RAJAMAHENDRI
INSTITUTE OF ENGINEERING & TECHNOLOGY

AISHE ID:C-18113	NAAC SSR	CYCLE II

2 : TEACHING - LEARNING & EVALUATION

2.6 Student Performance & Learning Outcome	2.6.1 Programme Outcomes (POs) and Course Outcomes (COs)

2.6.1 Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the Institution

Approved by AICTE, New Delhi, Government of AP & Affiliated to JNTUK, Kakinada, Accredited by NAAC and An ISO 9001:2015 Certified Institution

Bhoopalapatnam,Rajamahendravaram,E.G.Dist,AP-533103

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RAJAMAHENDRI
INSTITUTE OF ENGINEERING & TECHNOLOGY
(Approved by AICTE, New Delhi, Affiliated to JNTUK, Kakinada, Accredited BY NAAC)

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2.6.1.Programme Outcomes(POs),Course Outcomes (COs) and PSOs for all Programmes offered by the institution

Principal
Rajamahendri Institute of Engineering & Technology
Bhoopalapatnam, Rajahmundry-533 107.
E.G.Dist., (A.P)

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

Program: B.Tech.	Academic year : 2023-2024	Semester: I
Branch: Electronics & Communication Engg.	Regulation: R20	

S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
1	II/I	Mathematics-III	C211	**CO1:** Interpret the physical meaning of different operators such as gradient, curl and divergence and Estimate the work done against a field, circulation and flux using vector calculus
				CO2: Apply the Laplace transform for solving differential equations
				CO3: Find or compute the Fourier series of periodic signals
				CO4: Know and be able to Apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms
				CO5: Identify solution methods for partial differential equations that model physical processes
2	II/I	Electronic Devices And Circuits	C212	**CO1:** Apply the basic concepts of semiconductor physics.
				CO2: Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
				CO3: Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.
				CO4: Understand the construction, principle of operation of transistors, BJT and FET with the V-I characteristics in different configurations. Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions.
				CO5: Perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations

S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
3	II/I	Switching Theory and Logic Design	C213	**CO1:** Classify different number systems and apply to generate various codes.
				CO2: Use the concept of Boolean algebra in minimization of switching functions.
				CO3: Design different types of combinational logic circuits.
				CO4: Apply knowledge of flip-flops in designing of Registers and counters.
				CO5: The operation and design methodology for synchronous sequential circuits and algorithmic state machines.
4	II/I	Signals and Systems	C214	**CO1:** Differentiate the various classifications of signals and systems
				CO2: Analyze the frequency domain representation of signals using Fourier concepts
				CO3: Classify the systems based on their properties and determine the response of LTI Systems.
				CO4: Know the sampling process and various types of sampling techniques.
				CO5: Apply Laplace and z-transforms to analyze signals and Systems (continuous & discrete).
5	II/I	Random Variables and Stochastic Processes	C215	**CO1:** Describe and investigate mathematical models of random phenomena by understand the random variables and probability
				CO2: Calculate probability distribution function of different random variables.
				CO3: Estimate moments and joint moments
				CO4: Learn how to use the change of variable technique and describe the behavior of random processes.
				CO5: Analyze linear systems with random signals
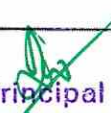
S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
1	II/II	Electronic Circuit Analysis	C221	CO1: Design and analysis of small signal high frequency transistor amplifier using BJT and FET.
				CO2: Design and analysis of multistage amplifiers using BJT and FET and Differential amplifier using BJT
				CO3: Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept.
				CO4: Know the Feedback principles and concept of Feedback with comparisons
				CO5: Know the classification of the power and tuned amplifiers and their analysis with performance comparison
2	II/II	Digital IC Design	C222	CO1: Understand the structure of commercially available digital integrated circuit families.
				CO2: Learn the IEEE Standard 1076 Hardware Description Language (VHDL).
				CO3: Model complex digital systems at several levels of abstractions, behavioral, structural, and rapid system prototyping.
				CO4: Analyze and design basic digital circuits with combinatorial and sequential logic circuits using VHDL.
				CO5: Analyze and design basic digital circuits with combinatorial and sequential MOS logic circuits.
3	II/II	Analog Communications	C223	CO1: Differentiate various Analog modulation and demodulation schemes and their spectral characteristics
				CO2: Differentiate various Analog modulation and demodulation schemes and their spectral characteristics for DSB & SSB
				CO3: Analyze noise characteristics of various analog modulation methods
				CO4: Analyze various functional blocks of radio transmitters and receivers
				CO5: Design simple analog systems for various modulation techniques

S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
4	II/II	Linear Control Systems	C224	CO1: This course introduces the concepts of feedback and its advantages to various control
				CO2: The performance metrics to design the control system intime-domain and frequency domain are introduced.
				CO3: Control systems for various applications can be designed using time-domain and frequency domain analysis.
				CO4: In addition to the conventional approach, the state space approach for the analysis of control systems is also introduced
5	II/II	Management And Organisational Behaviour	C225	CO4: After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational structure
				CO2: Will familiarize with the concepts of functional management that is HRM and Marketing of new product developments.
				CO3: The learners able to think in strategically through contemporary management practices.
				CO4: The learner can develop positive attitude through personality development and can equip with motivational theories.
				CO5: The student can attain the group performance and grievance handling in managing the organizational culture.
1	III/I	Analog ICs And Applications	C311	CO1: Understand the basic operation & performance parameters of differential amplifiers.
				CO2: Design circuits using operational amplifiers for various applications.
				CO3: Analyze and design amplifiers and active filters using Op-Amp.
				CO4: Discuss the Applications of Operational amplifier: 555 Timer, PLL
				CO5: Design A to D & D to A Converters using Op-Amp.

S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
2	III/I	Electro magnetic Waves And Transmission Lines	C312	**CO1:** Determine E and H using various laws and applications of electric & magnetic fields
				CO2: Apply the Maxwell equations to analyze the time varying behaviour of EM waves
				CO3: Gain the knowledge in uniform plane wave concept and characteristics of uniform plane wave in various media
				CO4: Calculate Brewster angle, critical angle and total internal reflection
				CO5: Derive and Calculate the expressions for input impedance of transmission lines, reflection coefficient, VSWR etc. using smith chart
3	III/I	Digital Communications	C313	**CO1:** Analyze the performance of a Digital Communication System for probability of error and are able to design a digital communication system.
				CO2: Analyze various source coding techniques.
				CO3: Compute and analyze Block codes, cyclic codes and convolution codes.
				CO4: Design a coded communication system.
4	III/I	Electronic Measurements And Instrumentation	C314	**CO1:** Select the instrument to be used based on the requirements
				CO2: Understand and analyze different signal generators and analyzers.
				CO3: Understand the design of oscilloscopes for different applications.
				CO4: Design different transducers for measurement of different parameters.

S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
5	III/I	Computer Architecture & Organization	C315	**CO1:** Students can understand the architecture of modern computer.
				CO2: They can analyze the Performance of a computer using performance equation
				CO3: Understanding of different instruction types. and can calculate the effective address of an operand by addressing modes
				CO4: They can understand how computer stores positive and negative numbers
				CO5: Understand the concepts of I/O Organization and Memory systems.
1	III/II	Microprocessor And Microcontrollers	C321	**CO1:** Understands the internal architecture and organization of 8086,8051
				CO2: Understand the internal architecture and organization of ARM processors/controllers.
				CO3: Understand the interfacing techniques to 8086 and 8051
				CO4: To develop assembly language programming to design microprocessor/micro controller based systems.
				CO5: Can interface various devices to processors & controllers
2	III/II	VLSI Design	C322	**CO1:** Demonstrate a clear understanding of CMOS fabrication flow and technology scaling and can Apply the design Rules and draw layout of a given logic circuit.
				CO2: Understand the basic circuit concepts and scaling of MOS circuits.
				CO3: Design basic building blocks in Analog IC design and can Analyze the behavior of amplifier circuits with various loads.
				CO4: Design various CMOS logic circuits for design of Combinational logic circuits and can design MOSFET based logic circuits using various logic styles like static and dynamic CMOS.
				CO5: Design various applications using FPGA.

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S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
3	III/II	Digital Signal Processing	C323	**CO1:** Apply the difference equations concept in the analysis of Discrete time systems
				CO2: Use the FFT algorithm for solving the DFT of a given signal
				CO3: Design a Digital filter (FIR&IIR) from the given specifications
				CO4: Realize the FIR and IIR structures from the designed digital filter and can use the Multirate Processing concepts in various applications (eg: Design of phase shifters, Interfacing of digital systems
				CO5: Apply the signal processing concepts on DSP Processor.
4	III/II	Mobile & Cellular Communication	C324	**CO1:** Identify the limitations of conventional mobile telephone systems; understand the concepts of cellular systems.
				CO2: Understand the types of interferences
				CO3: Understand the frequency management, channel assignment strategies and antennas in cellular systems.
				CO4: Understand the concepts of handoff and architectures of various cellular systems.
				CO5: Understand the various digital cellular networks
5	III/II	Computer Networks	C325	**CO1:** Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and get knowledge about various communication techniques, methods and protocol standards
				CO2: Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and get knowledge about various communication techniques, methods and protocol standards
				CO3: Analyze data link layer services, functions and protocols like HDLC and PPP.
				CO4: Compare and Classify medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols
				CO5: Determine application layer services and client server protocols working with the client server paradigms like WWW, HTTP, FTP, e-mail and SNMP etc.

S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
1	IV/I	Universal Human Values : Understanding Harmony	C411	CO1:Students are expected to become more aware of themselves, and their surroundings (family, society, nature)
				CO2:They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
				CO3:They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). 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.
				CO4:a)Faculty-student or mentor-mentee programs throughout their time with the institution b)Higher level courses on human values in every aspect of living. E.g. as a professional
				CO5:Students are expected to become more aware of themselves, and their surroundings (family, society, nature)
2	IV/I	Optical Communication	C412	CO1:Choose necessary components required in lern optical communications systems.
				2:Design and build optical fiber experiments in ….. laboratory, and learn how to calculate electromagnetic modes in waveguides, the amount of light lost going through an optical system, dispersion of optical fibers.
				CO3:Use different types of photo detectors and optical test equipment to analyze optical fiber and light wave systems.
				CO4:Choose the optical cables for better communication with minimum losses
				CO5:Design, build, and demonstrate optical fiber experiments in the laboratory.

S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
3	IV/I	Satellite Communication	C413	CO1:Understand the concepts, applications and subsystems of Satellite communications.
				CO2:Derive the expression for G/T ratio and to solve some analytical problems on satellite link design
				CO3:Understand the various types of multiple access techniques and architecture of earth station design.
				CO4:Understand the concepts of GPS and its architecture
4	IV/I	Radar Engineering	C414	CO1:Derive the radar range equation and to solve some analytical problems.
				CO2:Understand the different types of radars and its applications.
				CO3:Understand the concept of tracking and different tracking techniques
				CO4:Understand the various components of radar receiver and its performance.
5	IV/I	Internet Of Things	C415	CO1:Understand internet of Things and its hardware and software components.
				CO2: Interface I/O devices, sensors & communication modules.
				CO3: Remotely monitor data and control devices.
				CO4:Design real time IoT based applications

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

Program: B.Tech. Branch: Computer Science and Engineering	Academic year: 2023-2024	Semester: I

S.No	Year/ Sem	Couse Name	Course Code	Course Outcomes
1	II/I	Mathematics-III	C211	CO1.Interpret the physical meaning of different operators such as gradient, curl and divergence.
				CO2.Estimate the work done against a field, circulation and flux using vector calculus.
				CO3.Apply the Laplace transform for solving differential equations.
				CO4. Apply the Fourier series of periodic signals.
				CO5. Apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms.
				CO6.Identify solution methods for partial differentialequations that model physical processes.
2	II/I	Object Oriented Programming Through C++	C212	CO1.Classify object-oriented programming and procedural programming.
				CO2.Apply C++ features such as composition of objects, operator overloads.
				CO3.Apply C++ features such as dynamic memory allocation, inheritance.
				CO4. Apply C++ features such as polymorphism, file I/O, exception handling.
				CO5.Build C++ classes using appropriate encapsulation and design principles.
				CO6.Apply object oriented or non-object-oriented techniques to solve bigger computing problems.
3	II/I	Operating Systems	C213	CO1.Describe various generations of Operating n and functions of Operating System.
				Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance.
				CO3.SolveInter Process Communication problems using Mathematical Equations by various methods.
				CO4.Compare various Memory Management Schemes especially paging.
				CO5.Segmentation in Operating System and apply various Page Replacement Techniques.
				CO6.Outline File Systems in Operating System like UNIX/Linux and Windows

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				CO1.Review the basics of software engineering, processes, models and practices.
4	II/I	Software Engineering	C214	CO2.Compare conventional and agile software methods
				CO3.Discuss about software requirement engineering and its application using various models
				CO4.Discuss about data models, object models, context models and behavioural models.
				CO5.Design thinking at varied levels i.e architectural and component level and to also user interface
				CO6.Apply the testing and its theoretical background along with metrics to test source code, applications and maintenance of application
5	II/I	Mathematical Foundations of Computer Science	C215	CO1.Describe the skills in solving mathematical problems
				CO2. Apply mathematical principles and logic.
				CO3.Demonstrate knowledge of mathematical modelling and proficiency in using mathematical software.
				CO4.Solve mathematical calculations using techniques such as permutations and combinations.
				CO5.Communicate effectively mathematical ideas/results verbally or in writing.
				CO6.Describe the skills in solving mathematical problems
6	III/I	Computer Networks	C311	CO1. Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and get knowledge about various communication techniques, methods and protocol standards.
				CO2.Discuss different transmission media and different switching networks.
				CO3.Analyze data link layer services, functions and protocols like HDLC and PPP
				CO4.Compare and Classify medium access control protocols like ALOHA, CSMA, CSMA/CD
				CO5. Compare and Classify CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols
				CO6. Determine application layer services and client server protocols working with the client server paradigms like WWW, HTTP, FTP, e-mail and SNMP etc.
7	III/I	Design And Analysis of	C312	CO1.Analyze the performance of a given algorithm, denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms
				CO2. List and describe various algorithmic approaches and Solve problems using divide and conquer &greedy Method
				CO3.Synthesize efficient algorithms dynamic programming approaches to solve in common

		Algorithms		engineering design situations.
				CO4. Organize important algorithmic design paradigms
				CO5. Methods of analysis: backtracking, branch and bound algorithmic approaches
				CO6. Demonstrate NP- Completeness theory ,lower bound theory and String Matching
8	III/I	Data Warehousing And Data Mining	C313	**CO1.** Illustrate the importance of Data Warehousing, Data Mining and its functionalities and Design schema for real time data warehousing applications.
				CO2. Demonstrate on various Data Preprocessing Techniques viz. data cleaning, data integration
				CO3. data transformation and data reduction and Process raw data to make it suitable for various data mining algorithms
				CO4. Choose appropriate classification technique to perform classification, model building and evaluation.
				CO5. Make use of association rule mining techniques viz. Apriori and FP Growth algorithms and analyze on frequent itemsets generation.
				CO6. Identify and apply various clustering algorithm (with open source tools), interpret, evaluate and report the result.
9	III/I	Iot And Applications	C314	**CO1.**Gain comprehension of Internet of Things (IoT) principles, including hardware and software components.
				CO2. Learn to interface input/output (I/O) devices, sensors, and communication modules with IoT systems.
				CO3. Acquire skills in remotely monitoring data and controlling devices within IoT networks.
				CO4. Develop the ability to design real-time IoT-based applications for various purposes.
				CO5. Apply knowledge to effectively integrate different IoT components and devices.
				CO6. Demonstrate proficiency in implementing IoT solutions for practical applications and scenarios.
10	III/I	Software Project Management	C315-B	**CO1.**Apply the process to be followed in the software development life-cycle models.
				CO2. Apply the concepts of project management & planning.
				CO3. Implement the project plans through managing people, communications and change.
				CO4. Conduct activities necessary to successfully complete and close the Software projects.
				CO5. Implement communication, modelling, and construction & deployment practices in software development.

				CO6.Create project plans that address real-world management challenges.
11	IV/I	Cloud Computing	C411-A	CO1.Illustrate the key dimensions of the challenge of Cloud Computing.
				CO2.Classify the Levels of Virtualization and mechanism of tools.
				CO3.Analyze Cloud infrastructure including Google Cloud and Amazon Cloud.
				CO4.Create Combinatorial Auctions for cloud resource and design scheduling algorithms for computing cloud.
				CO5.Assess control storage systems and cloud security.
				CO6.The risks involved its impact and develop cloud application.
12	IV/I	Deep Learning Techniques	C412-A	CO1.Demonstrate the fundamental concepts learning techniques of Artificial Intelligence.
				CO2.Demonstrate the fundamental concepts learning techniques of Machine Learning and Deep Learning.
				CO3.Discuss the Neural Network training, various random models.
				CO4.Explain the Techniques of Keras, TensorFlow, Theano and CNTK.
				CO5. Classify the Concepts of CNN and RNN.
				CO6. Implement Interactive Applications of Deep Learning.
13	IV/I	Wireless Network Security	C413-B	CO1. Explain the Threats in networks and provide Authentication to real time problems.
				CO2. Identify and investigate in-depth both early and contemporary threats to wireless networks security.
				CO3. Ability to analyze and determine for any organization the database security requirements.
				CO4. Ability to analyze and determine for any organization the database appropriate solutions.
				CO5. Determined IP Security Issues and solve real time problems.
				CO6. Build wireless Development Strategies in real time issues.
14	IV/I	Principles Of Communication	C414	CO1.Analyze the performance of analog modulation schemes in time and frequency domains.
				CO2.Analyze the performance of angle modulated signals.
				CO3. Characterize analog signals in time domain as random processes and noise.
				CO4.Characterize the influence of channel on analog modulated signals.
				CO5.Determine the performance of analog communication systems in terms of SNR.

				CO6. Analyse pulse amplitude modulation, pulse position modulation, pulse code modulation and TDM systems.
15	IV/I	Electronic Measurements and Instrumentation	C415	CO1. Select the suitable instrument based on specific requirements.
				CO2.Analyze the functionality of different signal generators and analyzers.
				CO3. Understand the diverse designs of oscilloscopes for varied applications.
				CO4. Develop transducers tailored for measuring different parameters.
				CO5.Apply knowledge to effectively choose instruments for specific tasks.
				CO6.Demonstrate proficiency in designing and utilizingmeasurement tools for various engineering applications.
16	IV/I	Universal Human Values-2	C416	CO1.Better understanding of self and surroundings, including family, society, and nature.
				CO2.Increased sense of responsibility in addressing challenges with sustainable solutions.
				CO3.Improved critical thinking skills for analysing situations effectively.
				CO4.Heightened sensitivity towards personal commitments and human values.
				CO5. Encouragement to apply learned concepts in everyday life.
				CO6.Initial step towards lifelong learning and personal growth.

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Program: B.Tech. Branch: Computer Science and Engineering	Academic year: 2023-2024	Semester: II

S.No	Year/ Sem	Couse Name	Course Code	Course Outcomes
1	II/II	Probability And Statistics	C221	CO1.Classify the concepts of data science and its importance (L4) or (L2).
				CO2.Interrupt the association of characteristics and through correlation and regression tools.
				CO3.Make use of the concepts of probability and their applications (L3).
				CO4.Apply discrete and continuous probability distributions (L3).
				CO5.Design the components of a classical hypothesis test (L6).
				CO6.Infer the statistical inferential methods based on small and large sampling tests (L4).
2	II/II	Database Management Systems	C222	CO1.Identify the basic concepts and applications of database systems.
				CO2.Demonstrate data models and schemas in data base.
				CO3.Build the Entity relationship model.
				CO4.Explain structure query language in DBMS.
				CO5.Differentiate the functional dependencies and design of the database.
				CO6.Analyze the concept of Transactions , Recovery system and also file organization.
3	II/II	Formal Languages And Automata Theory	C223	CO1.Explain Applications and Limitation of Finite Automata.
				CO2.Summarize language classes & grammars relationship among them with the help of Chomsky hierarchy.
				CO3.Illustrate Employ finite state machines to solve problems in computing.
				CO4.Illustrate deterministic and non-deterministic machines.
				CO5.Analyze the hierarchy of problems arising in the computer science.
4	II/II	Java Programming	C224	CO1.Describe the concept of Object Oriented Programming & Java Programming Constructs.

					CO2.Describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords.
					CO3.Apply the concept of exception handling and Input/output operations.
					CO4.Design the applications of Java & Java applet.
					CO5.Analyze & Design the concept of multithreaded programming.
					CO6.Develop JDBC applications with database connectivity.
5	II/II	Managerial Economics And Financial Accountancy	C225		CO1.Define about the concept of managerial economics& different types of demand and demand Elasticity.
					CO2.Explain different types of production functions &cost concepts.
					CO3.Determine the nature of the markets and different pricing methods.
					CO4.Classify the different business forms and business cycles.
					CO5.Estimate the financial Position of the company based on different financial tools.
					CO6.Prepare the different proposals of Capital Budgeting.
6	III/II	Machine Learning	C321		CO1.Explain fundamental usage of concept Machine Learning system.
					CO2.Demonstrate on various regression Technique.
					CO3.Analyze Ensemble Learning Methods.
					CO4.Illustrate Clustering Techniques.
					CO5.Illustrate Dimensionality Reduction Models in Machine Learning.
					CO6.Discuss Neural Network Models and Fundamentals concepts of Deep Learning.
7	III/II	Compiler Design	C322		CO1.Explain compilation process, phases of compiler and the role of lexical analyser.
					CO2. Discuss about parser & construct different types of parsers & differentiate various parsing techniques.
					CO3. Analyse Syntax Directed Translation schemes and type checking and describe role of semantic analyser.
					CO4.Generate intermediate code in different representations.
					CO5.Discuss about run time organization and Code Generation.

				CO6.Describe optimization techniques to generate optimized code.
8	III/II	Cryptography And Network Security	C323	CO1.Describe various cryptographic techniques.
				CO2. Discuss the principles of Symmetric Encryption.
				3.Demonstrate Block Ciphers methods and lic Key Cryptography.
				4.Interpret Hashing functions and Digital Signature techniques.
				CO5.Inference various Security applications and protocols.
				CO6.Summarize system level security applications against the threats in the networks.
9	III/II	Object Oriented Analysis And Design	C324	CO1.Analyze the nature of complex system and its solutions.
				CO2.Illustrate & relate the conceptual model of the UML, identify & design the classes.
				CO3.Analyze & Design Class & Object Diagrams that represent Static Aspects of a Software System.
				CO4.Apply basic and Advanced Structural Modelling Concepts for designing real time applications.
				CO5.Analyze & Design behavioural aspects of a Software System using Use Case, Interaction and Activity Diagrams.
				CO6.Analyze & Apply techniques of State Chart Diagrams and Implementation Diagrams to model behavioural aspects and Runtime environment of Software Systems.
10	III/II	Digital Logic Design	C325	CO1.Classify different number systems and apply to generate various codes.
				CO2.Use concept of Boolean algebra in minimization of switching functions.
				CO3.Design different types of combination allogic circuits.
				CO4.Apply knowledge of flip-flops in designing of Registers and counters.
				CO5.Operation and design methodology for synchronous sequential circuits and algorithmic state machines.
				CO6.Algorithmic state machines employ a structured methodology, delineating states, transitions.
11	IV/II	Project	C421	CO:Major Project Work, Seminar Internship

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Program: B.Tech. Branch: CSE-AIML	Academic year : 2023-2024 Regulation: R20	Semester: I

S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
1	II/I	Mathematics-III	C211	**CO1:** Interpret the physical meaning of different operators such as gradient, curl and divergence
				CO2: Estimate the work done against a field, circulation and flux using vector calculus
				CO3: Apply the Laplace transform for solving differential equations
				CO4: Find or compute the Fourier series of periodic signals
				CO5: Know and be able to Apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms
				CO6: Identify solution methods for partial differential equations that model physical processes
2	II/I	Mathematical Foundation of Computer science	C212	**CO1:** Demonstrate skills in solving mathematical problems
				CO2: Comprehend mathematical principles and logic
				CO3: Demonstrate knowledge of mathematical modelling and proficiency in using mathematical software
				CO4: Manipulate and analyze data numerically and/or graphically using appropriate Software
				CO5: Communicate effectively mathematical ideas/results verbally or in writing
				CO6: Ability to apply mathematical logic to solve problems.

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S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
3	II/I	Introduction to Artificial Intelligence and Machine Learning	C213	**CO1:** Enumerate the history and foundations of Artificial Intelligence
				CO2: Apply the basic principles of AI in problem solving
				CO3: Choose the appropriate representation of Knowledge
				CO4: Enumerate the Perspectives and Issues in Machine Learning
				CO5: Identify issues in Decision Tree Learning
4	II/I	Object Oriented Programming With JAVA	C214	**CO1:** Able to realize the concept of Object Oriented Programming & Java Programming Constructs
				CO2: Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords
				CO3: Apply the concept of exception handling and Input/ Output operations
				CO4: Able to design the applications of Java & Java applet
				CO5: Able to Analyze & Design the concept of Event Handling and Abstract Window Toolkit
				CO6: Use multithreading concepts to develop inter process communication.
5	II/I	Database Management Systems	C215	**CO1:** Describe a relational database and object-oriented database
				CO2: Create ,maintain and manipulate a relational database using SQL.
				CO3: Describe ER model and normalization for database design
				CO4: Examine issues in data storage and query processing and can formulate appropriate solutions.
				CO5: Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage
				CO6: Introduce ER data model, database design and normalization

S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
6	II/I	Introduction to Artificial Intelligence and Machine Learning Lab	C216	**CO1:** Apply the basic principles of AI in problem solving using LISP/PROLOG
				CO2: Implement different algorithms using LISP/PROLOG
				CO3: Develop an Expert System using JESS/PROLOG
7	II/I	Object Oriented Programming With Java Lab	C217	**CO1:** Evaluate default value of all primitive data, Operations, Expressions, Control-flow, Strings.
				CO2: Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism.
				CO3: Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism
				CO4: Construct Threads, Event Handling, implement packages, developing applets
				CO5: Develop efficient programs using multithreading
				CO6: Design reliable programs using Java exception handling features.
8	II/I	Database Management Systems Lab	C218	CO1: Utilize SQL to execute queries for creating database and performing data manipulation operations
				CO2: Examine integrity constraints to build efficient databases
				CO3: Apply Queries using Advanced Concepts of SQL
				CO4: Build PL/SQL programs including stored procedures, functions, cursors and triggers
				CO5: Critically analyze the use of Tables, Views, Functions and Procedures
				CO6: Use typical data definitions and manipulation commands

Program: B.Tech. Branch: CSE-AIML	Academic year : 2023-2024 Regulation: R20	Semester: II

S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
1	II/II	Probability and Statistics	C221	CO1: Classify the concepts of data science and its importance (L4) or (L2)
				CO2:Interept the association of characteristics and through correlation and regression tools
				CO3:Make use of the concepts of probability and their applications (L3)
				CO4:Apply discrete and continuous probability distributions (L3)
				CO5:Design the components of a classical hypothesis test (L6)
				CO6:Infer the statistical inferential methods based on small and large sampling tests (L4)
2	II/II	Computer Organization	C222	CO1:Principles and the Implementation of Computer Arithmetic
				CO2:Operation of CPUs including RTL, ALU, Instruction Cycle and Busses.
				CO3:Build the Entity relationship model
				CO4: Different Instruction Set Architectures and their relationship to the CPU Design
				CO5:Memory System and I/O Organization
				CO6:Principles of Operation of Multiprocessor Systems and Pipelining
3	II/II	Data Warehousing and Mining	C223	CO1: Summarize the architecture of data warehouse
				CO2: Apply different preprocessing methods, Similarity, Dissimilarity measures for any given raw data.
				CO3: Construct a decision tree and resolve the problem of model over fitting
				CO4: Compare Apriori and FP-growth association rule mining algorithms for frequent item set generation
				CO5: Apply suitable clustering algorithm for the given data set
				CO6:Identify and apply various clustering algorithm (with open source tools), interpret, evaluate and report the result.

S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
4	II/II	Formal Languages and Automata Theory	C224	CO1:Explain Applications and Limitation of Finite Automata.
				CO2:Summarize language classes & grammars relationship among them with the help of Chomsky hierarchy
				CO3:Illustrate Employ finite state machines to solve problems in computing
				CO4:Illustrate deterministic and non-deterministic machines
				CO5:Analyze the hierarchy of problems arising in the computer science
				CO6:Develop JDBC applications with database connectivity
5	II/II	Managerial Economics And Financial Accountancy	C225	CO1:Define about the concept of managerial economics& different types of demand and demand Elasticity
				CO2:Explain different types of production functions &cost concepts
				CO3:Determine the nature of the markets and different pricing methods
				CO4:Classify the different business forms and business cycles
				CO5:Estimate the financial Position of the company based on different financial tools
				CO6:Prepare the different proposals of Capital Budgeting
6	II/II	R Programming Lab	C226	CO1:Implement basic concepts of R programming, and its different module that includes conditional, looping and lists
				CO2:Implement the concepts of R Script to extract the data from data frames and file operations.
				CO3:Implement the various statistical techniques using R
				CO4:Extend the functionality of R by using add-on packages
				CO5:Use R Graphics and Tables to visualize results of various statistical operations on data
				CO6:Prepare the different techniques using R

S.No.	Year/Sem	Course Name	Course Code	Course Outcomes
7	II/II	Data Mining Using Python Lab	C227	CO1:Apply preprocessing techniques on real world datasets
				CO2:Apply apriori algorithm to generate frequent item sets
				CO3:Apply Classification and clustering algorithms on different datasets
				CO4:Compose, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions
				CO5:Apply exception handling and gain efficient testing, debugging skills in python
				CO6:Implement applications in Machine Learning, IoT, Big data and Data Analysis using Python
8	II/II	Web Application Development Lab	C228	CO1:To develop the skill in Creating dynamic web pages with servlets
				CO2:To provide knowledge in connecting java programs with database using JDBC
				CO3:To develop the skill in server side programming using JSP, node.js, React.js
				CO4:To provide knowledge about MERN stack
				CO5:Testing the application on an Application Server
				CO6:Debugging Web applications locally and remotely
9	II/II	MongoDB	C229	CO1:Installing and configuring mongoDB in windows
				CO2:Perform all database operations using mongoDB
				CO3:Develop applications by integrating mongoDBwith java/PHP
				CO4:Understand the concepts of Game design and development.
				CO5:Explain how data is collected, managed and stored for data science;
				CO6:Implement a program with basic commands on databases and collections using *MongoDB*.

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

Program: B.Tech. Branch: CSE-Data Science	Academic year : 2023-2024 Regulation: R20	Semester: I

S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
1	II/I	Mathematics-III	C211	**CO1:** Interpret the physical meaning of different operators such as gradient, curl and divergence
				CO2: Estimate the work done against a field, circulation and flux using vector calculus
				CO3: Apply the Laplace transform for solving differential equations
				CO4: Find or compute the Fourier series of periodic signals
				CO5: Know and be able to Apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms
				CO6: Identify solution methods for partial differential equations that model physical processes
2	II/I	Mathematical Foundation of Computer science	C212	**CO1:** Demonstrate skills in solving mathematical problems
				CO2: Comprehend mathematical principles and logic
				CO3: Demonstrate knowledge of mathematical modelling and proficiency in using mathematical software
				CO4: Manipulate and analyze data numerically and/or graphically using appropriate Software
				CO5: Communicate effectively mathematical ideas/results verbally or in writing
				CO6: Ability to apply mathematical logic to solve problems.

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S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
3	II/I	Fundamentals of data science	C213	CO1: Apply principles of NumPy and Pandas to the analysis of data.
				CO2: Make use of various file formats in loading and storage of data.
				CO3: Identify and apply the need and importance of pre-processing techniques
				CO4: Show the results and present them in a pictorial format
				CO5: Describe the significance of data science and understand t he Data Science process
				CO6: Choose contemporary models, such as machine learning, AI, techniques to solve practical problems
4	II/I	Object Oriented Programming With JAVA	C214	CO1: Able to realize the concept of Object Oriented Programming & Java Programming Constructs
				CO2: Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords
				CO3: Apply the concept of exception handling and Input/ Output operations
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5	II/I	Database Management Systems	C215	CO1: Describe a relational database and object-oriented database
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S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
6	II/I	Fundamentals of Data Science Lab	C216	CO1:Perform various operations on numpy arrays
				CO2: Importing data from different file formats using panda
				CO3: Draw different types of charts using mat plot lib
				CO4: Analyze Data using various Visualization techniques
				CO5: Build, and prepare data for use with a variety of statistical methods and models
				CO6:Perform descriptive analytics on the benchmark data sets
7	II/I	Object Oriented Programming With Java Lab	C217	CO1: Evaluate default value of all primitive data, Operations, Expressions, Control-flow, Strings.
				CO2: Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism.
				CO3: Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism
				CO4: Construct Threads, Event Handling, implement packages, developing applets
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Program: B.Tech. Branch: CSE-Data Science		Academic year : 2023-2024 Regulation: R20		Semester: II

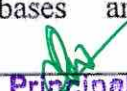| S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
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				CO5:Memory System and I/O Organization
				CO6:Principles of Operation of Multiprocessor Systems and Pipelining
3	II/II	Data Warehousing and Mining	C223	CO1:Data Mining and its functionalities and Design schema for real time data
				CO2:Demonstrate on various Data Preprocessing Techniques viz. data cleaning, data integration
				CO3:data transformation and data reduction and Process raw data
				CO4:Choose appropriate classification technique to perform model building
				CO5:Apriority and FP Growth algorithms and analyze on frequent itemsets generation.
				CO6:Identify and apply various clustering algorithm (with open source tools), interpret, evaluate and report the result.

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2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

Program:B.Tech.	Academic year : 2023-24	Semester: I
Branch : Electrical & Electronics Engg.	Regulation: R20	

S.No.	Sem	CourseName	Course Code	CourseOutcomes
1	11/1	**Mathematics-IV**	C211	CO1 : apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic (L3)
				CO2 : find the differentiation and integration of complex functions used in engineering problems (L5)
				CO3 : make use of the Cauchy residue theorem to evaluate certain integrals (L3)
				CO4 :apply discrete and continuous probability distributions (L3)
				CO5 : design the components of a classical hypothesis test (L6)
				CO6 : infer the statistical inferential methods based on small and large sampling tests (L4)
2	II/I	**ELECTRONIC DEVICES AND CIRCUITS**	C212	CO1: Understand the basic concepts of semiconductor physics.
				CO2 : Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
				CO3 : Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.
				CO4 : Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations.
				CO5: Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions.
				CO6: Perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations.

S.No.	Sem	CourseName	Course Code	CourseOutcomes
3	II/1	ELECTRICAL CIRCUIT ANALYSIS - II		CO1 : Understand the concepts of balanced and unbalanced three-phase circuits.□
				CO2 : Know the transient behavior of electrical networks with DC excitations.
				CO3 : Learn the transient behavior of electrical networks with AC excitations.
				CO4 : Estimate various parameters of a two port network
				CO5 : Understand the significance of filters in electrical networks.□
4	II/I	DC MACHINES AND TRANSFORMERS	C212	CO1: Assimilate the concepts of electromechanical energy conversion.
				CO2 : Mitigate the ill-effects of armature reaction and improve commutation in dc machines.
				CO3 : Understand the torque production mechanism and control the speed of dc motors.
				CO4 : Analyze the performance of single phase transformers.
				CO5: Predetermine regulation, losses and efficiency of single phase transformers.
				CO6: Parallel transformers, control voltages with tap changing methods and achieve three-phase to two-phase transformation.

S.No.	Sem	CourseName	Course Code	CourseOutcomes
5	II/1	ELECTRO MAGNETIC FIELDS	C211	CO1 : Compute electric fields and potentials using Gauss law or solve Laplace's or Poisson's equations for various electric charge distributions
				CO2 : Calculate the capacitance and energy stored in dielectrics
				CO3 : Calculate the magnetic field intensity due to current carrying conductor and understanding the application of Ampere's law, Maxwell's second and third law.
				CO4 : Estimate self and mutual inductances and the energy stored in the magnetic field.
				CO5 : Understand the concepts of displacement current and Poynting theorem and Poynting vector

S.No.	Sem	CourseName	Course Code	CourseOutcomes
1	I11/1	POWER SYSTEMS–II	C311	CO1 : Calculate parameters of transmission lines for different circuit configurations
				CO2 :Determine the performance of short, medium and long transmission lines.
				CO3 : Analyse the effect of travelling waves on transmission lines.
				CO4 : Analyse the various voltage control methods and effect of corona
				CO5 : Calculate sag/tension of transmission lines and performance of line insulators.
2	I11/1	POWER ELECTRONICS	C212	CO1: Illustrate the static and dynamic characteristics of SCR, Power-MOSFET and Power-IGBT. .
				CO2 : Analyse the operation of phase-controlled rectifiers .
				CO3 : Analyse the operation of three-phase full–wave converters, AC Voltage Controllers and Cycloconverters
				CO4 : Examine the operation and design of different types of DC-DC converters
				CO5: Analyse the operation of PWM inverters for voltage control and harmonic mitigation.

S.No.	Sem	CourseName	Course Code	CourseOutcomes
3	I11/1	CONTROL SYSTEMS	C211	CO1 : Derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs
				CO2 : Determine time response specifications of second order systems and absolute and relative stability of LTI systems using Routh's stability criterion and root locus method
				CO3 : Analyze the stability of LTI systems using frequency response methods
				CO4 : Design Lag, Lead, Lag-Lead compensators to improve systen performance using Bode diagrams
				CO5 : Represent physical systems as state models and determine the response. Understand the concepts of controllability and observability

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S.No.	Sem	CourseName	Course Code	CourseOutcomes
4	I11/1	**RENEWABLE ENERGY SOURCES**	C314	CO1 : Analyze solar radiation data, extra-terrestrial radiation, radiation on earth's surface and solar Energy Storage
				CO2 : Illustrate the components of wind energy systems .
				CO3 : Illustrate the working of biomass, digesters and Geothermal plants
				CO4 : Demonstrate the principle of Energy production from OTEC, Tidal and Waves
				CO5 : Evaluate the concept and working of Fuel cells & MHD power generation .
5	I11/1	**CONCEPTS OF OPTIMIZATION TECHNIQUES**	C315	CO1: State and formulate the optimization problem without and with constraints, also apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints and arrive at an optimal solution . .
				CO2 : Formulate a mathematical model and apply linear programming technique by using Simplex method. Also extend the concept of dual Simplex method for optimal solutions .
				CO3 : Formulate a mathematical model and apply non-linear programming techniques for unconstrained and constrained case studies
				CO4 : Solve transportation and assignment problem by using Linear programming Simplex method
				CO5: Formulate and apply Dynamic programming technique to inventory control, production planning, engineering design problems etc. to reach a final optimal solution from the current optimal solution .

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Program:B.Tech.			Academic year : 2023-24	Semester : II
Branch : Electrical & Electronics Engg			Regulation: R20	

S.No.	Sem	CourseName	Course Code	CourseOutcomes
1	Il/I1	**PYTHON PROGRAMMING**	C211	CO1 : Develop essential programming skills in computer programming concepts like data types, containers
				CO2 : Apply the basics of programming in the Python language Solve coding tasks related.
				CO3 : conditional execution, loops.
				CO4 : Solve coding tasks related to the fundamental notions and techniques used in object- oriented programming
2	11I/1	**DIGITAL ELECTRONICS**	C212	CO1: Classify different number systems and apply to generate various codes. .
				CO2 : Use the concept of Boolean algebra in minimization of switching functions.
				CO3 : Design different types of combinational logic circuits
				CO4 : Apply knowledge of flip-flops in designing of Registers and counters
				CO5: The operation and design methodology for synchronous sequential circuits and algorithmic state machines.

S.No.	Sem	CourseName	Course Code	CourseOutcomes
3	Il/I1	**POWER SYSTEMS - I**	C211	CO1 : Identify the different components of thermal power plants
				CO2 : Identify the different components of nuclear Power plants
				CO3 : Identify the different components of air and gas insulated substations
				CO4 : Identify single core and three core cables with different insulating materials
				CO5 :Analyse the different economic factors of power generation and tariffs

S.No.	Sem	CourseName	Course Code	CourseOutcomes
4	I1/11	**INDUCTION AND SYNCHRONOUS MACHINES**	C314	CO1 :Explain the operation and performance of three phase induction motor
				CO2 : Analyze the torque-speed relation, performance of induction motor and induction generator.
				CO3 : Implement the starting of single phase induction motors
				CO4 : Develop winding design and predetermine the regulation of synchronous generators
				CO5 : Explain hunting phenomenon, implement methods of staring and correction of power factor with synchronous motor.
5	I1/11	**MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS**	C315	CO1: The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product. .
				CO2 : The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
				CO3 : The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units
				CO4 : The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis
				CO5: The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

S.No.	Sem	CourseName	Course Code	CourseOutcomes
1	III1/I1	MICROPROCESSORS AND MICROCONTROLLERS	C211	CO1 : Know the concepts of the Microprocessor capability in general and explore the evaluation of microprocessors
				CO2 : Analyse the instruction sets - addressing modes - minimum and maximum modes operations of 8086 Microprocessors .
				CO3 : Analyse the Microcontroller and interfacing capability .
				CO4 : Describe the architecture and interfacing of 8051 controller
				CO5 : Know the concepts of PIC micro controller and its programming
2	I11/I1	ELECTRICAL MEASUREMENTS AND INSTRUMENTATION	C212	CO1: Know the construction and working of various types of analog instruments
				CO2 : Describe the construction and working of wattmeter and power factor meters .
				CO3 : Know the construction and working various bridges for the measurement resistance - inductance and capacitance
				CO4 : Know the operational concepts of various transducers
				CO5: Know the construction and operation digital meters .

S.No.	Sem	CourseName	Course Code	CourseOutcomes
3	II1/I1	POWER SYSTEM ANALYSIS	C211	CO1 : Draw impedance diagram for a power system network and calculate per unit quantities
				CO2 : Apply the load flow solution to a power system using different methods
				CO3 : Form Z_{bus} for a power system networks and analyse the effect of symmetrical faults
				CO4 : Find the sequence components for power system Components and analyse its effects of unsymmetrical faults
				CO5 : Analyse the stability concepts of a power system

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S.No.	Sem	CourseName	Course Code	CourseOutcomes
4	II1/11	**SIGNALS AND SYSTEMS**	C314	CO1 : Apply the knowledge of various signals and operations
				CO2 : Analyze the spectral characteristics of periodic signals using Fourier Analysis .
				CO3 : Classify the systems based on their properties and determine the response of LSI system using convolution
				CO4 : Understand the process of sampling and the effects of under sampling
				CO5 : Apply Laplace and z-transforms to analyze signals and Systems (continuous & discrete). .
5	II1/11	**ELECTRIC DRIVES**	C315	CO1: Explain the fundamentals of electric drive and different electric braking methods .
				CO2 : Analyze the operation of three-phase converter fed dc motors and four quadrant operations of dc motors using dual converters .
				CO3 : Describe the DC-DC converter fed control of dc motors in various quadrants of operation
				CO4 : Know the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters and differentiate the stator side control and rotor side control
				CO5: Learn the concepts of speed control of synchronous motor with different methods .

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

Program:B.Tech. Branch : Mechanical Engineering	Academic year : 2023-24 Regulation: R20	Semester : I

S.No.	Sem	CourseName	Course Code	CourseOutcomes
1	11/1	VECTOR CALCULUS FOURIER TRANSFORMS and PDE (M-III)	C211	CO1 : interpret the physical meaning of different operators such as gradient, curl and divergence
				CO2 : estimate the work done against a field, circulation and flux using vector calculus
				CO3 : apply the Laplace transform for solving differential equations
				CO4 : find or compute the Fourier series of periodic signals
				CO5 : know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms
				CO6 : identify solution methods for partial differential equations that model physical processes
2	II/I	MECHANICS OF SOLIDS	C212	CO1: Model & Analyze the behavior of basic structural members subjected to various loading and support conditions based on principles of equilibrium.
				CO2 : Understand the apply the concept of stress and strain to analyze and design structural members and machine parts under axial, shear and bending loads, moment and torsional moment.
				CO3 : Students will learn all the methods to analyze beams, columns, frames for normal, shear, and torsion stresses and to solve deflection problems in preparation for the design of such structural components. Students are able to analyze beams and draw correct and complete shear and bending moment diagrams for beams.
				CO4 : Students attain a deeper understanding of the loads, stresses and strains acting on a structure and their relations in the elastic behavior.
				CO5: Design and analysis of Industrial components like pressure vessels

S.No.	Sem	CourseName	Course Code	CourseOutcomes
3	II/1	FLUID MECHANICS & HYDRAULIC MACHINES	C211	CO1 : The basic concepts of fluid properties
				CO2 : The mechanics of fluids in static and dynamic conditions
				CO3 : Boundary layer theory, flow separation and dimensional analysis. CO4: Hydrodynamic forces of jet on vanes in different positions
				CO4 : Working Principles and performance evaluation of hydraulic pump and turbines

S.No.	Sem	CourseName	Course Code	CourseOutcomes
4	II/1	PRODUCTION TECHNOLOGY	C314	CO1 : Able to design the patterns and core boxes for metal casting processes
				CO2 : Able to design the gating system for different metallic components.
				CO3 : Know the different types of manufacturing processes
				CO4 : Be able to use forging, extrusion processes
				CO5 : Learn about the different types of welding processes used for special fabrication.
5	II/1	KINEMATICS OF MACHINERY	C315	CO1: Contrive a mechanism for a given plane motion with single degree of freedom.
				CO2 : Suggest and analyze a mechanism for a given straight line motion and automobile steering motion.
				CO3 : Analyze the motion (velocity and acceleration) of a plane mechanism.
				CO4 : Suggest and analyze mechanisms for a prescribed intermittent motion like opening and closing of IC engine valves etc
				CO5: Select a power transmission system for a given application and analyze motion of different transmission systems.

Program: B.Tech. Branch: Mechanical Engineering	Academic year : 2023-2024 Regulation: R20	Semester: I

S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
1	IV/I	Universal Human Values-2	C411	**CO1:** Purpose and motivation for the course, recapitulation from Universal Human Values-I.
				CO2: Self-Exploration.
				CO3: Continuous Happiness and Prosperity- A look at basic Human Aspirations.
				CO4: Right understanding, Relationship and Physical Facility
				CO5: Understanding Happiness and Prosperity correctly
				CO6: Method to fulfill the above human aspirations
2	IV/I	Unconventional Machining Processes	C412	**CO1:** Understand the concepts of modern machining processes. . CO2: CO3: CO4: CO5:
				CO2: Learn the principles of ultrasonic machining.
				CO3: Apply the principles and procedure of electro chemical and chemical machining processes.
				CO4: Apply the principles and procedure of thermal metal removal processes
				CO5 Illustrate the principles and procedure of electron beam machining, laser beam machining and plasma machining.
3	IV/I	Power Plant Engineering	C413	**CO1:** Identify the different components of the steam power plant for power production.
				CO2: Illustrate the component used in the diesel and gas power plant for power production
				CO3: Understand how the power is produced by hydro-electric and nuclear power plants
				CO4: Interpret the power production by combined power plants and operating principles of different instruments used in power plants.
				CO5: Analyze power plant economics and implementation of pollution standards and control of pollution caused by the power plants.

S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
4	IV/I	Non Destructive Evaluation	C414	**CO1:** Understand the concepts of various NDE techniques and the requirements of radiographytechniques and safety aspects.
				CO2: Interpret the principles and procedure of ultrasonic testing (BL-2).
				CO3: Understand the principles and procedure of Liquid penetration and eddy current testing.
				CO4: Illustrate the principles and procedure of Magnetic particle testing.
				CO5: Interpret the principles and procedure of infrared testing and thermal testing.
5	IV/I	Road Safety Engineering	C415	**CO1:** To understand fundamental of Traffic Engineering.
				CO2: To investigate & determine the collective factors & remedies of accident involved.
				CO3: To design & planning various road geometrics.
				CO4: To massage the traffic system from road safety point of view.
6	IV/I	Disaster Management	C416	**CO1:** Affirm the usefulness of integrating management principles in disaster mitigation work.
				CO2: Distinguish between the different approaches needed to manage pre- during and post- disaster periods
				CO3: Explain the process of risk management
				CO4: Relate to risk transfer

Program: B.Tech. Branch: Mechanical Engineering	Academic year : 2023-2024 Regulation: R20	Semester: II

S.No.	Year/ Sem	Course Name	Course Code	Course Outcomes
1	IV/II	Project	C421	**CO:** Major Project Work, Seminar Internship

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Program: B.Tech.	Academic year : 2023-24	Semester : II
Branch : Mechanical Engineering	Regulation: R20	

S.No.	Sem	CourseName	Course Code	CourseOutcomes
1	11/I1	MATERIALS SCIENCE & METALLURGY	C211	CO1 : Understand the crystalline structure of different metals and study the stability of phases in different alloy systems
				CO2 : Study the behavior of ferrous and non ferrous metals and alloys and their application in different domains
				CO3 : Able to understand the effect of heat treatment, addition of alloying elements on properties of ferrous metals
				CO4 : Grasp the methods of making of metal powders and applications of powder metallurgy
				CO5 : Comprehend the properties and applications of ceramic, composites and other advanced methods.
2	II/II	COMPLEX VARIABLES AND STATISTICAL METHODS	C212	CO1: apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic .
				CO2 : find the differentiation and integration of complex functions used in engineering problems .
				CO3 : make use of the Cauchy residue theorem to evaluate certain integrals .
				CO4 : apply discrete and continuous probability distributions .
				CO5: design the components of a classical hypothesis test
				CO5: infer the statistical inferential methods based on small and large sampling tests

S.No.	Sem	CourseName	Course Code	CourseOutcomes
3	II/I1	DYNAMICS OF MACHINERY	C211	CO1 : To compute the frictional losses and transmission in clutches, brakes anddynamometers
				CO2 : To determine the effect of gyroscopic couple in motor vehicles, ships andaeroplanes
				CO3 : To analyze the forces in four bar and slider crank mechanisms and design aflywheel
				CO4 : To determine the rotary unbalanced mass in reciprocatingequipment
				CO5 : To determine the unbalanced forces and couples in reciprocating and radialengines
				CO6 : To determine the natural frequencies of discrete systems undergoing longitudinal, torsional and transverse vibrations

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S.No.	Sem	CourseName	Course Code	Course Outcomes
4	II/1I	**THERMAL ENGINEERING - I**	C314	CO1 : Derive the actual cycle from fuel-air cycle and air- standard cycle for all practical applications.
				CO2 : Explain working principle and various components of IC engine.
				CO3 : Explain combustion phenomenon of CI and SI engines and their impact on engine variables.
				CO4 : Analyze the performance of an IC engine based on the performance parameters
				CO5 : Explain the cycles and systems of a gas turbine and determine the efficiency of gas turbine. CO6: Explain the applications and working principle of rockets and jet propulsion.
5	II/I1	**INDUSTRIAL ENGINEERING AND MANAGEMENT**	C315	CO1: Design and conduct experiments, analyse, interpret data and synthesize validconclusions .
				CO2 : Design a system, component, or process, and synthesize solutions to achieve desiredneeds .
				CO3 : Use the techniques, skills, and modern engineering tools necessary for engineering practice with appropriate considerations for public health and safety, cultural, societal, and environmental constraints .
				CO4 : Function effectively within multi-disciplinary teams and understand the fundamental precepts of effective project management

PROGRAM OUTCOMES (POs)

PO1. Engineering knowledge:

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis:

Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. 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.

PO4. 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.

PO5. 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.

PO6. 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.

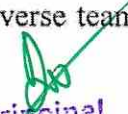### PO7. Environment and sustainability:

Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work:

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. 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.

PO11. 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 multidisciplinary environments.

PO12. 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.

Department of CSE

PROGRAM SPECIFIC OUTCOME (PSOs)

PSO1: Analyze: Identify the data, Design suitable algorithm by using Latest software for Real Time Applications.

PSO2: Computing Paradigms: Understand the evolutionary changes in computing possess knowledge of context aware applicability of paradigms and meet the challenges of the future.

Department of CSE (Data Science)

PROGRAM SPECIFIC OUTCOME (PSO'S)

PSO1: Ability to design and develop applications using various Data Science tools..

PSO2: The learners will be able to develop the knowledge of the competitive environment in success of globally acclaimed tests like GRE, TOEFL, ILTES, IES, GMAT, CAT, PSUs, and GATE etc.

Department of CSE (AIML)

PROGRAM SPECIFIC OUTCOME (PSO'S)

PSO1: Mobile Apps: Ability to design, develop and deploy mobile applications in Windows/ Google / Mac Apps Stores.

PSO2: Architecture of Computer System: Ability to visualize and articulate computer hardware and software systems for various complex applications.

PSO3: Problem Solving Skills: The ability to apply standard practices and strategies in software project development using open-ended environment to deliver a quality product for business success.

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