B.Sc.
Program Outcomes

The Three-year B.Sc Programme at Navjivan Science College,Dahod,Gujarat offers courses at different level in the subjects of Physics, Chemistry, Mathematics, Zoology, Botany, Microbiology and Biotechnology.

1. All of these subjects are designed with a specific aim of introducing students to various laboratory methods thereby exposing them to several laboratory techniques in handling of state of the art equipment, critical thinking and being independent as well as team learning
2. They develop laboratory skills throughout the curriculum via hands-on experiences with diverse experimental techniques and tools.
3. They learn several approaches to data analysis and become confident in using computational methods to analyze and solve various problems.
4. To aware the faculty and students about environment and sustainability
5. To be able to think innovatively to propose novel ideas in explaining facts or providing new solution to the problems.

Department of Physics

Knowledge Outcome

After completing B.Sc. (Physics) Programme students will be able to:

PO1: Apply the basic principles of Physics to the events occurring around us and also in the world;

PO2: Try to find out or analyze scientific reasoning for various things.

Program Specific Outcomes (PO)

PO3: Students get acquainted with techniques which are useful in industry.

PO4: Students get conceptual knowledge of entrepreneurships through the co-curricular activities;

PO5: Iearn the organizational skills and working in group. PSO4: Students will be well versed with use of computers;

Professional Skill Outcomes:

After completing B. Sc. Physics Program, the students will be able to:

PO6: Apply and demonstrate knowledge of the basic concepts of Physics to analyze a wide variety of physical phenomena;

PO7: Demonstrate knowledge and understanding of essential facts, concepts, principles and theories;

PO8: Demonstrate one's laboratory skills, enabling them to take measurements in the Physics laboratory and analyze the measurements to draw valid conclusions;

PO9: Have oral and written scientific communication and will prove that they can think critically and work independently;

PO10: Communicate effectively using different techniques, reports and presentations within a scientific environment;

PO11: Respond effectively to unfamiliar problems in scientific contexts;

PO12: Plan, design, execute and report the results of a complex extended experiment or investigation, using appropriate methods to analyze data and to evaluate the level of its uncertainty;
PO13: Integrate and apply one's skills to study different branches of Physics;
PO14: Ability to interact with other people and to engage in team-working;
PO15: Ability to plan and implement efficient and effective modes of working;
PO16: To work well with others in order to achieve a common objective;
PO17: To have an academic group project work, to work in a committee;
PO18: To work with others to organize an event, being part of a team in a job;
PO19: To handle change and adapt to new situations

Generic Competencies Outcomes:

After completing B. Sc. Physics Program, the students will be able to:
PO20: Work comfortably with numbers and analyzing an issue quantitatively;
PO21: Acquire knowledge effectively by self-study and work independently;
PO22: Present information in a clear, concise and logical manner and apply appropriate analytical and approximation methods.

Attitude/Value Outcomes:

After completing B. Sc. Physics Program, the student should have developed some positive attitudes and will have:
PO23: Willingness to take up responsibility in study and work;
PO24: Confidence in his/her capabilities;
PO25: Capacity to work effectively in a team;
PO26: Motivation for learning and experimentation.

Scientific Outcomes

After completing B. Sc. Physics, students will be able to:
PSO1: Demonstrate and understanding of principles and theories of physics. These include: Newtonian Mechanics, Thermodynamics, Electrodynamics, Atomic and Molecular Physics, Electronics, Optics, Nuclear Physics, Quantum Mechanics;
PSO2: Apply vector algebra, differential and integral calculus as well as graphical methods to solve problems;
PSO3: Demonstrate ability to apply knowledge learned in classroom to set and perform simple laboratory experiments;
PSO4: Solve problems using the appropriate methods in mathematical, theoretical and computational Physics.

Course Outcomes

Semester-I

Course: Vector analysis (BSC0C101)

After successfully completing this course, the student will be able to:

CO1: Understand the difference between vectors and scalars, combinations of vectors, their products and solve Physics problems using them;

CO2: Study vector and scalar fields and functions along with their properties;

CO3: Understand the concept of scalar and vector operators;

CO4: Study gradient, divergence and curl and their examples;

CO5: Be familiar with some vector identities and verify them which will be useful to them in the study of Electrodynamics.

Course: Waves

After successfully completing this course, the student will be able to;

CO1: Have basic ideas of waves and its classification;

CO2: Understand various wave properties;

CO3: Get the idea of Doppler Effect with the transverse and longitudinal motion of wave with respect to observer;

CO4: Understand the classification of sound on the base of frequency and detail about ultrasonic waves like its production, identification and applications of it's in various fields

Course: Optics & Gravitation

After successfully completing this course, the student will be able to:

CO1: Understand the basic nature of light;

CO2: Study Farmat's principle and use it to establish laws of reflection and those of refraction;

CO3: Have information about interference in thin films, and how Newton's Rings are formed and applications of it;

CO4: Have basic ideas of Gravitation, Gravitational field and potential;

CO5: Get the knowledge about Keplar's law of planetary motion and motion of satellites, gravity and weightlessness;

Course: Laser

After successfully completing this course, the student will be able to:

CO1: Iearn the fundamental properties of Laser light, interaction between matter and radiation and probability of absorption and emission to take place;

CO2: Get the detail knowledge about possibility of laser production, types and application of it.

Course: Physics Practical (BSCPO101)

After successfully completing this course, the student will be able to:

CO1: Demonstrate an ability to collect data through observation;
CO2: Acquire technical skills in using laboratory equipment, tools and materials;
CO3: Experimentation and interpretation of data;
CO4: Demonstrate an understanding of laboratory procedures using scientific methods;
CO5: Demonstrate a deeper understanding of the basic concepts and theories gained by experiencing and visualizing them as authentic phenomena;
CO6: Acquire complementary skills of collaborative learning and teamwork in the laboratory work.

Semester-II

Course: Electric and Electronic Circuits (BSC0C201)

After successfully completing this course, the student will be able to:
CO1: Study transformer and rectification;
CO2: Understand half-wave rectifier, full-wave rectifier and full-wave bridge rectifier along with their parameters;
CO3: Study necessity of filter circuits and understand different types of filters;
CO4: Discuss clippers, clampers and limiters.
CO5: Study phase analysis in ac circuits containing different combinations of components;
CO6: Do mathematical analysis of balancing an ac bridge having arms containing circuit components such inductor, resistor, capacitor etc;
CO7: Study different ac bridges and their applications.

Course: Electrostatics

After successfully completing this course, the student will be able to:
CO1: Understand Coulomb's law and its applications;
CO2: Study some basic quantities such as field, electric field, flux, electric flux etc.;
CO3: Understand Gauss's law for electrostatics and its applications for some specific charge distributions;
CO4: Solve numerical problems based on Coulomb's law, principle of superposition and Gauss's law.
CO5: Study electrostatic potential and potential energy;
CO6: Establish relationship between electric field and electrostatic potential;

Course: Plasma Physics

After successfully completing this course, the student will be able to:
CO1: Acquire the knowledge about fourth state of matter-Plasma and its characteristics.

CO2: Study the types of collisions with the detail examples of inelastic collisions, surface phenomena, transport phenomena, Ambi-Polar diffusion, conductivity and recombination in Plasma;

CO3: Study the comparisons of various natural and manmade plasma, plasma diagnostics and space plasma;

Course: Nuclear Physics

After successfully completing this course, the student will be able to:

CO1: Iearn the interaction between particles and matter;

CO2: Study different detectors for nuclear particles like, proportional counter, scintillation counter, spark chamber etc,;

CO3: Have fundamental ideas on radioactivity, radioactive radiations and their properties;

CO4: Study the determination of the age of the earth;

CO5: Iearn the types of nuclear and balance of mass and energy in nuclear reaction

CO6: Calculate the Q-equation and its solution;

Course: Physics Practical (BSCPO201)

After successfully completing this course, the student will be able to:

CO1: Demonstrate an ability to collect data through observation;

CO2: Acquire technical skills in using laboratory equipment, tools and materials;

CO3: Experimentation and interpretation of data;

CO4: Demonstrate an understanding of laboratory procedures using scientific methods;

CO5: Demonstrate a deeper understanding of the basic concepts and theories gained by experiencing and visualizing them as authentic phenomena;

CO6: Acquire complementary skills of collaborative learning and teamwork in the laboratory work.

Semester-III

Course: Solid State Physics (BSCC301A)

After successfully completing this course, the student will be able to:

CO1: Understand the Periodic array of atoms;

CO2: Describe fundamental type of lattices;

CO3: Understand index system for crystal planes;

CO4: Describe simple crystal structure and direct imagining of atomic structure and nonideal crystal structure;

CO5: Explain diffraction of waves by crystals;

CO6: Describe Brillouin zones.

CO7: Understand the wave diffraction and calculate the reciprocal lattices of different crystal systems;

Course: Classical Mechanics

After successfully completing this course, the student will be able to:

CO1: Iearn the mechanics of a particle and mechanics of system of particles;
CO2: Understand the equivalent one-body problem;
CO3: Acquire knowledge about general features of the motion, motion in a central force field and motion in an inverse-square law force field.
CO4: Study oscillations and simple and damped harmonic oscillator;
CO5: Know the laboratory and center of mass systems;

Course: Heat & Thermodynamics

After successfully completing this course, the student will be able to:

CO1: Use thermodynamic terminology correctly;
CO2: Understand entropy and its applications;
CO3: Read T- S diagram and derive internal energy equations and heat capacity equations;
CO4: Study Joule-Thomsan expansion:

Course: Nuclear Physics

After successfully completing this course, the student will be able to:

CO1: Detail study and understand the physical tools for doing nuclear physics;
CO2:Acquire knowledge of particle accelerators like vande graff generator, the cyclotron, synchrotron, betatron and the beta ray spectrometer;
CO3: Describe basic properties of nuclei, Rutherford scattering and estimation of the nuclear size;
CO4: Have detail understanding of alpha rays spectra and decay of alpha particles;
CO5: Iearn beta rays specta, Pauli's neutrino hypothesis and detection of neutrino;
CO6: Understand gamma ray emission and rules and internal conversion:

Course: Elementary Quantum Mechanics (BSC0C301B)
After successful completion of the course the student will be able to:

CO1: Get some flavor of Quantum Mechanics;
CO2: Distinguish Classical Mechanics and Quantum Mechanics;
CO3: Get the concept of wave function of a particle and its properties;
CO4: Establish time-dependent Schrodinger's Equation and its steady state form;
CO5: Obtain expectation value of an observable within the given interval;
CO6: Understand the significance of operators of some physical quantities/ observables in Quantum Mechanics.

Course:Electrostatics & Magnetostatics

After successfully completing this course, the student will be able to:

CO1: Understand Coulomb's law and its applications;

CO2: Study some basic quantities such as field, electric field, flux, electric flux etc.;

CO3: Understand Gauss's law for electrostatics and its applications for some specific charge distributions;

CO4: Study the basics of magnetism;

CO5: Study force on a moving charge and solve problems based on it;

CO6: Understand torque on a current carrying loop;

CO7: Faraday's experiments on electromagnetic induction;

Course:Optics

After successfully completing this course, the student will be able to:

CO1: Understand the wave nature of light based on Huygens' theory;

CO2: Study recti-linear propagation of light;

CO3: Apply superposition principle to the waves of light;

CO4: Study coherence, interference of light and diffraction of light;

CO5: Obtain intensity distribution on the screen because of two waves of light under different conditions;

CO6: Understand single-slit diffraction pattern.

After successfully completing this course, the student will be able to:

Course:Electronics

After successfully completing this course, the student will be able to:

CO1: Study the basic ideas of construction and working of special purpose diodes;

CO2: Understand characteristics of zener diode and its application as a voltage regulator;

CO3: Study the basic ideas of construction of transistors and its biasing;

CO4: Discuss characteristics of transistors.

CO5: Distinguish between BJT and FET;

CO6: Study FET, JFET, MOSFET and their parameters;

CO7: Discuss FET amplifiers and its applications

Course: Physics Practical (BSCPO301)

After successfully completing this course, the student will be able to:

CO1: Demonstrate an ability to collect data through observation;

CO2: Use various instruments and equipment used in the laboratory;

CO3: Design an experiment to test a hypothesis and/or determine the value of some unknown physical quantity;

CO4: Set up experimental equipment to implement an experimental approach;

CO5: Describe the methodology of science and the relationship between observation and theory;

CO6: Obtain and analyze data, plot appropriate graphs and reach conclusions from the data analysis;

CO7: Work in a group to plan, implement and report on a project/experiment;

CO8: Keep a well-maintained and instructive laboratory record book;

CO9: Express their knowledge and ideas through oral and written language.

Semester-IV

Course:Solid State Physics(BSCC401A)
After successful completion of the course the student will be able to:
CO1: Understand the Periodic array of atoms;
CO2: Describe fundamental type of lattices;
CO3: Understand index system for crystal planes;
CO4: Describe simple crystal structure and direct imagining of atomic structure and nonideal crystal structure;
CO5: Explain diffraction of waves by crystals;
CO6: Describe Brillouin zones.
CO7: Study the Experimental Survey, Theoretical Survey of superconductivity;
CO8: Understand High Temperature Superconductors

Course:Classical Mechanics
After successful completion of the course the student will be able to:
CO1: Understand the limitation of Newton's laws of motion;
CO2: Understand the concept of constraints, its significance and its classification;
CO3: Understand generalized coordinates and their physical significance;
CO4: Deduce Lagrange's equation using different methods;
CO5: Correlate Hamilton's principle, D' Alembert's principle and Newton's laws of motion;
CO6: Derive general expression for kinetic energy;
CO7: Understand conservation theorems, symmetry properties, Cyclic or ignorable coordinates;
CO8: Understand Velocity-dependent potential of electromagnetic field;

Course: Statistical Mechanics & Fiber Optics
After successful completion of the course the student will be able to:
CO1: Outline the importance of coherence in optical phenomena;
CO2: Describe different types of coherence and the factors affecting it;
CO3: Understand the concept of stimulated emission on the basis of Einstein's theory;
CO4: Define absorption, spontaneous emission and stimulated emission processes and describe lasing action through EDFA;
CO5: Generate different types of Lasers;
CO6: Study properties and applications of Laser
CO7: Outline the phenomena such as reflection, refraction, total internal reflection and interference of light;
CO8: Study the structure of optical fiber, its significance in context to communication

Course: Modern Physics : Special Theory of Relativity
After successful completion of the course the student will be able to:

CO1: Outline Galilean transformations electromagnetism and Newtonian relativity;
CO2: Study Michelson-Morley experiment and its outcome;

CO3: Iearn Lorentz-Fitzgerald contraction Hypothesis;
CO4: Study the ether drag hypothesis;
CO5: Iearn the postulates of the special theory of relativity.
CO6: To understand how the principle of relativity leads to time dilation and length contraction.
CO7: To solve novel problems using the equations for time dilation and length contraction.
CO8: To explore relativistic energy and momentum.
CO9: To recognize the significance of Einstein's famous equation $E = mc^2$.

Course: Quantum Mechanics (BSCC401B)
After successful completion of the course the student will be able to:
CO1: Establish time-dependent Schrodinger's Equation and its steady state form;
CO2: Use Schrodinger's Equation for solving problems of particle in a box finite potential and harmonic oscillator;
CO3: Understand tunnel effect based on Schrodinger's Equation and its solution.

Course:Astrophysics & Medical Physics
After successfully completing this course, the student will be able to:

CO1: Acquire knowledge of the Physical universe and its evolution
CO2: Define and use fundamental principles and techniques of astronomy and astrophysics.
CO3: Understand and apply basic physics and computational techniques to solve problems in astrophysics, and interpret the results.
CO4: Apply expert theoretical knowledge and an integrated understanding across all areas of medical physics.
CO5: Utilise advanced problem-solving skills to analyse outputs and synthesise complex information in applying medical physics knowledge into clinical practice.
CO6: Apply advanced theoretical and technical skills to perform and critically evaluate quality assurance procedures for medical physics.

Course: Digital Electronics
After successful completion of the course the student will be able to:
CO1: Outline different number systems;
CO2: Study multiplexer and demutiplexer, comparators, encoders and decoders;
CO3: Iearn parity generators and checkers;
CO4: Understand binary to decimal and decimal to primary conversions.
CO5: Have introduction to logic gates and understanding of universal gates;
CO6: Study Boolean algebra;
CO7: Iearn how to prepare Karnaugh map and use it;
CO8: Understand SOP and POS methods for solving Boolean expressions.

Course: Electronics
After successful completion of the course the student will be able to:
CO1: Have basic idea of CC amplifier and its parameters;
CO2: Study Darlington connections;
CO3: Understand Class B push-pull emitter follower;
CO4: Describe Class B amplifiers;

CO5: Discuss voltage regulation.
CO6: Understand the load line and Q-point;
CO7: Describe different types of biasing and their comparison.

Course: Physics Practical BSCPO401)
After successfully completing this course, the student will be able to:
CO1: Demonstrate an ability to collect data through observation;
CO2: Use various instruments and equipments used in the laboratory;
CO3: Design an experiment to test a hypothesis and/or determine the value of some unknown physical quantity;
CO4: Set up experimental equipment to implement an experimental approach;
CO5: Describe the methodology of science and the relationship between observation and theory;
CO6: Obtain and analyze data, plot appropriate graphs and reach conclusions from the data analysis;
CO7: Work in a group to plan, implement and report on a project/experiment;
CO8: Keep a well-maintained and instructive laboratory record book;
CO9: Express their knowledge and ideas through oral and written language.

Semester- V

PHYSICS PAPER- BSCC501A
UNIT -1 MATHEMATICAL PHYSICS

Course: Numerical Techniques & Differential equation

CO1:Mathematics forms the tools of modern workers in theoretical physics , chemistry and different branches of engineering.

CO2:Here Hemilton's equation , Laplase's equation in various coordinate systems are considered .

CO3: Separability of a partial differential equation invarious coordinate systems , linear and nonlinear first order differential equations and related examples are taught.

UNIT -2 MATHEMATICAL PHYSICS

Course: 2nd order differential equation.

After successful completion of the course the student will be able to:

CO1: Iearn about partial differential equation;

CO2: Derive series solution of Frobenius method

UNIT-3 CLASSICAL MECHANICS

Course : Motion of Rigid Body & Variational Principle

After successful completion of the course the student will be able to:

CO1: Study Euler's theorem

CO2: Establish the law of conservation of angular momentum and study its physical significance through some examples;

CO3: Mathematically derive expressions for inertia tensor and principal axes of the body;

CO4: Derive Euler's equations of motion and Euler's angles;

CO5: Study Torque-free motion;

CO6: Study the motion of symmetrical top in detail.

CO7: Know about variational Principle

UNIT-4 QUANTUM MECHANICS

Course : Exactly soluable Eigen value problem

After successful completion of the course the student will be able to:

CO1: Apply Schrodinger's equation to the simplest possible atom – hydrogen atom;

CO2: Extend the concepts of probability (of finding a particle) and (finding) expectation value (of an observable using wave function): the two pillars of Quantum Mechanics;

CO3: Compare theoretical data with experimental values of observables;

CO4: Understand how naturally quantum numbers get in when one solves Schrodinger's equation;

CO5: Come to know about the importance of quantum numbers in quantizing certain physical quantities.

PHYSICS PAPER – BSCC501B

UNIT – 1 ATOMIC PHYSICS

Course: Atomic Physics

After successful completion of the course the student will be able to:

CO1: Students can calculate bond length , force constant , moment of inertia, rotational frequency and vibrational frequency , Raman shift of diatomic molecules.

CO2: They also know to find out absorption and emission frequencies of molecular radiation.

UNIT -2 ASTROPHYSICS

Course: Stars and Stellar evolution & Atmosphere of stars

After successful completion of the course the student will be able to:

CO1: Understand the light coming from extraterrestrial objects in different electromagnetic spectrum and their astronomical spectrograph;

CO2: Iearn about apparent and absolute brightness of the star;

CO3: Outline the magnitude of the star determine by radiometer;

CO4: Have introduction about the color index and luminosities of the star.

UNIT -3 STATISTICAL MECHANICS

Course: Formulation of Quantum Statistics:

After successful completion of the course the student will be able to:

CO1: Information of diatonic moleular spectra are completed here with the electronic spectra.

CO2: Completing the study work of statistical mechanics , students have understanding of all basic concepts of statistical mechanics.

CO3:The scope of statistical mechanics is very wide.

CO4: It is applicable to all phenomena of macroscopic bodies whose behaviour can not be completly described by classical or quantum mechanics.

UNIT -4 SOLID STATE PHYSICS

Course: Free Electron Fermi Gas

After successful completion of the course the student will be able to:

CO1: Derive expression for energy levels for free electron gas in one dimension;

CO2: Understand effect of temperature on the fermi dirac distribution;

CO3: Derive expression for energy levels for free electron gas in one dimension;

CO4: Obtain expression for Heat capacity of the electron gas;

CO5: Study electric conductivity, thermal conductivity of metals and Ohm's law;

CO6: Study motion of charge particle in magnetic field.

PHYSICS PAPER - BSCC501C

UNIT -1 ELECTROMAGNETISM

Course: Magnetic Materials & Electromagnetic induction

After successful completion of the course the student will be able to:

CO1: Classify materials based on their magnetic properties;

CO2: Study how to magnetize an unmagnetized substance, such substances have many applications;

CO3: Study the origin of magnetic field in a substance;

CO4: Effect of magnetic field on diamagnetic, paramagnetic and ferromagnetic substances;

CO5: Study the origin of bound currents and its interpretation

CO6: Obtain Ampere's law in the presence of magnetized materials;

CO7: Define magnetic susceptibility and magnetic permeability;

CO8: Study hysteresis cycle of a ferromagnetic substance.

UNIT -2 ELECTROMAGNETISM

Course: Electromagnetic induction & Electromagnetic waves

After successful completion of the course the student will be able to:

CO1: Understand the behaviour of conductors and dielectrics in the presence of an external electric field;

CO2: Study polarization of dielectrics, resulting into surface and volume charge densities;

CO3: Have understanding of displacement field in the dielectric and its importance in the construction and working of a capacitor;

CO4: Study modified form of Gauss' law in the presence of dielectric and in turn derive electric field due to the given charge distribution;

CO5: Study linear dielectrics and their properties;

CO6: Discuss boundary value problems in the presence of dielectrics;

CO7: Obtain expressions for energy and forces in the presence of dielectrics.

UNIT -3&4 NUCLEAR PHYSICS

Course: Constituents of Nucleus & Alpha Ray, beta Ray, Gamma Ray

After successful completion of the course the student will be able to:

CO1: Outline various nuclear models, their properties, successes and failures.

CO2: Have fundamental ideas on radioactivity, radioactive radiations and their properties.

PHYSICS PAPER – BSCC501D

UNIT -1&2 ELECTRONICS

Course: General Amplifier characteristics & Frequency Response of a transistor Amplifier

After successful completion of the course the student will be able to:

CO1:Students get knowledge of basics of amplifier , current gain , voltage gain and power gain,distortion and low frequency and high frequency response of transistor amplifier .

CO2: Students get knowledge of basics of amplifier , current gain , voltage gain and power gain,distortion and low frequency and high frequency response of transistor amplifier

UNIT -3 DIGITAL ELECTRONICS

Course: Circuit Analysis, design

After successful completion of the course the student will be able to:

CO1:. Students also get clerity in fundamentals of digital principles and applications and get considerable understanding in network lines and field

UNIT -4 DIGITAL ELECTRONICS

Course: Arithmetic circuits & FLIP-FLOP

After successful completion of the course the student will be able to:

CO1: Iearn clock waveforms;

CO2: Study Schmitt trigger;

CO3: Understand the construction and working of various multivibrators;
CO4: Iearn basics of flip-flops;

CO5: Understand difference among various flip-flops;

CO6: Iearn the need of a master-slave flip-flop and working.

PHYSICS PAPER- BSCSE501(EC)

UNIT -1 Introduction to Nanomaterials

UNIT -2 Methods of synthesis of Nanomaterials

UNIT -3 Special Nanomaterials

UNIT -4 Analytical Technique

After successful completion of the course the student will be able to:

CO1: Useful knowledge of the study in nanotechnology will update and support their understanding of requirements of various research labs and applications in electronics, biotechnology and medical, automobiles, space, defense, sports, cosmetics, cloth industry. C02:Students are also given experimental work on general physics , nuclear physics instrument and optical instruments . The fundamentals they develop have applications in experimental astrophysics , the principles involved in fibre optics communication .

CO3:Basic experiments of analog and digital electronics are very useful to understand designing of advance electronic circuits and integrated circuits.

PHYSICS RACTICAL(BSCPO501)

After successful completion of the course the student will be able to:

CO1: Describe the underlying theory of experiments in the course;

CO2: Perform derivations of theoretical models of relevance for the experiments in the course;

CO3: Follow instructions to perform laboratory experiments in Optics, Thermodynamics, Mechanics, Modern Physics, Electronics and Electromagnetism;

CO4: Document their results, using correct procedures and protocols;

CO5: Perform a quantitative analysis of experimental data including the use of computational and statistical methods where relevant

CO6: Interpret relationships in graphed data and develop an intuition for alternative plotting methods and communicate results from laboratory experiments, orally or in a written laboratory report;

CO7: Calculate permissible standard error in any physics experiment;

CO8: Derive conclusions from the analysis of own data;

CO9: Assess the language used to describe physics experiments and how it can alter perceptions of the method and results.

Semester-VI

PHYSICS PAPER - BSCC601A

UNIT -1 MATHEMATICAL PHYSICS

Course: Some Special function in Physics

After successful completion of the course the student will be able to:

CO1: Outline algebraic equation and polynomials;

CO2: Know different method to solve algebraic equation;

CO3: Explain bisection method and false position method to solve algebraic equation;

CO4: Explain the iteration method Newton-Raphson method to solve algebraic equation;

CO5: Define interpolation and understand different types of interpolation;

CO5: Come to know about errors in polynomial interpolation;

CO6: Outline various operators and their uses to derive different polynomials;

CO7: Understand Newton's difference formulation and solve the algebraic equation.

UNIT -2 CLASSICAL MECHANICS

Course: Lagrangian Formulation
After successful completion of the course the student will be able to:

CO1: Understand the limitation of Newton's laws of motion;

CO2: Understand the concept of constraints, its significance and its classification;

CO3: Understand generalized coordinates and their physical significance;

CO4: Deduce Lagrange's equation using different methods;

CO5: Correlate Hamilton's principle, D' Alembert's principle and Newton's laws of motion;

CO6: Derive general expression for kinetic energy;

CO7: Understand conservation theorems, symmetry properties, Cyclic or ignorable coordinates;

CO8: Understand Velocity-dependent potential of electromagnetic field;

CO9: Understand and use Rayleigh's dissipation function.

UNIT-3 QUANTUM MECHANICS

Course :Three dimensional square well potential:

After successful completion of the course the student will be able to:

CO1: Determine the characteristics of atomic spectra;

CO2: Study effect of magnetic field on spectral lines (Zeeman Effect);

CO3: Will have an understanding on spin motion of electrons.

UNIT -4 QUANTUM MECHANICS

Course: Representation, Transformation and Symmetrics

After successful completion of the course the student will be able to:

CO1: Have an understanding of symmetric and antisymmetric wave functions and Pauli's exclusion principle.

CO2: Have an understanding about transformation & vector representation

PHYSICS PAPER - BSCC601B

UNIT -1 MOLECULAR HYSICS

Course: Separation of Electronic & Nuclear Motion

After successful completion of the course the student will be able to:

CO1: Study the theory of molecular bonds;

CO2: Iearn about rotational and vibrational energy levels.

UNIT -2 STASTICAL MECHANICS

Course: Transport phenomena

After successful completion of the course the student will be able to:

CO1: Outline phase space and quantum state;

CO2: Iearn the significance of the state of the system;

CO3: Distinguish between macrostates and microstates;

CO4: Study types of ensembles;

CO5: Iearn entropy and probability.

UNIT -3 SOLID STATE PHYSICS

Course: Theory of Dielectric

After successful completion of the course the student will be able to:

CO1: Outline the basic coupling schemes of spin and orbital motions of electrons in an atom and obtain the outcome as a result;

CO2: Understand the distribution of electrons in different shells and sub-shells in the atoms of the elements using Pauli's exclusion principle, prepare electron configuration in them and ultimately construct the periodic table;

CO3: Calculate quantum state of electrons in an atom and establish spectral notation;

CO4: Study X-ray spectra and their applications.

UNIT -4 SOLID STATE PHYSICS

Course: Super Conductivity & Fibre Optics

After successful completion of the course the student will be able to:

CO1: Study the basics optical fibres and its properties.

CO2: Study the Experimental Survey, Theoretical Survey of superconductivity;

CO3: Understand High Temperature Superconductors.

PHYSICS PAPER - BSCC601C

UNIT-1 PLASMA PHYSICS

Course: Motion of charged particles in Magnetic & Electric field

After successful completion of the course the student will be able to:

CO1:Students get very important fundamental understanding in plasma physics

CO2: The subject has wide applications.

CO3: In nuclear physics , basic concepts of nuclear structure , nuclear fission and nuclear.

CO4: Reactors , prelimnary understanding of elementary particles are also included.

UNIT -2 PLASMA PHYSICS

Course: Characteristics of plasma in magnetic field

CO1: Apart from applications range from energy production by thermonuclear fusion to laboratory astrophysics

CO2: Plasma physics has many industrial applications such as , blood coagulation,skin treatment,dental cleaning, treatment of certain types of cancer,hair treatment,sterilization of 14 hands,vegitables,seeds,bio films .

CO3:To increase germanism rate of seeds , increase surface energy of polymer films,surface hardening of metals , nano particle production by plasma.

UNIT-3 NUCLEAR PHYSICS

Course: Nuclear Models & Nuclear Energy

After successful completion of the course the student will be able to:

CO1: Outline various nuclear models, their properties, successes and failures;

CO2: Have fundamental ideas on radioactivity, radioactive radiations and their properties;

CO3: Get a flavor of artificial radioactivity.

CO4: Outline various nuclear models, their properties, successes and failures;

CO5: Have fundamental ideas on radioactivity, radioactive radiations and their properties.

UNIT-4 NUCLEAR PHYSICS

Course: Elementary particle

After successful completion of the course the student will be able to:

CO1: Classify elementary particles;

CO2: Understand the quantum numbers of elementary particles;

CO3: Explain the various conservation laws.

PHYSICS PAPER - BSCC601D

UNIT -1 ELECTRONICS

Course: Feedback & Oscillators

After successful completion of the course the student will be able to:

CO1: Have introduction to feedback amplifiers and their types;

CO2: Iearn various oscillators;

CO3: Understand the construction and working of IC 555 and its applications.

UNIT -2 ELECTRONICS

Course: FET & Op-Amp

After successful completion of the course the student will be able to:

CO1: Iearn basics of OP AMP;

CO2: Have introduction to IC 741;

CO3: Study various applications of OP AMP;

CO4: Construction and working of instrumentation amplifier.

UNIT -3 ELECTRONICS

Course: Network Transformation

After successful completion of the course the student will be able to:

CO1:These topics make students capable to understand working and designing of any electronic circuit may have any application.

CO2: They also understand Preliminary concepts required for microprocessor study.

CO3: Students also get detail understanding of many electronic instruments which are used for precise scientific measurements.

UNIT-4 ELECTRONICS

Course: Regulated Power supply & Instrumentation

After successful completion of the course the student will be able to:

CO1: Iearn principle, construction and working of CRT;

CO2: Study functions of deflection plates, graticule etc.;

CO3: Study basic CRO circuits;

CO4: learn how to do measurement of voltage, current, frequency and phase using CRO.

PHYSICS PAPER- BSCSE601 (EC)

Unit 1: Basic of Measurments

After successful completion of the course the student will be able to:

CO1: Iearn various thermometers and temperature transducers;

CO2: Study the construction and the functioning of LVDT and RVDT.

Unit 2: Opto-electric Device

After successful completion of the course the student will be able to:

CO1: Understand capacitive transducers

CO2: Iearn piezo-electric, Hall Effect and opto-electronic transducers.

Unit 3: Signal generators

After successful completion of the course the student will be able to:

CO1: Iearn about various display devices such as electrical, digital, SSD, dot matrix, LCD, LED etc.

Unit 4: Digital Multimeters

After successful completion of the course the student will be able to:

CO1: Iearn about various types of modern sensors, detectors and filters.

PHYSICS PRACTICAL(BSCPO601)

After successful completion of the course the student will be able to:

CO1: Describe the underlying theory of experiments in the course;

CO2: Perform derivations of theoretical models of relevance for the experiments in the course;

CO3: Follow instructions to perform laboratory experiments in Optics, Thermodynamics, Mechanics, Modern Physics, Electronics and Electromagnetism;

CO4: Document their results, using correct procedures and protocols;

CO5: Perform a quantitative analysis of experimental data including the use of computational and statistical methods where relevant;

CO6: Interpret relationships in graphed data and develop an intuition for alternative plotting methods and communicate results from laboratory experiments, orally or in a written laboratory report;

CO7: Calculate permissible standard error in any physics experiment;

CO8: Derive conclusions from the analysis of own data;

CO9: Assess the language used to describe physics experiments and how it can alter perceptions of the method and results.