Department of Physics
Course Outcome

Semester IPAPERCC-I
Mathematical Physics Course Outcome

CO1:Studentsareabletolearnlimit,continuityandelementaryideaabout the differential calculas.

CO2 : Students learn to solve differential equations first and second order and maximum andminimumofsingleandmultiplevariablesusingLagrange'sundeterminedmultiplier.

CO3: Studentslearnvectorcalculusandabletosolvethevectorproblem

CO4 : Students learn the vector integration including ordinary integration , surface and volumeintegration.

CO5: Studentslearncurvilinearcoordinatesandgradient,divergenceandcurlofavectorindifferentcoordinatesystem.

CO6 :Students learn probability theory, Binomial distribution function, Bayes' theorem andconditional probabilityandto solvedifferentproblems.

CO7 : Students learn Dirac Delta function and able to solve simple problems using Dirac Deltafunction.

Program Outcome

PO 1 : Elementary idea on differential calculas and its application in physicalproblems.

PO2: Solutiontodifferential equationsanditsapplicationinphysical problems.

PO3 : Application of vector calculas in physical problems.

PO4: Vectorintegrationfor line,surface andvolume.

PO5 : Curvilinear coordinates and its application to physical problems.

PO6: Probabilitytheoryandits applicationto physicalsystem.

PO7: LearnDiracdeltafunctionandits applicationtophysics.

Paper CC-II Mechanics

Course Outcome

CO1: Students learn fundamental of dynamics, review Newton's laws of motion, Gallilean invarianceprincipleand related problems.

CO2: Students learn work energy theorem, conservative system its physical applications and relatedproblems.

CO3: Students learn collisions of particles, elastic and non-elastic collisions in lab system and centreofmasssystemand relatedproblems.

CO4: Students study rotational dynamics problems, moment of inertia and able to find the moment ofinertiaof differentsymmetricalbodies.

CO5: Students learn elastic properties of matter and relation between different elastic coefficients.

CO6: Students learnfluiddynamics,Poiseuille's equationand itsapplications.

CO7: Students learn central force, law of gravitation and gravitational field and potential ofgravitatingobjects.

CO8: Students learn planetary motion, Kepler's law, satellites, geosynchronous orbits and theirrelatedproblems.

CO9: Students learn Wave and oscillations, damped motion and forced oscillations, resonance and itsapplications.

CO10:Studentslearnnon-inertialframesandphysicalproblemsinnon-inertialframes.

CO11: Students learn special theory of relativity, Lorentz transformation and its applications, massenergyrelation, relativisticdynamicandits applications.

ProgramOutcome

PO1: Study of dynamics of particles and application of Newton's laws of motion.

PO2: Conservative systemandits physicalapplications.

PO3 : Collision of particles, conservation of linear momentum in centre of mass and lab system.

PO4: Rotationaldynamics,momentofinertiaanditsapplicationto physical system.

PO5:Elasticpropertiesofmatter.

PO6:Fluiddynamicsanditsapplications.

PO7: GravityandNewton'slawsofgravitation.

PO8:Planetarymotion,satellitesandgeosynchronousorbits.

PO 9 : Waves and oscillations of different system, free, damped and force vibrations.

PO10: Rotatingcoordinatesandphysicalproblemsinrotatingcoordinatesystem.

PO11:Specialtheoryofrelativityanditsapplications.

SEMESTER-II

PARERCC:III

Electricity and Magnetism

Course Outcome

CO1 : Students learn electric field, potential an dlaw in electrostatics and solve various problemsrelatingto electrostaticfields and potentials.

CO2: Students learn to find the electrostatics energy of system, capacitance, conductors and able tosolvethe problemsofconductors bymethodofimage.

CO3:Studentslearndielectricpropertiesofmatterandabletosolvetheproblemsofdielectrics.

CO4: Students learn various problems in magnetostatics like magentis field due to a current carryingconductorandlearntechnique tosolve the problems inmagentostatics.

CO5 Students learn magnetic properties of magnetic materials and study hysteresis curve forferromagneticmaterials.

CO6: Students learn Faraday's laws of electromagnetic induction, Maxwell's equations and selfinductance,mutualinductance of various systems..

CO7: Students learn A.C circuits and behaviour of AC in LCR circuits and able to solve the problems.

CO8Studentsstudy NetworkTheoremsand itsapplicationstoDCcircuits.

CO 9 : Students learn the construction of Ballistic Galvanometer and able to measure charge andcurrentsusing Ballistic Galvanometer.

ProgrammeOutcome

PO1: Electric field and potential and its applicationPO2: Conductors, capacitance and method of

image.PO3: Dielectricbehaviourofthe matter.

PO4:Magnetostaticsanditsapplications.

PO5: Magnetic materials and study of dia ,para and ferromagnetic materials.

PO6:Faraday’slawsofelectromagneticinductionanditsapplications.

PO7:StudyonACcircuitsanditsapplications.

PO8:StudyofNetworktheoremanditsapplications.

PO9:Studyofdifferent kindofgalvanometersandapplications.

PAPER:CCIV

WavesandOptics

Course Outcome

CO 1 : Students learn linear superposition two simple harmonic oscillations and their behavior andacquireknowledge of Lissajousfigures.

CO 2 : Students learn transverse vibration of strings, propagation of travelling wave and behavior ofstanding wave in strings. They learn normal modes and of a string vibration, group and phasevelocity.

CO 3 : Students learn surface tension and properties of liquid surface. They learn fluid dynamics,viscosity and production of low pressure. They acquire knowledge of reverberation and buildingacoustics.

CO 4 : Students learn electromagnetic nature of light. They learn interference of lightand itspropertiesinopticaldeviceslike biprism and LLyodmirrors,Newton’srings.

CO5: StudentsMichelsonandFabryPerrotinterferometersandtheirapplications.

CO 6 : StudentsFraunhofer and Fresnel’s diffraction , zone plate and diffraction gratings and itsapplicationsto study diffraction.

ProgrammeOutcome

PO 1 : Study of superposition of two simple harmonic motion helps to study and determination ofunknownfrequencyofsimple harmonicmotion.

PO 2 : The study of string vibrations help to acquire knowledge of different musical stringinstruments.

PO3 : Theknowledge offluid dynamicshelpstofindtheflowoffluidthroughanarrowtube.

PO 4 : The knowledge of sound wave propagation and study of building acoustic aware studentsaboutthecriterion of a good auditorium.

PO 5 : The knowledge of propagation of electromagnetic wave in medium helps to study thepropertiesofelectromagnetic wave andopticalphenomena.

PO6: Theknowledgeofinterferometershelpstostudythephenomenaofinterferenceinlaboratory.

PO 7 : The knowledge of diffraction gratings and its accessories help students to study diffractionphenomena.

SEMESTER – IIIPAPER: CCV

Mathematical Physics- II

Course Outcome

CO1:StudentslearnFourierseriesanalysisanditsapplicationinaninfiniteseries.

CO2: Students learn to solve the second order differential equations in an ordinary point and regularsingularpoint,Besselfunctions, Legendrepolynomialsand theirrecurrencerelations.

CO3: Students learn some special integral like Beta and Gamma function, Error function and theirapplicationsin differentphysicalproblems.

CO4: Students learn partial differential equations (PDE) and its applications in rectangular, sphericalandcylindricalcoordinates.

ProgrammeOutcome

PO1: Study on Fourier series and application to Physical systems in sine and cosine form

PO2: The solution to second order differential equations and application to series solutions.

PO3: Application ofBetaand Gammafunctionsin physicalproblems.

PO4: Partial differential equations and its application in physical problems like heat flow and stringvibrations.

PAPER: CC– VI

ThermalPhysics

Course Outcome

CO1 : Students study the Zeroth, First law of thermodynamics , concept of work and heat developedandableto solvetheproblemsfollowing firstlaw.

CO2 :Students study second law of thermodynamics, reversible and irreversible process withexamples,Carnotcycle,Carnotengineanditsefficiency,refrigeratoranditsperformance.

CO3: Students studyentropyandentropyprincipleanditsapplicationsinvariousphysicalproblems.

CO4 : Students study thermodynamic potentials, enthalpy, Helmholtz free energy, Gibb's free energyandphasetransitionsrelating to physicalsystems.

CO5: Students study Maxwell relations and its applications, adiabatic demagnetisation and lowtemperaturephysics.

CO6 : Students study Maxwell's law of distribution of velocities, mean free path, transportphenomenaandlearnto solve the problems.

CO7: Students study real gasses and behaviour of real gases, Vander Waal's equation of state, Lowtemperaturephysicsanditsrelated applications.

ProgrammeOutcome

PO1: Zeroth law of thermodynamics and first law of thermodynamics and applications.

PO2: Secondlawofthermodynamicsanddifferent processesanditsapplications.
PO3:Studyandentropyandits principleanditsapplications.

PO4: Study on thermodynamic potentials, enthalpy and free energy and its applications.

PO5: Adiabatic demagnetizationandthirdlaw of thermodynamics.

PO6: Maxwell's equations and its applications to gasess.PO7: Behaviourofreal gasesanditsapplications.

PAPER: CC- VII

DigitalSystemsanditsApplications

Course Outcome

CO1: Students learn to study different Lissajous figures to study waveforms and voltages, frequencyand phases.

CO2 :Students learn integrated circuits, SSI, VLSI, linear and digital ICs and its applications

CO3: StudentslearnDigitalcircuitsandstudyofdifferentgatesanditsapplications.
CO4: Students learn Arithmetic Logics circuits including adders, subtractors and their applications.

CO5: Studentslearnsequentiallogic circuits anditsapplications.

CO6: Students learn Registers, Counters and their applications

CO7:Studentslearncomputerorganizationandarchitecture.

CO8: Studentslearncomputerprogrammingin8085microprocessoranditsapplications.

ProgrammeOutcome

PO1: Study on different Lissajous figures and finding unknown frequency of A.C signal.

PO2:Integrated circuitsand itsapplications.

PO3:Studyondigitalcircuitsanditsapplications.

PO4: Adders, subtractors and its applications to Digital circuits.PO5:Sequential logiccircuits,Flipflopsanditsapplications.

PO6:Registers,Countersanditsapplications.

PO7: Computer organization and study on 8085 microprocessor.PO8 : Study on8085microprocessor andits basicstructure.

SKILL ENHANCEMENT COURSEPAPER :SEC–1

Electrical Circuits and Network Skills

Course Outcome

CO 1 : Students learn basic electricity principle, AC Electricity, DC Electricity and become familar with multimeter, voltmeter, and ammeter.

CO2: Studentslearn electrical drwaing and symbols.

CO 3 :Students learn operation of AC/DC generators, transformers, and electric motors.

CO 4 : Students learn about solid state devices.

CO5 :Students learn electrical wiring and protection.

ProgrammeOutcome

The aim of this course is to learn electrical circuits, network theories, and its application in everyday life.

SemesterIV

PAPERCC:VIII

MathematicalPhysics –III

Course Outcome

CO 1 : Complex Variables is one of the most useful branches of Mathematical Physics which was ledfoundation by Cauchy, Riemann, Gauss and others in the 19^{th} Century. The students learn complexvariables which have many applications in Physical problems in heat flow, potential theory,electrodynamics,fluiddynamics and elasticity.

CO 2 : The topic covered under includes complex algebra and geometry. They learn differentiation ofcomplex function and condition for analytic function i.e Cauchy and Riemann conditions. They learnalsocomplex integration and pathintegrationofcomplex function.

CO 3: The course include infinite series namely Taylor and Laurent series, The evaluation of definiteintegral is learnt by students. They also learn residue theorem and learn evaluation of integrationusingresidue theorem.

CO 4 : The integral transform Fourier and Laplace transforms find several applications in physicalproblems. The students learn Fourier transform and its application in physical problems especially inquantummechanics.

CO 5 : The students learn Laplace transform and its applications to different physical systems.Students learn to solve the differential equations for damped oscillations and coupled differentialequations.

ProgrammeOutcome

PO1 : The knowledge on complex variables and its applications in physical problems help students tounderstand the importance and applications of complex variables and complex functions in physicalproblems.

PO2 : The knowledge of Fourier transform is important in physics, optics and quantum mechanics.The students learn Fourier transform and its application in physics enable them to apply theitknowledgein physicalsystems.

PO 3 : The students learn Laplace transform which has a wide application in electrical circuit theoryandtransmissionline.TheknowledgeofLaplacetransform andsolvingdifferentproblemsinphysics.

Paper CC- IX

ElementsofmodernPhysic

s

CourseOutcome

CO1: Students study the black body radiation and some historical scientific experiments which gavebirthof quantummechanics.

CO2:StudentsstudytheHeisenberguncertaintyprincipleanditsimportance.

CO3: Students study about the matter wave and get familiar with concept of wave function. They alsostudySchrodingerequationas thebasic equation of quantummechanics.

CO 4: Students study nucleus and its different properties and various types of measurements.

CO5 :Students learnradioactivitydecay and nuclearfission andfusion.

CO6:StudentslearnLaseritsformationandpropertiesof differenttypesofLasers.

ProgrammeOutcome

PO1: Students learn that Newtonian mechanics fails to describe the phenomena in the atomic andsubatomicparticles andnewformulationis neededtodescribe them.

PO2: Students learn to estimate different physical quantities by applying Heisenberg uncertaintyprinciple.

PO3:Studentsunderstandthewavenatureofsubatomicparticles

PO4: General propertiesofnucleianddifferent nuclearmodelsarestudied.

PO 5 : Radioactivity and nuclear fission and fusion are studied.

PO6: Laser propertiesanddifferent typesoflasersarestudied.

Paper:CC-X

AnalogSystemsandapplications

Course Outcome

CO-1 :- semiconductor basics, energy level diagram, doping, formation of P-N junction andphenomenaatthejunction

CO-2:- P-N junction diode applications, different types of rectifiers, Zener diode, LEDs, photodiodeandsolar cell

CO-3:- Bipolar junction transistors, characteristics and different modes of connection, load lineanalysis,physicalmechanismofcurrentflow.

CO-4:- Trasistor biasing and bias stabilization, fixed and voltage divider bias. Transistor as a twoportnetwork and h-parameter equivalent circuits. Analysis of single stage CE amplifier ,input outputimpedances,current, voltage, powergain .

CO-5:-twostageRCcoupledamplifieranditsfrequencyresponse.

CO-6:- Feedback in amplifiers, effect of positive and negative feedback on input/output impedance,gain,stability, distortion, noise.

CO-7:- Sinusoidal oscillators, Barkhausen criterion for self sustained oscillations, RC phase shiftoscillator,determinationoffrequency,Hartley&Colpitt's oscillators.

CO-8:- Operational amplifier black box approach, characteristics of ideal and practical opamp, virtualgroundconcept, CMRR, open andclosedloop gain

CO-9:- Application of opamp, inverting, non inverting amplifier, adder, subtractor, differentiator,integrator,logamplifier, zerocrossing detector,wien bridgeoscillator

CO-10:-Conversion, resistive network, weighted and R-2R ladder, accuracy and resolution, A/Dconversion

Programoutcome

After the completion of the courses students learned about the semiconductor basics, the Physicsbehind it, different and very important applications of semiconductors in modern electronics andachievedproficiencyin problemsolving.

SKILL ENHANCEMENT

COURSE

PAPER:SEC -2

Basic Instrumentation Skills

Course Outcome

CO1: Students learn about basic measurement skills such as accuracy, precision, sensitvity, resolution range etc.

CO2: Students learn in detail about electronic voltneter such as milivoltmeter, Cathod Ray Oscilloscope (CRO).

CO3: Students learn using signal generators and function generators.

CO4: Students learn using impedence bridges and Q-meter to mearure capcatance, resistance, and inductance.

CO5: Students learn about digital multimeters.ProgrammeOutcome

Programme Outcome

The aim of this course is to learn various electrical instruments andtheirapplications byhandexperiments.

SemesterV

PaperCC-XI

Quantummechanicsandapplication

Course Outcome

CO-1:-Time dependent Schroedinger equation, properties of wave function, probability andprobability current density, normalization, linearity and superposition principle. Eigen value,Eigenfunction, position, momentum, energy operator, expectation value of position and momentum,wavefunction of afree particle.

CO-2:- Time independent Schroedinger equation-Hamiltonian, stationary states and energy eigenvalues, expansion of an arbitrary wave function as a linear combination of energy eigen functions.General solution of the time dependent Schroedinger equation in terms of linear combinations ofstationarystates,applicationtospreadofGaussianwavepacketforafreeparticleinonedimension, Fouriertransformsandmomentumspacewavefunction,positionmomentum uncertaintyprinciple.

CO-3:- General discussion on bound states in an arbitrary potential , continuity of wave function,boundary condition and emergence of discrete energy levels, application to one dimensional problem-square well potential, simple harmonic oscillator energy levels and energy eigen functions usingFrobeniusmethod,Hermitepolynomials,groundstate,zeropoint energy anduncertaintyprinciple.

CO-4:- Hydrogen like atoms, time independent Schroedinger equation in spherical polar coordinates,separation of variables of second order partial differential equation, angular momentum operator &quantum numbers;radial wave function using Frobenius method, shapes of probability densities forgroundand excitedstates,l&m;s,p,d,f shells.

CO-5:-Atomsinelectricandmagneticfields,electronangularmomentum,spacequantization, electron spin and spin angular momentum, Larmor's theorem. Spin magnetic moment. Stern -Gerlachexperiment. Zeeman effect , gyromagnetic ratio and Bohr magneton. Normal and anomalous Zeemaneffect,Paschen Back&Stark effect(qualitativediscussion).

CO-6:- Many electron atoms, Pauli's exclusion principle, symmetric and antisymmetric wavefunctions, periodic table, spinorbit coupling. Spectral notations for atomic states. Total angularmomentum, vector atom model, L-S & J-Jcoupling. Hund's rule. Spectra of hydrogen and alkaliatoms.

Programmeoutcome

PO1: Computational problem to solve the s-wave schrodinger equation and plote thecorresponding wave function

PO2:Computationalproblem tosolvethes-waveradialSchrodingerequationforanatomand findtheenergyofthegroundstateand plottingthecorrespondingwavefunctions.

PO3: Computational problem to solve thes-wave radial Schrodinger equation fora particle ofmass. For the anharmonicoscillator potential.

PO4:Computational problem to solve thes-wave radial Schrodinger equation for the vibrations ofhydrogenmoleculeandFindthelowestvibrationalenergyand correspondingwavefunctionplotting.

Paper CC - XII

Solidstate physics

Course Outcome

CO1: Students studies the crystal structure, idea of unit cell, lattice vectors, existance of differentlattice planes and representation of the lattice planes by Miller indices. They also study aboutreciprocal lattice, X-ray diffraction by the crystal and representation of X-ray diffraction in reciprocallattice.

CO2:Studentsstudythelatticevibration,differenttheorytocalculatespecificheat ofsolids.

CO3: Students study about classification of mater on the basis of magnetic nature, their properties,theoreticalexplanationofdifferentmagneticnatureofmatterand magnetichysteresis.

CO4: Students study the dielectric properties of materials, electrical polarization and theory ofrefractive indices.

CO5:Studentsstudytheferroelectricpropertiesofmaterialsandpiezoelectricity.

CO6:Studentsstudythebandtheoryofsolids,conductivityofsemiconductors,Halleffect.

CO7:Studentsstudythesuperconductivityanddifferenttheoretical explanationofsuperconductivity.

Programme Outcome

PO1:Studentsgettheknowledgeabout differentcrystalstructuresandget theideahowtoobtainthestructuresofdifferentcrystalsexperimentallyby X-ray diffraction.

PO2: Students learn about discrete nature of lattice vibration energy, gradual theoretical developmenttomatch the experimentalvalues ofspecificheat.

PO3: Students learn the magnetic nature of different materials and get the idea how to choose suitablemagneticsubstance for aparticularpurpose.

PO4: Students learn how electromagnetic wave interacts with mater and get the idea why differentmaterialstransmitandabsorb differentwavelengthsofelectromagneticwave.

PO5: Students get the idea about different applications of ferroelectricity and piezoelectricity in ourdailylife.

PO6: Students learn to differentiate among conductors, semiconductors and insulators. They alsolearn how to measure conductivity and detect p-type and n-type semiconductors by measuring Hallcoefficient.

PO7:Studentslearntheimportanceofsuperconductingmaterialsandtheirusesinthepractical field.

Paper DSE-1

Classical Dynamics

Course Outcome

CO 1 : Students learn Lagrangian and Hamiltonian and hence Lagrange and Hamilton's equation of

motion and their application in different cases.

CO 2 : Students learn small oscillations and its applications to different cases and hence determination of normal modes and normal frequencies.

CO 3 : Students learn special theory of relativity, four vector, relativistic kinematics and their

applications.

CO 4 : Students study fluid dynamics, equation of continuity and Poiseuille's for streamline flow of a liquid through a capillary tube and its applications.

Programme Outcome

PO 1 : Lagrangian and Hamiltonian mechanics and their applications.

PO 2 : Small Oscillations and its applications.

PO 3 : Special theory of relativity, four vectors and their applications.

PO 4 : Fluid dynamics, Poiseuille's equation and its application.

Paper: DSE-2

AstronomyandAstrophysi

cs

Course Outcome

CO 1 : Astronomy usually considered as the oldest observational science and Astrophysics on theotherhandseemsto beyoungestof modern scientificdisciplines. In the coursecurriculumthestudentslearnastronomicalparameterslikedistance,stellarradius,stars,stellartemperature.Theyalso learn positional astronomy and different astronomical coordinates. Herzsprung - Russel diagramandclassification of stars.

CO 2 : Students learn different astronomical technique, telescopes and detectors They learn the basicthermodynamicsin Gravitation.

CO 3 : Students learn solar parameters, solar atmosphere and solar mageto hydrodynamics and originof the solar system. They learn about stellar spectra and classification of stars on the basis of surfacetemperatureofthe star.

CO 4 : Students learn the basic structure of Milkiwaygalaxy and its properties such as stars and starclusters,rotation of galaxyand galactic nucleus.

CO 5 : They learn the morphology of the galaxies, Hubble law and large scale structure of theuniverse.Theyfind theageofthe universemy knowingthe Hubbleconstantat present.

Programme Outcome

PO1:Theknowledgeofpositionalastronomyhelpstudentstodevelopbasicideaofthepositionofstars in the nightsky.

PO2:Theknowledgeofastronomicaltechniquehelpstomaketelescopeanddetectorsanddifferenttechnical gadgetsappliedinmodern astronomy.

PO3;TheknowledgeoftheSun developtheideaoftheactivityofthesunandmakeinterestlocationand sunspots.

PO 4:TheknowledgeofthebasicstructureofMilkiwaygalaxyhelpsstudentstoknowtheformationofstars inourgalaxy and the properties of galaxy.

PO5:Theknowledgeofexpandinguniversehelpsstudentstoacquireknowledgeaboutthemoderntrendsand researchinastronomyand astrophysics.

Semester VI

PaperCC–XIII

Electromagnetictheory

CO1: Students study the Maxwell's electromagnetic equations, electromagnetic wave equation fromMaxwell'sequationsandpropagationofelectromagneticwave indielectricmedium.

CO2: Students study aboutthe propagation oflightthrough conductingmediaandplasma.

CO3: Students study the reflection and refraction of light when fall on the interface of differentdielectricmedium.

CO4: Students study the polarization of light, different types of polarization, optic axis and doublerefractionin anisotropiccrystals.

CO5: Students study the phenomenon of optical rotation and its

theory.

CO6: Students studytheoryof waveguides.

CO7:Studentsstudydifferenttypesofopticalfibresandpropagationoflightthroughopticalfibres.

ProgrammeOutcome

PO1: Students get the idea about the nature of light waves, its energy density and velocity of light indifferentdielectric medium.

PO2: Studentslearnhowionosphereisusedforcommunicationusingradiowave.

PO3: Students learn about what kind of dielectric materials are suitable for different opticalinstrumentswhich work onreflection andrefraction.PO4: Students learn different applications of polarization of light in our daily life as well as inmedical field and scientificexperiments.

PO5: Students learn how to determine density of optically active solution by measuring rotation ofplaneof polarization.

PO6: Students get the idea about communication through waveguides and which modes can betransmittedthroughdifferenttypesof wave guides.

PO7: Students learn the advantage of using light signal in communication technology and how opticalfibresplay animportantrole inmodern day communication.

Paper :CC-XIVStatisticalMechanics

CO-1:- Classical statistics, micro and macro states, concept of ensemble, phase space,thermodynamicprobability.M.Bdistributionlaw,partitionfunction,thermodynamicfunctionsin terms of partition function, gibb's paradox, sackur tetrode formula, equipartition of energy with proof,thermodynamicfunctions of atwolevelsystem,negativetemperature.

CO-2:-Classicaltheoryofradiation,propertiesofthermal radiation,blackbodyradiation,puretemperaturedependence,Stefan-Boltzmannlaw,Rayleigh-Jeanslaw,ultravioletcatastrophe.

CO-3:- Quantum theory of radiationspectral distribution of blackbody radiation, Planck's quantumpostulate, planck's law, verification of Wien's distribution law, R-J law, S-B law and Wien'sdisplacementlawfromPlanck'slaw.

CO-4:-B.Edistributionlaw,thermodynamicfunctionsof astronglydegenerateBoseGas,B.Econdensation,propertiesofliquidhelium,,radiationasaphotongas,bosederivationofplanck'slaw.

CO-5:-Fermi-Dirac statistics, F.D distribution law, thermodynamic functions of a completely andstrongly degenerate gas, electron gas in a metal, specific heat of metals, relativistic Fermi gas, whitedwarfs,Chandrashekharmasslimit.

Programme Outcome

PO1: Computational analysis of the behavior of a collection of particles in a box that satisfy Newtonianmechanics.

PO2:Computation of the partition function and study of how partition function , average energy, energyfluctuation,specific heatatconstantvolume dependuponthe temperature.

PO3:Planck'slawforBlackBody radiationandcompareitwithRaleigh-JeansLaw

PO4:Dulong-Petit law, Einstein distribution function, Debye distribution function plotting for high and lowtemp and compare.

PO5:Maxwell-Boltzmann distribution, Fermi-Dirac distribution,Bose-Einstein distribution plotting withenergyatdifferenttemperatures.

Paper DSE-3

Communication Electronics

Course Outcome

CO1: Students learn basics of electronic communication

CO2: Students learn about Analog Modulation (AM), Frequency Modulation (FM), and Phase Mdulation (PM)

CO3: Students learn about Mobile Telephony System.

Programme Outcome

Students learn about electronic principles and its applications in communication.

Paper- DSE4

Experimental Techniques

Course Outcome

CO1: Students learn about measurement and error analysis.

CO2: Students can learn about noise in the experiment

CO3: Students learn about shielding and grounding

CO4: Students learn about various transducers

CO5: Students learn about digital multimeter

Programme Outcome

Students learn about how electrical circuits can be used to measure non-electrical signal and how design experimental set up for the measurement of non-electrical quantity in terms of electrical quantities.

OVERALLPROGRAMMEOUTCOMEINPHYSICSASMAJOR/HONOURSSUBJECT

After completion of B.Sc. Course in Physics as major subjects students learn various topics likeclassical mechanics, electromagnetic theory, mathematical methods, digital and analog and digitalelectronics, quantum mechanics, nuclear physics, statistical mechanics

and thermodynamics. Studentsalso perform different practical work related to their syllabus and gather sufficient knowledge inhands on experiments. Students are well equipped with recent developments in Physical Science andmay have sufficient knowledge in pursuing Physics in Post Graduate level and able to continue theirstudyand stepforwardtoresearch works.