



Hiralal Bhakat College Nalhati, Birbhum

Details of Program Specific Outcomes (PSOs) and Course Outcomes (COs)

Department: Physics
Program Name: B.Sc (General) under CBCS of BU

Program Specific Outcomes (PSOs)

PSO1.

The students will acquire a scientific knowledge of the fundamental principles of Physics through study of Classical Mechanics, Electromagnetic Theory, Optics, Heat and Thermodynamics, Statistical Mechanics, Solid State Physics, Nuclear Physics, Modern Physics, Quantum Mechanics and other areas of Physics.

PSO2.

The students will learn use of appropriate level of technology for : a) experimental design and implementation, b) analysis of experimental data, and c) numerical and mathematical methods in problem solving, d) different computational techniques and apply them for experimental data analysis and solving theoretical problems.

PSO3.

The students will acquire a fair amount of computational skill using open source software packages such as Gnuplot, Python, Numpy, Scipy, Matplotlib, Matlab, LaTeX , Arduino IDE etc. in both Linux and Windows platform. This will not only prepare them for higher studies or research in any branch of Physics but also make them ready for various kind of job in IT sector and other industries.

PSO4.

The students will learn effective communication skill to present their knowledge of

physics from basic concepts to specific advanced areas in the form of preparation of laboratory note book, project work, seminar presentation, poster presentation, wall magazines, models and other modes.

PSO4.

The students will learn to work independently as well as a group during laboratory sessions, projects and student seminars.

PSO5.

Students will get academic exposure through the various Internships offered by reputed National Research Institutes during their UG tenure. They will be able to utilize the small summer/ winter recesses through their involvement in small projects under careful guidance of reputed faculties and may get the flavor of the current trend of research.

PSO6.

The student will acquire a purposeful knowledge of scientific literature and ethical issues related to physics

Course Outcomes (COs)

Semester	Course Type	Course Title & Code	Course Outcomes (COs)
1 st Semester	CC	Mechanics (Theory) (BPG1CC2A)	This course will be offered to students of Chemistry, Mathematics, Computer Science & Statistics Honours as per their choice. The students will learn the basic mathematical tools like vectors analysis, calculus of vectors, differential equations etc. to get an entry into Mechanics, Gravitation and the studies of General properties of Matter. These will help the students to carry on higher studies in interdisciplinary fields.
		Mechanics (Practical)	In this laboratory course, the students will learn the verification of some known parameters like acceleration due to gravity, determination of moment of inertia of rotating objects and determination of some elastic constants of matter.
2 nd Semester	CC	Electricity & Magnetism (Theory) CC2B	The students will learn fundamental properties of charged particles and electric fields in this course. This course will also give students an understanding of the phenomena of electricity, magnetism, electromagnetic induction and electrical circuits which are extremely essential for higher studies in physics and also important for various engineering applications. This course builds the basis for studying more advanced topics in electromagnetic theory.

	CC	Electricity & Magnetism (Practical)	The students will strengthen their skill of experimental work in this course. They will be familiar with various electrical components, power supply, multimeter and various other measuring instruments. They will be able to perform experiments on various topics of electricity and magnetism in this course. They will learn about precautions to be taken during performing an experiment and will be able to identify different sources of error. They will also learn how to analyze experimental data.
3 rd Semester	CC	Thermal Physics and Statistical Mechanics (Theory)	A very important course particularly for the students of Chemistry Honours. This will pave the way to understand the basic laws of nature which are inbuilt in the laws of Thermodynamics. The other aspects like kinetic theory of gas, the distribution of radiation energy are also covered in this course. The course is further extended to understand Statistical Mechanics which is relevant to study Thermodynamics analytically.
	SEC	Thermal Physics and Statistical Mechanics (Practical)	In this course the student will perform different experiments on heat and thermodynamics. This laboratory course will further enrich their experimental skill learned so far.
	CC	Renewable energy	The student expected to learn not only the theories of the renewable sources of energy but also hand on experiences
Semester	Course Type	Course Title & Code	Course Outcomes (COs)
4 th Semester	CC	Waves and Optics (Theory)	The students will gain basic knowledge about vibration, wave motion and wave theory of light. Study of classical harmonic oscillator and wave propagation in vacuum and material media, and phenomena of interference and diffraction of light are important for further progress to more advanced topics of Physics.
	CC	Waves and Optics (Practical)	In this laboratory course the students will be acquainted with spectrometer, a very important optical instrument and some other optical instruments like Fresnel's biprism and Newton's ring experiment. They will learn how to level a spectrometer and how to take readings from it. They will also be familiar with various light sources used in physics laboratory. They will be able to determine some well known physical quantities like refractive index etc. by performing laboratory work.
	SEC	Weather Forecasting (theory)	After the completion of the course the student will acquire necessary skills and hand-on experience atmosphere, weather, weather forecasting etc.
		Elements of Modern Physics (theory)	The students will be introduced to the fascinating world of quantum physics in this course. One cannot have any other tool except this branch to probe the physics in the micro world. The students will become familiar with the mathematical tools and their physical implications and have a good practice in solving problems using those tools. The

5 th Semester			students will learn basics of nuclear structure, radioactivity, nuclear fission & fusion. They will also learn fundamental principle of Laser and its applications in this course. This course is extremely important from theoretical as well as application point of view..
	DSE	Elements of Modern Physics(Practical)	This laboratory course will introduce the students to some advanced level experiments. The students will learn to determine value of Planck's constant, study of photoelectric effect, verification of Stefan's law of radiation, determination of e/m of electron and behaviour of tunnel diod harmonic motion of particle.
	DSE	Nuclear and Particle Physics	The students of UG level will get the first lesson of Nuclear Physics in this topic. The contents are very important from the viewpoints of both theory and applications. Since it is very difficult to set up Nuclear Physics Laboratory at the UG level, the students are taught very carefully so that they may get the necessary inputs to carry on the study in Masters and in the Research level in reputed national and International
	SEC	Computational Physics (theory)	After the completion of the course the student will acquire algorithms and flow chart, scientific programming , control statement etc.
Semester	Course Type	Course Title & Code	Course Outcomes (COs)
6 th Semester	DSE	Digital Electronics (theory)	This topic intends to make the students familiar with the digital world. Starting from the introductory ideas of ICs, fundamental Gates and different number systems, the topic in steps is extended to implementation of different logic circuits. The students will be familiar with the basics of hardwire; learn Counters, Registers, Flip-Flops, Data Processing Circuits and Computer Organization.
		Digital Electronics (Practical)	This course will give the students hand on training of fabrication of the basic electronic components like different Gates, Flip-Flops, Shift Registers, Multiplexers using standard ICs.
	DSE	Quantum Mechanics (Theory)	The already introduced Quantum Mechanics finds application in this course and hence this is the appropriate course to introduce Atomic Physics so that the students get continuity in their progress. Student will also learn the behaviour of atoms in magnetic and electric field. This course is essential for progress to higher studies and research career in physics.
		Quantum Mechanics (Practical)	The student will learn some advanced computational techniques and applying them to solve various problems related to quantum mechanics using Python in this course.
	SEC	Electrical circuit	After the completion of the course the student will acquire necessary skills and hand-on experience on multimeter, volt

	and network skills	meter ammerer , electrical circuit etc.
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