

G PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY (Autonomous)

(Approved by AICTE | NAAC Accreditation with 'A' Grade |
Accredited by NBA (CIV, CSE, ECE & EEE) | Affiliated to JNTUA)
Nandikotkur Road, Venkayapalli (V), Kurnool - 518452, Andhra Pradesh

The following are the course outcomes of all the courses for the academic year 2020-21

R 20 Regulations:

Course Name: **MATHEMATICS – I**

	Course Outcomes
CO 1	Develop the use of matrix algebra techniques that is needed by engineers for practical Applications.
CO 2	Interpret the Eigen values and Eigen vectors of matrix in terms of the transformation it represents in to a matrix Eigen value problem.
CO 3	Utilize mean value theorems to real life problems.
CO 4	Familiarize with functions of several variables, which is useful in optimization.
CO 5	Apply important tools of calculus in higher dimension and will become familiar with 2dimensional coordinate systems.
CO 6	Analyze 3- dimensional coordinate systems and utilization of special functions.

• Course Name: **CHEMISTRY**

	Course Outcomes
CO 1	Illustrate the molecular orbital energy levels for different molecular species and Apply Schrodinger wave equation and particle in a box.
CO 2	Differentiate between pH metry, Potentiometric and conductometric titrations.
CO 3	Explain the preparation properties and applications of polymers and describe the mechanism of conduction in conducting polymers.
CO 4	Understand the principles of different analytical instruments and explain their applications.
CO 5	Explain the concept of nano clusters nano wires and characterize the applications of SEM & TEM.
CO 6	Explain different types of colloids, their preparations, properties and Applications

Course Name: **PYTHON PROGRAMMING**

	Course Outcomes
CO 1	Comprehend the fundamental concepts of computer hardware and problem-solving abilities
CO 2	Knowledge on the basic concepts of algorithms, flow charts and python programming
CO 3	Ability to analyze the procedure for providing input and acquire output from the program along with implementation of control statements
CO 4	Interpret the importance of pointers and functions in programming
CO 5	Analyze and modularize the problem and its solution by using functions
CO 6	Ability to relate the concepts of strings, files and preprocessors to the real-world applications

Course Name: **FUNDAMENTALS OF ELECTRONICS ENGINEERING**

	Course Outcomes
CO 1	Analyze brief history of electronic components and devices.
CO 2	Analyze the function of CRO used to measure frequency, amplitude and phase.
CO 3	Comprehend the operation and characteristics of various electronic devices.
CO 4	Analyze various applications of semiconductor diodes
CO 5	Make use of boolean algebra postulates to minimize boolean functions.
CO 6	Understand the basic principles of electronic communication.

Course Name: – **ENGINEERING WORKSHOP**

	Course Outcomes
CO 1	Apply wood working skills to make products.
CO 2	Perform metal cutting operations in the fitting section to make models
CO 3	Perform simple welding operations to join to metal pieces
CO 4	Apply sheet metal working skills to make required models.
CO 5	Evaluate the performance analysis of various pumps and turbines

CO 6	Perform general maintenance works on own at house/ work place.
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Course Name: **PYTHON PROGRAMMING LAB**

Course Outcomes	
CO 1	Design solutions to mathematical problems & Organize the data for solving the problem.
CO 2	Understand and implement modular approach using python.
CO 3	Learn and implement various data structures provided by python library including string, list, dictionary and its operations etc
CO 4	Understands about files and its applications.
CO 5	Develop real-world applications, files and exception handling provided by python
CO 6	Select appropriate programming construct for solving the problem.

Course Name: **CHEMISTRY LAB**

Course Outcomes	
CO 1	Understand the determine the cell constant and conductance of solutions
CO 2	Prepare advanced polymer materials.
CO 3	Measure the strength of an acid present in secondary batteries
CO 4	Understand and apply the pH metric titrations.
CO 5	Verify Lambert-Beer's law
CO 6	Potentiometry - determination of redox potentials and EMFs

Course Name: **FUNDAMENTALS OF ELECTRONICS ENGINEERING LABORATORY**

Course Outcomes	
CO 1	Analyze brief history of electronic components and devices
CO 2	Analyze the function of CRO used to measure frequency, amplitude and phase.
CO 3	Identify various electronic components and measuring equipment
CO 4	Assemble and test simple electronic circuits over a PCB
CO 5	Interpret specifications (ratings) of the components.

CO 6	Understand the working of various communication systems.
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Course Name: MATHEMATICS – II

	Course Outcomes
CO 1	Apply the mathematical principles to solve second and higher order differential equations.
CO 2	Analyze the non- homogeneous linear differential equations along with method of variation of parameters.
CO 3	Apply the concept of higher order differential equations to the various streams like Mass spring system and L-C-R Circuit problems.
CO 4	Apply a range of techniques to find solutions of standard PDEs and basic properties of standard PDEs.
CO 5	Analyze the vector calculus involving divergence, curl and their properties alongwith vector identities.
CO 6	Apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals.

Course Name: APPLIED PHYSICS

	Course Outcomes
CO 1	Interpret the properties of light waves and its interaction of energy with the matter
CO 2	Explain the principles of physics in dielectrics and magnetic materials.
CO 3	Apply electromagnetic wave propagation in different guided media.
CO 4	Calculate conductivity of semiconductors
CO 5	Interpret the difference between normal conductor and super conductor
CO 6	Elucidate the applications of nano materials

Course Name: **DATA STRUCTURES USING C**

	Course Outcomes
CO 1	Learn to choose appropriate data structure as applied to specified problem definition.
CO 2	Design and analyze linear and non-linear data structures.
CO 3	Design algorithms for manipulating linked lists, stacks, queues, trees and graphs
CO 4	Demonstrate advantages and disadvantages of specific algorithms and data structures
CO 5	Develop programs for efficient data organization with reduce time complexity
CO 6	Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.

Course Name: **COMMUNICATIVE ENGLISH**

	Course Outcomes
CO 1	Remember the concepts which the students has learnt previously and identifying their connections
CO 2	Understand the content, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
CO 3	Apply grammatical structures to formulate sentences and correct word forms
CO 4	Analyze discourse markers to speak clearly on a specific topic in informal discussions.
CO 5	Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.
CO 6	Create a coherent paragraph interpreting a figure/graph/chart/table.

Course Name: ENGINEERING GRAPHICS AND COMPUTER AIDED DRAFTING

	Course Outcomes
CO 1	Construct various curves like ellipse, parabola, hyperbola etc which are used in Engineering drawing.
CO 2	Apply orthographic projection concepts to draw projections of points, lines, planes and solids.
CO 3	Apply development concepts to draw development of surfaces of simple solids.
CO 4	Apply isometric projection concepts to draw isometric projections of right regular solids
CO 5	Apply orthographic projection concepts to convert isometric view to orthographic views.
CO 6	Make use of AutoCAD Software to draw 2D

Course Name: APPLIED PHYSICS LABORATORY

	Course Outcomes
CO 1	Operate optical instruments like Travelling microscope and spectrometer
CO 2	Understand the concepts of interference by finding thickness of paper, radius of curvature of Newton's rings
CO 3	Interpret the concept of diffraction by the determination of wavelength of different colors of white light and dispersive power of grating
CO 4	Plot the intensity of the magnetic field of circular coil carrying current with varying distance and B-H curve
CO 5	Evaluate the acceptance angle of an optical fiber and numerical aperture
CO 6	Determine the resistivity of the given semiconductor using four probe method, the band gap of a semiconductor.

Course Name: **DATA STRUCTURES LAB**

	Course Outcomes
CO 1	Learn to choose appropriate data structure as applied to specified problem definition.
CO 2	Design and analyze linear and non-linear data structures.
CO 3	Design algorithms for manipulating linked lists, stacks, queues, trees and graphs.
CO 4	Demonstrate advantages and disadvantages of specific algorithms and data structures.
CO 5	Develop programs for efficient data organization with reduce time complexity
CO 6	Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.

Course Name: **COMMUNICATIVE ENGLISH LAB**

	Course Outcomes
CO 1	Remember and understand the different aspects of the English Language proficiency with emphasis on LSRW skills
CO 2	Apply communication skills through various language learning activities.
CO 3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
CO 4	Evaluate and exhibit acceptable etiquette essential in social and professional settings.
CO 5	Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
CO 6	Improve upon speaking skills over telephone, role plays and public speaking.

Course Name: ENVIRONMENTAL SCIENCE

	Course Outcomes
CO 1	Solve environmental problems through higher level of personal involvement and interest.
CO 2	Apply ecological morals to keep up amicable connection among nature and human beings.
CO 3	Recognize the interconnectedness of human dependence on the earth's ecosystems.
CO 4	Apply environmental laws for the protection of environment and wildlife.
CO 5	Influence society in proper utilization of goods and services.

CourseName:ENGINEERINGPHYSICS

#	COURSEOUTCOMES
CO1	Applymechanicsforsolvingengineeringproblems.
CO2	Applytheprinciplesofacousticsfor noisecancellationandindesigning buildings
CO3	Analysetheapplicationsofultasonics invariousengineeringfields
CO4	Explaintheprinciplesofphysicsindielectricsandmagneticmaterials.
CO5	Interprettheconceptsoflasersand opticalfibersinvarious applications
CO6	Elucidatetheapplications ofsuperconductors andnano-materials

CourseName:**ENGINEERINGPHYSICSLABORATORY**

#	COURSEOUTCOMES
CO1	Estimatethemechanicalpropertiesof materials
CO2	Determinemomentofinertiaofaflywheel
CO3	Measurethevelocityofultrasonicsinliquid byapplying thebasicconceptsof ultrasonics
CO4	Determinethewavelengthoflaser,particlesize,numericalapertureandacceptanceangleby applying the principles of lasers and optical fibres
CO5	Measuretheelasticconstants, Poisson'sratioofthematerial
CO6	Measurethe strainofthemetalarbyusingstraingauge.

CourseName:**ENGINEERINGCHEMISTRY**

#	COURSEOUTCOMES
CO1	Toillustratethe molecularorbitalenergylevelsfordifferent molecularspeciesandApply Schrodinger wave equation and particle in a box
CO2	TodifferentiatebetweenpHmetry,Potentiometricandconductometric titrations
CO3	Explain the preparation properties and applications of polymers and describe the mechanism of conduction in conducting polymers..
CO4	Understandtheprinciplesofdifferentalanalyticalinstrumentsandexplaintheirapplications.
CO5	Explaintheconcept ofnano clustersnano wiresandcharacterizetheapplicationsofSEM&TEM.
CO6	Explainofdifferentspeciesofcolloids, theirpreparations, propertiesand applications

CourseName:**C&ATASTRUCTURES**

#	COURSEOUTCOMES
CO1	Learntochooseappropriatedatastructureasappliedtospecifiedproblem definition.
CO2	Designandanalyzelinear andnon-linear data structures.
CO3	Designalgorithmsformanipulatinglinkedlists,stacks,queues,treesandgraphs in python
CO4	Demonstrateadvantagesanddisadvantagesofspecificalgorithmsanddata structures
CO5	Developa baseforadvancedcomputersciencestudy.
CO6	Evaluatealgorithmsanddatastructuresinterms oftimeand memorycomplexityof basic operations.

CourseName:**ENGINEERINGMECHANICS**

#	COURSEOUTCOMES
CO1	Analyzethebasicconceptsofrigidbodiesubjectedtodifferenttypesofloadsandsupports.
CO2	Analyzethemotionofthebodiesconsideringfrictionandexternalloads.
CO3	Determinecentroids,centerofgravity,momentofinertiaofsimpleandcomposite figures.
CO4	Analyzethemotionofparticlewithoutconsideringforcesandconsideringforces, develop equations for different motions.
CO5	ApplyNewton's lawsandconservationlawstoelasticcollisionsandmotionofrigidbodies.
CO6	AnalyzetheperfectframesusingdifferentmethodsandconceptsofMechanical vibrations.

CourseName:**ENGINEERINGCHEMISTRYLABORATORY**

#	COURSEOUTCOMES
CO1	Determinethecellconstantandconductanceofsolutions
CO2	Prepareadvancedpolymermaterials.
CO3	Determinethephysicalproperties likesurfacetension, adsorptionandviscosity
CO4	EstimatetheIronand Calciumin cement
CO5	Calculatethehardnessofwater andcalculationofdissolvedoxygenpercentages
CO6	DeterminationofpercentageofIroninCementsample bycolorimetry

CourseName:**C&DATASTRUCTURES LABORATORY**

#	COURSEOUTCOMES
CO1	Learntochooseappropriatedatastructureasappliedtospecifiedproblemdefinition.
CO2	Designandanalyzelinear andnon-linear data structures.
CO3	Designandimplementalgorithmsformanipulatinglinkedlists,stacks,queues,trees and graphs in python
CO4	Implementrecursivealgorithmsastheyapplytotreesand graphs.
CO5	Formulatenewsolutionsforprogrammingproblemsorimproveexistingcodeusing learned algorithms and data structures
O6	Implementoperationslikesearching, insertion,deletion,traversingmechanismetc.on various data structures.

CourseName:**APPLIEDMECHANICSLABORATORY**

#	COURSEOUTCOMES
CO1	Acquireknowledgeofstaticanddynamicbehaviorofthebodies
CO2	VerifythePrincipleofmomentsusingthebellcranklever apparatus.
CO3	Determinevelocityratio,mechanicaladvantageandefficiencyofsingleanddoublegearcrab
CO4	Determinethevelocityratioofthemachineand tointerpret thelawofmachine
CO5	Analyzethecoefficientofstaticfrictionbetweentwosurfaces
CO6	Applylawsofmechanicsto determineefficiencyofsimple machineswithconsiderationof friction

CourseName:**UNIVERSALHUMAN VALUES**

#	COURSEOUTCOMES
CO1	Understandthesignificanceofvalue inputsinaclassroomandstartapplyingtheminthelife and profession
CO2	Distinguishbetweenvaluesandskills, happinessand accumulationofphysicalfacilities,the Self and the Body, Intention and Competence of an individual, etc
CO3	Understandthe valueofharmoniousrelationshipbasedontrustandrespect intheir lifeand profession
CO4	Understandtheroleofahumanbeingin ensuringharmonyinsocietyand nature
CO5	Distinguishbetweenethicalandunethicalpractices, andstart workingoutthestrategyto actualize a harmonious environment wherever they work.

CourseName:**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

#	COURSEOUTCOMES
CO1	State the basic laws and usage of components in electric circuits.
CO2	Investigate DC and AC circuits using different methods and laws.
CO3	Analyze the principle of operation of DC machines and AC machines along with the various tests to predetermine the efficiency and regulation.
CO4	Understand the theory, operation and applications of semiconductor devices.
CO5	Determine various parameters of rectifier circuits using with and without filters
CO6	Analyze and Design different oscillator circuits, op-amps and the characteristics of BJT, FET to meet the given specifications.

CourseName:**BASIC ELECTRICAL AND ELECTRONICS ENGINEERINGLABORATORY**

#	COURSEOUTCOMES
CO1	Practically verify Superposition, Thevenin's, Norton's theorems and Open and Short circuit parameters
CO2	Predetermine the Efficiency of a given DC Shunt Machine (i) while working as a Motor and (ii) while working as a Generator by using Swinburne's test.
CO3	Predetermine the Efficiency and Regulation at any given load and Power Factor of a transformer by using OC & SC tests.
CO4	Analyze the V-I characteristics of P -N Junction Diode and Zener Diode.
CO5	Analyze the input and output characteristics of BJT, Common Source Configuration Output and Transfer Characteristics of JFET.
CO6	Determine the ripple content present in half-wave and full-wave rectifiers using with and without filters.

Course Name: **FOUNDATION FOR IOT**

	Course Outcomes
CO 1	Utilize logic gate operations and Boolean theorems for circuit output evaluation and expression minimization
CO 2	Apply different arithmetic operations in CPU instruction sets.
CO 3	Apply addressing modes and instruction set to write simple programs.
CO 4	Distinguish sensors and actuators in terms of their functions and applications
CO 5	Apply Raspberry Pi to implement IoT projects.
CO 6	Develop simple Arduino-based by employing Arduino Uno boards along with sensors and actuators.

Course Name: **FOUNDATION FOR IOT LAB**

Course Outcomes	
CO 1	Analyze the basic laws and usage of components in electric circuits
CO 2	Analyze the principle of operation of DC machines and AC machines along with the various tests to predetermine the efficiency and regulation
CO 3	Analyze building blocks of Internet of Things and characteristics.
CO 4	Understand the theory, operation and applications of semiconductor devices
CO 5	Determine various parameters of rectifier circuits using with and without filters
CO 6	Analyze and Design different oscillator circuits, op-amps and the characteristics of BJT, FET to meet the given specifications

Course Name: **FUNDAMENTALS OF ELECTRICAL ENGINEERING**

Course Outcomes	
CO 1	Understand the basic concepts of magnetic circuits, electro magnetism and Electrostatics.
CO 2	Understand and analyse DC circuits and their transformations.
CO 3	Understand and analyse the concepts of AC fundamental circuits.
CO 4	Apply KCL and KVL for mesh and nodal analysis
CO 5	Understand the Knowledge of electromagnetism and its principles.
CO 6	Understand the basic types of wires, cables, Batteries and wiring systems

Course Name: **FUNDAMENTALS OF ELECTRICAL ENGINEERING LABORATORY**

Course Outcomes	
CO 1	Understand the basic concepts of electrical elements.
CO 2	Understand and analyses the basic laws.
CO 3	Understand and apply the connections of series and parallel circuits.
CO 4	Understand and apply the KCL and KVL.
CO 5	Understand and apply the basic wiring systems.
CO 6	Demonstration of parts of DC and AC Machines.

CourseName:**FUNDAMENTALS OF ARTIFICIAL ENGINEERING**

#	COURSEOUTCOMES
CO1	An ability to analyze a problem, identify and define the computing requirements appropriate to its solution.
CO2	An ability to design, implement and evaluate a system / computer based system process, component or program to meet desired needs
CO3	An ability to identify, formulate and solve engineering problems using the concepts of Artificial Intelligence.
CO4	Design and conduct experiments as well as analyze and interpret data using Machine Learning Algorithms.
CO5	An ability to use current techniques and skills necessary for computing and engineering practice
CO6	Get familiarized with the tools mandatory for handling problem solving techniques

CourseName:**BASIC ARTIFICIAL INTELLIGENCE LABORATORY**

#	COURSEOUTCOMES
CO1	Execute statistical problems to produce appropriate solutions
CO2	Categorize the problem for selection of an appropriate algorithm
CO3	Compare computational complexity of AI problems for better efficiency
CO4	Demonstrate various AI algorithms based on empirical and theoretical proofs for performance statistics
CO5	An ability to use current techniques and skills necessary for computing and engineering practice.
CO6	Get familiarized with the tools mandatory for handling problem solving techniques