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B.Tech - AR19 - Course Articulation Matrix

Note: Correlation Levels are 1 or 2 or 3. Where 1- Slight(Low), 2 - Moderate(Medium), 3 - Substantial (High).

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	CO Statements	POs												PSOs	
CO4	Explain the basic concepts of Semi-Conductors and Identify the type of semiconductors using Hall Effect.	2	1	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Explain about magnetic and dielectric properties of different materials.	3	2	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	19IES1T01 - PROGRAMMING FOR PROBLEM SOLVING USING C	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Illustrate the fundamental concepts of computers and basics of computer programming	2	3	-	-	1	-	-	-	-	-	-	2	-	-
CO2	Make use of control structures and arrays in solving complex problems.	3	2	-	-	2	-	-	-	-	-	-	2	-	-
CO3	Develop modular program aspects and strings fundamentals	2	2	3	-	-	-	-	-	-	-	-	1	-	-
CO4	Demonstrate the ideas of pointers usage.	2	3	-	-	2	-	-	-	-	-	-	2	-	-
CO5	Solve real world problems using the concept of structures, unions and File operations.	3	2	2	-	-	-	-	-	-	-	-	2	-	-
Course Code	19IHS1L01 - COMMUNICATIVE ENGLISH LAB-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Make use of the concepts to communicate confidently and competently in English Language in all spheres.	-	-	-	-	1	-	-	-	-	5	-	1	-	-
CO2	Express Creative skills to construct Dialogues / Conversations in Spoken and Written forms.	-	-	-	-	1	-	-	-	-	5	-	2	-	-
CO3	Identify Accent for intelligibility.	-	-	-	-	1	-	-	-	-	5	-	2	-	-
CO4	Demonstrate communicative ability in everyday Conversation, JAM Sessions and Public Speaking.	-	-	-	-	1	-	-	-	-	5	-	1	-	-
CO5	Demonstrate nuances of Language through Audio – Visual Experience and group activities.	-	-	-	-	1	-	-	-	-	5	-	1	-	-
Course Code	19IBS1L03 -APPLIED PHYSICS LAB	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Use spectrometer, travelling microscope for making measurements.	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO2	Determine energy gap of a semiconductor, draw characteristic curves to estimate thermal coefficient of a thermistor, Zener diode.	2	2	-	-	-	-	-	-	1	-	-	1	-	-
CO3	Determine the dielectric constant and resistivity.	3	1	-	-	-	-	-	-	1	-	-	1	-	-
CO4	Determine wavelength of source and width of the narrow slits.	3	2	-	-	-	-	-	-	1	-	-	1	-	-
CO5	Find the strength of magnetic field.	3	2	-	-	-	-	-	-	1	-	-	1	-	-
Course Code	19IES1L01 - PROGRAMMING FOR PROBLEM SOLVING USING C LAB	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Develop the basic programs in C and draw the flowcharts using Raptor	2	1	-	-	3	-	-	-	-	2	-	-	-	-
CO2	Make use of conditional and iterative statements to solve real time scenarios in C	3	2	-	-	-	-	-	-	-	-	1	2	-	-
CO3	Apply the concept of arrays, modularity and strings to handle complex problems.	3	2	-	-	-	-	-	-	-	-	1	2	-	-
CO4	Apply the dynamic memory allocation functions using pointers	2	3	-	-	-	-	-	-	-	2	-	1	-	-

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	CO Statements	POs												PSOs	
CO4	Analyze circuits using network theorems.	3	2	2	-	-	-	-	-	-	-	-	2	2	-
CO5	Explain parameters of two-port networks.	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO6	Apply transient conditions for any first order and second order systems.	3	2	2	-	-	-	-	-	-	-	-	1	3	-
Course Code	191HS2L02-COMMUNICATIVE ENGLISH LAB-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Make effective use of Body language in all situations and contexts to enhance effective communication in all aspects.	-	-	-	-	-	-	-	-	-	3	-	2	-	-
CO2	Identify communicative competency to respond to others in different situations.	-	-	-	-	-	-	-	-	-	3	-	2	-	-
CO3	Make use of effective delivery strategies to select, compile and synthesize information for oral presentation.	-	-	-	-	-	-	-	-	-	3	-	2	-	-
CO4	Demonstrate in mock interviews, group discussion and public speaking.	-	-	-	-	-	-	-	-	-	3	-	2	-	-
CO5	Illustrate interpersonal skills using English language confidently and effectively for personal and professional growth.	-	-	-	-	-	-	-	-	-	3	-	2	-	-
Course Code	191BS2L04 - ENGINEERING CHEMISTRY LAB	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Demonstrate Acid – Complexometric titrations by volumetric analysis.	2	-	-	-	-	-	-	-	1	1	-	1	-	-
CO2	Demonstrate Acid – Base titrations by instrumental analysis.	2	-	-	-	-	-	-	-	1	1	-	1	-	-
CO3	Estimate Vitamin C using volumetric analysis	2	-	-	-	-	-	-	-	1	1	-	1	-	-
CO4	Prepare polymer like Bakelite.	2	-	-	-	-	-	-	-	1	1	-	1	-	-
CO5	Prepare alternative fuel like Bio-Diesel.	2	-	-	-	-	-	1	-	1	1	-	1	-	-
Course Code	191ES2L08-BASIC ELECTRICAL ENGINEERING LAB	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Demonstrate the concept of resonance of series and parallel RLC circuit.	2	-	1	-	-	-	-	-	-	-	-	-	2	-
CO2	Calculate parameters of two port network.	2	-	1	-	-	-	-	-	-	-	-	-	2	-
CO3	Perform various network theorems on given networks.	2	1	1	-	-	-	-	-	-	-	-	-	2	-
CO4	Compute various characteristics of DC shunt motor, and 3 phase induction motor	2	1	1	-	-	-	-	-	-	-	-	-	2	-
CO5	Calculate the efficiency and regulation of single phase transformer.	2	1	1	-	-	-	-	-	-	-	-	-	2	-
CO6	Perform various speed control methods on DC motor	2	1	1	-	-	-	-	-	-	-	-	-	2	-
Course Code	191ES2L09-ELECTRONICS ENGINEERING WORKSHOP	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Find the values of Resistance /inductance / capacitance & tolerances by using colour coding.	3	-	-	-	-	-	-	-	2	-	-	1	1	-
CO2	Demonstrate the use of Analog Electronic Circuit development system for construction of a circuit.	3	-	-	-	-	-	-	-	2	-	-	1	2	-
CO3	Use testing and measuring instruments for different applications.	3	2	-	-	-	-	-	-	2	-	-	1	3	-
CO4	Design PCBs for simple applications.	3	2	-	-	-	-	-	-	2	-	-	1	3	-
CO5	Select batteries and solar panels for different applications.	3	2	-	-	-	-	-	-	2	-	-	1	3	-
CO6	Identify various hardware parts of a computer.	3	2	-	-	-	-	-	-	2	-	-	1	3	-

	CO Statements	POs												PSOs	
Course Code	191PR2P01 - ENGINEERING EXPLORATION PROJECT	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Analyze the surrounding environment and identify a design challenge	1	1	1	-	-	-	-	-	-	-	-	-	-	1
CO2	Foster team collaboration, find inspiration from the environment and learn how to identify problems	-	1	1	-	-	-	-	-	-	1	-	1	-	-
CO3	Encourage exploration to process the Design Challenge, empathize & brainstorm the users effectively	-	-	1	1	-	1	1	-	-	-	-	-	-	-
CO4	Build effective prototypes as tangible models to use as communication tools	-	-	-	1	-	-	-	-	-	1	-	1	-	-
CO5	Test the prototype for design challenge and submit the report adhering to professional ethics	-	-	-	-	1	-	-	1	-	-	-	1	1	-
III SEM															
Course Code	191BS3T13- NUMERICAL METHODS & VECTOR CALCULUS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Apply numerical methods to solve equations and interpolation of polynomials.	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Apply numerical methods to initial value problems and problems involving integration.	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Compute double integral over a region and triple integral over a volume.	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Compute the gradient of a scalar function, divergence and curl of a vector function.	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Apply line, surface and volume integrals.	3	2	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	191ES3T12-RANDOM VARIABLES AND STOCHASTIC PROCESSES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Summarize the characteristics of standard random variables.	3	2	-	-	-	-	-	-	-	-	-	-	3	-
CO2	Compare the random variables with respect to moments.	3	2	1	-	-	-	-	-	-	-	-	-	3	-
CO3	Develop multiple random variable with the help of single random variable.	2	2	1	-	-	-	-	-	-	-	-	-	2	-
CO4	Categorize the random processes in time domain.	2	2	-	-	-	-	-	-	-	-	-	-	2	-
CO5	Analyze the LTI system response with random inputs.	2	2	2	1	-	-	-	-	-	-	-	-	2	-
Course Code	191HS3T02-MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain the Managerial Economic concepts for decision making and forward planning.	-	-	-	-	-	-	-	-	1	-	-	-	-	1
CO2	Illustrate the law of demand and its exceptions by using different forecasting methods.	-	-	-	-	-	-	-	-	-	2	-	-	-	1
CO3	Apply the production and cost concepts to determine Break Even Point in managerial decision areas.	-	-	-	-	-	-	-	-	-	-	3	-	-	1
CO4	Classify different types of Market structures and business organizations.	-	-	-	-	-	-	-	-	-	-	1	-	-	1

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	CO Statements	POs												PSOs	
CO5	Summarize the performance metrics of power amplifiers.	3	2	1	1	-	-	-	-	-	-	-	-	2	-
CO6	Select the appropriate tuned amplifier circuit to build a given application.	2	2	-	1	-	-	-	-	-	-	-	-	2	-
Course Code	191EC4T05-ELECTROMAGNETIC WAVES AND TRANSMISSION LINES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Interpret the fundamental concepts of transmission lines.	3	2	1	1	-	-	-	-	-	-	-	-	2	-
CO2	Apply various impedance matching techniques for the setup of transmission lines.	2	2	1	1	-	-	-	-	-	-	-	-	2	-
CO3	Infer the Maxwell's equations for static electric and magnetic fields.	3	2	1	1	-	-	-	-	-	-	-	-	2	-
CO4	Analyze the time varying behavior of electric and magnetic fields by applying the Maxwell's equations.	2	2	1	1	-	-	-	-	-	-	-	-	2	-
CO5	Analyze the propagation, reflection and transmission of uniform plane waves in different media.	2	2	1	1	-	-	-	-	-	-	-	-	2	-
Course Code	191EC4T06-MICROPROCESSORS AND MICROCONTROLLERS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Illustrate the basic concepts of microprocessors.	3	1	-	-	-	-	-	-	-	-	-	1	3	-
CO2	Explain the assembly language programming concepts of 8086 microprocessors.	2	1	3	-	-	-	-	-	-	-	-	1	2	-
CO3	Demonstrate the basic concepts of interfacing memory and peripheral devices to a microprocessor.	2	1	3	-	-	-	-	-	-	-	-	1	2	-
CO4	Apply the knowledge of instruction set to write 8051 microcontroller based programs.	2	1	3	-	-	-	-	-	-	-	-	1	2	-
CO5	Explain the interfacing concepts of 8051 microcontrollers	2	2	3	-	-	-	-	-	-	-	-	1	2	-
Course Code	191EC4T07-ANALOG COMMUNICATIONS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Compare the linear modulation and demodulation techniques.	3	1	1	-	-	-	-	-	-	-	-	-	2	-
CO2	Illustrate the concepts of generation and detection of angle modulated signals.	3	2	2	1	-	-	-	-	-	-	-	-	2	-
CO3	Interpret the functionalities of AM and FM transmitters and receivers.	3	2	2	1	-	-	-	-	-	-	-	-	3	-
CO4	Illustrate noise performance in linear and angle modulation techniques.	2	1	1	1	-	-	-	-	-	-	-	-	3	-
CO5	Describe the generation and detection of pulse analog modulated signals.	2	1	1	1	-	-	-	-	-	-	-	-	3	-
Course Code	191EC4L02-ANALOG ELECTRONIC CIRCUITS LAB	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Determine the frequency response, impedance and Q-point of different types of multi stage amplifiers.	3	2	-	-	1	-	-	-	2	-	-	-	3	-
CO2	Construct voltage and current feedback amplifiers for given specifications.	3	2	-	-	1	-	-	-	1	-	-	-	2	-
CO3	Analyze LC and RC types of oscillators for given specifications.	2	3	-	-	2	-	-	-	2	-	-	-	3	-
CO4	Analyze the efficiency of class A power amplifier for given specifications.	2	1	-	-	-	-	-	-	2	-	-	-	2	-

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	CO Statements	POs												PSOs	
CO2	Explain crop selection and establishment of an adequate crop stand and ground cover.	1	-	-	-	2	-	-	-	-	-	-	-	-	-
CO3	Explain crop water management using integrated water management methods.	1	1	-	-	2	-	-	-	-	-	-	-	-	-
CO4	Apply agricultural crops production practices in field.	1	-	1	1	3	-	-	-	-	-	-	-	-	-
CO5	Apply the horticulture crops production practices in field.	1	-	1	1	3	-	-	-	-	-	-	2	-	-
Course Code	191EC5L05-INTEGRATED CIRCUITS AND APPLICATIONS LAB	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Experiment with Op-Amp circuits for linear and non linear applications with the given specifications	3	2	2	-	-	-	-	-	2	-	-	-	3	-
CO2	Design Butterworth filters using Op-Amps with given specification.	2	2	1	-	-	-	-	-	2	-	-	-	2	-
CO3	Design Waveform Generator using IC555 with variable duty cycle.	2	2	2	-	-	-	-	-	2	-	-	-	2	-
CO4	Evaluate Capture and Lock range using PLL.	2	2	1	-	-	-	-	-	2	-	-	-	3	-
CO5	Design Dual Power Supply using 78XX and 79XX.	2	2	1	-	-	-	-	-	2	-	-	-	2	-
Course Code	191EC5L06-DIGITAL COMMUNICATIONS LAB	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Examine Time Division Multiplexing and Demultiplexing	3	2	-	-	1	-	-	-	1	-	-	-	3	-
CO2	Analyze digital baseband modulation techniques.	3	1	-	-	1	-	-	-	1	-	-	-	3	-
CO3	Experiment with various digital carrier modulation schemes	2	1	-	-	2	-	-	-	1	-	-	-	3	-
CO4	Measure the efficiency of the source coding techniques.	2	2	-	-	2	-	-	-	1	-	-	-	2	-
CO5	Examine different error control coding schemes.	2	1	-	-	1	-	-	-	1	-	-	-	2	-
Course Code	191HS5T06-EMPLOYABILITY SKILLS-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain different types of puzzles,group reasoning,clock and calender problems	1	-	-	-	-	-	-	-	-	-	-	1	-	1
CO2	Solve problems on cubes & dice, partnership, percentages.	1	-	-	-	-	-	-	-	-	-	-	1	-	1
CO3	Solve problems on profit and loss, simple interest and compound interest	1	-	-	-	-	-	-	-	-	-	-	1	-	1
CO4	Apply interviewing skills, Group discussion skills and personal priorities	-	-	-	-	-	-	-	-	-	1	-	1	-	1
CO5	Apply resume writing skills, e-mail writing & business etiquette	-	-	-	-	-	-	-	-	-	1	-	1	-	1
Course Code	191PR5P02-SOCIALLY RELEVANT PROJECT	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Conduct a literature survey in the selected area	1	-	-	-	-	-	-	-	1	1	1	-	1	-
CO2	Use scientific reasoning to gather, evaluate and interpret the survey data to identify the problem	-	2	-	-	-	2	2	-	-	-	-	2	1	-
CO3	Design and develop many solutions in the light of societal, cultural, legal and environmental issues	-	-	2	2	-	-	-	1	-	-	-	-	2	-
CO4	Select a final solution to the social problem and submit as a working prototype	-	-	-	2	-	-	-	-	-	-	-	-	1	-
CO5	Use modern tools to prepare the results of the project as a report adhering to professional ethics	-	-	-	-	2	-	-	2	-	-	1	1	1	1

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	CO Statements	POs												PSOs	
CO3	Explain the hazard assessment and mitigation measures	1	1	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Explain landslides and earthquake disasters and management	1	1	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Explain about cyclone, fire disasters and rehabilitation programmes	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	191EE6004-ENERGY AUDIT AND CONSERVATION MANAGEMENT (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain energy efficiency, conservation and various technologies.	2	3	2	1	-	-	-	-	-	-	-	-	-	-
CO2	Design energy efficient lighting systems.	3	1	2	2	-	-	-	-	-	-	-	-	-	-
CO3	Calculate power factor of systems and propose suitable compensation techniques.	2	3	1	1	-	-	-	-	-	-	-	-	-	-
CO4	Explain energy conservation in HVAC systems.	2	3	1	1	-	-	-	-	-	-	-	-	-	-
CO5	Calculate life cycle costing analysis and return on investment on energy efficient technologies.	1	2	1	3	-	-	-	-	-	-	-	-	-	-
Course Code	191EE6005-NON CONVENTIONAL ENERGY SOURCES (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain the prospects of renewable energy and solar energy.	1	-	-	-	-	-	1	-	-	-	-	-	-	-
CO2	Apply the knowledge of solar principles for its applications.	1	-	-	-	-	-	1	-	-	-	-	-	-	-
CO3	Discuss the working principles of wind and Bio-mass energy resources.	1	-	-	-	-	-	1	-	-	-	-	-	-	-
CO4	Illustrate the techniques and conversion principles of Geothermal and tidal energy resources.	1	-	-	-	-	-	1	-	-	-	-	-	-	-
CO5	Explain the concept of Direct energy conversion	1	-	-	-	-	-	1	-	-	-	-	-	-	-
Course Code	191EE6006-INSTRUMENTATION (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain various types of signals	3	2	2	1	-	-	-	-	-	-	-	-	-	-
CO2	Explain various types of Transducers principles	2	3	2	2	-	-	-	-	-	-	-	-	-	-
CO3	Measure various parameters such as strain, velocity, temperature, pressure etc.	2	1	1	3	-	-	-	-	-	-	-	-	-	-
CO4	Explain the working principle of various types of digital Voltmeters and measure various parameter like phase and frequency of a signal with the help of CRO.	2	3	1	1	-	-	-	-	-	-	-	-	-	-
CO5	Analyze the different signals using various types of signal analyzers	1	3	2	1	-	-	-	-	-	-	-	-	-	-
Course Code	191ME6006-SOLAR ENERGY UTILISATION (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain the concept of solar radiation and its measurement.	1	-	-	-	-	-	1	-	-	-	-	1	-	-
CO2	Describe the working principle of different types of collector and its types.	2	-	-	-	-	2	1	-	-	-	-	2	-	-
CO3	Explain the various solar thermal energy technologies and their applications	2	-	-	-	-	2	1	-	-	-	-	2	-	-
CO4	Analyze the various solar PV cell materials and conversion techniques.	2	-	-	-	-	1	1	-	-	-	-	2	-	-
CO5	Apply solar passive building techniques for cooling and heating applications	2	-	-	-	-	1	1	-	-	-	-	2	-	-

	CO Statements	POs												PSOs	
Course Code	191ME6007-BASIC THERMODYNAMICS AND HEAT TRANSFER (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain basic thermodynamic concepts and laws of thermodynamics	2	1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Make use of steam tables to solve problems on properties of pure substance and gas mixture	2	2	1	-	-	-	-	-	-	-	-	-	-	-
CO3	Find the efficiency of a thermodynamic cycle	1	2	1	-	-	-	-	-	-	-	-	-	-	-
CO4	Explain basic heat transfer mechanisms	1	2	1	-	-	-	-	-	-	-	-	-	-	-
CO5	Evaluate the performance of heat exchangers	1	2	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	191ME6008-INTRODUCTION TO HYDRAULICS AND PNEUMATICS (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Describe the fundamentals of fluid power systems.	1	1	1	-	-	-	3	-	-	-	-	-	-	-
CO2	Illustrate the working of fluid power actuators, hydraulic motors, and Hydraul components.	1	1	1	-	-	-	3	-	-	-	-	-	-	-
CO3	Analyze the concepts of hydraulic circuits.	1	1	1	-	-	-	-	-	-	-	-	-	-	-
CO4	Explain the working of pneumatic systems.	1	1	2	-	-	-	-	-	-	-	-	-	-	-
CO5	Examine the concepts of pneumatic circuits.	1	1	2	-	-	-	-	-	-	-	-	-	-	-
Course Code	191ME6009-3D PRINTING (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Summarize the basics of AM technologies.	1	-	-	-	-	1	-	-	-	-	-	1	-	-
CO2	Explain about vat photo polymerization, material jetting and binder jetting AM technologies.	1	-	-	-	-	1	-	-	-	-	-	1	-	-
CO3	Explain material extrusion and sheet lamination AM technologies.	1	-	-	-	-	-	1	-	-	-	-	1	-	-
CO4	Illustrate powder bed fusion and directed energy deposition AM technologies.	1	-	-	-	-	-	1	-	-	-	-	1	-	-
CO5	Apply the AM techniques in different industries	1	-	-	-	-	1	-	-	-	-	-	1	-	-
CO6	Select AM technologies using decision methods	1	-	-	-	-	-	-	-	-	-	-	1	-	-
Course Code	191ME6010-ROBOTICS (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain the basic concepts, parts of robots and types of robots.	2	-	-	-	-	-	-	-	-	-	-	1	-	-
CO2	Identify various robot configuration and components,	2	-	-	-	-	-	-	-	-	-	-	1	-	-
CO3	Select appropriate actuators and sensors for a robot based on specific application	2	1	-	-	-	-	-	-	-	-	-	1	-	-
CO4	Analyze the simple serial kinematic chains	3	2	-	-	-	-	-	-	-	-	-	1	-	-
CO5	Analyze the trajectory planning for a manipulator by avoiding Obstacles	1	2	1	-	-	-	-	-	-	-	-	1	-	-
Course Code	191ME6011-MANAGEMENT SCIENCE (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Apply management and motivation theories to renovate the practice of management.	1	1	-	-	-	1		-	-	-	-	1	-	-

	CO Statements	POs												PSOs	
CO3	Make use of software technologies to build VR applications.	2	2	3	-	2	-	-	-	-	-	-	-	-	-
CO4	Develop 3D user interfaces using 3D interaction techniques.	2	2	3	-	2	-	-	-	-	-	-	-	-	-
CO5	Describe the fundamental concepts of AR	2	3	2	-	-	-	-	-	-	-	-	-	-	-
Course Code	191IT6O03-COMPUTER ORGANIZATION (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Describe the basic structure of a computer system, various number systems and arithmetic operations.	3	2	1	1	-	-	-	-	-	-	-	-	-	-
CO2	Explain the Operation of CPUs including RTL, ALU, Instruction Cycle and Buses	2	2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	Demonstrate the architecture and functionality of central processing unit	2	2	3	1	-	-	-	-	-	-	-	-	-	-
CO4	Illustrate the I/O and memory organization in an efficient way.	1	2	2	3	-	-	-	-	-	-	-	-	-	-
CO5	Make use of multi processors and pipelining to improve the efficiency of computer system.	1	2	2	3	-	-	-	-	-	-	-	-	-	-
Course Code	191IT6O04-AI TOOLS & TECHNIQUES (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain the fundamentals of Artificial Intelligence and its applications.	-	3	-	2	-	-	-	-	-	-	-	-	-	-
CO2	Describe various problems solving techniques and searching techniques.	-	2	-	-	3	-	-	-	-	-	-	-	-	-
CO3	Apply various logical systems to inference the different logical problems.	-	2	3	1	2	-	-	-	-	-	-	-	-	-
CO4	Demonstrate the concept of Knowledge Representation Techniques.	-	2	2	1	2	-	-	-	-	-	-	-	-	-
CO5	Develop Expert System and applications.	-	2	1	-	-	-	-	-	-	-	-	-	-	-
CO6	Identify various interpretations of probability theory, basic knowledge of fuzzy sets and fuzzy logic.	-	2	-	2	-	-	-	-	-	-	-	-	-	-
Course Code	191IT6O05-ROBOTIC PROCESS AUTOMATION (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Describe the fundamentals of Robotic Process Automation Technology.	-	3	1	2	-	-	-	-	-	-	-	-	-	-
CO2	Summarize the UiPath programming techniques to deploy robot configurations.	-	1	3	1	-	-	-	-	-	-	-	-	-	-
CO3	Explore various data extraction techniques and learn about integrations with various popular applications like SAP and MS Office	-	2	-	3	2	-	-	-	-	-	-	-	-	-
CO4	Develop a programmed robot including logging and exception handling	-	2	2	2	3	-	-	-	-	-	-	-	-	-
CO5	Create and Deploy the Bots and control it with UiPath Orchestrator.	-	2	1	3	2	-	-	-	-	-	-	-	-	-
Course Code	191MI6O02-INDUSTRIAL SAFETY PRACTICES (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain the different hazards and its prevention in mining industries.	1	-	-	-	-	1	-	-	-	-	-	-	-	-
CO2	Distinguish the mine accidents occurring in surface and underground mining area.	1	-	-	-	-	1	-	-	-	-	-	-	-	-
CO3	Explain the safety concepts, emergency preparation and response in disaster	1	-	-	-	-	1	-	-	-	-	-	-	-	-

	CO Statements	POs												PSOs	
CO4	Assess and minimize the risk using safety analysis techniques	1	-	-	-	-	1	-	-	-	-	-	-	-	-
CO5	Explain Safety standards, safety information system and safety audit	1	-	-	-	-	1	-	-	-	-	-	-	-	-
Course Code	191MI6003-ELECTRICAL EQUIPMENT'S IN MINES (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain about power systems used in mines.	2	1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Analyze various earthing methods used in mines.	2	1	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Summarize various electrical equipment used in mines.	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Explain the instrumentation and control systems used in mines	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Analyze about mine telephone system and intrinsic safety.	3	2	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	191PT6003-UNCONVENTIONAL HYDROCARBON RESOURCES (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Outline the fundamentals of Coal Bed Methane	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Estimate the shale gas reserves for Indian Scenario	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Determine the extent of gas hydrates resource estimation	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Illustrate the Origin and Characterize Shale Gas.	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Explain the Heavy oil reservoirs and their Challenges	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	191PT6004-ASSET MANAGEMENT (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain the Asset Management in corporate approach	2	-	-	-	-	-	-	-	-	-	1	-	-	-
CO2	Estimate the running cost and value for Asset Management	2	-	-	-	-	-	-	-	-	-	1	-	-	-
CO3	Determine value using Asset Management Interpretation	2	-	-	-	-	-	-	-	-	-	1	-	-	-
CO4	Illustrate Asset Management Decision making framework	2	-	-	-	-	-	-	-	-	-	1	-	-	-
CO5	Explain the Capital Planning System	2	-	-	-	-	-	-	-	-	-	1	-	-	-
Course Code	191AG6002-WEATHER FORECAST IN AGRICULTURE (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain the weather elements and their impact on crop production.	1	-	-	-	1	-	-	-	-	-	-	-	-	-
CO2	Identify the type of crop production risk and their management.	-	1	-	-	-	-	1	1	-	-	-	-	-	-
CO3	Explain crop weather relationships and their responses.	-	2	-	1	1	-	1	-	-	-	-	-	-	-
CO4	Classify the types of weather forecast and their characteristics.	1	-	-	-	-	-	1	-	-	-	-	-	-	-
CO5	Apply weather thumb rules and verification of weather forecast with real events.	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Course Code	191AG6003-BIO-ENERGY SYSTEMS DESIGN AND APPLICATIONS (OPEN ELECTIVE- II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain the importance of Bioenergy.	2	-	-	-	-	2	3	-	-	-	-	-	-	-
CO2	Compare and contrast Biomass and Agrochemical Conversion techniques.	3	2	-	1	-	2	-	-	-	-	-	-	-	-
CO3	Categorize different ways of biomass production.	2	1	-	-	-	2	3	-	-	-	-	-	-	-
CO4	Classify Gasification and Liquefaction.	2	1	-	-	-	3	1	-	-	-	-	-	-	-
CO5	Analyze advanced Bio-diesel production from Oils and Seeds.	2	1	-	-	-	3	1	-	-	-	-	-	-	-

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	CO Statements	POs												PSOs	
Course Code	191EE7009-INDUSTRIAL ELECTRICAL SYSTEMS (OPEN ELECTIVE- III)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain the electrical wiring systems for residential, commercial, and industrial consumers, representing the systems with standard symbols and drawings, SLD.	2	1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Illustrate the residential and commercial electrical systems.	3	1	1	1	-	-	-	-	-	-	-	-	-	-
CO3	Design the residential and commercial lightning systems.	3	1	1	-	-	-	-	-	-	-	-	-	-	-
CO4	Explain various components of industrial electrical systems.	3	2	2	1	-	-	-	-	-	-	-	-	-	-
CO5	Analyze and select the proper size of various electrical system components.	3	2	-	1	-	-	-	-	-	-	-	-	-	-
Course Code	191ME7013-OPTIMIZATION TECHNIQUES (OPEN ELECTIVE- III)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Use advanced optimization techniques to solve real-life problems.	3	2	1	-	-	-	-	-	-	-	-	1	-	-
CO2	Formulate and solve various practical optimization problems in manufacturing and service organizations	3	2	1	-	-	-	-	-	-	-	-	1	-	-
CO3	Use non-linear optimization techniques such as classical optimization methods, integer programming.	2	2	1	-	-	-	-	-	-	-	-	1	-	-
CO4	Apply unconstrained optimization and constrained non-linear programming and dynamic programming	1	2	1	-	-	-	-	-	-	-	-	1	-	-
CO5	Use Advance techniques to formulate and solve the optimization problems.	1	2	1	-	-	-	-	-	-	-	-	1	-	-
Course Code	191ME7014-ENERGY CONSERVATION (OPEN ELECTIVE- III)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain the concepts of National Energy consumption, Energy Auditing, and its types	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Explain the improvement in efficiency of various electrical equipment's like capacitors and electric motors etc.	1	2	1	-	-	-	-	-	-	-	-	-	-	-
CO3	Explain the improvement in efficiency of various mechanical equipment like boilers, condensers, and steam lines etc.	1	-	-	1	-	-	-	-	-	-	-	1	-	-
CO4	Explain the energy efficiency of components like pumps, blowers, fans, and various refrigeration equipment.	1	2	-	-	-	-	-	-	-	-	-	2	-	-
CO5	Apply the concepts of energy economics like payback period, internal rate of returns life cycle costing etc.	1	-	-	-	-	-	-	-	-	-	-	2	-	-
Course Code	191ME7015-INTRODUCTION TO MATERIAL HANDLING SYSTEMS (OPEN ELECTIVE- III)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Demonstrate ability to complete successfully Forklift Certification to safely and operate effectively in the manufacturing environment.	3	-	-	-	-	-	-	-	-	-	1	-	-	-

	CO Statements	POs												PSOs	
Course Code	191EC7O07-BASICS OF VLSI DESIGN (OPEN ELECTIVE- III)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Demonstrate the fundamental concepts of basic MOS theory of fabrication process and the electrical properties of MOS and Bi-CMOS Circuits.	2	1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Develop the stick and layout models of MOS circuits using design rules.	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Develop various CMOS logic structures using different MOS logic technologies.	2	2	1	2	-	-	-	-	-	-	-	-	-	-
CO4	Demonstrate the scaling factors in determining the characteristics and performance of MOS circuits in silicon.	2	3	1	1	-	-	-	-	-	-	-	-	-	-
CO5	Explain different architectural issues of subsystem design process and testability.	2	1	3	1	-	-	-	-	-	-	-	-	-	-
Course Code	191EC7O08-MICRO ELECTRO MECHANICAL SYSTEMS (OPEN ELECTIVE- III)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Summarize the operation of micro systems, and their applications	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Classify the materials for micro system applications	2	1	2	-	-	-	-	-	-	-	-	-	-	-
CO3	Explain the state-of-the-art for lithography and packaging techniques	3	2	1	1	-	-	-	-	-	-	-	-	-	-
CO4	Extend the knowledge of basic approaches for various sensors and actuators design	2	2	1	-	-	-	-	-	-	-	-	-	-	-
CO5	Apply the expertise on micro systems for interdisciplinary applications	2	2	2	1	-	-	-	-	-	-	-	-	-	-
Course Code	191EC7O09-IMAGE PROCESSING (OPEN ELECTIVE- III)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain the concepts of digital image processing.	2	1	1	1	-	-	-	-	-	-	-	-	-	-
CO2	Identify various image enhancement and image restoration techniques.	2	2	2	2	-	-	-	-	-	-	-	-	-	-
CO3	Outline the color fundamentals and different color image processing methods.	2	1	1	1	-	-	-	-	-	-	-	-	-	-
CO4	Utilize different morphological operators for image processing.	2	2	2	2	-	-	-	-	-	-	-	-	-	-
CO5	Analyze different image segmentation techniques for image processing.	2	2	2	2	-	-	-	-	-	-	-	-	-	-
Course Code	191CS7O10-BIG DATA ANALYTICS (OPEN ELECTIVE- III)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Illustrate big data challenges in different domains including social media, transportation, finance, and medicine	-	2	3	-	2	2	-	-	-	-	-	-	-	-
CO2	Use various techniques for mining data stream	-	2	2	-	3	2	-	-	-	-	-	-	-	-
CO3	Demonstrate building blocks of Hadoop	-	2	3	-	2	2	-	-	-	-	-	-	-	-
CO4	Apply map reduce procedure to solve big data problems	-	3	2	-	2	2	-	-	-	-	-	-	-	-
CO5	Make use of Pig & Hive Frameworks to work with big data.	-	2	2	-	3	2	-	-	-	-	-	-	-	-
CO6	Explore various visualization techniques	-	2	3	-	2	2	-	-	-	-	-	-	-	-

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	CO Statements	POs												PSOs	
Course Code	191AG7004 - GREENHOUSE TECHNOLOGY (OPEN ELECTIVE- III)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Design small scale polyhouse for drying purpose.	3	2	1	-	-	-	-	-	-	-	2	-	-	-
CO2	Classify greenhouses based on construction materials.	3	2	-	-	1	-	-	1	-	-	-	-	-	-
CO3	Explain the scenario of protective cultivation around the globe and in India.	3	1	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Make use of non-chemical and chemical pesticides and growth regulators effectively in an environmentally responsible way.	1	-	1	-	-	-	2	3	-	-	-	-	-	-
CO5	Assess the basic production requirements and the knowledge of horticulture crop cultivation in greenhouse.	3	-	-	-	-	-	2	-	-	-	-	-	-	-
Course Code	191AG7005-FLOODS AND CONTROL MEASURES (OPEN ELECTIVE- III)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Determine the peak rate of flood by rational, empirical methods and flood frequency by log normal, Gumbel's extreme value and log-Pearson type-III distribution methods.	2	2	1	-	3	-	-	-	-	-	-	-	-	-
CO2	Explain importance of various flood routing techniques and flood control measures.	3	2	1	-	1	-	-	-	-	-	-	-	-	-
CO3	Design of flood control projects and their cost economics estimation.	3	2	1	-	2	-	-	-	-	-	-	-	-	-
CO4	Estimate seepage through earth embankments and understand causes of failures.	3	2	1	-	-	-	-	-	-	-	-	-	-	-
CO5	Design of earthen dam and its stability analysis by different methods	3	2	1	-	2	-	-	-	-	-	-	-	-	-
Course Code	191EC7L09-DIGITAL SIGNAL AND IMAGE PROCESSING LAB	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Develop basic programs in MATLAB	2	-	-	-	2	-	-	-	2	2	-	-	2	-
CO2	Compare the performance of various digital filters	3	-	-	-	2	-	-	-	2	2	-	-	2	-
CO3	Apply image enhancement and restoration techniques for image processing applications	3	-	-	-	2	-	-	-	2	2	-	-	2	-
CO4	Evaluate the image processing algorithms on a real time hardware	2	-	-	-	3	-	-	-	2	2	-	-	2	-
CO5	Evaluate the video processing algorithms on a real time hardware	2	-	-	-	3	-	-	-	2	2	-	-	1	-
Course Code	MICROWAVE AND OPTICAL COMMUNICATIONS LAB	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Demonstrate Reflex klystron Characteristics.	2	1	-	1	-	-	-	-	2	-	-	-	2	-
CO2	Interpret parameters of various waveguide components.	2	1	-	1	-	-	-	-	2	-	-	-	2	-
CO3	Explain various characteristics of LEDs.	2	1	-	1	-	-	-	-	2	-	-	-	2	-
CO4	Illustrate the impact of optical devices with and without channel losses.	2	1	-	1	-	-	-	-	2	-	-	-	2	-
CO5	Demonstrate various waveguide parameters for a given Multiport network	2	1	-	1	-	-	-	-	2	-	-	-	2	-
Course Code	191EC7P03-INTERNSHIP	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Conduct a technical survey to identify a real world engineering problem	1	1	-	-	-	-	-	-	-	1	-	1	1	-

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	CO Statements	POs												PSOs	
Course Code	191PT8007-CHEMICAL PROCESS SAFETY (OPEN ELECTIVE- IV)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain the Process Safety, Accidents and Loss statistics, Toxicological Studies	2	-	-	-	-	1	-	-	-	-	-	1	-	-
CO2	Explain the fire and explosion and its prevention	2	-	-	-	-	1	-	-	-	-	-	1	-	-
CO3	Explain the Source model and dispersion, Relief sizing	2	-	-	-	-	1	-	-	-	-	-	1	-	-
CO4	Illustrate Hazard Identification, HAZOP analysis, Risk Assessment	2	-	-	-	-	1	-	-	-	-	-	1	-	-
CO5	Explain the Process of Accident Investigation, Reliability Engineering, Economics of loss prevention	2	-	-	-	-	1	-	-	-	-	-	1	-	-
Course Code	191PT8007-MECHANICAL UNIT OPERATION	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Explain the fundamentals of Mechanical unit operations	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Explain storage of bulk solids and flow measurements.	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Explain the Flow past immersed solid objects and motion of particles through fluids, beds of solids	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Apply Filtration, flow through packed and fluidized beds, cross flow filtration	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Explain the Gravity sedimentation, centrifugal separations, floatation	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	191AG8006-APPLICATIONS OF RS AND GIS IN LAND AND WATER RESOURCES MANAGEMENT(OPEN ELECTIVE- IV)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Apply the knowledge of RS and GIS in land and water resources management.	1	-	-	-	3	-	-	-	-	-	-	1	-	-
CO2	Explain DEM hydro-processing for watershed characterization.	1	-	-	-	2	-	-	-	-	-	-	-	-	-
CO3	Demonstrate the digital image processing techniques using ERDAS/ARC GIS software.	1	1	-	-	2	-	-	-	-	-	-	-	-	-
CO4	Apply the Geospatial techniques in irrigation water management.	1	-	1	-	3	-	-	-	-	-	-	1	-	-
CO5	Apply RS & GIS inputs for site suitability for various water related projects.	1	1	3	-	1	-	-	-	-	-	-	-	-	-
Course Code	191AG8007-PLASTIC APPLICATIONS IN AGRICULTURE (OPEN ELECTIVE- IV)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Assess the types and quality of plastics used in soil and water conservation	2	1	-	-	-	-	3	-	-	-	2	-	-	-
CO2	Design, estimation and laying of plastic films in lining of canal, reservoir and water harvesting ponds	3	1	2	2	-	-	-	-	-	-	-	-	-	-
CO3	Design, estimation and installation of green, poly and shade net houses, low tunnels etc	3	1	2	2	-	-	-	-	-	-	-	-	-	-
CO4	Explain plastics application in drying, preservation, handling and storage of agricultural produce.	3	1	-	2	-	2	-	-	-	-	-	-	-	-

	CO Statements	POs												PSOs	
CO5	Outline plastic usage due to hands on experience through visit to a greenhouse and farmer's field.	3	1	-	2	-	2	-	-	-	-	-	-	-	-
Course Code	191EC8P05-PROJECT PART 2	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Demonstrate technical skills of data collection and data analysis adhering to professional ethics	1	1	-	-	-	-	-	2	-	-	-	1	1	-
CO2	Design the solutions for the critical problem areas marked in data analysis in the light of environmental and societal adherence	-	-	3	2	-	1	1	-	-	-	-	-	1	-
CO3	Build a team of people to work together and communicate well in the critical stages of project progress.	-	-	-	-	-	-	-	-	1	2	1	1	1	1
CO4	Use modern tools to derive conclusions of the project work effectively	-	-	-	-	3	-	-	-	-	2	1	1	1	-
CO5	Demonstrate the results of the project work as a functional product prototype / application / analytical solution for a specified operation	-	-	-	-	1	-	-	-	-	1	1	1	2	1