



SWARNANDHRA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

Narsapur, West Godavari District, A.P. 534280

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE OUTCOMES OF ALL COURSES

ACEDAMIC YEAR: 2019-2020

SEMESTER: I

REGULATION: R-19

Course Code	Course Name	CO Number	CO Statement	Knowledge Level
19MA1T01	CALCULUS AND LINEAR ALGEBRA	1	Develop the use of matrix algebra techniques that is needed by engineers for practical applications	K3
		2	familiarize with functions of several variables which is useful in optimization	K3
		3	Learn important tools of calculus in higher dimensions. Students will become familiar with double integral	K3
		4	familiarize with triple integral and also learn the utilization of special functions	K3
19BS1T01	ENGINEERING PHYSICS	1	Describe Basic crystal systems and determination of crystal structures	K2
		2	Explain Magnetic and Dielectric Materials properties	K2
		3	Describe Concept of Magnetic Induction and Super Conducting properties	K2
		4	Explain Pure & Doped Semiconductor materials for better utility	K2
		5	Describe Optical fibres and Optical properties of materials and their applications	K2
19CS1T01	PROBLEM SOLVING AND PROGRAMMING USING C	1	Illustrate the Fundamental concepts of Computers and basics of computer programming	K1
		2	Use Control Structures and Arrays in solving complex problems	K3
		3	Develop modular program aspects and Strings fundamentals.	K6
		4	Demonstrate the ideas of pointers usage.	K3
		5	Solve real world problems using the concept of Structures, Unions and File operations	K3
19ME1T01	ENGINEERING GRAPHICS	1	Construct polygons, conics, cycloids, involutes.	K3
		2	Draw the orthographic projections of points, lines in different positions.	K3
		3	Draw the orthographic projections of plane surfaces in different positions.	K3
		4	Draw the orthographic projections of solids like prisms, cylinder, pyramids and cone.	K3
		5	Convert Isometric views to orthographic views and vice-versa and also visualize 2D & 3D objects using Auto CAD.	K4
19BS1L01	ENGINEERING PHYSICS LAB	1	Demonstrate the basic knowledge to know the frequency of a vibrator, hall coefficient	K3
		2	Attain knowledge to verify some of the properties of physical optics.	K4
		3	Develop skills to plot various characteristic curves and to calculate the physical properties of given materials.	K4
		4	Calculate some the properties of semiconducting materials.	K2
19CS1L01		1	Implement basic programs in C and design flowcharts in Raptor.	K3
		2	Use Conditional and Iterative statements to solve real time scenarios in C.	K3

	C PROGRAMMING LAB	3	Implement the concept of Arrays and Modularity and Strings.	K3
		4	Apply the Dynamic Memory Allocation functions using pointers	K4
		5	Develop programs using structures, and Files.	K4
19CS1L02	IT WORKSHOP	1	Identify the components of a personal computer and Install Operating System.	K1
		2	Send email messages (with or without attachments)	K3
		3	Prepare their own Presentation / Documentation using Office Tools	K5
		4	Create Interactive Visual Programs Using Scratch.	K4
		5	Develop Static web site Applications	K3
19HS1L01	ENGLISH PROFICIENCY LAB	1	a) Reading Skills. <ul style="list-style-type: none"> • Addressing explicit and implicit meaning of a text. • Understanding the context. • Learning new words and phrases. • Using words and phrases in different contexts 	K2
		2	b) Writing Skills: <ul style="list-style-type: none"> • Using the basic structure of a sentence. • Applying relevant writing formats to create paragraphs, essays, letters, E-Mails, reports and presentations. • Retaining a logical flow while writing. • Planning and executing an assignment creatively 	K2
		3	c) Interactive skills: <ul style="list-style-type: none"> • Analyzing a topic of discussion and relating to it. • Participating in discussions and influencing them. • Communicating ideas effectively. • Presenting ideas coherently within a stipulated time 	K3
		4	d) Life Skills and Core Skills: <ul style="list-style-type: none"> • Examining self-attributes and identifying areas that require improvement self- diagnosis, self-motivation. • Adopting to a given situation and developing a functional approach to find solutions- adaptability, problem-solving. • Understanding the importance of helping others- community service, enthusiasm. 	K4

19MA2T02	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	1	solve the differential equations related to various engineering fields	K3
		2	identify solution methods for partial differential equations that model physical processes	K1
		3	interpret the physical meaning of scalar and vector point functions different operators such as degradant, curl and divergence	K1
		4	estimate the work done against a field, circulation and flux using vector calculus and familiarize vector integral theorems.	K5
19BS2T02	ENGINEERING CHEMISTRY	1	Explain the impurities present in raw water, problems associated and how to avoid them	K2
		2	Explain the advantages of Polymers in daily life	K1
		3	Explain the theory of construction of battery and fuel cells and theories of corrosion and prevention methods.	K2
		4	Differentiate conventional and non-conventional energy sources and their advantages and disadvantages.	K3
		5	Identify the usage of advanced materials in day to day life	K3
19HS2T01	ENGLISH	1	A) Reading Skills • Addressing explicit and implicit meaning of a text. • Understanding the context. • Learning new words and phrases. • Using words and phrases in different contexts.	K1
		2	B) Writing Skills • Using the basic structure of a sentence. • Applying relevant writing formats to create paragraphs, essays, letters, e-mails, reports and presentations. • Retaining a logical flow while writing. Planning and executing an assignment creatively	K2
		3	C) Interactive skills • Analyzing a topic of discussion and relating to it. • Participating in discussions and influencing them. • Communicating ideas effectively. • Presenting ideas coherently within a stipulated time	K3
		4	D) Grammar in context • Enable the skills of grammar using in a situation • Identifying the needs of apt grammar in life related situation • Promoting discourse with grammar effectively	K4
19ME2T02	BASICS OF MECHANICAL ENGINEERING	1	Analyse the principles of statics of particles to solve engineering problems.	K4
		2	Calculate the centroids of different composite plane figures.	K3
		3	Understand the concepts of properties of fluids, fluid flow and flow measuring devices.	K1

		4	Identify and differentiate different types of turbines and pumps.	K1, K2
		5	Describe the basics of various thermodynamic concepts.	K1
19EE2T02	ELECTRICAL NETWORKS	1	Solve electrical networks using various techniques.	K3
		2	Solve electrical networks using network topology concepts.	K3
		3	Solve electrical circuits using network theorems with AC and DC excitations	K3
		4	Analyze the behavior of RLC networks for sinusoidal excitation	K4
		5	Analyze magnetic circuits	K4
19BS2L02	ENGINEERING CHEMISTRY LAB	1	Identify the concentration of given solution by different methods of chemical analysis	K1, k2
		2	Analyze the water purity by checking hardness, DO and Acidity.	K4
		3	Estimate the Cu ⁺² , Fe ⁺³ , Ca ⁺² , Mg ⁺² ions and Ascorbic acid present in given solution.	K3
		4	Identify the pour and cloud point of lubricants.	K1, k2
		5	Understand the principles of conductometric and potentiometric titrations.	K2
19ME2L01	ENGINEERING WORKSHOP	1	Model and Develop various basic prototypes in Carpentry trade	K6
		2	Model and Develop various basic prototypes in Fitting trade	K5
		3	Perform Various Forging Operations	K4
		4	Perform various House Wiring Techniques.	K4
		5	Develop various basic prototypes in the trade of Sheet metal.	K6
19ME2L02	MECHANICAL ENGINEERING LAB	1	Utilize the knowledge about boilers, internal combustion engines and dynamometers in various real world problems	K4
		2	Predict major and minor losses in various piping system	K4
		3	Predict performance characteristics of Turbines and Pumps.	K4
		4	Calibrate Venturi meter and Orifice meter.	K5
19HS2L02	ENGLISH COMMUNICATION SKILL LAB	1	a) Reading Skills. <ul style="list-style-type: none"> • Addressing explicit and implicit meaning of a text. • Understanding the context. • Learning new words and phrases. • Using words and phrases in different contexts. 	K1
		2	b) Writing Skills: <ul style="list-style-type: none"> • Using the basic structure of a sentence. • Applying relevant writing formats to create paragraphs, essays, letters, E-Mails, reports and presentations. • Retaining a logical flow while writing. • Planning and executing an assignment creatively. 	K1

		3	<p>c) Interactive skills:</p> <ul style="list-style-type: none"> • Analyzing a topic of discussion and relating to it. • Participating in discussions and influencing them. • Communicating ideas effectively. • Presenting ideas coherently within a stipulated time 	K3
		4	<p>d) Life Skills and Core Skills:</p> <ul style="list-style-type: none"> • Examining self-attributes and identifying areas that require improvement self-diagnosis, self- motivation. • Adopting to a given situation and developing a functional approach to find solutions- adaptability, problem-solving. • Understanding the importance of helping others- community service, enthusiasm. 	K4

19MA3T06	NUMERICAL METHODS AND TRANSFORMS	1	Evaluate the approximate roots of polynomial and transcendental equations by different algorithms	K3
		2	apply different algorithms for approximating the solutions of integration and ordinary differential equations to its analytical computations	K3
		3	express a function as a Fouries series	K3
		4	solve the problems on Z-transforms and Fourier transforms	K1, K3
		5	solve many problems in engineering with the knowledge of Laplace transforms	K3
19EE3T01	ELECTRICAL CIRCUITS AND SYNTHESIS	1	Solve the Three Phase Circuits under Balanced & Unbalanced Conditions	K2
		2	Analyze the Transient Response of Electrical Circuits for AC and DC Excitations	K4
		3	Determine the Different Parameters of Two Port Network.	K4
		4	Realize the Electrical Equivalent Network for a given Network Transfer Function	K3
19EE3T02	ELECTROMAGNETIC FIELDS	1	Determine Electric Field Intensity and Electric Potential Using Guass's Law	K2
		2	Calculate Magnetic Field Intensity Due to Current	K3
		3	Apply Ampere's Law, and The Maxwell's Second and Third Equations in Static Magnetic Field	K4
		4	Analyze the Magnetic Forces and Torque Produced by Currents in Magnetic Field	K4
		5	Understand the Concept of Time Varying Fields and Calculate Induced EMF's	K1
19EE3T03	ELECTRICAL MACHINES-I	1	Demonstrate the Construction and Operation of DC Machines.	K2
		2	Understand Various Performance Characteristics of DC Machine	K2
		3	Distinguish Different Types of Speed Control Methods of DC Machine	K3
		4	Determine the Performance of DC Machine Through Different Methods	K3
		5	1. Demonstrate the Construction and Operation of Two Winding Transformer 2. Analyze the Performance of Single Phase Transformer and Demonstrate the Operation of Three Phase Transformer. 3. Achieve Three Phase to Two Phase Transformation	K1,k4
19EC3T04	ANALOG ELECTRONICS	1	Explain the current voltage characteristics of semiconductor devices and distinguish different type of junction diodes	K2
		2	Compare and analyze different types of Rectifiers and Filters.	K4
		3	Describe the V I characteristics of transistors, FET and biasing of same.	K1

		4	Discuss the applications of diode as Integrator, differentiator circuit also explain about clippers and Clamper circuits.	K2
19EE3L01	ELECTRICAL CIRCUITS AND SIMULATION LAB	1	Determine self and mutual inductances, and resonance frequency	K2
		2	Solve DC circuits using Network Theorems and mesh and nodal methods.	K3
		3	Compute two port parameters of a given electric circuits	K3
		4	Calculate three phase power and power factor.	K4
19EC3L04	ANALOG ELECTRONICS LAB	1	Describe the frequency response of single stage amplifiers and multistage amplifier using BJTs and FETs in different configurations.	K1
		2	Construct Hybrid- π Common Emitter transistor model. Compare and analyze the different types of feedback amplifiers and oscillator circuits.	K3
		3	Explain the efficiency of different types of power amplifiers. Analyze Second harmonic distortions, Higher order harmonic Distortion.	K2, k3
		4	Analyze the Multivibrators and time base generators.	K4
19CS3L03	C++ PROGRAMMIN G LAB	1	Proficient in Principles of object oriented technology.	K2
		2	The Evolution and Purpose of Object Oriented Programming.	K3
		3	Mastering in basic Object Oriented programming concepts and logic implementations.	K2
		4	Knowledge in file I/O operations and exceptions	K3
		5	Ability to identify and implement appropriate Solution for a given Problem.	K4
		6	Know the terms Object oriented Programming, Class, Object Constructor, Destructor, friend, static, Data Abstraction, Encapsulation, Inheritance, Polymorphism, File I/O, templates, Exceptions and where they are applicable	K4

19EE4T01	ELECTRICAL MACHINES-II	1	Explain the Construction an Operating Characteristics of an Synchronous Generator	K2
		2	Demonstrate the Principle Operation, Characteristics and the Phenomenon of Synchronous Motor	K3
		3	Explain the Operating Characteristics Three Phase Induction Machines.	K2
		4	Distinguish Different Method of Starting and Speed Control of Three Induction Machines	K4
		5	Differentiate the Starting Methods of Single Phase Induction Motor	K3
19EE4T02	CONTROL SYSTEMS	1	Derive the Transfer Function of Physical Systems	K3
		2	Apply Block Diagram and Signal Flow Graph Techniques for Determining the Transfer Function.	K4
		3	Analysis a System Using Time Domain and Frequency Domain. Understand the Concepts of Compensators to Improve System Performances	K4
		4	Analyze Absolute and Relative Stability of LTI Systems.	K4
		5	Examine the Concepts of Controllability and Observability	K5
19EE4T03	ELECTRICAL AND ELECTRONICS INSTRUMENTATION	1	Demonstrate the construction and working principles of different types of measuring instruments.	K2
		2	Determine the circuit parameters through DC bridges and AC bridges	K2
		3	Measure the power and energy through watt and energy meters.	K2
		4	Understand the knowledge of potentiometers and digital meters.	K1, k2
19EC4T04	DIGITAL ELECTRONICS	1	Describe the function of basic gates and universal gates.	K1
		2	Analyze the behavior of various combinational circuits.	K4
		3	Explain the behavior of various sequential circuits	K2, k4
		4	Demonstrate Digital systems using combinational and/or sequential circuits	K3
19CS4T05	DATA STRUCTURES	1	Design applications using stacks and implement various types of queues.	K3
		2	Analyze and implement operations on linked lists and demonstrate their applications	K4
		3	Demonstrate operations on trees.	K3
		4	Demonstrate implementation of various types of Graphs and Graph Traversals	K4
		5	Implement various searching and sorting techniques.	K4
19EE4L01	ELECTRICAL MACHINES LAB-I	1	Determine and Predetermine the Performance of DC Machines	K2
		2	Draw Magnetizing Characteristics of DC Generator and Control the Speed of DC Motor.	K3
		3	Determine and Predetermine the Performance of Transformers	K4
		4	Realize Three Phase to Two Phase Transformation	K2

19EE4L02	ELECTRICAL MEASUREMENTS LAB	1	Demonstrate the knowledge about construction and working principles of different types of measuring instruments	K2
		2	measure the resistance, inductance and capacitance and test the current transformers and dielectric strength of oil	K3
		3	calibrate and test single phase energy meter, calibrate PMMC voltmeter and calibrate LPF wattmeter and resistance strain gauge	K3
		4	measure three Phase active power and reactive power	K3
19EC4L02	DIGITAL ELECTRONICS LAB	1	Describe and implementation of code conversion	K1
		2	Explain simple Boolean expressions using the theorems and to minimize the combinational functions.	K2, K3
		3	Analyze combinational circuits like Adders, Subtractors, Encoders, Decoders etc.	K4
		4	Construct various types of sequential circuits like Flipflops, counters and Registers	K3
19CS4L05	DATA STRUCTURES LAB	1	Illustrate various linked lists and its operations.	K2
		2	Complete operations on stack application using arrays and linked lists.	K2
		3	State Queue operations and applications using arrays and linked lists.	K1
		4	Demonstrate various operations on binary trees.	K2
		5	Apply various searching techniques for user data.	K4
		6	Apply various sorting techniques for user data.	K4

19EE5T01	POWER GENERATION AND TRANSMISSION SYSTEMS	1	Explain the Basics of electrical power generations from conventional Energy Sources	K2
		2	Analyze the economical aspects of Power generation and different tariff methods	K4
		3	Estimate the expressions for transmission line parameters(R,L,C).	K5
		4	Compare various types of transmission line (short, medium, long) and its performance	K2
		5	Estimate the mechanical performance of insulators, sag & tension to a transmission line	K5
19EC5T04	LINEAR IC APPLICATIONS	1	Describe fundamental of IC Fabrication process.	K2
		2	Explain different applications based on operational amplifier.	K2
		3	Design the applications of waveform generators based on operational amplifier and IC 555 timers.	K3
		4	Construct D to A & A to D converters.	K3
19BM5T02	PRINCIPLES OF ECONOMICS AND MANAGEMENT	1	Explain the concept of economics and discriminate demand forecasting Methods.	K2 & K4
		2	Evaluate different market structures and discriminate various pricing methods.	K4 & K5
		3	Recognize the role of HR management for effective functioning of the organization.	K1
		4	Illustrate the contemporary concepts of marketing and types of production management.	K4
		5	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
19EE5E01	INDUSTRIAL ELECTRICAL SYSTEMS	1	Explain about electrical wiring systems.	K2
		2	Compare different Protective Devices.	K4
		3	Estimate the illumination levels produced by various sources	K5
		4	Adapt with the different types of heating and welding techniques.	K6
		5	Find the speed/time characteristics of different types of traction motors	K1
19EE5L01	ELECTRICAL MACHINES – II LAB	1	Determine equivalent circuit parameters of 1ph and 3ph Induction motor	K5
		2	Evaluate the efficiency of the 3ph Induction motor by analyzing their test results	K5
		3	Find the Voltage regulation of Alternator by using different methods	K1
		4	Estimate the performance of Synchronous Motor	K5
		5	Adapt the knowledge in Single Phase induction Motor	K6
19EE5L02	CONTROL SYSTEMS AND SIMULATION LAB	1	Analyze the response and stability of the closed and open loop systems.	K4
		2	Analyze the performance and working of D.C. & A.C. Servo motors	K4
		3	Develop and analyze state space models	K3

		4	Design P,PI,PD and PID controllers and also lag, lead and lag-lead compensators	K6
		5	Design State Space model for classical transfer function using Matlab	K6
19CS5L04	JAVA PROGRAMMIN G LAB	1	Implement solutions for a range of problems using object-oriented programming.	K4
		2	Develop Java programs that solve simple business applications.	K4
		3	Develop Java programs using String and String Buffer Class	K4
		4	Develop Java programs that implement concept of various types of inheritance.	K4
		5	Implement Java programs using packages and interfaces.	K4
		6	Implement Exception Handling in java.	K4

19EE6E03	POWER SYSTEM PROTECTION	1	Define the principle of operation of circuit breaker with arc phenomena and also different types of circuit breaker	K1
		2	Identify different types of relays and circuit breakers depends on applications and electrical equipment which has to be protected	K3
		3	Explain the protection schemes for different power system components.	K2
		4	Identify the basic principles of digital protection.	K3
		5	Explain about Generation of over voltages in power systems	K2
19EE6T01	POWER SYSTEM ANALYSIS	1	Determine Per unit quantities and to form a Ybus and Zbus for a power system networks.	K1
		2	Illustrate the load flow solution of a power system using different methods	K3
		3	Develop the concepts of Z-bus building algorithm	K2
		4	Categorize the fault currents and sequence components of currents for both balanced and unbalanced power system network	K3
		5	Analyze the steady state, transient and dynamic stability concepts of a power system	K2
19EE6T02	POWER ELECTRONICS	1	Compare the characteristics of various power semiconductor devices	K2
		2	Explain the operation of 1-Phase converters	K2
		3	Analyze the operation of & 3-Phase converters & AC-AC Converters	K4
		4	Explain the operation of of DC-DC converters.	K2
		5	Explain the working of inverters and Different modulation techniques of PWM inverters (K5)	K5
19EE6E05	HIGH VOLTAGE ENGINEERING	1	Demonstrate the performance of high voltages with regard to different configurations of electrode systems.	K2
		2	Explain the theory of breakdown phenomena of all types of dielectric materials.	K2
		3	Explain the techniques of generation of AC, DC and Impulse voltages.	K2
		4	Explain the testing of Various Non-destructive materials and electrical apparatus	K2
		5	Distinguish the techniques of testing various Equipment's used in HV Engineering.	K4
19EE6L01	POWER ELECTRONICS - LAB	1	Explain the characteristics of various power electronic devices with firing circuits.	K2
		2	Analyze the performance of single phase and three phase full wave converters.	K4
		3	Explain the operation of AC voltage controller and Cyclo converter.	K2
		4	Analyze the performance of 1-Ph bridge inverter, converter and PWM inverter.	K2
		5	Explain the working of Buck, Boost converters, Triac and Diac.	K2
19EE6L02	INDUSTRIAL	1	Demonstrate basic functions of Siemens PLC's	K2

	AUTOMATION LAB USING PLC	2	Construct various ladder logic programs.	K3
		3	Solve plc practical problems.	K3
		4	Design various relay logic circuits to operate the motors.	K6
		5	Develop, rectify errors and download the ladder programs to control the motors	K6
19CS6L03	PYTHON AND APPLICATION LAB	1	Apply core programming basics and program design with functions using Python programming language.	K4
		2	Interpret the high-performance programs designed to strengthen the practical expertise.	K3
		3	Develop applications for real time problems by applying python data structure concepts.	K4
		4	Test and apply the concepts of packages, handling, multithreading and socket programming	K5, K4
		5	Divide the importance of object-oriented programming over structured programming.	K3
19HS6L03	ADVANCED ENGLISH COMMUNICATI ON LAB	1	Gather ideas and organize information relevantly and coherently	K2
		2	Participate in group discussions and face interviews with confidence	K3
		3	Write Resume with covering letter	K2
		4	Make oral presentations and public speaking	K4
		5	Take part in social and professional communication	K3

19EE7T01	POWER SYSTEM OPERATION AND CONTROL	1	Explain the Economic Operation of power system	K2
		2	Explain the hydrothermal Scheduling and Unit commitment Problems	K2
		3	Analyze the power system and to control the power and frequency in power system	K4
		4	Interpret impact of load frequency control and Plan for optimum load dispatch.	K2
		5	Analyze different compensation technique for power system stability	K4
19EC7T03	MICRO PROCESS AND MICRO CONTROLLER	1	Explain architecture, instructions and addressing modes of 8086 Microprocessor	K2
		2	Develop Assembly programs for various industrial requirements.	K3
		3	Analyze 8086 interfacing with different peripherals and implement programs.	K4
		4	Design a minimum workable system with 8051Microcontroller.	K3
19EE7E07	ELECTRICAL DISTRIBUTION SYSTEM	1	Relate the various concepts of distribution system.	K1
		2	Explain the design of substations and feeders.	K2
		3	Determine the voltage drop and power loss in distribution systems.	K5
		4	Explain the protection and its coordination in distribution system.	K2
		5	Explain the effect of compensation on power factor improvement & voltage control in distribution systems.	K2
19EE7L01	POWER SYSTEM SIMULATION LAB	1	Determine the Parameters of Transmission lines	K5
		2	Analyze the power flow using GS and NR method.	K4
		3	Analyze faults and Transient stability analysis in power system	K4
		4	Estimate the Frequency of single and Two area Power systems	K5
		5	Evaluate the Economic Dispatch with & without losses	K5
19EC7L03	MICRO PROCESSORS AND MICRO CONTROLLERS LAB	1	Write assembly language programs for various problems.	K1
		2	Design minimum workable system using Microcontroller 8051.	K6
		3	Interface different external devices like keyboard, DAC, ADC, Stepper motor.	K2
		4	Develop the Embedded C programs for simple applications.	K3
19EE7P01	MINI PROJECT	1	Undertake problem identification, formulation and solution	K3
		2	Demonstrate a sound technical knowledge of their selected project topic	K3
		3	Analyze and assemble the basic information to find solution of a complex engineering problem by using suitable methodology/procedure.	K4
		4	Demonstrate the knowledge, skills and attitudes of a professional engineer	K3
		5	Document and report the project work carried out in an appropriate format.	K2

19EE7I01	INTERNSHIP	1	To learn the application of knowledge in real world problems	K2
		2	To get exposure to team-work and leadership quality	K2
		3	To deal with industry-professionals and ethical issues in the work environment.	K2

19EE8E09	RENEWABLE ENERGY SYSTEMS	1	Illustrate the energy scenario and the consequent growths of power generated by wind.	K2
		2	Demonstrate the basic physics of wind power generation.	K2
		3	Analyze solar radiation data, extraterrestrial radiation, radiation on earth's surface and solar thermal systems.	K4
		4	Explain the photovoltaic developing technologies and correlate the power electronic interfaces for wind and solar generation.	K2
		5	Demonstrate the various solar energy storage systems, and applications in various sectors.	K2
19EE8E11	FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS	1	Demonstrate power flow control in transmission lines using FACTS controllers.	K2
		2	Illustrate operation and control of Voltage Source and Current Source converters.	K2
		3	Explain the method of shunt compensation using Static VAR compensators.	K2
		4	Analyze the methods of compensations using Series compensators.	K4
		5	Explain Operation and Control of UPFC and IPFC.	K2
19EE8P01	PROJECT WORK	1	Undertake problem identification, formulation and solution	K2
		2	Demonstrate a sound technical knowledge of their selected project topic	K4
		3	Analyze and assemble the basic information to find solution of a complex engineering problem by using suitable methodology/procedure.	K4
		4	Demonstrate the knowledge, skills and attitudes of a professional engineer	K5
		5	Document and report the project work carried out in an appropriate format.	K2
