SWARNANDHRA

COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous)

Seetharampuram, Narasapuram-534280, W.G. Dt., A.P.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

ACADEMIC YEAR: 2020-21 SEMESTER: I REGULATION: R20

CODE	COURSE TITLE	COURSE OUTCOMES	Knowledge Level
20MA1T01	Linear Algebra	Develop the use of matrix algebra techniques that is needed by engineers for practical applications	K3
		Familiarize with functions of several variables which is useful in optimization	K3
		Learn important tools of calculus in higher dimensions. Students will become familiar with double integral	K3
		Familiarize with triple integral and also learn the utilization of special functions.	K4
20BS1T01	ENGINEERING PHYSICS	Define Basic crystal systems and determination of crystal structures	K2
		Explicate Magnetic and Dielectric Materials properties	K2
		Describe Concept of Magnetic Induction and Super Conducting properties	K2
		Explicate Pure &Doped Semiconductor materials for better utility	K2
		Define Optical fibers and Optical properties of materials and their applications	K2
20CS1T01	PROBLEM SOLVING USING C PROGRAMMING	Analyze a computational problem and develop an algorithm/flowchart to find its solution	K2
		Develop C programs with branching and looping statements, which uses Arithmetic, Logical,	K3
		Divide a given computational problem into a number of modules and develop C program with arrays	K3
		Write C programs which use pointers for array processing and parameter passing	K3
20MA1T01	ENGINEERING DRAWING	Construct polygons, conics, cycloids, involutes.	K2
		Draw the orthographic projections of points, lines in different positions.	K2
		Draw the orthographic projections of plane surfaces in different positions.	K2
		Draw the orthographic projections of solids like prisms, cylinder, pyramids and cone.	K2
		Convert Isometric views to orthographic views and vice-versa and also visualize 2D & 3D objects	K2
20BS1L01	ENGINEERING PHYSICS LAB	Demonstrate the basic knowledge to know the frequency of a vibrator, hall coefficient.	K3
		Attain knowledge to verify some of the properties of physical optics.	K4
		Develop skills to plot various characteristic curves and to calculate the physical properties of given materials.	K4
		Calculate some the properties of semiconducting materials.	K2

20CS1L01	C PROGRAMMING LAB	Implement basic programs in C and design flowcharts in Raptor.	K1
		Use Conditional and Iterative statements to solve real time scenarios in C	K2
		Implement the concept of Arrays and Modularity and Strings.	K5
		Apply the Dynamic Memory Allocation functions using pointers	K5
		Develop programs using structures, and Files.	K2
		Implement basic programs in C and design flowcharts in Raptor.	K1
20ME1L01	ENGINEERING WORKSHOP	Model and Develop various basic prototypes in Carpentry trade	K3
		Model and Develop various basic prototypes in Fitting trade	K3
		Perform Various Forging Operations	K3
		Perform various House Wiring Techniques.	K3
		Develop various basic prototypes in the trade of Sheet metal.	K3
20HS1L01	ENGLISH PROFICIENCY LAB	Model and Develop various basic prototypes in Carpentry trade	K3
		Model and Develop various basic prototypes in Fitting trade	K3
		Perform Various Forging Operations	K3
		Perform various House Wiring Techniques.	K3
		Develop various basic prototypes in the trade of Sheet metal.	K3

ACADEMIC YEAR: 2020-21 SEMESTER: II REGULATION: R20

CODE	COURSE TITLE	COURSE OUTCOMES	Knowledge Level
20MA2T02	DIFFERENTIAL EQUATIONS AND NUMERICAL METHODS	Solve the differential equations related to various engineering fields	K3
		Identify solution methods of partial differential equations that model physical processes	K3
		Evaluate the approximate roots of polynomial and transcendental equations by different algorithms	K3
		Solve integrate and ordinary differential equations by various numerical techniques.	K3
20BS2T02	ENGINEERING CHEMISTRY	Explicate the impurities present in raw water, problems associated and how to avoid them	K2
		Explicate the advantages of Polymers in daily life	K2
		Explicate the theory of construction of battery and fuel cells and theories of corrosion and prevention methods.	K2
		Differentiate conventional and non-conventional energy sources and their advantages and disadvantages.	K2
		Identify the usage of advanced materials in day to day life	K2
20HS2T01	ENGLISH	Identify the parts of speech, root words and apply relative writing formats to prepare notes	K2, K3
		Express ideas coherently in day to day life	K2
		Identify the importance of correct usage of grammar	K2
		Illustrate ideas effectively on various topics	K3
		Prepare the reports and essays by using appropriate sentences	K2
20ME2T02	BASICS OF CIVIL AND MECHANICAL ENGINEERING	Explicate the importance of civil engineering in the infrastructural development of the country.	K2
		Understand different types of construction materials & Masonry.	K2
		Explicate about the properties of fluids, pressure measuring instruments and different types of fluid flow.	K2
		Describe the working of fluid flow measuring instruments and understand the energy losses in the closed conduit flow.	K2
		Explicate about the construction and working principles of pumps and turbines.	K2
20EE2T02	ELECTRICAL NETWORKS	Define the basic concepts of Electrical circuits	K1
		Demonstrate the Single-Phase AC circuits.	K2
		Interpret the behavior of the circuit at series & parallel resonance circuits	K2
		Explicate the properties of electromagnetic circuit and their application.	K2
		Illustrate the Network Theorems (DC & AC Excitation)	K2
20BS2L02	ENGINEERING CHEMISTRY LAB	Identify the concentration of given solution by different methods of chemical analysis	K3
		Analyze the water purity by checking hardness, DO and Acidity.	K4

		Estimate the Cu^{+2}, Fe^{+3}, Ca^{+2}, Mg^{+2} ions and Ascorbic acid present in given solution.	K4
		Identify the pour and cloud point of lubricants.	K3
		Understand the principles of conductometric and potentiometric titrations.	K2
20IT2L01	IT WORKSHOP	Attain complete knowledge of a computer hardware	K2
		Able to install basic computer engineering software.	K3
		Able to do document task through MS office.	K2
		Attain technically strong usage of Google Tools and Email handling.	K2
20ME2L02	BASICS OF CIVIL AND MECHANICAL ENGINEERING LAB	The Student can able to, determine the friction factor of pipe line.	K2
		The student can able to calibrate venturi meter	K3
		Able to conduct performance test on single stage centrifugal pump	K3
		Able to determine finesse modules of cement	K2
		Able to determine particle size distribution of fine aggerates by sieve analysis	K3
		Able to determine particle size distribution of course aggerates	K2
20HS1L01	ENGLISH COMMUNICATIONS LAB	Addressing explicit and implicit meaning of a text.	K1
		Understanding the context.	K1
		Learning new words and phrases.	K1
		Using words and phrases in different contexts.	K4

ACADEMIC YEAR: 2021-22 SEMESTER: III REGULATION: R20

CODE	COURSE TITLE	COURSE OUTCOMES	Knowledge Level
20MA3T04	TRANSFORMS TECHNIQUES	Solve many problems in engineering with the knowledge of Laplace transforms	K3
		Apply the Inverse Laplace transforms for different types of functions	K3
		Express a function as a Fourier series	K3
		State how the Fourier Transforms of a function depends on whether that function is even or odd or neither.	K3
		Solve the problems on Z-transforms and Fourier transforms	K1,K3
20EE3T01	ELECTRICAL CIRCUITS AND SYNTHESIS	Solve three phase circuits under balanced & unbalanced condition	K3
		Illustrate transient response of electrical circuits for DC excitations	K2
		Illustrate transient response of electrical circuits for AC excitations	K2
		Design different kinds of two port networks filter circuits.	K6
		Define network functions and Synthesize networks using Foster and Causer Forms	K1
20EE3T02	ELECTRO MAGNETIC FIELDS	Evaluate electric fields & potentials using Gauss law or solve Laplace's or Poisson's equations	K5
		Apply the concepts of conductors, dielectrics and capacitance in electrostatic fields	K3
		Explicate the application of Ampere's law, Maxwell's second and third law	K2
		Evaluate self &mutual inductances and the energy stored in the magnetic field.	K5
		Develop knowledge on time varying fields.	K6
20EE3T03	ELECTRICAL MACHINES-I	Explicate the concepts of D.C Machines& and its applications	K2
		Explicate Various losses taking place in D.C. Machines	K2
		Demonstrate the different testing methods Dc Machines	K2
		Explicate the operation& Performance of transformer	K2
		Explicate About performance of Three face Transformer	K2
20EC3T05	ANALOG ELECTRONICS	Explicate the characteristics of different semiconductor diodes and its applications	K2
		Describe the characteristics of Transistors, FET and biasing.	K1
		Construct the wave shaping circuits of non-sinusoidal signals.	K3
		Analyze and design the Multi vibrators using BJT	K4
20EC3L04	ANALOG ELECTRONICS LAB	Describe the diode, FET and transistor characteristics	K1
		Explicate the rectifier circuits using diodes and implement them using hardware.	K2,K3
		Construct various Linear and Non-Linear wave shaping circuits and implement them using hardware, also observe their responses for different input signals	K3

		Analyze the switching characteristics and generate non-sinusoidal waveforms using Transistor circuits.	K4
20EE3L01	ELECTRICAL CIRCUITS LAB	Explicate about basics electrical circuits with nodal and mesh analysis.	K2
		Determine the resonant Frequency, quality factor & bandwidth of the RLC circuits	K5
		Solve and verify electrical network theorems	K3
		Determine Self and Mutual Inductance	K5
		Determine the Impedance, Admittance, Transmission and hybrid parameters for a two-port network	K5
20EE3L02	ELECTRICAL MACHINES-I LAB	Explicate and analyze DC Machine	K2
		Analyze and understand the operation and characteristics of DC Motor	K4
		Demonstrate No-load/magnetization characteristics of DC Generators	K2
		Demonstrate the OC & SC Test on 1-Ph transformer	K2
		Determine the efficiency and Regulation of Transformer by various tests	K5
20EE3S01	DESIGN OF ELECTRICAL CIRCUITS - MATLAB/SIMULINK	Explicate different types of signals using MATLAB.	K2
		Determine the responses of R-L, R-C, R-L-C Networks using MATLAB	K5
		Determine the Impedance (Z) and Admittance (Y) parameters using MATLAB	K5
		Determine the self and mutual inductances using MATLAB	K5
		Solve the Network theorems using MATLAB	K3

ACADEMIC YEAR: 2021-22 SEMESTER: IV REGULATION: R20

CODE	COURSE TITLE	COURSE OUTCOMES	Knowledge Level
20EE4T01	ELECTRICAL MEASUREMENTS	Explicate the different electrical instrument used for electrical measurement.	K2
		Measure the resistances, inductance and capacitance using different bridges	K5
		Measure various electrical measuring instruments for calculating power	K5
		Explicate the concept of measuring Energy	K2
		Classify different Digital meters and Explicate the principles of each device	K5
20EE4T02	ELECTRICAL MACHINES - II	Explicate the Construction and working of 3-ph Induction Motor	K2
		Determine the Starting, Breaking and speed control of 3-ph induction motor	K5
		Explicate the Principle, construction, operation of synchronous machine.	K2
		Examine the Synchronous machine on infinite bus, synchronous motor operation with variable excitation &load	K4
		Explicate the construction, operation and characteristics of commonly used special purpose machines.	K2
20EE4T03	CONTROL SYSTEMS	Understand linear systems, deduce mathematical model, obtain block diagrams/signal flow graphs and to obtain Transfer function	K2
		Analyze the time response and time response specifications with steady state error for various types of input.	K4
		Understand the Frequency response analysis using Bode plot, Polar Plot and Nyquist plot Method	K2
		Evaluate Preliminary ideas of compensation	K5
		Explicate concept of state variable, state space, nonlinear system, nonlinear characteristics.	K2
20EC4T04	DIGITAL ELECTRONICS	Describe the different types of number systems and Boolean algebra.	K1
		Explicate the minimization techniques and universal gates.	K2
		Construct the logic circuits of various combinational circuits.	K3
		Explicate the behavior of various sequential circuits.	K2,K4
20BM4T02	PRINCIPLES OF ECONOMICS AND MANAGEMENT	Explicate the concept of economics and discriminate demand forecasting Methods.	K2,K4
		Evaluate different market structures and discriminate various pricing methods.	K5,K4
		Recognize the role of HR management for effective functioning of the organization.	K1
		Illustrate the contemporary concepts of marketing and types of production management.	K4
		Enumerate the role of financial management in day-to-day business activities and examine the ability and read readiness to develop, organize and run a business enterprise.	K1,K4
20EE4L01		Measure resistance, inductance and capacitance using bridges	K5

	ELECTRICAL MEASUREMENTS LAB	Examine and conduct experiments, as well as to analyze and interpret data of power and energy.	K4
		Analyze based on comparing true and actual value of potentiometer & Power factor meter.	K4
		Measure three phase power and energy	K5
		Measure the electrical power and energy and use of CT	K5
20EE4L02	ELECTRICAL MACHINES - II LAB	Determine equivalent circuit parameters of 3ph Induction motor	K5
		Demonstrate the basic operation of synchronous machines.	K2
		Determine the different parameters of a 3-phase alternator & its regulation	K5
		Determine the different parameters of a three-phase synchronous motor as well as its 'V' and 'inverted V' curves	K5
		Determine the parameters of equivalent circuit of single-phase motor	K5
20EE4S01	INDUSTRIAL AUTOMATION - PLC	Demonstrate basic functions of Siemens PLC's	K2
		Construct various ladder logic programs.	K3
		Solve plc practical problems.	K3
		Design various relay logic circuits to operate the motors.	K6
		Develop and rectify errors in order to control the motors	K6
20EC4L02	DIGITAL ELECTRONICS LAB	Describe and implementation of code conversion	K1
		Explicate simple Boolean expressions using the theorems and to minimize the combinational functions.	K2,K3
		Analyze combinational circuits like Adders, Subtractors, Encoders, Decoders etc.	K4
		Construct various types of sequential circuits like Flipflops, counters and Registers	K3

ACADEMIC YEAR: 2022-23 SEMESTER: V REGULATION: R20

CODE	COURSE TITLE	COURSE OUTCOMES	Knowledge Level
20EE5T01	POWER GENERATION & TRANSMISSION SYSTEM	Explicate the basics of electrical power generation from conventional Energy Sources	K2
		Analyze the economic aspects of power generation and different tariff methods	K4
		Simplify the expressions for transmission line parameters(R,L,C)	K4
		Compare various types of transmission line (Short, medium, long) and its performance	K2
		Analyze the performance of overhead transmission line	K4
20EE5T02	POWER ELECTRONICS	Illustrate the characteristics of SCR, Power-MOSFET and Power-IGBT	K2
		Understand the operation of Single-phase Converters	K1
		Analyze the operation of three-phase converters and AC-AC Converters.	K4
		Learn the basic concepts of operation of dc-dc converters in steady state in continuous and discontinuous mode	K1, K2
		Analyze the operation of Single and three Phase inverters	K4
20CS5T04	PYTHON PROGRAMMING	Recognize core programming basics and program design with functions using Python programming language.	K2
		Interpret the high-performance programs designed to strengthen the practical expertise	K3
		Develop applications for real time problems by applying python data structure concepts.	K4
		Understand and apply the concepts of packages, handling, multithreading and socket programming.	K1
		Analyze the importance of object-oriented programming over structured programming.	K5
20CS5O01	INTERNET OF THINGS AND APPLICATIONS	Explicate Arduino IDE tool and Arduino Programming concept.	K1
		Illustrate concept hardware configuration with Firmata protocols.	K2
		Explicate the knowledge Arduino pin configuration.	K2
		Differentiate various sensors configuration and workflows.	K3
		Define architecture of IoT.	K1
20EE5E01	UTILIZATION OF ELECTRICAL ENERGY	Understanding of selection of drives for industrial application	K1
		Distinguish between various types of heating methods and Welding methods	K3
		Design Illumination systems for various applications.	K4
		To understand the basic principle of electric traction including speed– time curves	K1
		To understand the method of calculation of various traction system for braking, acceleration and other related parameters	K1,K2
20EE5L01	CONTROL SYSTEM& SIMULATION LAB	Demonstrate the response of second order systems	K2
		Estimate the error obtained in control system with the effect of P, PI, PID controllers.	K4
		Design of lead, lag, lag-lead compensator to improve characteristics of control system.	K5

		Analyze the stability of time invariant control system using root locus, bode plot, Nyquist criterions	K4
		Able to Design controllers, compensators using MATLAB software	K5
20CS5L03	PYTHON PROGRAMMING LAB	Apply core programming basics and program design with functions using Python programming language.	K4
		Interpret the high-performance programs designed to strengthen the practical expertise.	K3
		Develop applications for real time problems by applying python data structure concepts	K3
		Test and apply the concepts of packages, handling, multithreading and socket programming.	K4
		Divide the importance of object-oriented programming over structured programming.	K4
20EE5S01	IOT APPLICATIONS IN ELECTRICAL ENGINEERING	Understand the basic concept of Internet of Things	K1
		Develop web services to access/control IoT devices.	K5
		Deploy an IoT application and connect to the cloud.	K5
		Analyze applications of IoT in real time scenario.	K4
		Implement IoT to study Smart Home, Smart city, etc	K3,K4
20EE5I01	INTERNSHIP - I	To learn the application of knowledge in real world problems.	K1
		To get exposure to team-work and leadership quality.	K4
		To deal with industry-professionals and ethical issues in the work environment.	K2, K3

ACADEMIC YEAR: 2022-23 SEMESTER: VI REGULATION: R20

CODE	COURSE TITLE	COURSE OUTCOMES	Knowledge Level
20EC6T01	MICROPROCESSORS AND MICROCONTROLLERS	Summarize architecture, instructions and addressing modes of 8086 Microprocessor	K2
		Explicate 8086 interfacing with different peripherals and implement programs	K2
		Examine 8051 Microcontroller interfacing and implement programs	K1
		Understand the architecture and applications of advanced processors	K2
20EE6T01	POWER SYSTEM ANALYSIS	Determine Per unit quantities and to form a Ybus and Zbus for a power system networks.	K5
		Illustrate the load flow solution of a power system using different methods	K2
		Develop the concepts of Z-bus building algorithm	K3
		Categorize the fault currents and sequence components of currents for both balanced and unbalanced power system network	K4
		Analyze the steady state, transient and dynamic stability concepts of a power system	K4
20EE6T02	CONTROL OF ELECTRIC DRIVES	Explicate the single-phase rectifier fed DC drives and its operation	K2
		Illustrate the Speed-Torque characteristics of different motor drives by various power converter topologies	K2
		Classify the different quadrant operations of motors by using choppers	K4
		Explicate control schemes of various drives fed to induction motor	K2
		Explicate speed control mechanism of synchronous motors	K5
20EE6E01	POWER SYSTEM PROTECTION	Define the principle of operation of circuit breaker with arc phenomena and also different types of circuit breaker	K1
		Identify different types of relays and circuit breakers depends on applications and electrical equipment which has to be protected	K3
		Explicate the protection schemes for different power system components.	K2
		Identify the basic principles of digital protection.	K3
		Explicate about Generation of over voltages in power systems	K2
20CE6O02	DISASTER MANAGEMENT	Identify the tools of integrating disaster management principles in disaster mitigation process.	K2
		Discuss about different approaches needed to manage pre and post- disaster activities.	K2
		Prepare the process of risk management and develop a basic understanding method for the role of public in risk management.	K2
		Administer the role of technology in Disaster management.	K2
		Conclude the planning strategies for education and community preparedness programs.	K2
20EC6L01		Write ALP for Arithmetic operations	K3

	MICROPROCESSORS AND MICROCONTROLLERS LAB	Explicate 8086 interfacing with different peripherals and implement programs	K2
		Write Programs in 8051	K3
		Write Programs in ARM CORTEX M3 PROCESSOR using KEIL MDK ARM	K3
		Apply Neural Networks and fuzzy logic for real-time applications.	K3
20EE6L01	POWER SYSTEM AND SIMULATION LAB	Estimate the sequence impedances of 3-phase Transformer	K2
		Estimate the sequence impedances of 3-phase Alternators	K2
		Determine the Parameters of Transmission lines	K5
		Analyze and simulate power flow methods in power systems	K4
		Analyze faults in power system	K4
20EE6L02	POWER ELECTRONICS AND SIMULATION LAB	Analyze the characteristics of various power electronic devices with firing circuits.	K2
		Analyze the performance of single phase and three phase full wave converters.	K4
		Examine the operation of AC voltage controller and Cyclo converter.	K2
		Analyze the performance of 1-Ph bridge inverter, converter and PWM inverter.	K2
		Explicate the working of Buck, Boost converters	K2
20HS6S01	ADVANCED COMMUNICATION SKILLS LAB	Gather ideas and organize information relevantly and coherently	K6
		Analyze in group discussions and face interviews with confidence	K3
		Write Resume with covering letter	K6
		Prepare oral presentations and public speaking	K3
		Differentiate in social and professional communication.	K2
20EE6C01	COMMUNITY SERVICE PROJECT	Increasing the knowledge of community issues and resources.	K2
		To make students aware of their inner strength and help them to find new/out of box solutions to the social problems	K4
		To make students socially responsible.	K3
		To develop holistic life among the students by making study culture, habits, lifestyle and wastage management.	K5

ACADEMIC YEAR: 2023-24 SEMESTER: VII REGULATION: R20

CODE	COURSE TITLE	COURSE OUTCOMES	Knowledge Level
20EE7E01	POWER SYSTEMS OPERATION AND CONTROL	Explicate the Economic Operation of power system	K2
		Explicate the hydrothermal Scheduling and Unit commitment Problems	K2
		Analyze the power system and to control the power and frequency in power system	K4
		Interpret impact of load frequency control and Plan for optimum load dispatch.	K2
		Analyze different compensation technique for power system stability	K4
20EE7E03	FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS	Know the concepts of facts controller and power flow control in transmission line.	K1
		Demonstrate operation and control of voltage source converter and know the concepts current source converter	K1
		Analyze compensation by using different compensators to improve stability and reduce power oscillations in the transmission lines.	K4
		Know the concepts methods of compensations using series compensators.	K2
		Analyze operation of Unified Power Flow Controller and Interline power flow controller.	K4
20EE7E05	HYBRID ELECTRIC VEHICLES	Illustrate different types of electric vehicles	K2
		Select suitable power converters for EV applications	K3
		Design HEV configuration for a specific application	K4
		Choose an effective method for EV and HEV applications	K4
		Analyze a battery management system for EV and HEV	K4
20HS7T01	UNIVERSAL HUMAN VALUES : UNDERSTANDING HARMONY	Understand the need, basic guidelines, content and process of value education; explore the meaning of happiness and prosperity	K1
		Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body	K2
		Analyze the value of harmonious relationship based on trust and respect in life and profession	K4
		Examine the role of a human being in ensuring harmony in society and nature.	K4
		Apply the understanding of ethical conduct to formulate the strategy for ethical life and profession.	K5
20EE7S01	RENEWABLE ENERGY SYSTEMS	Ability to understand and analyze Renewable energy sources available at present	K1
		Ability to understand the solar energy operation and its characteristics.	K1, K2
		Ability to simulate the various Renewable energy sources.	K2
		Ability to recognize current and possible future role of Renewable energy sources.	K2
		To educate the wind energy operation and its types.	K1
20EE7I01		To learn the application of knowledge in real world problems.	K1

	INDUSTRIAL/RESEARCH INTERNSHIP	To get exposure to team-work and leadership quality.	K3
		To deal with industry-professionals and ethical issues in the work environment.	K2

ACADEMIC YEAR: **SEMESTER: VIII** **REGULATION: R20**

CODE	COURSE TITLE	COURSE OUTCOMES	Knowledge Level
20EE8P01	PROJECT WORK, SEMINAR AND INTERNSHIP IN INDUSTRY	Undertake problem identification, formulation and solution.	K2
		Demonstrate a sound technical knowledge of their selected project topic.	K1
		Analyze and assemble the basic information to find solution of a complex engineering problem by using suitable methodology/procedure.	K4
		Demonstrate the knowledge, skills and attitudes of a professional engineer.	K2
		Document and report the project work carried out in an appropriate format.	K3

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