



Joya Gogoi College
Khumtai-785619
Golaghat (Assam)
Affiliated to Dibrugarh University

BSc. Honours with Physics	
CBCS (Core Course)	
Semester-I	
PHYSICS-C-I: MATHEMATICAL PHYSICS – I	At the completion of this course, a student with the knowledge and understanding of these mathematical methods can solve problems in several elementary branches of Physics like mechanics, electromagnetic theory, statistical Physics, thermal Physics etc. The student can also learn computer programming and numerical analysis and know its role in solving problems in Physics.
Physics-C- II: MECHANICS	At the completion of this course, a student will be able to understand about the basic concepts of mechanics by simultaneous study of linear and rotational dynamics. A detail understanding of inertial and non-inertial frame and as well as the peculiar concepts of the special theory of relativity can be realized in this course. Analysis of harmonic oscillator system and motion of planetary system as central force problem can be also learnt within the realm of the course.
Semester-II	
PHYSICS–C III: ELECTRICITY AND MAGNETISM	At the completion of this course, a student will get basic knowledge of electricity and magnetism as well as the fundamental laws of electric and magnetic field. The basic principle of the electrical circuit (AC) circuit and electrical networking is thoroughly discussed in the course.
PHYSICS–C IV: WAVES AND OPTICS	At the completion of this course, a student will be able to learn various phenomenon related to light such as diffraction, interference, polarization etc. al. The properties of longitudinal and transverse wave as well as the characteristic of central wave equation is also in this course. Students will obtain knowledge about various light experiments like Newtons Ring, Llyod Mirror within the realm of the course.
Semester-III	
PHYSICS-C-V: MATHEMATICAL PHYSICS – II	At the completion of this course, a student will be able touse diverse mathematical techniques to formulate and solve a problem in basic Physics.Special emphasis on the series solution method using Frobenius techniques as well as Legendre, Hermite, Bessel equation is also given in



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	<p>this course. In the mathematical lab section, students will learn the use of Scilab as well as Mathematica to construct a problem in Physics computationally.</p>
PHYSICS C-VI: THERMAL PHYSICS	<p>At the completion of this course, a student will be able to understand the classical laws that govern the field of thermodynamics and use the laws to study the central theme of thermodynamics-the heat engine. With the understanding of the concept of entropy and various other thermodynamic potential, students can probe questions in varied fields of Physics, chemistry and biology based on principles of Thermal Physics.</p>
PHYSICS-C-VII: DIGITAL SYSTEMS AND APPLICATIONS	<p>At the completion of this course, a student will properly understand the key ideas behind digital electronics. With the study of fundamental gates, Flip-flops, Counter, Registers, Multivibrator, students will get to know how a complex digital system microprocessor or RAM or ROM operates.</p>
Semester-IV	
PHYSICS-C-VIII: MATHEMATICAL PHYSICS-III	<p>At the completion of this course, a student will be able to</p> <ol style="list-style-type: none"> 1. Write a problem in Physics (slightly more advanced than those in Mathematical Physics I and II) in the language of mathematics. 2. Identify a range of diverse mathematical techniques/ideas to formulate, simplify and solve some problems in Physics. 3. Analyse some of the useful mathematical ideas and techniques. 4. Apply the knowledge and understanding of these mathematical methods to solve problems in several fundamental topics in Physics. 5. Construct a problem in Physics computationally and use simulations to design an experiment.
PHYSICS-C-IX: ELEMENTS OF MODERN PHYSICS	<p>At the completion of this course, a student will be able understand the theoretical basis that revolutionized the 20th century Physics- Quantum Mechanics. The understanding of the concepts presented in this course, namely Planck theory of Black Body radiation, de Broglie's wave particle duality, Schrodinger Wave Equation, Heisenberg uncertainty principle and his formulation of matrix mechanics, Born's interpretation of wave function can develop insight into the key principles and applications of Nuclear Physics, Atomic Physics and</p>



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	Condensed matter physics.
PHYSICS-C-X: ANALOG SYSTEMS AND APPLICATIONS	At the completion of this course, a student will be able to familiarize themselves about the basics of PN junction diode, bipolar transistors, operational amplifiers and oscillators. The students will be able to develop knowledge about analog to digital and digital to analog conversion techniques within the realm of the course.
SEM V	
PHYSICS-C-XI: QUANTUM MECHANICS AND APPLICATIONS	At the completion of this course, a student will be able to understand the fundamental concepts of quantum mechanics, such as Planck theory of Black Body radiation, de Broglie's wave particle duality, Schrodinger Wave Equation, Heisenberg uncertainty principle and his formulation of matrix mechanics, Born's interpretation of wave function in its concrete mathematical form. The applications of quantum mechanics in solving physical problems are also presented in this course.
PHYSICS-C-XII: SOLID STATE PHYSICS	At the completion of this course, a student will be able to familiarize with the structure of solid as well as the electronic and lattice vibration dependent behavior of solids. Various laboratory experiments associated with the course help the students to learn the basic concepts in practical conditions.
PHYSICS DSE -I: CLASSICAL DYNAMICS	After completing the course, a student will be able to understand fundamental ideas of classical mechanics and the advantages of its formulation over Newtonian mechanics. With the understanding of the Lagrangian and Hamiltonian formulation, the mechanics of central force motion as well as small amplitude system is explored within the realm of the course. The students can also observe the peculiar phenomena when transformed from Newtonian relativity to special relativity and to understand the concept of space-time.
PHYSICS DSE II: PHYSICS OF DEVICES AND INSTRUMENTS	After completing this course, a student will be able to familiarize themselves with the following electronic devices and instruments: 1. UJT, FET, MOSFET, CMOS etc. and its application to different electronic circuits. 2. Rectifiers, passive and active filters, multivibrators, Phase Locked Loop etc. Different IC fabrication techniques as well as the standards of digital data communication can also be



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	learnt in this course.
SEM VI	
PHYSICS-C-XIII: ELECTROMAGNETIC THEORY	At the completion of this course, a student will have a complete understanding of Maxwell's theory of Electromagnetic radiation and its application to explain the properties of the electromagnetic wave and its interaction with matter. Students will also be familiarized with the principles and processes related to polarization, interference, and diffraction along with their applications to the development of wave-guide and optical fibres.
PHYSICS-C-XIV: STATISTICAL MECHANICS	At the completion of this course, a student will understand the dynamical behavior of the microscopic constituents of a thermodynamic system. The students can apply the laws of statistics to a system having many degrees of freedom. All the basic laws of thermodynamics along with the laws of entropy can be understood in its microscopic detail.
PHYSICS-DSE 3: NUCLEAR AND PARTICLE PHYSICS	After the end of the course, a student will be able to understand various concepts in Nuclear Physics and its connections with other domains of Physics, particularly Quantum Mechanics, Mathematical Physics and Particle Physics. The various aspects of nuclear detectors and use of nuclear energy to the benefits of the human civilization can be learnt within the realm of the course.
PHYSICS-DSE 4: EXPERIMENTAL TECHNIQUES	After completing this course, a student will be able to enhance the knowledge of some measurement techniques and data and error analysis technique. The students will be familiarized with the working principle, efficiency, and applications of Transducers & industrial instrumentation in this course. A detail description of the Vacuum system and its accessories such as gauges, pump etc., is also given in this course.
PHYSICS-GE-1: MECHANICS (SEMESTER I, GENERIC ELECTIVE)	At the completion of this course, a student will be able to understand about the basic concepts of mechanics by simultaneous study of linear and rotational dynamics. A detail understanding of inertial and non-inertial frame and as well as the peculiar concepts of the special theory of relativity can be realized in this course. Analysis of harmonic oscillator system and motion of planetary system as central force problem can be also learnt within the



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	realm of the course.
PHYSICS-GE-2 : ELECTRICITY AND MAGNETISM (SEMESTER II, GENERIC ELECTIVE)	At the completion of this course, a student will get basic knowledge of electricity and magnetism as well as the fundamental laws of electric and magnetic field. The basic principle of the electrical circuit (AC) circuit and electrical networking is thoroughly discussed in the course.
PHYSICS-GE-3: THERMAL PHYSICS AND STATISTICAL MECHANICS (SEMESTER III, GENERIC ELECTIVE)	At the completion of this course, a student will understand the dynamical behavior of the microscopic constituents of a thermodynamic system. The students can apply the laws of statistics to a system having many degrees of freedom. All the basic laws of thermodynamics along with the laws of entropy can be understood in its microscopic detail.
PHYSICS-GE-4: WAVES AND OPTICS (SEMESTER IV, GENERIC ELECTIVE)	At the completion of this course, a student will be able to learn various phenomenon related to light such as diffraction, interference, polarization etc. al. The properties of longitudinal and transverse wave as well as the characteristic of central wave equation is also in this course. Students will obtain knowledge about various light experiments like Newtons Ring, Llyod Mirror within the realm of the course.