



GOKULA KRISHNA COLLEGE OF ENGINEERING: SULLURUPET

(Affiliated to JNTUA Ananthapuramu and approved by AICTE, New Delhi)

DEPARTMENT OF HUMANITIES AND SCIENCES

Program Outcomes (POs) Engineering Graduates will be able to:

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES

PSO 1: Ability to design manufacturing processes, products, the equipment, tooling and necessary environment for the manufacture of products that meet specific material and other requirements.

PSO 2: Ability to use design, manufacturing and industrial engineering software packages to formulate and solve real time issues.

PSO 3: Ability to analyze, synthesis and control manufacturing operations using statistical methods and to create competitive advantage through the application of manufacturing planning, strategy, quality and control concepts.

Course Objectives and Outcomes (COs)

Course Name :(20A54101) LINEAR ALGEBRA & CALCULUS

Course Objectives:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Course Outcomes (CO):

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications. Utilize mean value theorems to real life problems
- Familiarize with functions of several variables which is useful in optimization
- Students will also learn important tools of calculus in higher dimensions. Students will become
- Familiar with 2- dimensional coordinate systems Students will become familiar with 3- dimensional coordinate systems and also learn the
- Utilization of special functions

Course Name :(20A54201) DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

Course Objectives:

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into
- Advanced level by handling various real world applications.

Course Outcomes (CO):

- Solve the differential equations related to various engineering fields Identify solution methods for partial differential equations that model physical processes
- Interpret the physical meaning of different operators such as gradient, curl and divergence
- Estimate the work done against a field, circulation and flux using vector calculus

Course Name :(20A54202) PROBABILITY AND STATISTICS

Course Objectives:

- To familiarize the students with the foundations of probability and statistical methods
- To impart probability concepts and statistical methods in various applications Engineering

Course Outcomes:

- Upon successful completion of this course, the student should be able to
- Make use of the concepts of probability and their applications
- Apply discrete and continuous probability distributions
- Classify the concepts of data science and its importance
- Interpret the association of characteristics and through correlation and regression tools
- Design the components of a classical hypothesis test
- Infer the statistical inferential methods based on small and large sampling tests

Course Name :20A56201T APPLIED PHYSICS

Course Objectives

- To make a bridge between the physics in school and engineering courses
- To identify the importance of the optical phenomenon i.e. interference, diffraction and
- polarization related to its Engineering applications To understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications, study of propagation of light wave through optical fibres along with engineering applications.

- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
- To enlighten the concepts of Quantum Mechanics and to provide fundamentals of de'Broglie waves, quantum mechanical wave equation and its applications, the importance of free electron theory and band theory of solids.
- Evolution of band theory to distinguish materials, basic concepts and transport phenomenon of charge carriers in semiconductors.
- To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.

Course Outcomes

- Study the different realms of physics and their applications in both scientific and technological systems through physical optics. Identify the wave properties of light and the interaction of energy with the matter.
- Asses the electromagnetic wave propagation and its power in different media.
- Understands the response of dielectric and magnetic materials to the applied electric and magnetic fields.
- Study the quantum mechanical picture of subatomic world along with the discrepancies between the classical estimates and laboratory observations of electron transportation phenomena by free electron theory and band theory.
- Elaborate the physical properties exhibited by materials through the understanding of properties of semiconductors and superconductors.

Course Name :(20A52101T) COMMUNICATIVE ENGLISH

Course Objectives

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing.

Course Outcomes

- Retrieve the knowledge of basic grammatical concepts
- Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
- Apply grammatical structures to formulate sentences and correct word forms
- Analyze discourse markers to speak clearly on a specific topic in informal discussions
- Evaluate reading/listening texts and to write summaries based on global comprehension of these texts. Create a coherent paragraph interpreting a figure/graph/chart/table

Course Name :(20A51101T) CHEMISTRY**Course Objectives:**

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers
- To introduce instrumental methods, molecular machines and switches

Course Outcomes:

- At the end of the course, the students will be able to: Compare the materials of construction for battery and electrochemical sensors.
- Explain the preparation, properties, and applications of thermoplastics &thermosetting, elastomers & conducting polymers. Explain the principles of spectrometry, slc in separation of solid and liquid mixtures
- Apply the principle of Band diagrams in application of conductors and semiconductors

Course Name :(20A51201T) ENGINEERING CHEMISTRY**Course Objectives:**

- To familiarize engineering chemistry and its applications•
- To impart the concept of soft and hard waters, softening methods of hard water•
- To train the students on the principles and applications of electrochemistry, polymers, surface chemistry, and cement.

Course Outcomes:

- At the end of the course, the students will be able to demonstrate the corrosion prevention methods and factors affecting.
- Explain the preparation, properties, and applications of thermoplastics & thermosetting, elastomers & conducting polymers.
- Explain calorific values, octane number, refining of petroleum and cracking of oils. Explain the setting and hardening of cement and concrete phase
- Summarize the concepts of colloids, micelle and nanomaterials.

Course Name :(20A56101T) ENGINEERING PHYSICS

Course Objectives

- To make a bridge between the physics in school and engineering courses.
- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications.
- To understand the mechanisms of emission of light, the use of lasers as light sources• for low and high energy applications, study of propagation of light wave through optical fibres along with engineering applications
- To open new avenues of knowledge in dielectric and magnetic materials which find• potential in the emerging micro device applications.
- Considering the significance of micro miniaturization of electronic devices and significance of low dimensional materials, the basic concepts of nano materials, their properties and applications in modern emerging technologies are elicited.
- To familiarize the concepts of theoretical acoustics to practical use in engineering field.
- To explain the significance of ultrasound and its application in NDT for diversified engineering application.
- To enlighten the periodic arrangement of atoms in crystals, Bragg's law and to provide• fundamentals related to structural analysis through powder diffraction method.

Course Outcomes

- Study the different realms of physics and their applications in both scientific and technological systems through physical optics. Identify the wave properties of light and the interaction of energy with the matter.
- Asses the electromagnetic wave propagation and its power in different media.
- Understands the response of dielectric and magnetic materials to the applied electric and magnetic fields. Elucidates the importance of nano materials along with their engineering applications.
- Explain the basic concepts of acoustics and ultrasonic's.
- Apply the concept of NDT to material testing. Study the important properties of crystals like the presence of long-range order, periodicity and structure determination using X-ray diffraction technique.

Course Name :(20A52201) UNIVERSAL HUMAN VALUES**Course Objective:**

- The objective of the course is four fold: Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
- Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence Strengthening of self-reflection.
- Development of commitment and courage to act.

Course Outcomes

- By the end of the course, Students are expected to become more aware of themselves, and their surroundings (family, society, nature)
- They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
- They would have better critical ability.
- They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
- It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

Course Name :(20A99201) ENVIRONMENTAL SCIENCE**Course Objectives:**

- To make the students to get awareness on environment.
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life
- To save earth from the inventions by the engineers.

Course Outcomes:

- At the end of the course, the student will be able to Grasp multidisciplinary nature of environmental studies and various renewable and nonrenewable resources. Understand flow and bio-geo- chemical cycles and ecological pyramids.
- Understand various causes of pollution and solid waste management and related preventive measures. About the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation.
- Casus of population explosion, value education and welfare programmes.

Course Name :(20A56201P) APPLIED PHYSICS LAB**Course Objectives:**

- Understands the concepts of interference, diffraction and their applications.

- Understand the role of optical fiber parameters in communication.
- Recognize the importance of energy gap in the study of conductivity and Hall Effect in a semiconductor.
- Illustrates the magnetic and dielectric materials applications.
- Apply the principles of semiconductors in various electronic devices.

Course Outcomes:

- At the end of the course, the student will be able to Operate optical instruments like microscope and spectrometer
- Determine thickness of a hair/paper with the concept of interference
- Estimate the wavelength of different colors using diffraction grating and resolving power
- (L2) Plot the intensity of the magnetic field of circular coil carrying current with distance
- Evaluate the acceptance angle of an optical fiber and numerical aperture
- Determine the resistivity of the given semiconductor using four probe method
- Identify the type of semiconductor i.e., n-type or p-type using hall effect
- Calculate the band gap of a given semiconductor

Course Name: (20A52101P) COMMUNICATIVE ENGLISH LAB

Course Objectives

- students will be exposed to a variety of self instructional, learner friendly modes of language
- learning students will learn better pronunciation through stress, intonation and rhythm students will be trained to use language effectively to face interviews, group discussions, public speaking students will be initiated into greater use of the computer in resume preparation, report writing, format making etc.

Course Outcomes:

- After completing the course, the student will be able to Listening and repeating the sounds of English Language
- Understand the different aspects of the English language proficiency with emphasis on LSRW skills Apply communication skills through various language learning activities
- Analyze the English speech sounds, stress, rhythm, intonation and syllable
- Division for better listening and speaking comprehension.
- Evaluate and exhibit acceptable etiquette essential in social and professional settings
- Create awareness on mother tongue influence and neutralize it in order to Improve fluency in spoken English.

Course Name: (20A51101P) CHEMISTRY LAB

Course Objectives:

- Verify the fundamental concepts with experiments

Course Outcomes:

- At the end of the course, the students will be able to Determine the cell constant and conductance of solutions
- Prepare advanced polymer Bakelite materials
- Measure the strength of an acid present in secondary batteries
- Analyse the IR of some organic compounds

Course Name: (20A51201P) ENGINEERING CHEMISTRY LAB

Course Objectives:

- To Verify the fundamental concepts with experiments

Course Outcomes:

- At the end of the course, the students will be able to Determine the cell constant and conductance of solutions
- Prepare advanced polymer materials
- Determine the physical properties like surface tension, adsorption and viscosity
- Estimate the Iron and Calcium in cement
- Calculate the hardness of water

Course Name: (20A56101P) ENGINEERING PHYSICS LAB

Course Objectives:

- Understand the role of Optical fiber parameters in engineering applications.
- Recognize the significance of laser by studying its characteristics and its application in finding the particle size.
- Illustrates the magnetic and dielectric materials applications.
- Identifies the various sensor applications.

Course Outcomes:

- After completing the course, the student will be able to Operate various optical instruments
- Estimate wavelength of laser and particles size using laser
- Evaluate the acceptance angle of an optical fiber and numerical aperture
- Estimate the susceptibility and related magnetic parameters of magnetic materials plot the intensity of the magnetic field of circular coil carrying current with distance
- Determine magnetic susceptibility of the material and its losses by B-H curve
- Apply the concepts of ultrasonics by acoustic grating.