

Govt. College Haripur, Manali, Distt Kullu, (H.P.)

Name of the Department:	Physics
Year of Establishment:	2013
Names of Programmes/ Courses:	UG
No. of Teaching posts sanctioned:	2
No. of Teaching posts filled:	1

Course structure: B.Sc. With Physics
(UG yearly programme w.e.f. 2018)

Year	Course Type	Course Code	Course Title	Credit
I	CORE COURSE I	PHYS101TH	MECHANICS Theory	4
		PHYS101PR	MECHANICS Lab	2
	CORE COURSE IV	PHYS102TH	ELECTRICITY, MAGNETISM AND EMT Theory	4
		PHYS102PR	ELECTRICITY, MAGNETISM AND EMT Lab	2
II	CORE COURSE VII	PHYS201TH	STATISTICAL AND THERMAL PHYSICS Theory	4
		PHYS201PR	STATISTICAL AND THERMAL PHYSICS Lab	2
	CORE COURSE X	PHYS202TH	WAVES AND OPTICS Theory	4
		PHYS202PR	WAVES AND OPTICS Lab	2
	SEC 1 (Choose any one from given two)	PHYS203TH PHYS203SE	PHYSICS WORKSHOP SKILLS Theory PHYSICS WORKSHOP SKILLS Skill Exam	4 2
		PHYS204TH PHYS204SE	COMPUTATIONAL PHYSICS Theory COMPUTATIONAL PHYSICS Lab	4 2
	SEC 2 (Choose any one from given two)	PHYS205TH PHYS205SE	ELECTRICAL CIRCUITS AND NETWORK SKILLS Theory ELECTRICAL CIRCUITS AND NETWORK SKILLS Skill Exam	4 2
		PHYS206TH PHYS206SE	BASIC INSTRUMENTATION SKILLS Theory BASIC INSTRUMENTATION SKILLS Skill Exam	4 2
III	DISCIPLINE SPECIFIC ELECTIVES DSC: 1A (Choose any one from given three)	PHYS301TH PHYS301PR	ELEMENTS OF MODERN PHYSICS Theory ELEMENTS OF MODERN PHYSICS Lab	4 2
		PHYS302TH PHYS302PR	SOLID STATE PHYSICS AND ELECTRONICS Theory SOLID STATE PHYSICS AND ELECTRONICS Lab	4 2
		PHYS302TH PHYS302TU	ASTRONOMY AND ASTROPHYSICS Theory ASTRONOMY AND ASTROPHYSICS Tutorials	4 2
	DISCIPLINE SPECIFIC ELECTIVES DSC: 2B (Choose any one from given three)	PHYS304TH PHYS304TU	NUCLEAR AND PARTICLE PHYSICS Theory NUCLEAR AND PARTICLE PHYSICS Tutorials	4 2
		PHYS305TH PHYS305PR	QUANTUM MECHANICS Theory QUANTUM MECHANICS Lab	4 2
		PHYS306TH PHYS306PR	PHYSICS OF DEVICES AND INSTRUMENT Theory PHYSICS OF DEVICES AND INSTRUMENT Lab	4 2
	SEC 3 (Choose any one from given two)	PHYS307TH PHYS307SE	RADIATION SAFETY Theory RADIATION SAFETY Skill Exam	4 2
		PHYS308TH PHYS308SE	APPLIED OPTICS Theory APPLIED OPTICS Skill Exam	4 2
	SEC 4 (Choose any one from given two)	PHYS309TH PHYS309SE	WEATHER FORECASTING Theory WEATHER FORECASTING Skill Exam	4 2
		PHYS310TH PHYS310SE	RENEWABLE ENERGY AND ENERGY HARVESTING Theory RENEWABLE ENERGY AND ENERGY HARVESTING Skill Exam	4 2

Department of Physics

JLN Govt. College Manali, Distt. Kullu, HP

Physics

Physics is the natural science that studies matter, its motion and behaviour through space and time, and also the related entities of energy and force. It is one of the oldest academic disciplines with the inclusion of astronomy as a branch of physics since ancient times. Advances in physics often enable advances in new technologies. For example, advances in the understanding of electromagnetism, solid state physics and nuclear physics led directly to the development of new products that have dramatically transformed modern-day society, such as television, computers, domestic appliance, and nuclear weapons. Advances in thermodynamics led to the development of industrialization and advances in mechanism inspired the development of calculus. Thus physics is a branch of science, so intricately woven into the growth & advance of modern day technology & life that it is impossible to think of the modern day world, without the highly dynamic & ever-changing field of physics.

Vision of Department:

To build a foundation for excellence and encourage the development of institution as a premier institution by igniting and promoting enthusiasm, interest and passion in the study of physics.

Mission:

- 1.) To awaken the young minds and discover their talents both in theory and practical physics through dedication to teach, commitment towards students and innovative instructional methods like PPT and Visual Aids.
- 2.) To support the developmental activities of the collage and make the Department Vibrant.
- 3.) To make vital contributions in areas such as faculty, model labs and demonstrate a high level of competence in the study of physics.
- 4.) To develop strategy in the department for continues improvement.

Program Objectives

The Physics program aims to educate students to become professionals with in-depth knowledge and skills in science and mathematics to understand physical systems; to research, design and solve problems in physics and related disciplines; and to provide the foundation for graduate study and lifelong learning. Our objective is to prepare students to be able to successfully pursue:

- Advanced studies leading to research and/or professional careers in physical science;
- Careers in related technical and professional fields in industry or government.

Program Outcomes

Graduates of the Physics program at Govt. College Kullu will attain:

- an ability to apply knowledge of physics in mathematics, other sciences, and engineering;
- an ability to design and conduct experiments, as well as to analyse and interpret data;
- an ability to function on multi-disciplinary teams;
- an ability to identify, formulate, and solve problems;
- an understanding of professional and ethical responsibility;
- an ability to communicate effectively;
- a recognition of the need for, and an ability to engage in life-long learning;
- a knowledge of contemporary issues;
- an ability to apply advanced mathematics through multivariate calculus, differential equations, and/or numerical techniques;
- a knowledge of contemporary analytical and experimental techniques;
- a competence in the use of computational tools and in the use of a high-level programming language;
- a depth of knowledge in calculus-based physics at an advanced level.

Our physics curriculum places emphasis on:

- Physics
- Mathematics
- Computer Science
- Problem Solving
- Science and Scientific Principles
- Communications
- Multi-disciplinary Teamwork
- Continuous Learning
- Leadership
- Ethics

Why Study Physics?

Physics is crucial to understanding the world around us, the world inside us, and the world beyond us. It is the most basic and fundamental science. Physics challenges our imaginations with concepts like relativity and string theory, and it leads to great discoveries, like computers and lasers, that change our lives.

Physics encompasses the study of the universe from the largest galaxies to the smallest subatomic particles. Moreover, it's the basis of many other sciences, including chemistry, oceanography, seismology, and astronomy. All are easily accessible with a bachelor's degree in physics.

The importance of physics isn't limited to the "hard sciences." Increasingly, physicists are turning their talents to molecular biology, biochemistry, and biology itself. Even medicine has a niche for physicists, and since medical physicists are hard to come by, they are much in demand.

Physics also undergirds many new technologies. Cell phones, the Internet, and MRIs are only a few examples of the physics-based technological developments that have revolutionized our world. Many theoretical and experimental physicists work as engineers, and many electrical and mechanical engineers have physics degrees.

A physics education equips a person to work in many different and interesting places—in industrial and government labs, on college campuses, and in the astronaut corps. So—physics is interesting, relevant, and it can prepare you for great jobs in a wide variety of places. Shouldn't you take a physics course?

Program outcomes, program specific outcomes and course outcomes of Physics Department

Subject specific outcomes

- Students gain knowledge and skill in Physics.
- Apply the knowledge and perform various experiments based on the knowledge of physics.
- Analyse Newtonian mechanics, Dynamics of rigid body, various properties of matter like elasticity, viscosity, surface tension.
- Understands the oscillatory motion, special theory of relativity, electrostatics, magnetostatics, thermodynamics and light phenomenon like interference of light, diffraction, polarization their role in various technological instrumentations.
- Understand the failure of classical physics in some modern experiments and development of quantum mechanics.
- Gain knowledge of crystal structures, radioactivity, nuclear physics and classical and quantum statistics.
- Understands the role of LASER, X-ray and radioactive rays in the field of medical science.
- Understand the role of semiconductor devices in electronic, digital and computer industry

Program specific outcomes

- Understand the basic concepts of Newton's laws, Center of mass, Moment of Inertia, Momentum, Energy, Rotational motion, Lorentz transformations, gravitation, Oscillations, frequency, wavelength, surface tension, Viscous force, Moduli of Elasticity, Kinetic theory of gases, heat engine and efficiency, Laws of thermodynamic, Black body radiation, M-B, B-E and FD statistics, Schrodinger equation, wave packets, applications of Schrodinger equation, atomic model and stability, Natural and artificial radioactivity, use of isotope for various applications, Fission and fusion phenomenon, Nuclear reactions, dielectric and magnetic properties of matter and solid state physics.
- Perform procedures as per laboratory standards in the areas of Gravitation, modulus of rigidity, Surface tension, heat and energy, semiconductor device, probability distributions, spectroscopy, Planck's law, hydrogen spectra, crystal structure parameters and prism spectra, resolving power dispersive power, Brewster's law etc.
- Understand the applications of X-ray, radioactive isotopes, LASER beam and semiconductor device, in Agriculture, Medicine, electronic industry and computer technology.

COURSE OUTCOMES

Upon completion of the undergraduate physics program, graduates will be able to:

- **Demonstrate command of theoretical, experimental and computational physics in preparation for their chosen career path after graduation.**
- **Apply the tools of physics including mathematics, experimental design with apparatus, and computers to explore independently new problems of practical or theoretical importance.**
- **Exhibit growth as members of a scientific community and in awareness of professional responsibilities.**
- **Demonstrate the ability to construct, articulate, and defend a valid scientific argument and to critique others' arguments and techniques.**

STRENGTHS

- The Department of physics has well qualified and dedicated faculty.
- Faculty Trained in ICT Methodologies
- All the laboratories are as per the curriculum
- Testing facilities are available to carry out the routine tests for various equipment's is available.
- Excellent central library including separate department library and computing, Internet facilities are available in excess of the norms stipulated.
- Mechanism is available for direct mentoring of students by faculty, interacting with students, and directing them to upgrade their skills.

Weaknesses:

- Number of volumes and journals in the department library need to be increased.
- The activities through Industry Institution Interaction Cell are to be improved.
- Student-Taught ratio is not appropriate
- Soft skills and communication skills of students need to be improved.
- Student and staff are to be encouraged for paper presentation at various National/International conferences, workshops and seminars.
- Limited Scope for Content delivery through Course Structure
- Lack of Student involvement in Research
- Moderate Placement ratio.

Opportunities:

- Interdisciplinary Research and Consultancy
- Scope for the development of interdisciplinary projects useful for society.
- Organizing International Conferences
- Societal Impact Project
- Faculty as Resource Persons

Challenges:

- Offering PG courses not viable
- Strengthen Industry-Institute Interaction.
- More placements
- Encouraging students for competitive examinations and higher studies.
- More focus on Industrial training for faculty and students.