



V.S.K DEGREE COLLEGE

(Affiliated to Adikavi Nannaya University)

BHIMAVARAM-534201

**Learning Outcomes based Curriculum Framework
(LOCF)**

B.Sc., Physics

Undergraduate Program

(with effective from admitted batch 2015 to 2016)

DEPARTMENT OF PHYSICS

V.S.K DEGREE COLLEGE

BHIMAVARAM-534201



DEPARTMENT OF PHYSICS

B.Sc., Physics

Course Outcomes

Course Name	MECHANICS & PROPERTIES OF MATTER
Course Code	1
Credits	4
Total Hours	60

This course provides the student with

Course Outcomes

- CO1 Introduction to mathematical methods physicists often use, including differential Calculus, The Operator Δ Gradient, Divergence, Curl, integral calculus, matrices and curvilinear coordinates
- CO2 Acknowledge Gauss divergence theorem, Green's theorem, and Stokes' theorem and appreciate its applications.
- CO3 Know the Newton Mechanism
- CO4 Acknowledge the basics of material properties like, elasticity, elastic constants and their relation, torsion of a cylinder, bending of a beam, cantilever, and beam supported at its ends and loaded in the middle.
- CO5 Know the application of central force to the stability of circular orbits, Kepler's laws of planetary motion, Orbital Precession and Rutherford scattering.
- CO6 Acknowledge the dynamics of rotating objects i.e. rigid bodies, angular velocity, the moment of inertia, parallel axis theorem, the inertia tensor, the motion of rigid bodies. non-inertial frames.
- CO7 Acknowledge the negative result of Michelson Morley experiment, Galilean and Lorentz Transformation
- CO8 Fundamental ideas of special theory of relativity such as length contraction and time dilation and Mass –energy invariance
- CO9 Overview of bending behavior beams and analyze the expression for young's modulus

Physics Lab:

In addition to learning about various measuring tools and performing fundamental mechanics-related experiments, students will gain an understanding of the significance of measuring accurately.

Title Of Paper	Waves & Oscillations
Course Code	2
Credits	4
Total Hours	60

This course provides the student with

Course Outcomes

- CO1 Study the elastic behavior and working of tensional pendulum
- CO2 Analyze waves and oscillations
- CO3 Study the basic properties and production of ultrasonic's by different methods
- CO4 Derive the equation of motion of a mass oscillating on a spring, using Newton's and Hooke's laws.
- CO5 Acknowledge the terms damping constant, characteristic frequency, kinetic and potential energy of a spring.
- CO6 Solve the equation for mass oscillating on a spring, including damping and periodic driving force.
- CO7 Know the terms transient and steady solution, resonance.
- CO8 Find the normal modes of two or three pendulums coupled by springs.
- CO9 Acknowledge the derivation of the wave equation; understand the terms frequency, wavelength and phase velocity of a wave.
- CO10 Know the difference between longitudinal and transversal, travelling and standing waves.
- CO11 Find solutions of the wave equation in one dimension by separation of variables.
- CO12 Interpret solutions of the wave equation as travelling waves.
- CO13 Describe the points where a Fourier series converges

Physics Lab:

- ❖ A working knows of fundamental physics and basic mechanics principles.
- ❖ The Potential to identify, formulates, and solve physics problems
- ❖ The ability to formulate, conduct, analyzes and interprets experiments in physics.

Title Of Paper	WAVE OPTICS
Course Code	3
Credits	4
Total Hours	60

This course provides the student with

Course Outcomes

- CO1 Gain knowledge on various theories of light
- CO2 Acknowledge the natural behavior of aberration in lens
- CO3 Acknowledge the basics of the Matrix method to solve problems of geometrical optics
- CO4 Obtain skills to identify and apply formulas of optics and wave physics
- CO5 Acknowledge the properties of light like reflection, refraction, interference, diffraction etc
- CO6 Learning the theories for production of polarization of light
- CO7 Acknowledge the applications of diffraction and polarization

- CO8 Understand the natural behavior of aberration in lens
- CO9 Exploration the theory and experiment of interference using air wedge, Newton rings and Michelson interferometer
- CO10 Know the applications of interference in design and working of interferometers.
- CO11 Study the theory and experimental past of diffraction by fresnels and fraunhoffer methods
- CO12 Know the resolving power of different optical instruments

- CO13 Understand the basic principle of laser, types of lasers and characteristics
- CO14 Perform the procedures into applications oriented one
- CO15 Know the basic concepts of optical fibres
- CO16 Gain knowledge on working of holography and their applications in various fields.
- CO17 Gain knowledge in optical fiber and their applications in communication

Physics Lab:

- ❖ They would also learn optical phenomena such as interference, diffraction and dispersion and do experiments related to optical devices: Prism, grating, spectrometers

Title Of Paper	Thermodynamics and Radiation Physics
Course Code	4
Credits	4
Total Hours	60

This course provides the student with

Course Outcomes

- CO1 Gain knowledge in Kinetic theory of gases.
- CO2 Acknowledge the process of thermal conductivity, viscosity and diffusion in gases
- CO3 Acknowledge the nature of thermodynamic properties of matter like internal energy, enthalpy, entropy, temperature, pressure and specific volume
- CO4 Know the efficiency of Carnot's engine.
- CO5 Know the significance of first law and second of thermodynamics
- CO6 Analyze entropy changes in a wide range of processes and determine the reversibility or irreversibility of a process from such calculations.
- CO7 Elaborate critical understanding of concept of Thermodynamic potentials, the formulation of Maxwell's equations and its applications.
- CO8 Distinguish between principles and methods to produce low temperature and liquefy air and also understand the practical applications of substances at low temperatures
- CO9 Understand the interrelationship between thermodynamic functions and ability to use such relationships to solve practical problems.
- CO10 Examine the nature of black body radiations and the basic theories.
- CO11 Examine the nature of black body radiations and the basic theories.

Physics Lab:

- ❖ Students would attain practical knowledge about heat and radiation, thermodynamics etc. and perform various experiments.
- ❖ Study the elastic behavior of materials
- ❖ Perform the procedure as per standard values

Title Of Paper	Electricity, Magnetism and Electronics
Course Code	5
Credits	03
Total Hours	45

This course provides the student with

Course Outcomes

- CO1 Gain Knowledge on the basic concepts of electric and magnetic fields.
- CO2 Acknowledge the concept of conductors, dielectrics, inductance and capacitance
- CO3 Exploration the electric field using coulombs inverse square law in electrostatics of current
- CO4 Analyze the value of Maxwell equation- boundary conditions
- CO5 Attain knowledge on the nature of magnetic materials.
- CO6 Acknowledge the concept of static and time varying fields.
- CO7 Empathize with the faradays laws of electromagnetic induction
- CO8 Attain knowledge on electromagnetic induction and its applications
- CO9 Attain knowledge on EM waves, propagation and their properties.
- CO10 Acknowledge the concept of basic electronics and applications of digital electronics
- CO11 Know the fundamentals of codes and number system
- CO12 Understand the binary arithmetic , logics and Boolean functions
- CO13 Analyze the characteristics of transistor and transistor biasing circuits

Physics Lab:

- ❖ Students would attain practical knowledge about electricity and magnetism and measurements such as: Resistance, Voltage, current etc.

Title Of Paper	Modern Physics
Course Code	6
Credits	03
Total Hours	45

This course provides the student with

Course Outcomes

- CO1 To understand the difference between Atomic and Molecular spectroscopes.
- CO2 Acknowledge the intuitive ideas of the Quantum physics and Nuclear physics.
- CO3 Derive Schrodinger time dependent and time independent wave equations
- CO4 Know the theory of quantum measurements, wave packets and uncertainty principle.
- CO5 To understand dual nature of matter
- CO6 Gain knowledge on classification of various crystal systems
- CO7 Understand the basics of crystallography, x-ray diffraction and Superconductivity.
- CO8 Expected to gain knowledge of superconductivity, its underlying principles and its applications in modern world
- CO9 Gain a clear picture of nuclear composition and various nuclear models
- CO10 Have a deep understand about Radio activity, nuclear Fission and Nuclear Fusion, the relevance of nuclear transformation.

Physics Lab:

- ❖ In this course students would be able to acknowledge Basic experiments of modern physics such as: Determination of Plank's and Boltzmann's constants, Determination of ionization potential, Wavelength of H-spectrum, Single and double slit diffraction, Photo electric effect and determination of e/m

Title Of Paper	Material science
Course Code	7
Credits	03
Total Hours	45

This course provides the student with

Course Outcomes

- CO1 Explain the basic concepts of material science and understand the different of materials Alloys, semiconductors, Polymers, Ceramics, Plastics, Bio-materials, Composites and nano materials.
- CO2 Understand the various types of Crystal bandings.
- CO3 To Know the types of crystal structures and relate it to the final properties.
- CO4 Gain some knowledge on Defects (Point Defect, Line defect, Surface defect, Volume defect) production and how to removal defects fick's law in diffusion
- CO5 Acquire some idea about creep
- CO6 Gain some knowledge on different types of fractures
- CO7 Explain the concept of Engineering & True stress, strain
- CO8 Explain the different mechanical properties with appropriate diagrams & examples
- CO9 Explain plastic deformation & distinguish between its different modes
- CO10 Explain the purpose & objectives of Heat Treatment
- CO11 Suggest suitable heat treatment process for a particular requirement
- CO12 Distinguish between the major heat and cold treatment processes
- CO13 To acquire knowledge of newer materials and its applications
- CO14 To acquire knowledge about composite materials, types, manufacturing methods & its applications

Physics Lab:

- ❖ The course deliver practical knowledge of various physical phenomena such as: magnetism, dielectrics, ferroelectrics and semiconductors. Students would gain a hands-on learning experience by performing experiments on these properties of materials

Activities planned for achievement of outcomes:

Activities to be selected from following list (Partial list, more activities can be added by faculty)	Tick mark
1. Assignments	✓
2. Quizzes	✓
3. Internal Assessment Tests	✓
4. Course Seminar	✓
5. Course Project (Mini project)	
6. Group discussion	✓
7. Viva-Voce	✓

PROGRAMME: B.Sc. PHYSICS

Program Outcomes

- PO1:** Acquire adequate knowledge of the subject
- PO2:** Craft a foundation for higher learning
- PO3:** Be initiated into the basics of research
- PO4:** Imbibe sound moral and ethical values
- PO5:** Become conscious of environmental and societal responsibilities
- PO6:** Attain skills for communication and career
- PO7:** Learn to tolerate diverse ideas and different points of view
- PO8:** Become empowered to face the challenges of the changing universe
- PO9:** Study the materials in different dimensions.
- PO10:** Explore about the new materials.
- PO11:** Understand the materials about human necessity.
- PO12;** Understand the application of mathematics in materials.
- PO13;** Understand its role in human development.
- PO14:** Find career opportunities throughout nation and abroad.
- PO15:** Formulate the basic mathematical equations based on natural phenomenon.

PROGRAMME SPECIFIC OUTCOMES

This undergraduate course in Physics would provide the opportunity to the students

- To Acknowledge the basic laws and explore the fundamental concepts of physics
- To Attain the concepts and significance of the various physical phenomena.
- To carry out experiments to attain the laws and concepts of Physics.
- To apply the theories learnt and the skills gain to solve real time problems.
- To gain a wide range of problem solving skills, both analytical and technical and to apply them.
- To enrich the student's academic abilities, personal qualities and transferable skills this will give them an opportunity to develop as responsible citizens.
- To produce graduates who excel in the ability and values required for leadership to serve a rapidly evolving global community.
- To inspire the students to pursue PG courses in reputed institutions.
- This course acquaint students to the methods of experimental physics.
- Significance will be given on laboratory techniques specially the importance of accuracy of measurements.
- Providing a experimental learning experience such as in measuring the basic concepts in properties of matter, heat, optics, electricity and electronics.