



V.S.K DEGREE COLLEGE

(Affiliated to Adikavi Nannaya University)
BHIMAVARAM-534201

Learning Outcomes based Curriculum Framework (LOCF)

B.Sc., Physics

Undergraduate Programme

(with effective from Academic year 2020 -2021)

DEPARTMENT OF PHYSICS

DEPARTMENT OF PHYSICS

B.Sc., Physics

Course Outcomes

Course Name	Mechanics, Waves & Oscillations
Course Code	1
Credits	4(Theory)+1(Lab)
Total Hours	60

On successful completion of this course, the students will be able to:

- CO1: Acknowledge Newton's laws of motion and motion of variable mass system and its application to rocket motion and the concepts of impact parameter, scattering cross section.
- CO2: Apply the rotational kinematic relations, the principle and working of gyroscope and its applications and the precessional motion of a freely rotating symmetric top.
- CO3: understand the general characteristics of central forces and the application of Kepler's laws to describe the motion of planets and satellite in circular orbit through the study of law of Gravitation.
- CO4: Know the postulates of Special theory of relativity and its consequences such as length contraction, time dilation, relativistic mass and mass-energy equivalence.
- CO5: Study the phenomena of simple harmonic motion and the distinction between undamped, damped and forced oscillations and the concepts of resonance and quality factor with reference to damped harmonic oscillator.
- CO6: Appreciate the formulation of the problem of coupled oscillations and solve them to obtain normal modes of oscillation and their frequencies in simple mechanical systems.
- CO7: Figure out the formation of harmonics and overtones in a stretched string and acquire the knowledge on Ultrasonic waves, their production and detection and their applications in different fields

Learning outcomes:

- ✓ To understand basic theories related with properties of matter and its applications to determine values of various physical quantities associated with matter.
- ✓ Be able to apply knowledge of the properties of matter to explain natural physical processes and related technological advances.
- ✓ To learn about fundamentals of verbal and mathematical concepts of waves and oscillations
- ✓ We should make the students to know their skills required to get the information from the syllabus and use them in a proper way

Physics Lab:

- ❖ Students would perform basic experiments related to mechanics and also get familiar with various measuring instruments would learn the importance of accuracy of measurements.

Title Of Paper	Wave Optics
Course Code	2
Credits	4(Theory)+1(Lab)
Total Hours	60

On successful completion of this course, the student will be able to:

CO1: Know the phenomenon of interference of light and its formation in (i) Lloyd's single mirror due to division of wave front and (ii) Thin films, Newton's rings and Michelson interferometer due to division of amplitude.

CO2: Distinguish between Fresnel's diffraction and Fraunhofer diffraction and observe the diffraction patterns in the case of single slit and the diffraction grating.

CO3: Describe the construction and working of zone plate and make the comparison of zone plate with convex lens.

CO4: Explain the various methods of production of plane, circularly and polarized light and their detection and the concept of optical activity..

CO5: Comprehend the basic principle of laser, the working of He-Ne laser and Ruby lasers and their applications in different fields.

CO6: Explain about the different aberrations in lenses and discuss the methods of minimizing them.

CO7: Understand the basic principles of fiber optic communication and explore the field of Holography and Nonlinear optics and their applications.

Student able to Learning:

- ✓ Understand the nature of light and principles of Laser and holography.
- ✓ Analyze the intensity variation of light due to interference, diffraction and polarization.
- ✓ Solve problems in Optics by selecting the appropriate equations and performing numerical or analytical calculations.
- ✓ Student can able to operation of optical devices including polarizer's, interferometers, and Lasers.

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	Heat and Thermodynamics
Course Code	3
Credits	4(Theory)+1(Lab)
Total Hours	60

On successful completion of this course, the student will be able to:

CO1: Know the basic aspects of kinetic theory of gases, Maxwell-Boltzmann distribution law, equipartition of energies, mean free path of molecular collisions and the transport phenomenon in ideal gases

CO2: Attain the knowledge on the basic concepts of thermodynamics, the first and the second law of thermodynamics, the basic principles of refrigeration, the concept of entropy, the thermodynamic potentials and their physical interpretations.

CO3: Acknowledge the working of Carnot's ideal heat engine, Carnot cycle and its efficiency

CO4: Elaborate critical understanding of concept of Thermodynamic potentials, the formulation of Maxwell's equations and its applications.

CO5: Distinguish between principles and methods to produce low temperature and liquefy air and also understand the practical applications of substances at low temperatures.

CO6: Study the nature of black body radiations and the basic theories.

Student able to Learning:

- ✓ Students will be able to Perform experiments and interpret the results of observation, including making an assessment of experimental uncertainties.
- ✓ They develop the ability to apply the knowledge acquired in the classroom and laboratories to specific problems in theoretical and experimental Physics.
- ✓ To apply the theories learnt and the skills acquired to solve real time problems
- ✓ To understand the concepts and significance of the various physical phenomena

Physics Lab:

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

Title Of Paper	Electricity, Magnetism and Electronics
Course Code	4
Credits	4(Theory)+1(Lab)
Total Hours	60

On successful completion of this course, the students will be able to:

- CO1: Know the Gauss law and its application to obtain electric field in different cases and formulate the relationship between electric displacement vector, electric polarization, Susceptibility, Permittivity and Dielectric constant.
- CO2: Distinguish between the magnetic effect of electric current and electromagnetic induction and apply the related laws in appropriate circumstances.
- CO3: Acknowledge Biot and Savart's law and Ampere's circuital law to describe and explain the generation of magnetic fields by electrical currents.
- CO4: Elaborate an understanding on the unification of electric and magnetic fields and Maxwell's equations governing electromagnetic waves.
- CO5: Phenomenon of resonance in LCR AC-circuits, sharpness of resonance, Q- factor, Power factor and the comparative study of series and parallel resonant circuits.
- CO6: Detail operation of p-n junction diodes, zener diodes, light emitting diodes and transistors
- CO7: Know the operation of basic logic gates and universal gates and their truth tables.

Learning Outcomes:

- ✓ To learn about Gauss law and solve the electric field and magnetic field for various geometric objects and to learn basic electronic concepts in analog and digital theory.
- ✓ To be Explain all the topics of Experiments, Concepts and Derivations to the student
- ✓ Apply the principles of electronics in day to day life.
- ✓ Encourage all the students to study higher educational courses in reputed institutes and to enrich the students with creative, logical and analytical skills and to motivate the students towards research side

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	5
Credits	4(Theory)+1(Lab)
Total Hours	60

This course provides the student with

CO1:To know the difference between Atomic and Molecular spectroscopes.

CO2:Know the intuitive ideas of the Quantum physics and Nuclear physics.

CO3:Derive Schrodinger time dependent and time independent wave equations

CO3:Acknowledge the theory of quantum measurements, wave packets and uncertainty principle.

CO4:To understand dual nature of matter

CO5:Attain knowledge on classification of various crystal systems

CO6:Know the basics of crystallography, x-ray diffraction and Superconductivity.

CO7:Expected to gain knowledge of superconductivity, its underlying principles and its applications in modern world

CO8:Attain a clear picture of nuclear composition and various nuclear models

CO9:Have a deep knowledge about Radio activity, nuclear Fission and Nuclear Fusion, the relevance of nuclear transformation.

Physics Lab:

- ❖ In this course students would be able to understand 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	Applications of Electricity & Electronics
Course Code	6C
Credits	4(Theory)+1(Lab)
Total Hours	50

Learning Outcomes

CO1:Identify various components present in Electricity& Electronics Laboratory.

CO2:Acquire a critical knowledge of each component and its utility (like resistors, capacitors, inductors, power sources etc.).

CO3:Demonstrate skills of constructing simple electronic circuits consisting of basic circuit elements. Understand the need & Functionality of various DC & AC Power sources.

CO4:Comprehend the design, applications and practices of various electrical & Electronic devices and also their trouble shooting.

CO5:Analysis of Resistive Circuits and Solution of resistive circuits with independent sources

CO6:Two Terminal Element Relationships for inductors and capacitors and analysis of magnetic circuits.

CO7:Analysis of Single Phase AC Circuits, the representation of alternating quantities and determining the power in these circuits.

Learning Outcomes:

- ✓ List out, identify and handle various equipment in Electrical & Electronics laboratory.
- ✓ Learn the procedures of designing simple electrical circuits.
- ✓ Demonstrate skills on the utility of different electrical components and devices.
- ✓ Acquire the skills regarding the operation, maintenance and troubleshooting of various Devices in the lab.
- ✓ Understand the different applications of Electromagnetic induction

Title Of Paper	Electronic Instrumentation
Course Code	7C
Credits	4(Theory)+1(Lab)
Total Hours	50

Course Outcomes:

CO1:Identify various facilities required to set up a basic Instrumentation Laboratory.

CO2:Acquire a critical knowledge of various Electrical Instruments used in the Laboratory.

CO3:Demonstrate skills of using instruments like CRO, Function Generator, Multimeter etc. through hands on experience.

CO4:Understand the Principle and operation of different display devices used in the display systems and different transducers

CO5:Comprehend the applications of various biomedical instruments in daily life like B.P. meter, ECG, Pulse oxymeter etc. and know the handling procedures with safety and security.

CO6:Explain basic concepts and definitions in measurement.

CO7:Describe the bridge configurations and their applications.

CO8:Elaborate discussion about the importance of signal generators and analyzers in Measurement.

Electronic Instrumentation Lab

Learning Outcomes:

- ✓ List out, identify and handle various equipment in Instrumentation Laboratory or Electronic Laboratory.
- ✓ Learn the construction, operational principles of various instruments.
- ✓ Demonstrate skills on handling, Maintenance & trouble shooting of different instruments used in the Labs.
- ✓ Acquire skills in observing and measuring various electrical and electronic quantities.
- ✓ Perform some techniques related to Biomedical Instrumentation and measurement of Certain physiological parameters like body temperature, B.P. and sugar levels etc.

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.

B.Sc., PHYSICS

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.