paper 1	Mechanics, Oscillations and Properties of matter	1. Understand laws of motion and their applications to various dynamic situations, motion of inertial frame and concept of Galilean invariance. 2. Understand the analogy between translational and rotational dynamics. 3. Understand the phenomena of collisions and idea about center of mass and laboratory frames and their correlations.

				4. Understand the principles of elasticity through the study of modulus of rigidity. 5. Understand the simple principle of fluid flow and the equations governing fluid dynamics and the phenomena of simple harmonic motion and the properties of system excuting such motions. 6. In the laboratory course , the students will perform experiments related to mechanics (Compound Pendulum), rotational dynamics (Flywheel), Elkastic properties (Young's modulus and modulus of rigidity), and fluid dynamics (verification of Stoke's law, Searl's method), etc. 7. Demonstrate Gauss's law, Coulomb's law for electric field and apply to the systems of point charges as well as line, surface and volume distributions of charges. 8. Articulate knowledge of electric current resistance and capacitance in terms of electric field and electric potential.
2	BSc.	Part-1, Paper 2	Electricity, Magnetism and Electomagnetic Theory	1. Understand the electric properties , magnetic properties of materials and the phenomena of electromagnetic induction. 2. Apply Kirchhoff's rule to analize AC circuit consisting of parallel and/or series combinations of voltage source and resisters and to describe the graphical relation ship of resistsnce, capacitor and resister. 3. In the laboratory course the students will get an opportunity to verify various laws in electricity and magnetism such as Lenz's law, Faraday's law and learn about the construction, working of various measuring instruments.
3	BSc.	Part-2 Paper 1	Thermodynamics, Kinetic Theory and Statistical Physics	1. Comprehend the basic concepts of thermodynamics, the first and second law of thermodynamics, the concept of entropy and thermodynamic potentials and their physical interpretations. 2. Learn about the Maxwell's thermodynamic relations. 3. Learn the basic aspects of Kinetic theory of gases, Maxwell-Boltzman distribution law, Equation of energy, Mean free path of molecular collisions, viscocity, thermal conductivity, Diffusion. 4. Learn to calculate Maxwell, Bose-Einstein and Fermi-Dirac statistics.

				5. In the laboratory course, the students are aspected to do some basic experiments in thermal physics, viz, determination of Stefen's constant, coefficient of thermal conductivity, temperature coefficient of resistance etc.
4	BSc.	Part-2 Paper 2	Waves, Acoustic and Optics	1. Recognize and use a mathematical oscillator equation and wave equation and derive these equations for certain systems. 2. Apply basic knowledge of principles and theories about the behavior of light and the physical environment to conduct experiments. Use the principles of wave motion and superposition to explain the physics of polarization, interference and Diffraction. 3. Understand the working of selected optical instruments like biprism, interferometer, diffraction grating. 4. Distinguish the different type of aberrations and achromatism. 4. Use different types of eyepieces according to their applications. 5. Familiar with basics of Laser physics. 5. In the laboratory course, students will gain hands- on experience of using various optical instruments and making finer measurement of wavelength of light using Laser beam, resolving power of prism and grating etc.
5	BSc.	Part-3 Paper 1	Relativity, Quantum Mechanics, Atomic, Molecular and Nuclear Physics	1. Understand the basic concepts of reference system. 2. To get familiar with inadequacies of classical mechanics in explaining microscopic phenomena, quantum theory formulation is introduced through Schrodinger equation. 3. Through understanding the behavior of quantum particle encountering a i) barrier ii) potential, the students gets exposed to solving non-relativistic hydrogen atom, for its spectrum and eigen functions. 4. Learn the ground state properties of nucleus and know about the nuclear reaction and the process of radioactivity.
6	BSc.	Part-3 Paper 2	Solid State Physics and Electronics	1. A brief idea about crystalline and amorphous solids, about lattice, unit cell, miller indices, reciprocal lattice, concept of Brillouin zones and diffraction of x-rays by crystalline materials. 2. Basic knowledge of P and N type

				semiconductors, mobility of charges, drift velocity, fabrication of P-N junctions, forward and reverse bise in P-N junctions 3. Applications of P-N junction diode for different types of rectifiers and voltage regulators. 4. NPN and PNP transistors and basic configurations namely common base, common emitter and common collector and also about voltage and current gain. 5. Basic and equivalent circuits, coupled amplifiers and feed back in amplifiers and oscillators. 6. To characterize various devices namely P-N junction diode, LED, Zener diode, solar cells, PNP and NPN transistors, also construct amplifiers and oscillators using descrete components.

PROGRAM- MSc, Physics

PROGRAM OUTCOMES

1. Domonstrate solve and an understanding of major concepts of all disciplines of physics.
2. Solve the problem and also think methodically independently and draw a logical conclusion.
3. Employ critical thinking and the scientific knowledge to design, carry out, record and analize the results of physics experiments.
4. Create an awareness of the impact of physics on the society and development outside the scientific community.
5. To inculcate the scientific temperament in the students and outside the scientific community.
6. Use modern techniques decent equipements and phonics softwares.

PROGRAM SPECIFIC OUTCOME

1. Gain the knowledge of physics through theory and practicals.
2. Understand good laboratory practices and safety.
3. Develop research oriented skills.
4. Make aware and handle the sophisticated instruments/equipments.

COURSE OUTCOME

SN	NAME OF COURSE	YEAR/SEMESTER	NAME OF SUBJECT/PAPER	COURSE OUTCOME
1	MSc.	I Sem.	Paper-1 Mathematical Method -1	1. To understand the vector spaces and matrices. 2. To obtain the series solution by Legendre and Laguerre polinomials. 3. Study the generating function for Bessels and Hermite polinomials. 4. To obtain the solution of integral transform and Fourier series.
2	MSc.	I Sem.	Paper-2 Classical Mechanics	1. Understand mechanics of system of particles. 2. Understand the concept of D'Alembert principle. 3. Solve Langrangian and Hamiltonian formulation. 4. Learn Canonical transformation and Poisson's Bracket.
3	MSc.	I Sem.	Paper-3 Numerical Method and C-Programing	1. Identify methods to solve numerical algebraic and transcendental equations. 2. Computes solutions to simultaneous linear algebraic equation. 3. Undersatand the concepts of finite differences. 4. Gains knowledge about to interpolation for equal intervals and unequal intervals. 5. Understand the computer fundamentals and the C-programing language concepts. 6. Study the concept of C-character set, identifiers and key words, variable names. 7. Choose the Loops and descision making statements to solve the problems. 7. Use function to solve given problems.
4	MSc.	I Sem.	Paper-4 Electronics-1	1. Know the special purpose of diode like MIS, MOS, CCD. 2. To study the microwave devices. 3. To understand the FET, JFET, MOSFET. 4. To understand the process of modulation and demodulation.
5	MSc.	II Sem.	Paper-1 Mathematical Method-2	1. Understand the tensor and their transformation law. 2. Solve the problem using Green's function and boundary value problem. 3. Understand the Cauchy integral problem and their evaluation.
6	MSc.	II Sem.	Paper-2 Quantum Mechanics-1	1. Understand the behavior of quantum particle through Schrodinger equation and their applications.

				2. Understand the uncertainity relation and learn the matrix representation of an operator. 3. Know the motion in central force problem. 4. Study the time independent perturbation theory and its application such as Zeeman effect and Stark effect.
7	MSc.	II Sem.	Paper-3 Electrodynamics	1. Derive Maxwell equation and wave equation. 2. Study the Frensel equation and propagation of EW through different media. 3. Study the special theory of relativity and Lorentz transformation. 4. Get extended knowledge of electromagnetic scalar and vector potential.
8	MSc.	II Sem.	Paper-4 Electronics-2	1. Know the principles of LDR and LED. 2. Know the purpose of photo detector and bipolar transistor. 3. Study the OP-AMP and their types. 4. Study the multuvibrator.
9	MSc.	III Sem.	Paper-1 Quantum Mechanics-2	1. To study the application of time dependent pertubatin theory. 2. To understand the WKB approximation. 3. Know the application and validity of Born approximation. 4. To study the symmetry in quantum mechanics.
10	MSc.	III Sem.	Paper-2 Statistical Mechanics	1. To learn postulates of statistical mechanics. 2. To learn statistical interpretation of thermodynamics, micro canonical, canonical and grand canonical ensembles. 3. To study the methods of statistical mechanics used to develop the statistics for Bose-Einstein and Fermi-Dirac statistics. 4. To understand cluster expamnsion and thermodynamic fluctuation.
11	MSc.	III Sem.	Paper-3 Condensed Mater Physics-1	1. Study the crystalline and amorphous solids. 2. Understanding the concept of defects or imperfection in crystal. 3. Study the band theory and Hall effect. 4. Get knowledge of Weiss theory of ferromagnetism.
12	MSc.	III Sem.	Paper-4 Electronics-3	1. Understand different number system, codes, logic gates, Boolean laws and theorems. 2. Simplify the Boolean functions to the minimum number of literals using Karnaugh map. 3. Gain knowledge about combinational circuits and sequential circuits.

				4. Can design various synchronous and asynchronous circuits using flip flop. 5. Design counters, shift resisters using J-K/D flip flop. 6. Understand the A to D and D to A converter.
13	MSc.	IV Sem	Paper-1 Condensed Matter Physics-2	1. Study the superconductivity. 2. Understand the polarization. 3. Study the semiconductor and its types. 4. Understand the nano-structure and their classification.
14	MSc.	IV Sem.	Paper-2 Nuclear Physics	1. Know the properties of nucleus like binding energy, magnetic dipole moment and electrical quadrapole moment. 2. To study achievement of nuclear models of physics and its limitations. 3. To give an extended knowledge about nuclear reactions such as nuclear fission and fusion. 4. To understand the basic concepts of particle physics.
15	MSc.	Iv Sem.	Paper-3 Atomic and Molecular Physics	1. Know the spectra of hydrogen, helium, alkali and alkaline earth material. 2. Understand thecomplete description of continuous X-ray spectra. 3. Study the types of molecule. Study the diatomic molecule and principle of Frank Condon.
16	MSc.	IV Sem.	Paper-4 Electronics-4	1.Explain microcontroller architecture. 2. Write simple programs for addition, subtraction, multiplication and division. 3. comprehend a suitable input and output peripheral. 4. Study thwe optical fibres.