SRI VASAVI ENGINEERING COLLEGE

(AUTONOMOUS)

(Sponsored by Sri Vasavi Educational Society)
(Approved by AICTE, New Delhi &Recognized by UGC under section 2(f) & 12(B))
(Permanently affiliated to JNTUK, Kakinada, Accredited by NBA and NAAC with 'A' Grade)
Pedatadepalli, **TADEPALLIGUDEM–534 101.**W.G.Dist**. (A.P)**

V20 REGULATION COURSE OUTCOMES

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

I – SEMESTER

Name of the Course: Linear Algebra and Differential Equations

Course Code: V20MAT01

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Apply matrix technique to solve system of linear equations	K3
CO2	Find Eigenvalues and Eigen vectors	K3
CO3	Solve the ordinary differential equations of first order & first degree	K3
CO4	Solve the linear differential equations of higher order with constant coefficients	K3
CO5	Apply Laplace Transformation to given function	K3
CO6	Find maxima and minima of functions of two variables	K3

Name of the Course: Engineering Chemistry

Course Code: V20CHT01

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Solve boiler troubles originated due to poor water quality and suggest suitable water treatment methods.	K3
CO2	Choose plastics and rubbers for engineering applications	K3
CO3	Associate concepts of Electro Chemistry in designing electrochemical energy systems	K2
CO4	Assess the quality of fuels	K3
CO5	Apply corrosion principles for protection of metallic structures	K3
CO6	Interpret important applications of engineering materials	K2

Name of the Course: English for Professional Enhancement
Course Code: V20ENT01
Course Outcomes:
After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Identify the central theme of the text, use cohesive items for coherence in a paragraph, recognize nouns and basic sentence structures.	K2
CO2	Restate the central idea of the letter by using appropriate vocabulary. Gain mastery over articles and prepositions	K2
CO3	Find the success formula after reading the text in detail to answer questions. Use appropriate tense and concord, find suitable vocabulary and format to draft letters and e-mails.	K3
CO4	Employ reading skills to comprehend the given biography. Interpret visual information .Use quantifiers appropriately and get acquainted with writing for media and statement of purpose	K3
CO5	Appraise the delivered lecture and text, recognize the contextual vocabulary, write error free academic proposals and prepare poster presentations.	K4
CO6	Infer the real meaning of the text, listen for global comprehension and identify foreign phrases, use active and passive voice, practise note making.	K4

Name of the Course: Engineering Workshop
Course Code: V20MEL02
Course Outcomes:
After successful completion of the course, the student will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Prepare different models in the carpentry trade and understand basic concepts of carpentry	K3
CO2	Develop various basic prototypes in the trade of Tin smithy and understand basic concepts of Tin smithy.	K3
CO3	Prepare various basic prototypes in the trade of fitting and understand basic concepts of fitting.	K3
CO4	Prepare different models in the Black smithy and understand basic concepts of Black smithy.	K3
CO5	Develop various basic House Wiring techniques, Electrical wiring circuits	K3
CO6	Develop various basic prototype models in Welding and Foundry shop.	K3

Name of the Course: Programming in 'C' for problem Solving
Course Code: V20CST01
Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Describe various problem solving strategies such as Algorithms and Flowcharts	K2
CO2	Develop various programming constructs using Control Structures	K3
CO3	Construct Programs using modular programming approach	K3
CO4	Illustrate the usage of Arrays, String and pointers	K3
CO5	Construct Programs using Structures and Unions	K3
CO6	Distinguish between Sequential files and Random access files	K4

Name of the Course: Hone your Communication Skills, Lab-I
Course Code: V20ENL01
Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Identify suitable expressions to greet people, say good bye to them, introduce one another, listen to consonants	K2
CO2	Select suitable words to invite someone, accept or decline invitations, listen to…, identify and produce vowel sounds	K2
CO3	Choose suitable expressions to seek/refuse permissions, to apologize and listen to word accent	K3
CO4	Find apt expressions to give suggestions, express opinions and identify tone groups.	K3
CO5	Use appropriate words to give commands, requests and identify pauses and prominent syllables	K3
CO6	Practise listening to dialogues, role-plays using common vocabulary used in dialogues	K3

Name of the Course: Engineering Chemistry Laboratory
Course Code: V20CHL01
Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Analyze quantitatively a variety of samples using volumetric methods and instrumental methods	K4
CO2	Apply volumetric and instrumental methods for the determination of water quality parameters namely Alkalinity, Hardness and pH	K3
CO3	Prepare polymeric materials, nanoparticles and analyze the given coal samples	K3

Name of the Course: Programming Lab in 'C' for problem Solving
Course Code: V20CSL01
Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Demonstrate problem solving techniques using Control Structures	K3
CO2	Construct Programmes using the concepts of Arrays, Strings and Pointers	K3
CO3	Apply the concepts of Functions, Structures and Unions	K3
CO4	Use various file processing operations to develop real-time applications	K4

II – SEMESTER

Name of the Course: Programming Lab in 'C' for problem Solving
Course Code: V20CSL01

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Demonstrate problem solving techniques using Control Structures	K3
CO2	Construct Programmes using the concepts of Arrays, Strings and Pointers	K3
CO3	Apply the concepts of Functions, Structures and Unions	K3
CO4	Use various file processing operations to develop real-time applications	K4

Name of the Course: Numerical Methods and Vector Calculus
Course Code: V20MAT02

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Compute approximate roots of algebraic and transcendental equations and interpolating polynomial for the given data	K3
CO2	Solve ordinary differential equations with initial conditions using numerical methods	K3
CO3	Find multiple integrals and improper integrals	K3
CO4	Calculate gradient of a scalar function, divergence and curl of a vector function	K3
CO5	Apply the knowledge of vector integral concepts to find characteristics of vector fields	K3
CO6	Find Fourier series of a periodic functions	K3

Name of the Course: Engineering Physics
Course Code: V20PHT01

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Grasp the basic principles of structure of materials, crystallography and X-ray diffraction.	K2
CO2	Expose the students to the basic concepts of Lasers and their applications in optical fiber communication link	K3
CO3	Classify the applications of sound waves in various fields.	K2
CO4	Interpret wavelike behavior of matter and motivates the need of fundamental physical laws for better understanding of materials.	K3
CO5	Describe the properties of semiconducting materials	K2
CO6	Illustrate the fundamental concepts of dielectrics and Superconductors.	K4

Name of the Course: Switching Theory and Logic Design
Course Code: V20ECT01

Course Outcomes (CO's) (Along with Knowledge Level (K)):
After going through this course the student will be able to

CO No.	Course Outcome	Knowledge Level
CO-1	**Explain** the different types of number Systems, number conversions, codes and logic Gates.	K_2
CO-2	**Apply** the concepts of Boolean algebra and use the knowledge of K-maps and tabular method for minimization of Boolean expressions.	K_3
CO -3	**Construct** the higher order modules from their lower order structures of various combinational logic circuits.	K_3
CO-4	**Explain** the concept of various flip flops	K_2
CO-5	**Develop** various sequential circuits like registers, counters by using basic flip flops.	K_3
CO-6	**Develop** the various Finite State Machine Models	K_3

Name of the Course: Electrical Circuit Analysis-I
Course Code: V20EET03

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Apply various network reduction techniques for solving electrical DC circuits.	K3
CO2	Calculate different parameters of single phase alternating quantities.	K3
CO3	Understand the concepts of different powers and apply network reduction techniques for solving electrical AC circuits.	K3
CO4	Determine various parameters in series and parallel resonant circuits.	K3
CO5	Apply the network theorems for solving electrical DC and AC circuits.	K3
CO6	Compute electrical parameters for 3-phase balanced systems	K3

Name of the Course: Engineering Graphics
Course Code: V20MEL01

Course Outcomes:
After successful completion of the course, the student will be able to:

CO No.	Course Outcome	Knowledge Level
CO1	Understand the basic commands in CAD Software and draw the conic sections	K3
CO2	Construct different types of scales and special curves	K3
CO3	Draw the projections of the points and lines	K3
CO4	Develop the projections of planes and surfaces of regular solids	K3
CO5	Draw the Isometric projections and conversion of views	K3

Name of the Course: Electrical Engineering Workshop
Course Code: V20EEL03
Course Outcomes:
After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Design different wiring circuits	K4
CO2	Use electrical parameter measuring instruments	K3
CO3	Construct the circuits on PCB board	K4
CO4	Test the domestic appliances	K4
CO5	Identify the parts of the Machine	K3
CO6	Analyze electrical circuits through simulation	K4

Name of the Course: Engineering Physics Lab
Course Code: V20PHL01
Course Outcomes:
After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Analyze the physical principle involved in the various instruments; also relate the principle to new application.	K4
CO2	Demonstrate the various experiments in the areas of optics, mechanics and Electronics in all branches of engineering.	K3
CO3	Think innovatively and also apply the creative skills that are essential for engineering.	K4

Name of the Course: Hone your Communication Skills, Lab-II
Course Code: V20ENL02
Course Outcomes:
After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Collect suitable expressions and vocabulary to participate in JAM.	K1
CO2	Prepare, face and perform well in interviews with required etiquette.	K3
CO3	Use appropriate telephone etiquette to succeed in telephonic interviews.	K3
CO4	Show team spirit and communicative skills in group discussion.	K3
CO5	Arrange ideas and prepare to give presentations in a professional manner.	K4
CO6	Debate rationally and cogently while putting forth the ideas.	K4

Name of the Course: Environmental Studies
Course Code: V20CHT02
Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Recognize the importance of environment and ecosystem services	K2
CO2	Identify the characteristic features, uses and impact of overutilization of natural resources	K2
CO3	Explain biodiversity, biodiversity services and conservation of biodiversity	K2
CO4	Report the causes and impacts of various pollutions	K2
CO5	Illustrate social and global environmental issues; sustainable development practices	K2
CO6	Describe environmental management and environmental legislations in India	K2

III-SEMESTER

Name of the Course: Transform Calculus

Course Code: V20MAT05

Course Outcomes:
After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	find the integrals using Laplace transforms	**K3**
CO2	apply the Laplace transform for solving differential equations	**K3**
CO3	apply the Z- transform for solving difference equations	**K3**
CO4	find the Fourier series of periodic signals	**K3**
CO5	find the Fourier transforms of given function	**K3**

Name of the Course: Electrical Circuit Analysis –II

Course Code: V20EET04

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Determine electrical parameters for 3-phase unbalanced systems	**K3**
CO2	Apply the network theorems for solving electrical circuits.	**K3**
CO3	Analyze circuit parameters under transient conditions	**K3**
CO4	Calculate two-port network parameters for any type of electrical networks	**K3**
CO5	Understand the concept of filters	**K2**

Name of the Course: Electro Magnetic Fields

Course Code: V20EET05

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Compute the electric field and potential due to different configurations of static charges and electric dipole.	**K3**
CO2	Calculate the capacitance of various configurations and understand the concept of conduction and convection current densities.	**K3**
CO3	Apply the Biot-Savart's law and Amperes Circuital Law for finding MFI for different cables and develop the Maxwell equations.	**K3**
CO4	Determine the magnetic forces, torque produced by currents in magnetic fields, self-inductance of solenoid and toroid.	**K3**
CO5	Calculate the induced E.M.F's and understand the concept of fields varying with time.	**K3**

Name of the Course: Electrical Machines – I

Course Code: V20EET06

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Asses the performance of a DC Machines	**K3**
CO2	Understand the torque production mechanism and control the speed of DC Machines	**K2**
CO3	Asses the performance of single phase transformers	**K3**
CO4	Calculate the regulation, losses and efficiency of single phase transformers	**K3**
CO5	Understand the parallel transforms, control voltages with tap changing methods and achieve three phase to two phase transformation	**K2**

Name of the Course: Analog Electronics

Course Code: V20ECT06

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Explain the working principle of diode and Diode rectifier circuits with and without Filters	**K2**
CO2	Sketch V-I characteristics of BJT and FET in different configurations	**K3**
CO3	Construct wave shaping circuits for various applications	**K3**
CO4	Construct circuits for different applications using ICs	**K3**
CO5	Explain the operation of Data Converters using IC 741 OP-AMP	**K2**

Name of the Course: Electrical Circuits Laboratory

Course Code: V20EEL04

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Compute response in the electrical circuits using various Network theorems	**K3**
CO2	Sketch Locus Diagrams of RL and RC Series Circuits	**K2**
CO3	Find parameters of the circuit under resonance conditions	**K3**
CO4	Determine two port network parameters	**K3**
CO5	Calculate 3phase power and choke coil parameters	**K3**

Name of the Course: Analog Electronics Laboratory

Course Code: V20ECL03

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Interpret the Characteristics of various semiconductor devices.	**K2**
CO2	Examine the Performance of Rectifiers with and without Filters.	**K3**
CO3	Construct circuit for linear wave shaping circuits.	**K3**
CO4	Construct circuits for verifying linear and nonlinear applications using IC741op-amp And IC 555 timer.	**K3**
CO5	Verify the Characteristics of 4 bit Digital to Analog Converter.	**K3**

Name of the Course: Data Structures & Algorithms Lab

Course Code: V20CSL31

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	ConstructSorting and searching methods.	**K3**
CO2	Implement programs using Singly Linked Lists, Double Linked List.	**K3**
CO3	Construct Basic Data Structures, Stacks, Queues and Applications.	**K3**
CO4	Construct Binary search tree.	**K3**
CO5	Implement various graph operations and shortest path algorithm.	**K3**

Name of the Course: Professional Communication Skills - I

Course Code: V20ENT02

Course Outcomes:

After successful completion of the course, the student will be able to**:**

CO No.	Course Outcome	Knowledge Level
CO1	Use vocabulary in regular chores of life with accuracy, make meaningful sentences, and describe people and their traits vividly.	K3
CO2	Distinguish between places of pilgrimage and holiday spots; describe incidents, things and process; and frame questions, statements and expressions.	K4
CO3	Demonstrate their knowledge of idioms which are similar to those of native speakers while speaking and writing and use phrases clearly and precisely to articulate their views that compare and contrast Indianisms with native expressions and avoid common errors.	K3
CO4	Employ the vocabulary of netizens with ease and walk through the letters and emails for effective official correspondence and infer the accurate meaning of the homophones that are often confusing.	K3
CO5	Summarize their profile; introduce themselves as well as others by incorporating their accomplishments and Sketch stories and anecdotes in an interesting and engaging manner that arouses curiosity of the audience.	K5

IV Semester

Name of the Course: Signals and Systems

Course Code: V20EET07

Course Outcomes

After Successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand and estimate various types of signals and systems.	K2
CO2	Understand the basic principles of Sampling Theorem.	K2
CO3	Understand the characteristics of LTI Systems	K2
CO4	Understand the concepts of Cross-Correlation and Auto-Correlation of Functions	K2
CO5	Apply the concept of ROC for Laplace Transform and Z transform, Inverse Z transforms.	K3

Name of the Course: Electrical Machines – II

Course Code: V20EET08

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Explain the operation and performance of three phase induction motor	K2
CO2	Assess the torque-speed relation, performance of induction motor and induction generator	K3
CO3	Explain the torque production mechanism and starting of single phase induction motors	K2
CO4	Asses the performance of synchronous generators by determining its voltage regulation	K3
CO5	Explain the operation and performance of Synchronous Motors	K2

Name of the Course: Electrical and Electronic Measurements

Course Code: V20EET09

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Identify the proper instrument for measurement of AC or DC voltages and currents	K2
CO2	Choose the suitable instrument for the measurement of power and energy.	K3
CO3	Compute the electrical parameters by using appropriate bridge.	K3
CO4	Calculate different magnetic parameters by using magnetic instruments and Understand the operation of potentiometer.	K3
CO5	Understand the operation of various digital instruments.	K2

Name of the Course: Electrical Power Generation & Transmission

Course Code: V20EET10

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Understand the working of conventional power generating stations	K2
CO2	Calculate various factors of load, insulation resistance and power factor of the cables.	K3
CO3	Compute the resistance, inductance and capacitance of transmission lines	K3
CO4	Determine the various transmission line parameters	K3
CO5	Calculate the corona loss, sag and tension in transmission lines	K3

Name of the Course: Managerial Economics & Financial Analysis

Course Code: V20MBT51

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Understand the basic concepts of managerial economics, demand, elasticity of demand and methods of demand forecasting.	K2
CO2	Interpret production concept, least cost combinations and various costs concepts in decision making.	K3
CO3	Differentiate various Markets and Pricing methods along with Business Cycles	K2
CO4	Prepare financial statements and its analysis.	K3
CO5	Assess various investment project proposals with the help of Capital Budgeting techniques for decision making.	K3

Name of the Course: Python Programming Lab

Course Code: V20CSL32

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Demonstrate Basic Python Programs	K3
CO2	Construct control structures in python	K3
CO3	Demonstrate functions and packages.	K3
CO4	Construct python programs using structured data types.	K3
CO5	Demonstrate Text Files	K3

Name of the Course: Electrical Machines-I Lab

Course Code: V20EEL05

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Sketch the magnetizing characteristics of DC shunt generator	K3
CO2	Determine and predetermine the performance of DC machines	K3
CO3	Apply different methods to control the speed of the DC motors	K3
CO4	Assess the performance of transformers	K3
CO5	Convert three phase supply to two phase	K2

Name of the Course: Electrical Measurements Laboratory

Course Code: V20EEL06

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Calibrate voltmeters, ammeters, single phase energy meter	K3
CO2	Measure the electrical parameters using Anderson, Schering& Kelvin's double Bridges.	K5
CO3	Apply various methods to calculate powers and choke coil parameters	K3
CO4	Calibrate dynamometer and LPF Wattmeters	K3
CO5	Measure the Dielectric Strength of transformer oil	K3

Name of the Course: Professional Communication Skills - II

Course Code: V20ENT03

Course Outcomes

After successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Demonstrate grammatical competence, analyze noun and pronoun dispositions, classify various kinds of verbs, adjectives and adverbs and identify errors in sentences; distinguish the subtle meanings of various words in different contexts, recognize similar words as well as words with contrast meanings and use them appropriately. (K3)	K2
CO2	Organize individual words into one whole sentence using new vocabulary and focus on the error analysis of prepositions and conjunctions, build conversations which befit the situations and develop pre-reading strategies to improve comprehension skills. Distinguish and acquire knowledge of using words of the same category in a sentence and learn new words that promote communicative finesse. Find errors in sentences where the modifiers are misplaced and put them at the appropriate place, use hit pair words and send an email that is concise and lucid.	K3
CO3	Recognize the easiest and best possible way of solving problems in the area of Number and Letter Series, Analogy, Classification, Coding & Decoding Symbols, Ranking and Analytical Reasoning.	K4
CO4	Investigate the different types of logics involved in Mirror and Water Images, Logical Reasoning &Arithmetic Reasoning.	K4
CO5	Find the common traps in the questions and errors likely to be made from the concepts of Blood Relations, Directions, Average, Clock and Calendar, Data Sufficiency, Permutations-Combinations and Probability.	K3

V Semester

Name of the Course: Switchgear & Protection

Course Code: V20EET12

Course Outcomes
After Successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand the arc interruption phenomenon in oil, air, vacuum, SF6 gas type circuit breakers.	(K2)
CO2	Extract the constructional features and working of different types of electromagnetic relays.	(K2)
CO3	Choose suitable relay for different type of protective schemes.	(K3)
CO4	Apply suitable protective scheme for generators and transformers against different faults.	(K3)
CO5	Choose suitable protective scheme for the protection of feeders & bus bars, digital relays and the concept of grounding.	(K3)

Name of the Course: Power Electronics

Course Code: V20EET13

Course Outcomes

After Successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Illustrate the characteristics of various power semiconductor devices and different firing circuits of SCR.	(K3)
CO2	Operate various 1- φ AC-DC Controlled rectifiers for R and RL Loads and compare their performance.	(K3)
CO3	Explain the operation of 3-φ full converter and dual converter.	(K2)
CO4	Explain the operation of AC voltage controller, 1- φcyclo-converter and high frequency dc-dc converters.	(K2)
CO5	Apply PWM techniques for voltage control and harmonic mitigation.	(K3)

Name of the Course: Utilization of Electrical Energy (Professional Elective –I)

Course Code: V20EET14

Course Outcomes

After Successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Choose a suitable motor for electric drives and industrial applications	(K3)
CO2	Select appropriate heating and welding techniques for different applications	(K2)
CO3	Recognise lightning system for particular inputs and constraints.	(K2)
CO4	Illustrate the speed-time characteristics of traction motors.	(K3)
CO5	Estimate the energy consumption levels at various modes of operation.	(K2)

Name of the Course: Renewable Energy Systems (Professional Elective –I)

Course Code: V20EET15

Course Outcomes

After Successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand the solar radiation and calculate geometric angle.	(K2)
CO2	Understand the working of solar thermal collectors.	(K2)
CO3	Understand the working of solar photo voltaic systems and develop the maximum power point techniques.	(K2)
CO4	Understand the wind energy conversion systems, Betz coefficient and tip speed ratio.	(K2)
CO5	Understand the basic principle and working of tidal, fuel cell and geothermal energy systems.	(K2)

Name of the Course: INSTRUMENTATION (Professional Elective –I)

Course Code: V20EET16

Course Outcomes

After Successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Illustrate various types of signals and their characteristics.	(K3)
CO2	Explain different types of transducers with applications.	(K2)
CO3	Compute various parameters of non-electrical quantities.	(K3)
CO4	Understand the principles of digital voltmeters and CRO.	(K2)
CO5	Explain various types of signal analyzers.	(K2)

Name of the Course: Energy Audit & Demand Side Management (Professional Elective-I)

Course Code: V20EET17

Course Outcomes

After Successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Describe the concepts and procedures for Energy Audit & Management.	(K2)
CO2	Understand the necessity of Energy efficient lighting systems.	(K2)
CO3	Understand the operation of Energy instruments and their use in energy audit.	(K2)
CO4	Explain Energy Conservation measures in HVAC system	(K2)
CO5	Apply various economic aspects of Energy systems and life cycle costing analysis for various system	(K3)

Name of the Course: Electrical Machines Lab - II

Course Code: V20EEL07

Course Outcomes

After Successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Pre-determine the performance parameters and sketch the performance characteristics of 3-phase induction motor by conducting different tests.	(K3)
CO2	Pre-determine the performance parameters of cylindrical pole synchronous machine by conducting OC and SC tests.	(K3)
CO3	Determine the direct and quadrature axis reactance by conducting slip test.	(K3)
CO4	Determine V and inverted V curves through synchronization of synchronous machine to mains.	(K3)
CO5	Calculate the equivalent circuit parameters of a 1-phase transformer by conducting OC and SC Tests.	(K3)

Name of the Course: Control Systems Lab

Course Code: V20EEL08

Course Outcomes

After Successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Find time response of given control system model.	(K3)
CO2	Analyze the performance and working of Magnetic amplifier, D.C. servo motors, A.C. Servo motors and synchronous motors.	(K4)
CO3	Analyze PID controllers for given control system model.	(K4)
CO4	Analyze lead, lag and lead-lag systems in control system	(K4)
CO5	Determine the transfer function of D.C. motor and D.C Generator.	(K4)

Name of the Course: Power System Analysis
Course Code: V20EET18

Course Outcomes

After Successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Compute Y_{BUS} matrix for a power system network.	(K3)
CO2	Find the load flow solution of a power system network using load flow methods.	(K3)
CO3	Develop the Z_{BUS} for a power system network and calculate the fault currents for symmetrical faults.	(K3)
CO4	Compute the sequence components of currents for unbalanced power system network.	(K3)
CO5	Understand the concepts of power system stability.	(K2)

Name of the Course: Electrical Drives
Course Code: V20EET19
Course Outcomes
After Successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand the fundamentals concepts of an electric drive and different electric braking methods.	(K2)
CO2	Operate Chopper fed DC motor drives in various quadrants.	(K4)
CO3	Understand the closed loop operation of chopper fed dc motor drive.	(K2)
CO4	Compute the change in speed of 3-φ induction motor with variable voltage and v/f control	(K3)
CO5	Illustrate the speed control mechanism of synchronous motors	(K3)

Name of the Course: Microprocessors and Microcontrollers
Course Code: V20EET20

Course Outcomes
After Successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand the microprocessor capability in general.	(K2)
CO2	Explain the addressing modes of microprocessor.	(K2)
CO3	Understand the microcontroller capability.	(K2)
CO4	Develop microprocessor and microcontroller programmes.	(K3)
CO5	Connect microprocessor and microcontroller with other electronic devices.	(K4)

Name of the Course: Smart Grid Technologies (Professional Elective –II)
Course Code: V20EET21
Course Outcomes:
After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand concept of smart grid and its advantages over conventional grid.	K2
CO2	Explain the architecture of smart Grid.	K2
CO3	Illustrate the concept of Micro Grid and its integration.	K2
CO4	Understand the smart metering and measuring techniques.	K2
CO5	Illustrate different communication technologies and power quality problems associated with smart grid.	K2

Name of the Course: Power Quality & Custom Power Devices (Professional Elective –II)
Course Code: V20EET22
Course Outcomes:
After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Identify the issue related to power quality in power systems	K2
CO2	Describe the problems of transient voltage variations in power systems	K2
CO3	Analyze the effects of harmonics and understand different mitigation techniques	K4
CO4	Identify the importance of custom power devices and their applications	K2
CO5	Choose suitable custom power device to mitigate power quality problem	K2

Name of the Course: Modern Control Theory (Professional Elective –II)
Course Code: V20EET23
Course Outcomes:
After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand the concepts of State Space Analysis.	(K2)
CO2	Find the concepts of Controllability, Observability and development of pole placement techniques.	(K3)
CO3	Demonstrate the non-linear systems behaviour by describing function analysis.	(K3)
CO4	Demonstrate the non-linear systems behaviour by phase-plane.	(K3)
CO5	Compute the stability of linear and non-linear systems by Lypunov's Method.	(K3)

Name of the Course: IoT Applications In Electrical Engineering (Professional Elective –II)
Course Code: V20EET24

Course Outcomes

After Successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand various fundamentals, architectures and technologies of Internet of Things.	(K2)
CO2	Discuss about various communication technologies used in the Internet of Things.	(K2)
CO3	Acquire knowledge on the various device connectivity methods using web and internet in the IoT environment.	(K2)
CO4	Explore various data acquisition methods, data handling using cloud for IoT applications.	(K3)
CO5	Apply IoT to design Smart Home, Smart cities, and agriculture practices.	(K3)

Name of the Course: Power Systems Lab
Course Code: V20EEL09
Course Outcomes:
After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Calculate the sequence impedances of 3-φ Transformer.	K4
CO2	Determine the power Angle Characteristics of 3-φ Alternator with infinite bus bars.	K4
CO3	Calculate the dielectric strength of Transformer oil.	K4
CO4	Explain load flow studies using G-S & N-R method.	K5
CO5	Assess load frequency control with & without controller and Evaluate economic load dispatch with & without losses.	K5

Name of the Course: Power Electronics & Simulation Lab
Course Code: V20EEL10
Course Outcomes

After Successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Sketch the characteristics of various power electronics devices and analyse the firing circuits.	(K4)
CO2	Analyze the performance of 1-φ and 3-phase full converter and 1-φ dual converter for resistive and inductive loads.	(K4)
CO3	Experiment the 1-φ AC voltage controller and cyclo-converter with resistive and inductive loads.	(K4)
CO4	Operate the DC-DC buck converter and boost converter.	(K3)
CO5	Analyze the performance of the 1-φ bridge and PWM inverter	(K4)

Name of the Course: Microprocessors and Microcontrollers Lab

Course Code: V20EEL11

Course Outcomes:
After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand assembly language program using 8086 based on arithmetic, logical, and shift operations.	(K2)
CO2	Connect 8086 with I/O and other devices.	(K3)
CO3	Operate Stepper motor control using microcontroller.	(K3)
CO4	Understand the serial and parallel communication using 8051 microcontroller.	(K2)
CO5	Connect PIC18 with a DC motor.	(K3)

VII Semester

Name of the Course: Extra High Voltage AC Transmission (Professional Elective –III)

Course Code: V20EET25

Course Outcomes:
After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Calculate the parameters of EHV line modeling.	(K3)
CO2	Find electric field and interference characteristics of EHVAC system.	(K3)
CO3	Understand the corona loss formulation and radio interference to 3-φ Induction machines.	(K2)
CO4	Understand the Lightning phenomenon and methods of Lightning Protection	(K2)
CO5	Understand the over-voltage phenomenon and methods to limit over-voltage EHVAC systems.	(K2)

Name of the Course: Power System Operation and Control (Professional Elective –III)

Course Code: V20EET26

Course Outcomes:
After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Analyze the optimal scheduling of power generating thermal units.	K4
CO2	Compute optimal hydro and thermal scheduling and predict the optimal unit commitment problem.	K3
CO3	Calculate the transfer function of single area and two area load frequency control.	K4
CO4	Evaluate the steady state response of single area load control with PI controller.	K5
CO5	Assess the reactive power control and compensation of transmission lines.	K3

Name of the Course: Digital Control Systems (Professional Elective –III)

Course Code: V20EET27

Course Outcomes:
After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Solve difference equations and determine pulse transfer functions.	K3
CO2	Analyse a discrete time system using state space model.	K3
CO3	Determine the stability of a discrete time system.	K4
CO4	Design a controller for discrete time system using conventional methods.	K4
CO5	Design a controller for discrete time system using state feedback.	K4

Name of the Course: Electrical Machine Modeling & Analysis (Professional Elective –III)

Course Code: V20EET28

Course Outcomes:
After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Analyze Kron's primitive Machine.	(K4)
CO2	Develop modeling of dc machine.	(K3)
CO3	Explain Linear transformation and mathematical modeling concepts to 3-phase Induction machines.	(K5)
CO4	Develop control strategies based on dynamic modeling of 3-ph Induction machines and 3-phase synchronous machine.	(K3)
CO5	Analyze BLDC Machine and switched reluctance machine based on mathematical modeling of BLDCM and SRM.	(K4)

Name of the Course: High Voltage Engineering (Professional Elective –IV)

Course Code: V20EET29

Course Outcomes:
After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand the performance of high voltages with regard to different configurations of electrode systems.	K2
CO2	Understand the theory of breakdown and withstand phenomena of all types of dielectric materials.	K2
CO3	Explain various methods available for generation and measurement of high DC, AC and Impulse voltages and currents.	K2
CO4	Choose suitable method for measuring the dielectric property of a material used for HV equipment.	K3
CO5	Illustrate the testing techniques for various equipments used in HV engineering.	K2

Name of the Course: Electrical Distribution Systems (Professional Elective –IV)

Course Code: V20EET30

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Understand various factors of distribution system	K2
CO2	Construct the distribution substation and feeders	K3
CO3	Calculate the voltage drop and power loss calculations on Distribution System	K3
CO4	Understand the distribution system protection and its coordination.	K2
CO5	Understand the effect of compensation for power factor improvement, voltage control on distribution system.	K2

Name of the Course: Power System Reforms (Professional Elective –IV)
Course Code: V18EET31

Course Outcomes:

After successful completion of course the student will able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand fundamentals of power system deregulation and restructuring.	K2
CO2	Compute Available Transfer Capability (ATC).	K3
CO3	Apply methods to reduce congestion.	K3
CO4	Compute electricity pricing in deregulated environment.	K3
CO5	Understand importance of ancillary services.	K2

Name of the Course: Advanced Power Electronics (Professional Elective –IV)
Course Code: V20EET32

Course Outcomes

After Successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Analyze and design power converter configurations for specific applications	(K3)
CO2	Design power electronic converters to improve power quality	(K3)
CO3	Analyze and design resonant converters	(K3)
CO4	Develop power converter models under steady state and small signal conditions	(K3)
CO5	Understand the designing of magnetic components for power converters	(K2moder)

Name of the Course: Special Electrical Machines (Professional Elective –V)
Course Code: V20EET33

Course Outcomes:

After Successful completion of this course, students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Describe the operation and characteristics of permanent magnet dc motor	**(K2)**
CO2	Understand the operation and control of stepper motors	**(K2)**
CO3	Understand the operation and control of switched reluctance motor	**(K2)**
CO4	Describe the operation and characteristics of brush less dc Motor	**(K2)**
CO5	Understand the construction and operation of linear induction motors	**(K2)**

Name of the Course: AI Techniques for Power Systems (Professional Elective –V)

Course Code: V20EET34

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Understand fundamentals concepts of artificial neural networks.	K2
CO2	Understand concepts of different algorithms ANN paradigms.	K2
CO3	Understand fundamentals of fuzzy set properties and membership functions, concept of evolutionary techniques	K2
CO4	Understand fundamentals of optimization techniques.	K2
CO5	Apply optimization techniques to power system applications.	K4

Name of the Course: Energy Storage and Battery Management (Professional Elective – V)

Course Code: V20EET35

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Use suitable energy storage system in real time applications.	K3
CO2	Understand the role of electrical energy storage technologies in various aspects.	K2
CO3	Interpret the role of battery management system.	K3
CO4	Illustrate the requirements of Battery Management System.	K3
CO5	Understand the concepts of battery state of charge and state of health estimations.	K2

Name of the Course: Hybrid Electric Vehicles(Professional Elective – V)

Course Code: V20EET36

Course Outcomes:

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

CO No.	Course Outcome	Knowledge Level
CO1	Differentiate between Electric vehicles and Hybrid Electric Vehicles	K2
CO2	Discriminate between various Drive-Train Topologies	K2
CO3	Identify different motors used for hybrid electric vehicles.	K2
CO4	Explain the Sizing of Drive Train	K2
CO5	Illustrate different batteries and other energy storage systems.	K3

Name of the Course: Advanced Electrical Simulation Lab

Course Code: V20EEL12

Course Outcomes:
After successful completion of the course, the student will be able to:

CO No.	Course Outcome	Knowledge Level
CO1	Construct the Electrical circuits using MultiSim& LT Spice.	**K2**
CO2	Analyze the LTI systems & State space model using MATLAB.	**K4**
CO3	Construct the Inverters, Series RLC circuits, Op-amp circuits using Or CAD.	**K2**
CO4	Design the power electronic converters using PLECS.	**K4**
CO5	Operate Electrical Drives using different controllers.	**K3**