

Shikshak Sanchalit Shikshan Sansthas

Dr.S.D.D. Arts College and Commerce & Science College Wada Dist:Palghar

Department of Physics

1. Program & Program Specific Outcome (Year 2023-2024)

Program Name Code	Program specific Outcome
Program Specific Name Code – B.Sc PHYSICS	On completion of the B. Sc. (Physics) program, 1. Students will be able to understand theories & principles of physics, which include mathematical methods, electromagnetism, Atomic and molecular spectra, Electrodynamics, electronics, thermodynamics, & Nuclear physics, quantum mechanics solid state. 2. Learn the Concept of Quantum Mechanics, Relativity, introduced at degree level in order to understand nature at atomic levels. Provide knowledge about material properties and its application for developing technology to ease the problems related to society. 3. Understand physical properties chemical bonds in crystallography its structures and dynamics. 5. Analyze the application of mathematics to problem in physics & development of mathematical method suitable for such application & for formulation of physical theories. 6. Learn the structure of solid materials & their different physical properties along with mechanics, Dynamics, electronics, optics & material science. On completion of the B. Sc. Practical's program, students will be able to 1. Understand Basic Circuits using Active Devices, Analog Circuits and their applications using Active Devices. 2. Learn basic test instruments such as power supply, function generator, CRO and their construction and working principle. understand Basic differential amplifier and their applications in linear Integrated circuits 3. Design & conduct experiments as well as to analyze data and its interpretation. 4. Design a system component on bread board or process to meet desired needs within realistic constraints such as economic environmental, social, political, ethical, health & safety. 5. Understand the fundamental concept of semiconductor like crystal structure, energy band gap, charge carrier statistics.

2. Course Outcome (Year 2023--24)

Course Name & Code	Outcome
Physics Paper I Classical Physics USPH-101	After successful completion of the course, the student is expected to Learn the basics of properties of matter, stress, strain, how Young's modulus and rigidity modulus are defining, how they are evaluated for different shapes of bodies that can solved using their practical's of determination. 1. Apply Newton's laws for the calculations of the motion of simple systems. 2. Use Work and Energy equivalence and its application through suitable numerical. 3. Use Elasticity, Viscosity and Fluid dynamics in daily life. 4. Understand Real gases and validity of the laws of thermodynamics. 5. Demonstrate quantitative problem solving skills in all the topics covered
Physics Paper II Modern Physics USPH-102	On successful completion of this course students will be able to: 1. Understand nuclear properties, nuclear behavior and various types of nuclear reactions 2. Understand various types of nuclear detectors and their applications 3. Demonstrate and understand the quantum mechanical concepts. 4. Demonstrate quantitative problem solving skills in all the topics covered
USPHP1	1. Understand & practice the skills while performing experiments. 2. Understand the use of apparatus and their use without fear & hesitation. 3. Correlate the physics theory concepts to practical application. 4. Understand the concept of errors and their estimation.
Physics Paper I Optics -I USPH-201	1. Understand the concept of lens, lens defects and their minimization. 2. Significance of combination of lenses implied to eyepiece of optical instrument. 3. Understand interference of light with few well known daily life examples. 4. Understand Lasers and Optical fibers, their applications in day today life.
Physics paper II- Electricity and Electronics	1. Understand the basic concepts of Alternating current theory, AC bridges and Circuit theorems 2. Understand the basics of Analog and Digital Electronics and apply the min real life

USPH-202	situations 3. Demonstrate quantitative problem solving skills in all the topics covered
Practical\ USPH-P-02	On successful completion of this course students will be able to: 1. To demonstrate their practical skills. 2 To understand and practice the skills while doing physics practical. 3 To understand the use of apparatus and their use without fear. 4 To correlate their physics theory concepts through practical. 5. Understand the concepts of errors and their estimation
Physics-paper -I Thermodynamics and Temperature Transducers USPH-301	1.Comprehend the basic concepts of thermodynamics & its applications in physical situation. 2.Learn about situations in low temperature. 3. Demonstrate tentative problem solving skills in all above areas. 4.Able to know function of cycles in different types of engines 5. Able to solve mathematical derivations statistically.
Physics Paper-II Electronics USPH-302-	On successful completion of this course students will be able to: 1. Understand the basics of semiconductor devices and their applications. 2. Understand the basic concepts of operational amplifier: its prototype and applications as instrumentation amplifier, active filters, comparators and waveform generation. 3.Understand the basic concepts of timing pulse generation and regulated power supplies 4. Understand the basic electronic circuits for universal logic building blocks and basic concepts of digital communication. 5. Develop quantitative problem solving skills in all the topics covered.
Physics paper III Mathematical Methods & Applied Physics - I USPH-303	1. The ability to apply the principles of physics to solve new and unfamiliar problems. 2. Learn Mathematical Techniques required to Physical phenomena at the under graduate level and get exposure to important ideas of differential equations. 3. Solve non homogeneous differential equation and partial differential equation using simple methods. 4. Describe and recognize different types of differential equation in program. 5. Understand the basic mathematical concepts and applications of them in physical situations. 6. Students will be exposed to contextual real-life situations. 7. Students will appreciate the role of Physics in 'interdisciplinary areas related to Acoustics and Radio Communication' and understand the scope of the subject in Industry.
Practical- Course-3 USPH-P-03P	On successful completion of this course students will be able to 1. Understand & practice the skills while performing experiments. 2. Understand the use of apparatus and their use without fear& hesitation. 3. Correlate the physics theory concepts to practical application. 4. Understand the concept of errors and their estimation.

Physics paper I- Optics Applied Physics USPH-401	1. Understand the diffraction, polarization processes and applications of them in physical situations. 2. Understand the applications of interference in design and working of interferometers. 3. Understand the resolving power of different optical instruments. 4. To develop assembly language programming skills and learn the real time applications of microprocessor. 5. Demonstrate quantitative problem solving skill in all the topics covered.
USPH-402 Electrodynamics	1. Understand the concept of Mechanics and properties of Matter and to apply them to problems 2. Students are able to understand del operator, curl equations, coulombs law etc. 3. Students are able to understand functions of divergence, Maxwell equations. 4. Students are able to understand functions of linear media, isotropic media.
Practical- practical- course-4 ABC D USPH-P-04	On successful completion of this course students will be able to 1. Understand & practice the skills while performing experiments. 2. Understand the use of apparatus and their use without fear & hesitation. 3. Correlate their physics theory concepts to practical application.
USPH501: Mathematical, Thermal and Statistical Physics	1. From this course, the students are expected to learn some mathematical techniques required to understand the physical phenomena at the undergraduate level and get exposure to important ideas of statistical mechanics. 2. The students are expected to be able to solve simple problems in probability, understand the concept of independent events and work with standard continuous distributions. 3. The students will have idea of the functions of complex variables; solve nonhomogeneous differential equations and partial differential equations using simple methods. 4. The units on statistical mechanics would introduce the students to the concept of microstates, Boltzmann distribution and statistical origins of entropy. 5. It is also expected that the student will understand the difference between different statistics, classical as well as quantum.
Physics Paper II Solid-state- physics USPH-502	1. Be able to account for inter atomic forces and bonds, have a basic knowledge of crystal systems and symmetries, crystalline materials are studied using diffraction, including concepts like structure factor, and scattering amplitude hkl value determination. 2. Be able to perform structure determination of simple structures, understand the concept of reciprocal space and be able to use it as a tool know the significance of Brillouin zones 3. Be able to calculate thermal and electrical properties in the free-electron model and know Bloch's theorem and energy band and distinction between metals, semiconductors and insulators 4. Be able to estimate the charge carrier mobility and density. Be able to account for what the Fermi surface is and how it can be measured. 5. To understand Lattice heat capacity and to compare Classical theory, Einstein's

	theory, Debye's theory of specific heat of solids. Students are able to understand crystal its systems, types 6. Semiconductors its types conduction and characteristics were understood by students. Semiconductors its various characteristics were verified practically. 7. Band theory periodic potential. Fermi energy, superconductivity understand by students. Number of numerical are solved like susceptibility, characteristics, Design of circuits etc.
USPH503: Atomic and Molecular Physics	1. The application of quantum mechanics in atomic physics 2. The importance of electron spin, symmetric and antisymmetric wave functions and vector atom model 3. Effect of magnetic field on atoms and its application 4. Learn Molecular physics and its applications. 5. This course will be useful to get an insight into spectroscopy.

**Practical
Physics Paper I
USPH-P05**

Knowledge Outcomes:

Students able to understand fundamental knowledge of physics, including basic concepts and principles in thermodynamics & mathematical (analytic and numerical) methods, Solid state Physics, Atomic and Molecular Physics, electrodynamics, Classical Mechanics, Electronics, Nuclear Physics, Relativity and experimental methods for physics.

Professional Skills

Students will have acquired the following professional skills to deal with representative physics problems and situations at the undergraduate level:

1. Identifying the key factors and applying appropriate principles and assumptions in the formulation of physics problems;
2. Applying appropriate analytical and approximation methods;
3. Applying general experimental and measurement skills with prescribed procedures;
4. Analyzing experimental data and their level of uncertainty, and relating the experimental results with theoretical expectations;
5. Applying appropriate scientific programming skills;
6. Reporting the solutions to physics problems, experimental or project studies either orally or in written format

Generic Competencies:

Graduates should have acquired some generic skills in their study, including the following

- . identifying the key issues and attempting different methods in dealing with general problems;
- . manipulating precise and intricate concepts to construct logical arguments;
- . paying attention to the details and their logical relationships when analyzing an issue; Evaluating an issue critically based on evidence and scientific principles;
- . being comfortable with numbers and analyzing an issue quantitatively;
- . Acquiring knowledge effectively by self-study and work independently;
- . working effectively in a team;
- . Presenting information in a clear, concise and logical manner; and
- . having good time management skills.

Physics paper I -Classical- Mechanics USPH-601	1. students are able to understand central force, Kepler's law, co-ordinate system and laws of motion with types of pendulum. 2. students are able to solve Lagrange's equations, Alembert's principle, constraints and numerical, kinematics of moving fluids and eulers equation, tensor. 3. students are able to understand Duffings equations, Chaos and types of Harmonic Oscillator 4. overall understanding of concepts of equations of motion ,linear harmonic and nonlinear harmonic oscillator and their motions, chaos, dynamics kinematics of fluid intrigued fascinating interest to the students.
Physics Paper II Electronics USPH-602	1. Understand the basics of semiconductor devices and their applications. About SCR, JFET, MOSFET, UJT, OPAMP. 2. Understand-Operational-Amplifier-as an-instrumentation, comparator, filters of amplifier. Wave form generation. 3. 3.understand the basic concept of timing pulse generation and regulated power supplies 4. Understand the basic of digital circuits, number of numerical are solved. good ideas and skill to solve numerical to design circuits.
USPH603: Nuclear Physics	1. Upon successful completion of this course, the student will be able to understand the fundamental principles and concepts governing classical nuclear and particle physics and have a knowledge of their applications interactions of ionizing radiation with matter the key techniques for particle accelerators the physical processes involved in nuclear power generation. 2. Knowledge on elementary particles will help students to understand the fundamental constituents of matter and lay foundation for the understanding of unsolved questions about dark matter, antimatter and other research oriented topics.
USPH604: Special Theory of Relativity	1. Understand the significance of Michelson Morley experiment and failure of the existing theories to explain the null result 2. Understand the importance of postulates of special relativity, Lorentz transformation equations and how it changed the way we look at space and time, Absolutism and relativity, Common sense versus Einstein concept of Space and time. 3. Understand the transformation equations for: Space and time, velocity, frequency, mass, momentum, force, Energy, Charge and current density, electric and magnetic fields. 4. Solve problems based on length contraction, time dilation, velocity addition, Doppler effect, mass energy relation and resolve paradoxes in relativity like twin paradox etc.

Practical Physics Paper I USPH-P06	Knowledge Outcomes: Students able to understand fundamental knowledge of physics, including basic concepts and principles in thermodynamics & mathematical (analytic and numerical) methods, Solid state Physics, Atomic and Molecular Physics, electrodynamics, Classical Mechanics, Electronics, Nuclear Physics, Relativity and experimental methods for physics. Professional Skills Students will have acquired the following professional skills to deal with representative physics problems and situations at the undergraduate level: 1. Identifying the key factors and applying appropriate principles and assumptions in the formulation of physics problems; 2. Applying appropriate analytical and approximation methods; 3. Applying general experimental and measurement skills with prescribed procedures; 4. Analyzing experimental data and their level of uncertainty, and relating the experimental results with theoretical expectations; 5. Applying appropriate scientific programming skills; 6. Reporting the solutions to physics problems, experimental or project studies either orally or in written format Generic Competencies: Graduates should have acquired some generic skills in their study, including the following 1. identifying the key issues and attempting different methods in dealing with general problems; 2. manipulating precise and intricate concepts to construct logical arguments; 3. paying attention to the details and their logical relationships when analyzing an issue; 4. evaluating an issue critically based on evidence and scientific principles; 5. being comfortable with numbers and analyzing an issue quantitatively 6. acquiring knowledge effectively by self-study and work independently 7. working effectively in a team presenting information in a clear, concise and logical manner; and having good time management skills.
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 & Commerce & Science College,
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