


Seth Kesarimal Porwal College of Arts & Science & Commerce, Kamptee

B. Sc. Programme Outcomes

After acquiring graduation in science faculty a student should have:

- ❖ The skills of observations and drawing logical inferences from the scientific experiments.
- ❖ Developed scientific outlook not only with respect to science subjects but also in all aspects related to life.
- ❖ Gained the knowledge with facts and figures related to various subjects in pure sciences such as Physics, Chemistry, Botany, Zoology, Mathematics, Biochemistry, Microbiology, Computer Science and Electronics.
- ❖ The skills in handling scientific instruments, planning and performing in laboratory experiments.
- ❖ Understood the basic concepts, fundamental principles and the scientific theories related to various scientific phenomenon and their relevance in the daily life.
- ❖ Analyzed the given scientific data critically and systematically and the ability to draw the objective conclusions.
- ❖ Realized the fact that developments in any science subject helps in the development of other science subject and vice – versa.
- ❖ Understood that the interdisciplinary approach helps in providing better solutions and new ideas for the sustainable developments.
- ❖ Developed various communication skills such as reading, listening, speaking, etc., which will help in expressing ideas and views clearly and effectively.
- ❖ Imbided ethical, moral and social values in personal and social life leading to highly cultured and civilized personality.
- ❖ Developed a sense of social responsibility for creating awareness about the social practices in the society.


Principal
S.K.P. College Kamptee


Head
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Seth Kesarimal Porwal College

Department of Physics

Course outcome

Program outcomes of B.Sc Physics

- B.Sc physics graduate can find ample career opening in both private and government sector.
- Be able to prepare electronic devices which help in development of technology.
- Be able to develop skills of analysis of material independently.
- Be able to work independently and collaborate effectively in team work.
- Be able to realise the importance of different communication system.
- To understand general idea about what is science, what is scientific temper, history of science and scientific revolution.
- Be aware of brief history of physics giving emphasis on quantum theory using black body radiation and photoelectric effect.
- Be aware of general idea of theory of relativity.
- Be able to continuously enrich themselves through lifelong learning.

Title of paper	Properties of matter and mechanics
Course code	Physics(101)
Total Hours	30 hours

After successful completion of the course the student is expected to learn the following objectives.

- Learn the basic properties of matter, how Young's modulus, bulk modulus and modulus of rigidity are defined.
- How modulus of elasticity are evaluated for different shapes of practical relevance such as cantilever, beams, torsional pendulum etc.
- Have a clear understanding of flow of fluid on a surface and find the coefficient of viscosity.
- Application of Bernoulli's theorem to practical application such as lift of aeroplane and atomisers.
- Learn the concept of terminal velocity and Stoke's law.
- Learn the fundamentals of surface tension and application of surface tension.
- How to calculate surface tension by Quinke's and capillary rise method.
- Introduction to Newton's law of motion and fundamental idea of different coordinate systems.
- Study the application of Coriolis force.
- Fundamental concept of center of mass and equation of motion.
- Concept of Conservation of momentum and energy and its application to single stage and multistage rockets.
- Concept of moment of inertia and its application to various shapes.

Title of paper	Electrostatics, time varying field and electric currents
Course code	Physics (102)
Total Hours	30 hours

After successful completion of the course the student is expected to learn the following objectives.

- Have gained elaborated knowledge of electrostatics.
- Have the understanding of laws governing the charge distribution over various shapes.
- Become familiar with the concept of dielectrics.
- Study in depth about polarisation, bound charges and boundary conditions.
- Concept of capacitance and application of dielectric in capacitors.
- Fundamental idea of electromagnetism and it's application to transformers.
- Detailed Study of transformers.
- Students will be able to solve a variety of problems related to Faraday's law of induction.
- Study in depth the transient response of CR,LR, and LCR circuits which are essential in designing as well as understanding the working of electronic circuits.
- Solve complex problems involving linear electrical networks employing the symmetry concept together with various network theorems.

Title of paper	Oscillations, kinetic theory of gases and thermodynamics
Course code	Physics (201)
Total Hours	30 hours

After successful completion of the course the student is expected to learn the following objectives.

- Learn the fundamentals of the harmonic oscillator model.
- Study of harmonic oscillations by lissajous's figures.
- Concept of damped harmonic oscillator and grasp significant terms like power dissipation and sharpness of resonance and damping factor.
- Concept of forced oscillations and idea of significant terms like power dissipation and sharpness of resonance and damping factor.
- Fundamentals of kinetic theory of gases.
- Learn the concept of molecular collision and mean free path.
- Learn the fundamentals of transport of mass, momentum and energy in gases.
- Basics of thermodynamics process and work done in each of these processes.
- A clear understanding of reversible and irreversible process.

- Understanding of First law of thermodynamics and its application to carnot engines.
- Fundamental understanding of the concept of entropy and the second law of thermodynamics.
- Realise the importance of thermodynamic functions and application of Maxwell's relations.
- Concept of liquefaction of gases and its application in air conditioning.

Title of paper	Gravitation, astrophysics, magnetism and magnetostatics
Course code	Physics (202)
Total Hours	30 hours

After successful completion of the course the student is expected to learn the following objectives.

- Knowledge of Kepler's law of planetary motion.
- Fundamental knowledge of Newton's law of gravitation.
- Students will be able to solve gravitational potential and energy problems.
- Basic knowledge of constituents of the universe, solar system and structure of the sun.
- Able to estimate mass of earth and planets.
- Concept of cosmological theories of the universe.
- Basic knowledge of magnetic material and their applications.
- Study Langevin's theory of domains and its application to different types of magnetic materials.
- Learn the Concept of superconductors.
- Basic idea of behavior of charged particles in the magnetic field.
- Concept of magnetic dipole moment and gyromagnetic ratio.
- Application of Biot-Savart law and Ampere's law..

Title of paper	Sound waves, applied acoustics, ultrasonics and power supply
Course code	Physics(301)
Total Hours	30 hours

After successful completion of the course the student is expected to learn the following objectives.

- Study the general equation of wave motion and waves in strings.
- Fundamental understanding of sound and response of human ear.
- Physics of musical instruments.

- Concept of transducers such as crystal microphone and moving coil loudspeaker.
- The basic idea of recording and reproduction of sound.
- Study of acoustics of building and requirements for good acoustics.
- Fundamental understanding of ultrasonics waves and their generation.
- Application of ultrasonics in sea depth measurement, SONAR and medical sciences.
- Fundamental and working of the rectifiers and filters.
- Understand the need of regulated power supply.
- Learn various methods of regulations of voltage in power supply.

Title of paper	Physical optics and electromagnetic waves
Course code	Physics (302)
Total Hours	30 hours

After successful completion of the course the student is expected to learn the following objectives.

- Gain knowledge of interference mechanisms in thin films.
- Study Newton's ring and it's applications.
- Study Michelson and Febry Perot interferometer and their applications.
- Have basic knowledge of fresnel's diffraction and it's application to narrow slit.
- Knowledge of Fraunhofer diffraction and use of gratings in spectroscopy.
- Able to Calculate resolving power of different optical instruments.
- Study of polarisation and Brewster's law.
- Nicol prism and it's application as analyser and polariser.
- Basic knowledge of EM waves.
- Able to understand the significance of Maxwell's equation.
- Basic knowledge of Poynting's theorem.

Title of paper	Solid state physics, X-ray and laser
Course code	Physics (401)
Total Hours	30 hours

After successful completion of the course the student is expected to learn the following objectives.

- Understand the crystal structure and clear understanding about X-ray diffraction.
- Study the crystal structure of NaCl, ZnS
- Awareness of brief history of physics, giving emphasis on the birth of X-ray.
- Study of Duan-Hunt law.

- Understand application of X-ray in various fields.
- Study of geometric relation between direct and reciprocal lattice.
- Understand Laue's theory of X-ray diffraction and Bragg's spectrometer to calculate the structure of material.
- Have gained basic knowledge of laser and working of different types of laser.

Title of paper	Solid state electronics and molecular physics
Course code	Physics (402)
Total Hours	30 hours

After successful completion of the course the student is expected to learn the following objectives

- Study the basic electronics technology.
- Understand types of transistor and it's application.
- Understand hybrid parameters and solve problems based on it.
- Understand construction and working of JFET.
- Understand how to calculate parameters of FET.
- understand quantization of vibrational and rotational energy.
- Understand types of molecules based on moment of inertia.
- Study the Born-Oppenheimer approximation.
- Become familiar with molecular spectroscopy and have gained basic ideas regarding NMR and ESR and Raman spectroscopy.
- Study the Frank-Condon principle.

Title of paper	Atomic physics, free electron theory and statistical physics
Course code	Physics (501)
Total Hours	30 hours

After successful completion of the course the student is expected to learn the following objectives

- Able to understand Stern-Gerlach experiment.
- Learn the concept of quantum numbers.
- Understand the difference between Zeeman and Stark effect.
- Understand the relation between electrical conductivity and thermal conductivity at particular temperature.

- Understand the Kroning Penny model and what are allowed and forbidden energy zones.
- Understand Hall effect and how charge carriers are calculated.
- Familiarise in depth about statistical distribution and basic idea of B-E, F-D and M-B statistics and their applications.

Title of paper	Quantum mechanics, nanomaterial and nanotechnology
Course code	Physics (502)
Total Hours	30 hours

After successful completion of the course the student is expected to learn the following objectives.

- To become familiar with black body radiation, Planck's radiation laws and Compton effect.
- How quantum theory emerges.
- Grasped the idea of wave mechanics.
- Concept of Eigen value and Eigen function.
- Solution of Schrodinger equation in a box and its application to free particles in one and three dimensions.
- Gain some knowledge of nanotechnology.
- Identify the difference between nanomaterial and bulk material.
- Understand the different methods of synthesis of nanomaterial like sol-gel, wet chemical techniques.
- Understand characterisation techniques like SEM and TEM.

Title of paper	Relativity, nuclear physics, and biophysics
Course code	Physics (601)
Total Hours	30 hours

After successful completion of the course the student is expected to learn the following objectives.

- Gain a clear picture of Michelson Morley experiment.
- Have deep knowledge about different detectors such as GM counter, Wilson cloud chamber, cyclotron and linear accelerator.
- Gain basic knowledge of alpha, beta and gamma decay, nuclear fission and fusion
- Gain basic knowledge about ECG, EEG, ERG.
- Learn basic principles of bioinstruments and calorimeter

- Learn basics of spectrophotometer, ph-meter and centrifuge measurements.

Title of paper	Electronics, fibre optics, communication and digital electronics
Course code	Physics (602)
Total Hours	30 hours

- Study basic electronic technology.
- Develop the idea of an operational amplifier and oscillator such as phase shift, Hartley oscillator.
- Understand basics of modern optics like fibre optics.
- Knowledge of various number systems and their applications.
- Realise the importance of different electronic communications systems.



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