



**ELECTRICAL AND
ELECTRONICS
ENGINEERING**



Estd:1980

SAGIRAMAKRISHNAM RAJU ENGINEERING COLLEGE(AUTONOMOUS)
(Affiliated to JNTUK, Kakinada), (Recognized by AICTE, New Delhi) Accredited by NAAC with 'A'
Grade UG Programmes CE, CSE,ECE, EEE,IT&ME are Accredited by NBA
Chinna Amiram,Bhimavaram-534204.(AP)

B. TECH – ELECTRICAL AND ELECTRONICS ENGINEERING

Department Vision

Transforming the individuals into globally competent Electrical Engineers to accomplish the technological needs of the society.

Department Mission:

- Establishing world class infrastructure in Electrical Engineering.
- Adopting continuous improvement methods in content delivery and assessment.
- Facilitating industry institution interaction in teaching & learning, consultancy and research activities to fulfill the technological needs of the society.
- Encouraging the faculty and students to carry out innovative research and practicing ethical standards.
- Motivating the students for active participation in co-curricular and extracurricular activities.

Program Educational Objectives (PEOs) :

PEO1	Graduates will be technically sound to have vibrant careers in core & IT sector.
PEO2	Graduates will compete, sustain, lead and enhance in competitive world.
PEO3	Graduates will serve the nation by solving technical problems with professional ethics and social responsibility

Program Specific Outcomes (PSO's):

PSO1	The ability to analyse, design and implement power systems, power electronics, control systems using software systems.
PSO2	The ability to apply project management techniques to electrical & Electronics systems & to utilize applied differential equations, matrices, different transform methods, discrete mathematics in support to the program.



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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 analyze 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 multi-disciplinary 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.



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Course outcomes (Cos) of all courses of all programs offered by the institution

Course Outcomes for First Year First Semester Course	
Course Code: B20HS1101	
Course Title: ENGLISH	
CO-1	Identify the context, topic and pieces of specific information by understanding and responding to the social or transactional dialogues spoken by native speakers of English.
CO-2	Apply suitable strategies for skimming and scanning to get the main idea of a text and locate specific information.
CO-3	Build confidence and adapt themselves to the social and public discourses, discussions and presentations.
CO-4	Apply the principles of writing to paragraphs, arguments, essays and formal/informal communication.
CO-5	Construct sentences using proper grammatical structures and correct word forms.
Course Code: B20 BS 1101	
Course Title: Mathematics-I	
CO-1	Solve a given system of linear algebraic equations
CO-2	Determine Eigen values and Eigen vectors of a system represented by a matrix
CO-3	Solve linear ordinary differential equations of first order and first degree.
CO-4	Apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits.
CO-5	Solve linear ordinary differential equations of second order and higher order.
CO-6	Determine Laplace transform and inverse Laplace transform and solve linear ODE.
Course Code: B20 BS 1102	
Course Title: APPLIED PHYSICS	
CO-1	Interpret the behavior of light radiation in interference and diffraction Phenomena and their applications.
CO-2	Explain the classification and properties of dielectric and magnetic materials suitable for engineering applications.
CO-3	Understand the basics of modern technologies lasers, optical fibers and ultrasonics and their utility in various fields.
CO-4	Explain the important aspects of semiconductors and electrical conductivity in them.
CO-5	Understand the basics of technology of Ultrasonics in various fields and demonstrate the synthesis and applications of nano materials.
Course Code: B20ME1101	
Course Title: ENGINEERING DRAWING	
CO-1	Apply principles of drawing to Construct polygons and engineering curves.
CO-2	Apply principles of Ortho graphic projections to draw the projections of points and lines.
CO-3	Apply principles of drawing to draw the projections of planes.
CO-4	Apply principles of drawing to draw projections of solids and their sectional views.
CO-5	Apply principles of drawing to draw developments and pictorial view of solids.
Course Code: B20EE1101	
Course Title: INTRODUCTION TO ELECTRICAL SYSTEMS	
CO-1	Apply basic knowledge to understand principles of power generation and its scenario in India.
CO-2	Identity different components of transmission and distribution sub stations and understand the Indian Power grid scenario.
CO-3	Apply energy conversion principles to understand operation of electrical utility components
CO-4	Apply basic knowledge to understand operation of rectifier, Inverter, batteries and uninterrupted power supply
CO-5	Understand and apply the Electrical safety measures while handling electrical equipment.
Course Code: B20EE1104	
Course Title: BASICELECTRICALSYSTEMS LAB	
CO-1	Analyze the performance of AC and DC Machines by Testing.
CO-2	Conduct experiments to obtain L-V Characteristics of Solar panel
CO-3	Measure voltage, current, power and energy in different electrical power supply systems.
CO-4	Demonstrate wiring connection for domestic uninterrupted power supply
CO-5	Analyze the safety measures in handling electrical equipment



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CO-6	Calculate luminous efficiency of different light sources
Course Code: B20BS1107	
Course Title: APPLIED PHYSICSLAB	
CO-1	Get hands on experience in setting up experiments and using the instruments/equipment individually.
CO-2	Get introduced to using new/advanced technologies and understand their significance.
Course Code: B20ME1102	
Course Title: WORKSHOP PRACTICE	
CO-1	Apply wood working skills in real world applications.
CO-2	Build different parts with metal sheets in real world applications.
CO-3	Apply fitting operations in various applications.
CO-4	Apply different types of basic electric circuit connections.

Course Outcomes for First Year second Semester Course	
Course Code: B20BS1201	
Course Title: MATHEMATICS –II	
CO-1	Determine Fourier series and half range series of functions
CO-2	Determine Fourier transforms of non-periodic functions and also use them to evaluate integrals.
CO-3	Compute partial derivatives, total derivative and Jacobians.
CO-4	Find maxima/minima of functions of two variables and evaluate some real definite integrals.
CO-5	Form partial differential equations and solve Lagrange linear equation. Solve linear higher order homogeneous and non-homogeneous PDEs.
CO-6	Find theoretical solution of one-dimensional wave equation and one-dimensional heat equation
Course Code: B20 BS 1203	
Course Title: APPLIED CHEMISTRY	
CO-1	Develop polymer composites, synthetic polymers and formulation of polymers and their use in design
CO-2	Apply the knowledge about quality of water and its treatment methods for domestic and industrial applications. Understanding the principle, mechanism of corrosion and utilization of various techniques to control.
CO-3	Develop the knowledge of fuels and their economics, advantages and limitations. Make use of the basic concepts of semiconductors and liquid crystals for engineering applications.
CO-4	Identify constituents of various ceramic materials, characteristics and their appropriate use in construction. Apply the knowledge of electro chemistry principles to design energy storage
Course Code: B20 CS 1201	
Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C	
CO-1	Apply Precedence and Associativity rules to evaluate Expressions.
CO-2	Make use of Decision Making and Looping statements to solve various problems in C
CO-3	Illustrate the importance of Arrays and Strings and to apply various operations on them.
CO-4	Solve various problems by making use of Structure and Union concepts
CO-5	Design and implement programs to analyze the different pointer applications
CO-6	Develop programs using Functions and Pointers.
Course Code: B20CS1204	
Course Title: DIGITAL COMPUTER FUNDAMENTALS	
CO-1	Understand various hardware and software components of computers
CO-2	Distinguish different input/output devices and memory devices of computers
CO-3	Know the importance of CPU in computers
CO-4	Distinguish various types of software
CO-5	Know various types of computer networks and security issues
Course Code: B20ME1204	
Course Title: PRIMEMOVERS AND PUMPS	
CO-1	Apply the concepts of air standard cycles in internal combustion engines.
CO-2	Compute various thermodynamic processes under gone by steam by using Mollier chart and steam tables.
CO-3	Compute the efficiencies of steam and gas power plants.
CO-4	Apply the concepts of fluid mechanics to understand the working of turbines and pumps
Course Code: B20 BS 1208	
Course Title: APPLIED CHEMISTRY LAB	
CO-1	Gain technical knowledge of measuring, operating and testing of chemical instruments and equipments. Carrying out different types of chemical reactions for analyzing different materials in micro level quantities.



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CO-2	Analyze and generate experimental skills to enhance the analytical thinking capabilities in the modern trends in engineering and technology.
Course Code: B20 HS1202	
Course Title: COMMUNICATION SKILLS LAB	
CO-1	Apply their linguistic competence in all LSRW skills to professional and personal settings.
CO-2	Apply communication skills through various language learning activities to their advancement in academics and competitive examinations.
CO-3	Draft job application letters, E-Mail messages and other writing discourses.
CO-4	Adopt a professional etiquette in formal settings.
CO-5	Improve fluency and clarity in both spoken and written English.
Course Code: B20CS1205	
Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C LAB	
CO-1	Write, Trace and Debug the programs and correct syntax and logical errors.
CO-2	Solve various Problems by making use of Arrays, Strings, Structures, Unions and Pointers
CO-3	Solve a complex problem by decomposing into several modules by using Functions
CO-4	Apply various File I/O operations
Course Code: B20MC1201	
Course Title: ENVIRONMENTAL SCIENCE	
CO-1	Bring awareness among the students about the nature and natural ecosystems
CO-2	Sustainable utilization of natural resources like water, land, energy and air
CO-3	Resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc to inculcate the students about environmental awareness and safe transfer of our mother earth and its natural resources to the next generation
CO-4	Constitutional provisions for the protection of natural resources
CO-5	Green technologies and its applications

Course Outcomes for Second Year First Semester Course

Course Code: B20 BS 2101	
Course Title: Numerical Methods & Vector Calculus	
CO-1	Determine a real root of an algebraic or transcendental equation. Fit an interpolation formula and perform interpolation for equally spaced and unequally spaced data.
CO-2	Evaluate numerically certain definite integrals. Solve a first order ordinary differential equation by Euler and RK methods
CO-3	Evaluate double integrals and determine the areas.
CO-4	Evaluate triple integrals and determine the volumes.
CO-5	Find the gradient of a scalar function, divergence and curl of a vector function.
CO-6	Solve simple problems using vector integral theorems.
Course Code: B20EC2101	
Course Title: ELECTRONIC DEVICES AND CIRCUITS	
CO-1	Analyze the characteristics and operation of Diode, BJT
CO-2	Deduce the stability factors of different biasing circuits of BJT
CO-3	Analyze the characteristics and operation of JFET and MOSFET
CO-4	Design the small signal BJT single stage amplifiers.
Course Code: B20EE2101	
Course Title: NETWORK ANALYSIS	
CO-1	Understand electric circuit laws and Apply theorems to solve electrical networks.
CO-2	Analyze the transient behavior of electrical networks using differential equation, and understand the concept of dot convention
CO-3	Understand AC fundamentals and Solve R, L, C network with sinusoidal excitation.
CO-4	Understand the concept of electrical resonance and also able to solve three- phase circuits under balanced and unbalanced condition.
CO-5	Apply two-port network analysis for devices like amplifiers, transmission lines and understand the concept of network functions, poles and zeros.
Course Code: B20EE2102	
Course Title: ELECTROMAGNETIC FIELD THEORY	
CO-1	Compute the electrostatic forces and electric field intensity for given charge configuration by applying Vector Calculus/Coulomb's / Gauss's law.



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CO-2	Calculate the Electric Potential, Energy and discriminate the conductors and dielectrics by its properties, Laplace's and Poisson's equations.
CO-3	Calculate the Magnetic field intensity by applying Biot-Savart's/ Ampere's law
CO-4	Illustrate the properties of magnetic materials and find the Magnetic potential and energy
CO-5	Derive Maxwell's equations and apply them to Analyze the EM wave in different domains and compute average power density
Course Code: B20EE2103	
Course Title: ELECTRICAL MACHINES-I	
CO-1	Apply the concepts of electro mechanical energy conversion to understand the construction and working principle of DC machine.
CO-2	Analyze the performance characteristics of DC Machines using EMF and torque equations and understand the concepts of armature reaction and commutation.
CO-3	Analyze the performance of DC Machines using various tests and understand the starting and speed control methods
CO-4	Understand the construction and operating principle and analyze the performance of transformer using various tests and its characteristics using phasor diagram, equivalent circuit.
CO-5	Illustrate the constructional details, connections, parallel operation and cooling methods of a 3- Φ transformer and understand the construction and operating principle of auto-transformer
Course Code: B20EE2104	
Course Title: NETWORKS LABORATORY	
CO-1	Apply the concept of theorems and analyze responses in D.C resistive network
CO-2	Justify resonance concept for series R-L-C circuit.
CO-3	Determine parameters of two port networks.
CO-4	Determine parameters of iron cored inductor
CO-5	Determine phasor values in series R-L-C circuit
Course Code: B20EE2104	
Course Title: MATLAB SIMULATION LABORATORY	
CO-1	Apply MATLAB Programming to solve simultaneous linear and nonlinear equation
CO-2	Apply MATLAB Programming, simulation to solve differential equations and function minimization using optimization
CO-3	Apply MATLAB Programming to Analyze the series resonance and transient response of RLC network
CO-4	Apply MATLAB simulation to obtain the single-phase diode rectifier and DC Shunt motor characteristics
CO-5	Analyze the performance of Three phase circuits, Solar power system by MATLAB simulation
Course Code: B20EC2105	
Course Title: ELECTRONIC DEVICES AND CIRCUITS LAB WITH SIMULATION	
CO-1	Apply the concepts of different electronic devices to verify their characteristics and measure the important parameters.
CO-2	Analyze the performance of rectifier circuits with and without filters.
CO-3	Analyze the performance of BJT and FET amplifier circuits
CO-4	Simulation and Design of small electronic circuits using BJT and FET.
Course Code: B20EE2106	
Course Title: SOLAR ENERGY SYSTEMS LABORATORY	
CO-1	Demonstrate PV Panels erection, connections, Solar energy extraction and Solar power Measurement.
CO-2	Explain the working principle of solar equipment like cooker, street lights etc.
CO-3	Installation of roof top solar PV panels and understand their maintenance
CO-4	Plan to estimate required number of PV panels for given domestic load
CO-5	Integrate MPPT device and Net metering for the solar power
Course Code: B20MC2102	
Course Title: PROFESSIONAL ETHICS AND HUMAN VALUES	
CO-1	Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field
CO-2	Identify the multiple ethical interests at stake in a real-world situation or practice
CO-3	Articulate what makes a particular course of action ethically defensible
CO-4	Assess their own ethical values and the social context of problems.
CO-5	Identify ethical concerns in research and intellectual contexts including academic integrity use and citation of sources the objective presentation of data and the treatment of human subjects
CO-6	Demonstrate knowledge of ethical values in non classroom activities such as service learning, internships, and field work.
CO-7	Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings including focused and interdisciplinary research

Course Outcomes for Second Year Second Semester Course

Course Code: B20BS2204

Course Title: COMPLEX VARIABLES AND STATISTICAL METHODS



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CO-1	Comprehend the concept of Analytic function and apply in Electrostatics and Fluid dynamics
CO-2	Determine Laurent series of functions about isolated singularities, and determine residues. Use the residue theorem to evaluate certain real definite integrals.
CO-3	Formulate and solve linear difference equations.
CO-4	Use Z-transforms to solve linear difference equations with constant coefficients.
CO-5	Identify a random variable as discrete/continuous, find its expected value and also fit a probability distribution for a given frequency distribution.
CO-6	Decide the test applicable and apply it for giving inference about Population Parameter based on sample statistic for some large samples and small samples.
Course Code: B20EC2201	
Course Title: ELECTRONIC CIRCUIT ANALYSIS AND DESIGN	
CO-1	Outline the concepts of multistage amplifiers, feedback amplifiers, power amplifiers, tuned amplifiers, operational amplifiers and oscillators.
CO-2	Apply the concepts in the realization of practical circuits.
CO-3	Analyze and design practical electronic circuits using amplifiers, oscillators and operational amplifiers.
Course Code: B20EE2201	
Course Title: ELECTRICAL MACHINES-II	
CO-1	Illustrate the constructional features of AC rotating machines, MMF distribution in air-gap, Rotating Magnetic field and calculate generated voltage.
CO-2	Compute voltage regulation and analyze the power angle characteristics of salient and Non salient pole synchronous generator.
CO-3	Explain Parallel operation of synchronous generator and Analyze characteristics of salient pole synchronous motor and explain the starting methods of synchronous motor.
CO-4	Illustrate the operation of three phase induction motor and apply the slip-torque equations in Analyzing the performance of 3 Φ Induction Motor
CO-5	Demonstrate the starting and speed control of 3- Φ induction motor, operation of single-phase induction motor and its starting methods.
Course Code: B20EE2202	
Course Title: ELECTRICAL POWER GENERATION, TRANSMISSION & DISTRIBUTION	
CO-1	Describe the power generation from different energy sources, tariffs and Economic aspects
CO-2	Apply Kelvin's law and analyze different type's transmission and distribution networks.
CO-3	Calculate Inductance & Capacitance of transmission lines
CO-4	Determine the performance of short, medium and long transmission lines.
CO-5	Explain the mechanical and electrical design aspects of transmission system
Course Code: B20EE2203	
Course Title: ELECTRICAL MEASUREMENTS AND INSTRUMENTATION	
CO-1	Examine the operation of moving coil, moving iron and dynamometer type instruments for measuring electrical quantities such as voltage, current, power, energy and power factor.
CO-2	Analyze the compensation techniques for accurate measurement and extension of range of measurement
CO-3	Analyze the usage of different bridges for the measurement of Resistance, Capacitance, Inductance and Frequency.
CO-4	Examine the operation of different transducers for measuring non-electrical quantities such as displacement, pressure and temperature.
CO-5	Interpret the usage of CRO, ADC and DAC.
Course Code: B20EC2206	
Course Title: ELECTRONIC CIRCUIT ANALYSIS AND DESIGN LAB WITH SIMULATION	
CO-1	Apply the concepts of amplifier analysis to verify their characteristics and measure the important parameters.
CO-2	Analyze the performance of power amplifiers.
CO-3	Analyze the frequency response and characteristics of operational amplifiers.
CO-4	Simulation and Design of different amplifiers and oscillator circuits.
Course Code: B20EE2204	



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Course Title: ELECTRICAL MEASUREMENTS AND INSTRUMENTATION LABORATORY	
CO-1	Determine the quality factor of inductance using Anderson and Maxwell Bridge
CO-2	Examine the necessity of calibration for wattmeter, energy meter, LVDT, Thermocouple and Strain Gauge.
CO-3	Analyze the experimental setup for measuring resistance, capacitance, power, and energy and evaluate the importance of accuracy in measuring devices.
CO-4	Examine the operation of transducers for measuring displacement, temperature and force
CO-5	Test for the dielectric strength of oil and select the oil based on quality
Course Code: B20EE2205	
Course Title: ELECTRICAL MACHINES- I LABORATORY	
CO-1	Conduct Load tests on DC motors and Hopkinson's test to Analyze the efficiency performance of DC Shunt and DC series motors
CO-2	Conduct OC and SC tests and Load test on transformer to Analyze the regulation and efficiency performance of the transformer.
CO-3	Conduct Swinburn's test and Sumpner's test to Predict the Efficiency performance of Dc shunt machine and Transformer.
CO-4	Conduct OCC on DC Shunt generator and Load test on DC compound generator to Determine the open circuit characteristics and over compound and under compound characteristics.
CO-5	Conduct a test on Speed control of a DC shunt motor to Analyze the Speed characteristics of DC shunt motor
Course Code: B20EE2206	
Course Title: SMART SYSTEMS LABORATORY	
CO-1	Identify different components of IoT Networks
CO-2	Interface various sensors to Processor boards
CO-3	Apply various IoT network protocols to communicate between sensors and machines wirelessly
CO-4	Connect the devices using web and internet in the IoT environment.
CO-5	Develop automation of a system using IoT devices
Course Code: B20MC2201	
Course Title: ENGLISH PROFICIENCY	
CO-1	Improve speaking skills.
CO-2	Enhance their listening capabilities
CO-3	Learn and practice the skills of composition writing
CO-4	Enhance their reading and understanding of different texts
CO-5	Improve their communication both in formal and informal contexts.
CO-6	Be confident in presentation skills.

Course Outcomes for Third Year First Semester Course	
Course Code: B20EE3101	
Course Title: SIGNALS AND SYSTEMS	
CO-1	Apply the properties of continuous time and discrete time signals and systems to classify them
CO-2	Apply convolution to analyze CT and DT systems in the Time domain
CO-3	Analyze the spectral characteristics of periodic signals using Fourier series analysis
CO-4	Apply Fourier Transform to analyze the systems.
CO-5	Analyze discrete time signals and systems using Z-Transforms and apply sampling theorem for signal conversion.
Course Code: B20EE3102	
Course Title: POWER SYSTEMS ANALYSIS AND STABILITY	
CO-1	Compute the p.u. reactance and draw the per unit reactance diagram of a power system
CO-2	Apply the load flow techniques to analyze load flow problems in the power system



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CO-3	Compute short circuit MVA and analyze symmetrical fault currents and voltages in a power system.
CO-4	Determine the symmetrical components and un-symmetrical fault currents in a power system
CO-5	Derive swing equation and apply equal area criterion to analyze steady-state and transient stability of a power system.
Course Code: B20EE3103	
Course Title: POWER ELECTRONICS	
CO-1	Illustrate thyristor characteristics, turn on and turn off methods, protection circuits and modern power semiconductor devices.
CO-2	Illustrate the phase-controlled rectifiers with different loads.
CO-3	Analyze the operation of choppers
CO-4	Explore the Cyclo-converter and AC voltage Controller configurations.
CO-5	Analyze the inverter operation, performance parameters and PWM techniques.
Course Code: B20EE3104	
Course Title: SOLAR AND WIND ENERGY SYSTEMS	
CO-1	Apply the fundamental principles to understand the solar geometry, operation of solar cell and analyze its Characteristics, equivalent circuit parameters.
CO-2	Design a PV Module and analyze series and parallel interconnection schemes
CO-3	Apply the MPPT techniques and analyze the Operating range of Buck, Boost and Buck-Boost converters.
CO-4	Apply the fundamental of wind energy systems to illustrate the wind turbine operation and control.
CO-5	Illustrate various configurations of wind energy conversion systems.
Course Code: B20EE3105	
Course Title: SENSORS AND TRANSDUCERS	
CO-1	Apply the principles to understand the characteristics & classification of Sensors and Transducers
CO-2	Explore the concepts and construction of Electromechanical and Radiation Sensors
CO-3	Explore the concepts and construction of Thermal sensors
CO-4	Explore the concepts and construction of Magnetic sensors
CO-5	Illustrate the Recent Trends in Sensor Technologies and applications
Course Code: B20EE3106	
Course Title: SPECIAL ELECTRICAL MACHINES	
CO-1	Illustrate the principle of operation and control of different stepper motors.
CO-2	Acquire the knowledge of operation and control of Permanent Magnet Brushless DC Motor
CO-3	Illustrate the operation and control of Permanent Magnet Synchronous motor.
CO-4	Acquire the knowledge of operation and control of Switched reluctance Motor.
CO-5	Illustrate the operation and control of Synchronous reluctance Motor.
Course Code: B20EE3107	
Course Title: POWER QUALITY	
CO-1	Acquire the knowledge of power quality issues and power quality parameters
CO-2	Illustrate the sources of transient over voltages and protection techniques
CO-3	Analyze filters for controlling harmonic distortion.
CO-4	Analyze long duration voltage variations and regulation of voltage variations.
CO-5	Explore power quality aspects and protection in distributed generation.
Course Code: B20EE3108	
Course Title: ELECTRICAL MACHINES-II LABORATORY	
CO-1	Investigate the voltage regulation of an alternator by using EMF, MMF and ZPF methods
CO-2	Analyze the performance characteristics of Line excited induction generator and Synchronous motor
CO-3	Analyze the performance characteristics of a 3- Φ and 1- Φ Induction motors.
CO-4	Determine X_d & X_q and sequence reactances of a Synchronous machine.
CO-5	Conduct an experiment on BLDC motor to obtain speed – torque characteristics.
Course Code: B20EE3109	



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Course Title: POWER ELECTRONICS LABORATORY	
CO-1	Analyze the characteristics of semiconductor devices
CO-2	Analyze the triggering and commutation methods for SCR
CO-3	Investigate the performance of Controlled rectifiers, DC-DC converters, AC voltage controllers and cycloconverter
CO-4	Examine the performance of single phase and three phase inverters.
CO-5	Investigate the speed control of AC and DC drives using power electronic converters.
Course Code: B20EE3110	
Course Title: PYTHON PROGRAMMING LABORATORY	
CO-1	Write, Test and Debug Python Programs
CO-2	Implement Conditionals and Loops for Python Programs
CO-3	Use functions and represent Compound data using Lists, Tuples and Dictionaries
CO-4	Use python basic libraries in programming
Course Code: B20MC3101	
Course Title: EMPLOYABILITY SKILLS PART-A	
CO-1	Detect grammatical errors in the text/sentences and rectify them while answering their competitive/company specific tests and frame grammatically Correct sentences while writing.
CO-2	Answer questions on synonyms, antonyms and other vocabularybased Exercises while attempting CAT, GRE, GATE and other related tests.
CO-3	Use their logical thinking ability and solve questions related to analogy, Syllogisms, and other reasoning-based exercises.
CO-4	Choose the appropriate word/s/phrases suitable to the given context in order to make the sentence/paragraph coherent.
PART-B	
CO-1	The students will be able to perform well in calculating on number problems and various units of ratio concepts
CO-2	The students will be able to solve problems on time and distance and units related solutions
CO-3	The students will become adept in solving problems related to profit and loss, in specific, quantitative ability
CO-4	The students will present themselves well in the recruitment process using analytical and logical skills which he or she developed during the course as they are very important for any person to be placed in the industry
CO-5	The students will learn to apply Logical thinking to the problems of Syllogisms and be able to effectively attempt competitive examinations like CAT, GRE, GATE for further studies

Course Outcomes for Third Year Second Semester Course	
Course Code: B20EE3201	
Course Title: LOGIC DESIGN AND MICROPROCESSORS	
CO-1	Explore number systems, binary arithmetic and apply the Boolean algebra for simplifying the Boolean expressions.
CO-2	Design of combinational logic circuits using K – maps
CO-3	Implement Flipflops using gates and design synchronous counters and shift registers.
CO-4	Illustrate the architecture of 8085 Microprocessor and its operation and timing diagrams.
CO-5	Interface various I/O devices to 8085 Microprocessor using 8251, 8253, 8255, 8279 peripheral devices and A/D & D/A converters.
Course Code: B20EE3202	
Course Title: CONTROL SYSTEMS	
CO-1	Model electrical and mechanical physical systems by applying laws of physics and derive transfer functions from block diagrams & Signal Flow Graphs
CO-2	Analyze systems in time domain for transient and steady-state behavior
CO-3	Analyze the stability of a system by RH criterion and Root locus.
CO-4	Analyze the behavior of system using frequency response plots.



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Chinna Amiram,Bhimavaram-534204.(AP)

Estd:1980

CO-5	Model and analyze the LTI system using state space approach.
Course Code: B20HS3202	
Course Title: UNIVERSAL HUMAN VALUES-2 : UNDERSTANDING HARMONY	
CO-1	Students are expected to become more aware of themselves, and their surroundings (family, society, nature)
CO-2	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
CO-3	They would have better critical ability.
CO-4	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
CO-5	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 Code: B20EE3203	
Course Title: POWER ELECTRONIC DRIVES	
CO-1	Select suitable converter for motor drives & explore different electric starting and braking methods
CO-2	Analyze the dynamics of electric drive and demonstrate the operation of drive to meet the load requirements
CO-3	Apply and analyze rectifier fed DC drives with continuous current mode operation.
CO-4	Apply and analyze chopper fed DC drives with closed loop control.
CO-5	Investigate the control strategies for Induction motor Drives and slip power recovery schemes
Course Code: B20EE3204	
Course Title: ELECTRICAL DISTRIBUTION SYSTEMS	
CO-1	Explore the types of Loads and Load Characteristics
CO-2	Analyze the design considerations of primary and secondary distribution systems
CO-3	Compute voltage drop and power loss and apply capacitive compensation for power factor correction and voltage control in a distribution system
CO-4	Illustrate types of substations and cables
CO-5	Apply various protective devices and its coordination techniques to distribution system
Course Code: B20EE3205	
Course Title: DIGITAL SIGNAL PROCESSING	
CO-1	Apply Sampling theorem to analyze the Discrete time signals, systems and realize digital filters
CO-2	Analyze discrete signals in the frequency domain and compute the linear and circular convolutions of discrete sequences
CO-3	Apply FFT algorithms to find the DFT of Discrete sequence.
CO-4	Design the IIR filter by considering the given specifications.
CO-5	Design the FIR filter by using window techniques and know the finite word length effects in FIR filter
Course Code: B20EE3206	
Course Title: SOFT COMPUTING TECHNIQUES	
CO-1	Examine the Feasibility of Applying Soft Computing Techniques
CO-2	Apply Fuzzy Logic to Design Intelligent Controllers for Electrical Systems
CO-3	Apply Artificial Neural Networks to Identify Engineering Prediction Models
CO-4	Apply Genetic Algorithm to Identify Optimal Solutions of Engineering Problems
CO-5	Apply Particle Swarm Optimization to Identify Optimal Solutions of Engineering Problems
Course Code: B20EE3207	
Course Title: CONTROL SYSTEMS LABORATORY	
CO-1	Investigate the time response of control system
CO-2	Draw the Torque speed characteristics of AC and DC Servo Motor
CO-3	Analyze the stability of a control system by generating Root locus, Bode and Nyquist plot.
CO-4	Investigate the effect of PID Controller on system performance
CO-5	Explore the performance of control system components



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Chinna Amiram,Bhimavaram-534204.(AP)

Estd:1980

Course Code: B20EE3208	
Course Title: LOGIC DESIGN AND MICROPROCESSORS LABORATORY	
CO-1	Develop Adders, Multiplexers, Encoders & Decoders using combinational logic circuits
CO-2	Design Synchronous counters, shift registers using sequential logic circuits
CO-3	Develop ALP to add 8 - bit binary numbers, 2 - digit BCD numbers and pick largest & smallest numbers using 8085 Microprocessor
CO-4	Develop ALP to convert binary to BCD numbers and sorting array of 8-bit binary numbers
CO-5	Interface different peripherals with 8085 Microprocessor
Course Code: B20EE3209	
Course Title: ELECTRICAL SYSTEM SIMULATION LABORATORY	
CO-1	Compute the Y-bus and solve Gauss – Seidel (GS) load flow, Economic Load Dispatch using MATLAB Programming.
CO-2	Compute the symmetrical components and LG, LLG fault currents using MATLAB Programming / SIMULINK
CO-3	Construct the model of swing equation for assessing transient stability, load frequency control of single area system using MATLAB/ SIMULINK software.
CO-4	Construct the simulation models to illustrate the operation of Rectifier, Inverter, Chopper, AC Voltage controller and Cycloconverter using MATLAB/SIMULINK software.
CO-5	Construct the various simulation models to illustrate the functioning of PF correction, Effect of shading in PV array and GS load flow using PSCAD and ETAP softwares
Course Code: B20HS3203	
Course Title: SOFT SKILLS	
CO-1	Apply soft skills in the workplace and build better personal and professional relationships making informed decisions
CO-2	Participate in group discussions/group activities, exhibit team spirit, use language effectively according to the situation, respond to their interviewer/employer with a positive mind, make answers to the questions asked during their technical/personal interviews, exhibit skills required for the different kinds of interviews (stress, technical, HR) that they would face during the course of their recruitment process