SRI VASAVI ENGINEERING COLLEGE (Autonomous)

(Permanent Affiliation to JNTUK, Kakinada), PEDATADEPALLI, TADEPALLIGUDEM-534 101

Department of Computer Science and Engineering

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Department of Computer Science and Technology

Course Outcomes of B.Tech(CSE) & B.Tech(CST) -V20 Regulation

Semester	Course Code & Name	Course Outcomes
I Semester	V20MAT01 **Linear Algebra and Differential Equations**	**After Successful completion of the Course, the student will be able to:** 1. Apply matrix technique to solve system of linear equations 2. Find Eigen values and Eigen vectors 3. Solve the ordinary differential equations of first order & first degree 4. Solve the linear differential equations of higher order with constantcoefficients. 5. Find maxima and minima of functions of two variables.
I Semester	V20CHT01 **Engineering Chemistry**	**After Successful completion of the Course, the student will be able to:** 1. Solve boiler troubles originated due to poor water quality and suggest suitable water treatment methods.. 2. Choose plastics and rubbers for engineering applications. 3. Associate concepts of Electro Chemistry in designing electrochemical energy systems. 4. Assess the quality of fuels. 5. Apply corrosion principles for protection of metallic structures.
I Semester	V20ENT01 **English for Professional Enhancement**	**After Successful completion of the Course, the student will be able to:** 1. Identify the central theme of the text, use cohesive items for coherence in a paragraph, recognize nouns and basic sentence structures. 2. Restate the central idea of the letter by using appropriate vocabulary. Gain mastery over articles and prepositions. 3. Find the success formula after reading the text in detail to answer questions. Use appropriate tense and concord, find suitable vocabulary and format to draft letters and e-mails. 4. Employ reading skills to comprehend the given biography. Interpret visual information .Use quantifiers 5. appropriately and get acquainted with formal drafting 6. Appraise the delivered lecture and text, recognize the contextual vocabulary and prepare poster presentations.
I Semester	V20MEL02 **Engineering Workshop**	**After Successful completion of the Course, the student will be able to:** 1. Prepare different models in the carpentry trade and understand basic concepts of carpentry. 2. Develop various basic prototypes in the trade of Tin smithy and understand basic concepts of Tin smithy. 3. Prepare various basic prototypes in the trade of fitting and understand basicconcepts of fitting. 4. Prepare different models in the Black smithy and understand basic concepts of Black smithy 5. Develop various basic House Wiring techniques, Electrical wiring circuits. 6. Develop various basic prototype models in Welding and Foundry shop.

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I Semester	V20CST01 **Programming in 'C' for problem Solving**	**After Successful completion of the Course, the student will be able to:** 1. Describe various problem solving strategies such as Algorithms and Flowcharts. 2. Develop various programming constructs using Control Structures. 3. Construct Programs using modular programming approach. 4. Illustrate the usage of Arrays, String and pointers. 5. Construct Programs using Structures, Unions and Files.
I Semester	V20ENL01 **Hone your Communication Skills, Lab-I**	**After Successful completion of the Course, the student will be able to:** 1. Identify suitable expressions to greet people, say good bye to them, introduce one another, listen to consonants. 2. Select suitable words to invite someone, accept or decline invitations, listen to…, identify and produce vowel sounds. 3. Choose suitable expressions to seek/refuse permissions, to apologize and listen to word accent. 4. Find apt expressions to give suggestions, express opinions, use appropriate words to give commands and requests. 5. Practise listening to dialogues, role-plays using common vocabulary used in dialogues.
I Semester	V20CHL01 **Engineering Chemistry Lab**	**After Successful completion of the Course, the student will be able to:** 1. Analyse quantitatively a variety of samples using volumetric methods and instrumental methods. 2. Apply volumetric and instrumental methods for the determination of water quality parameters namely Alkalinity, Hardness and pH. 3. Prepare polymeric materials and analyse the given coal samples joint.
I Semester	V20CSL01 **Programming Lab in 'C' for problem Solving**	**After Successful completion of the Course, the student will be able to:** 1. Demonstrate problem solving techniques. 2. Construct Programs using the concepts of Arrays, Strings and Pointers 3. Apply the concepts of Functions, Structures and Unions. 4. Use various file processing operations to develop real-time applications
II Semester	V20MAT02 **Numerical Methods and Vector Calculus**	**After Successful completion of the Course, the student will be able to:** 1. Compute approximate roots of algebraic and transcendental equations and inter polating polynomial for the given data 2. Solve ordinary differential equations with initial conditions using numerical methods 3. Find multiple integrals and improper integrals 4. Calculate gradient of a scalar function, divergence and curl of a vector function 5. Apply the knowledge of vector integral concepts to find characteristics of vector fields
II Semester	V20PHT01 **Engineering Physics**	**After Successful completion of the Course, the student will be able to:** 1. Associate the basic principles of structure of materials, crystallography and X-ray diffraction. 2. Prepare the students to the basic concepts of Lasers and their applications in optical fiber communication link 3. Indicate the applications of sound waves in various fields 4. Interpret wave and particle behavior of matter and relate it to electron theory of metals 5. Examine the advanced concepts of engineering materials like Semiconductors, Superconductors and Dielectrics
II Semester	V20ECT01 **Switching Theory and Logic Design**	**After Successful completion of the Course, the student will be able to:** 1. Explain the different types of number Systems, number conversions, codes and logic Gates. 2. Apply the concepts of Boolean algebra and use the knowledge of K-maps and tabular method for minimization of Boolean expressions.. 3. Construct the higher order modules from their lower order structures of various M combinational logic circuits. 4. Explain the concept of various flip flops. 5. Develop various sequential circuits like registers, counters and various Finite State Machine Models

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II Semester	V20CST02 **Python Programming**	**After Successful completion of the Course, the student will be able to:** 1. Illustrate basic concepts of Python Programming 2. Describe control structures in python. 3. Construct python programs using structured data types. . 4. Demonstrate functions and packages . 5. Develop programs on Files, Exception handling and OOPs Concepts.
II Semester	V20MEL01 **Engineering Graphics**	**After Successful completion of the Course, the student will be able to:** 1. Understand the basic commands in CAD Software and draw the conic sections. 2. Construct different types of scales and special curves. 3. Draw the projections of the points and lines. 4. Develop the projections of planes and surfaces of regular solids. 5. Draw the Isometric projections and conversion of views
II Semester	V18MET01 **Engineering Graphics**	**After Successful completion of the Course, the student will be able to:** 1. Demonstrate the usage of drawing instruments and sketch conic sections 2. Construct different types of scales and special curves 3. Draw the projections of the points, lines and planes with reference to the principal planes. 4. Develop the projections of solids and its surfaces. 5. Draw the Isometric projections of solids. 6. Convert the isometric view to orthographic view and vice versa.
II Semester	V20PHL01 **Engineering Physics Lab**	**After Successful completion of the Course, the student will be able to:** 1. Analyze the physical principle involved in the various instruments; also relate the principle to new application. 2. Demonstrate the various experiments in the areas of optics, mechanics and Electronics in all branches of engineering. 3. Think innovatively and also apply the creative skills that are essential for engineering.
II Semester	V20CSL02 **Python Programming Lab**	**After Successful completion of the Course, the student will be able to:** 1. Demonstrate Basic Python Programs. 2. Construct control structures in python 3. Demonstrate functions and packages. **4.** Construct python programs using structured data types**.** 5. Demonstrate Text Files and exception handling.
II Semester	V20ENL02 **Hone your Communication Skills Lab-II**	**After Successful completion of the Course, the student will be able to:** 1. Collect suitable expressions and vocabulary to participate in JAM. Identify root words. 2. Prepare, face and perform well in interviews with required etiquette. 3. Use appropriate telephone etiquette to succeed in telephonic interviews 4. Show team spirit and communicative skills in group discussion. 5. Arrange ideas and prepare to give presentations in a professional manner. 6. Debate rationally and cogently while putting forth the ideas.
II Semester	V20CHT02 **Environmental Studies**	**After Successful completion of the Course, the student will be able to:** 1. Recognize the importance of environment and eco system services. 2. Identify the characteristic features, uses and impact of overutilization of natural resource 3. Explain biodiversity, biodiversity services and conservation of biodiversity 4. Report the causes and impacts of various pollutions. 5. Illustrate social and global environmental issues; sustainable development practices.
II Semester	V20MBT51 **Managerial Economics and Financial Analysis**	**After Successful completion of the Course, the student will be able to:** 1. Understand the basic concepts of managerial economics, demand, elasticity of demand and methods of demand forecasting. 2. Interpret production concept, least cost combinations and various costs concepts in decision making. 3. Differentiate various Markets and Pricing methods along with Business Cycles 4. Prepare financial statements and its analysis. 5. Assess various investment project proposals with the help of Capital Budgeting techniques for decision making.

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II Semester	V20MAT07 **Mathematical Foundation of Computer Science**	**After Successful completion of the Course, the student will be able to:** 1. Demonstrate the concepts associated with propositions and mathematical logic. 2. Demonstrate the basic concepts associated with relations, functions and their applications. 3. Solve recurrence relations using various methods. 4. Apply techniques of graphs for real-time problems. 5. Construct minimal spanning tree by using different algorithms.
III Sem	V20CST03 **OOPs Through C++**	**After Successful completion of the Course, the student will be able to:** 1. Differentiate Procedural Oriented Programming and Object-Oriented Programming. 2. Develop programs using Classes and Objects. 3. Demonstrate Constructors, destructors & Operator-Overloading. 4. Construct Classes using inheritance and Exceptions. 5. Demonstrate Files and Generic Programming.
III Sem	V20CST04 **Data Structures**	**After Successful completion of the Course, the student will be able to:** 1. Illustrate the time and space complexities for searching and sorting algorithms. 2. Demonstrate linked lists and their applications. 3. Demonstrate Stacks and Queues. . 4. Illustrate basic operations on binary trees. 5. Demonstrate Graphs and their applications.
III Sem	V20CST05 **Computer Organization and Architecture**	**After Successful completion of the Course, the student will be able to:** 1. Illustrate Basic structure of Computers, Instruction types and their addressing modes. 2. Describe the different modes of Input / Output transfer. 3. Illustrate different types of Memory. 4. Describe the different types of Control Unit techniques. 5. Explain the Concepts of Pipelining and Parallel Processing
III Sem	V20CSL03 **OOPs Through C++Lab**	**After Successful completion of the Course, the student will be able to:** **1.** Develop Programs on Classes and Objects**.** 2. Demonstrate Constructors, Destructors and Operator-Overloading, Inheritance and Polymorphism. 3. Develop programs to handle Exceptions & Files. **4.** Demonstrate Generic Programming**.**
III Sem	V20CSL04 **Data Structures Lab**	**After Successful completion of the Course, the student will be able to:** 1. Construct Programs on Sorting and Searching Techniques. 2. Illustrate Various Operations On Linked Lists. 3. Develop Programs On Stacks, Queues and Their Applications. 4. Develop Various Operations on Trees and Graphs
III Semester	V20CSL05 **Linux Shell Scripting Lab**	**After Successful completion of the Course, the student will be able to:** 1. Demonstrate the basic knowledge of Linux commands and utilities by using Linux shell environment. 2. Experiment with the Concept of shell Programming on Files and Directories 3. Experiment with the Concept of shell Programming on File Permissions 4. Experiment with the Concept of shell Programming on Conditional Statements 5. Experiment with the Concept of shell Programming on Looping Statements
III Semester	V20ENT02 **Professional Communication Skills - I**	**After Successful completion of the Course, the student will be able to:** 1. Use vocabulary in regular chores of life with accuracy, make meaningful sentences, and describe people and their traits vividly. 2. Distinguish between places of pilgrimage and holiday spots; describe incidents, things and process; and frame questions, statements and expressions. 3. Demonstrate their knowledge of idioms which are similar to those of native speakers while speaking and writing and use phrases clearly and precisely to articulate their views that compare and contrast indianisms with native expressions and avoid common errors. 4. Employ the vocabulary of netizens with ease and walk through the letters and emails for effective official correspondence and infer the accurate meaning of the homophones that are often confusing. 5. Summarize their profile; introduce themselves as well as others by incorporating their accomplishments and Sketch stories and anecdotes in an interesting and engaging manner that arouses curiosity of the audience.

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IV Semester	V20CST06 **Design and Analysis of Algorithms**	**After Successful completion of the Course, the student will be able to:** 1. Demonstrate asymptotic notation and divide and conquer technique. 2. Use greedy technique to solve various problems. 3. Demonstrate dynamic programming technique to various problems. 4. Develop algorithms using backtracking technique. 5. Demonstrate branch and bound technique to various problems.
IV Semester	V20CST07 **Software Engineering**	**After Successful completion of the Course, the student will be able to:** 1. Demonstrate the Software Development life cycle Models. 2. Illustrate the Requirements engineering process and SRS document. 3. Develop the Software Architecture and Design Modeling. 4. Apply the Coding & Testing techniques and Risk management strategies. 5. Describe Project estimation techniques and Quality Management& Metrics.
IV Semester	V20CST08 **Database Management Systems**	**After Successful completion of the Course, the student will be able to:** 1. Describe Database systems, various Data models and Database architecture. 2. Develop various real time applications using Relational algebra and Relational calculus. 3. Apply various Normalization technique store fine schema. 4. Explain Transaction management and Concurrency control. 5. Illustrate various Database indexing techniques.
IV Semester	V20CST09 **Java Programming**	**After Successful completion of the Course, the student will be able to:** 1. Describe Java Virtual Machine and Type casting. 2. Demonstrate Concepts like Constructors, Arrays, Nested Classes and Command Line Arguments. 3. Implement Concepts of Inheritance and Exception Handling 4. Develop programs on Multi-Threading and Files 5. Implement Event Handling and Swings.
IV Semester	V20MAT04 **Probability and Statistics**	**After Successful completion of the Course, the student will be able to:** 1. Find the Expectation of Random variables. 2. Apply probability distribution to real time problems. 3. Plot a best fit curve to an experimental data and find the correlation and regression 4. Create good estimators to various parameters 5. Apply the principles of Statistical Inference to practical problems
IV Semester	V20CSL06 **Statistical Visualization using R Lab**	**After Successful completion of the Course, the student will be able to:** 1. Employ math and simulation in R. 2. Demonstrate various types of data structures in R. 3. Apply appropriate control structures to solve a particular Programming problem. 4. Use R to graphically visualize data and results of statistical calculations.
IV Semester	V20CSL07 **Data Base Management System Lab**	**After Successful completion of the Course, the student will be able to:** 1. Construct SQL queries to perform different database operations. 2. Experiment with various constraints and Database Indexing Techniques. 3. Construct PL/SQL Cursors and Exceptions 4. Develop PL/SQL Functions ,Procedures and Packages 5. Apply basic operations on collections of Mongo DB database
IV Semester	V20CSL08 **Java Programming Lab**	**After Successful completion of the Course, the student will be able to:** 1. Demonstrate Programs on Classes, Objects, Constructors and Arrays. 2. Demonstrate Inheritance and Exception Handling. 3. Implement programs on Multi-Threading and File Handling. 4. Implement Event handling using Swings.

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IV Semester	V20ENT03 **Professional Communicati on Skills - II**	**After Successful completion of the Course, the student will be able to:** 1. Demonstrate grammatical competence, analyze noun and pronoun dispositions, classify various kinds of verbs, adjectives and adverbs and identify errors in sentences; distinguish the subtle meanings of various words in different contexts, recognize similar words as well as words with contrast meanings and use them appropriately. 2. Organize individual words into one whole sentence using new vocabulary and focus on the error analysis of prepositions and conjunctions, build conversations which befit the situations and develop pre-reading strategies to improve comprehension skills. Distinguish and acquire knowledge of using words of the same category in a sentence and learn new words that promote communicative finesse. Find errors in sentences where the modifiers are misplaced and put them at the appropriate place, use hit pair words and send an email that is concise and lucid. 3. Recognize the easiest and best possible way of solving problems in the area of Number and Letter Series, Analogy, Classification, Coding & Decoding Symbols, Ranking and Analytical Reasoning. 4. Investigate the different types of logics involved in Mirror and Water Images, Logical Reasoning & Arithmetic Reasoning. 5. Find the common traps in the questions and errors likely to be made from the concepts of Blood Relations, Directions, Average, Clock and Calendar, Data Sufficiency, Permutations-Combinations and Probability.
IV Semester	V20ENT03 **Professional Communication Skills - II**	**After Successful completion of the Course, the student will be able to:** 1. Correlate individual words into one whole sentence using new vocabulary and focus on the error analysis of prepositions and conjunctions. 2. Distinguish and acquire knowledge of using words of same category in a sentence and learn new words that promote communicative finesse. 3. Find errors in sentences where the modifiers are misplaced and put them at the appropriate place, use hit pair words and send an email that is concise and lucid. 4. Interpret the importance of Attire and Etiquette in societal context and manage their time. 5. Discover the team working abilities among themselves and display their leadership qualities. 6. Identify various elements of emotional balance that have positive impact on work-life-balance.
V Semester	V20CST10 **Operating Systems**	**After Successful completion of the Course, the student will be able to:** 1. Describe Operating System Services and System Calls. 2. Illustrate Process Management Concepts and CPU Scheduling Algorithms. 3. Demonstrate Process Synchronization primitives and Process Deadlocks. 4. Illustrate Memory Management Techniques and Page Replacement Algorithms. 5. Describe File System Concepts and Mass Storage Structures.
V Semester	V20CST11 **Data Mining**	**After Successful completion of the Course, the student will be able to:** 1. Explain the concept of Data Mining and its functionalities. 2. Discuss various Data Preprocessing Techniques. 3. Demonstrate Association Analysis Techniques. 4. Illustrate various Classification Techniques. 5. Use different Clustering techniques to cluster data.
V Semester	V20CST12 **Web Technologies**	**After Successful completion of the Course, the student will be able to:** 1. Illustrate the basic concepts of HTML and CSS. 2. Illustrate Extensible markup language and XML parsers. 3. Develop web applications using JDBC. 4. Build database driven web applications using JSP. 5. Illustrate the basic concepts of Angular and NODE JS.

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V Semester	V20CSTPE01 **Software Testing Methodologies (Professional Elective-I)**	**After Successful completion of the Course, the student will be able to:** 1. Describe Software testing objectives and methodology. 2. Apply various Software testing techniques. 3. Discuss Static testing techniques for software testing. 4. Distinguish Software testing and debugging process. 5. Explain modern Software testing tools to Support software testing.
V Semester	V20CSTPE02 **Principles of Programming Languages (Professional Elective-I)**	**After Successful completion of the Course, the student will be able to:** 1. Describe syntax and semantics of programming languages. 2. Explain data types and basic statements of programming languages. 3. Design and implement subprogram constructs. 4. Discuss concurrency process using OOP. 5. Develop programs in Scheme, ML, and Prolog.
V Semester	V20CSTPE03 **Artificial Intelligence (Professional Elective-I)**	**After Successful completion of the Course, the student will be able to:** 1. Discuss the foundations of AI. 2. Identify Search Strategies for Problem Solving. 3. Illustrate Adversarial Search for Game Playing. 4. Discuss Reasoning approaches. 5. Illustrate Knowledge Representation approaches.
V Semester	V20CSTPE04 **Computer Graphics (Professional Elective-I)**	**After Successful completion of the Course, the student will be able to:** 1. Discuss the applications of computer graphics and learn basic algorithms. 2. Discuss the concepts of 2D graphics along with transformation techniques. 3. Demonstrate3D graphics and 3D object representation. 4. Discuss different visible surface detection methods and color models. 5. Illustrate different animation sequences.
V Semester	V20CSL09 **Data Mining Lab**	**After Successful completion of the Course, the student will be able to:** 1. Demonstrate Data Preprocessing techniques. 2. Demonstrate Association Rule Mining techniques. 3. Demonstrate Classification techniques. 4. Demonstrate the Clustering techniques.
V Semester	V20CSL10 **Web Technologies Lab**	**After Successful completion of the Course, the student will be able to:** 1. Illustrate the basic concepts of HTML and CSS. 2. Illustrate Extensible markup language and XML parsers. 3. Develop web applications using JDBC. 4. Build database driven web applications using JSP. 5. Illustrate the basic concepts of Angular and NODE JS.
V Semester	V20ENT04 **Professional Communication Skills – III**	**After Successful completion of the Course, the student will be able to:** 1. Distinguish the subtle meanings of various words in different contexts, recognize similar words as well as words with contrast meanings and use them appropriately. Express writer‘s tone and relevant ideas using different types of writing skills and prepare resume to showcase skills and accomplishments. Organize thoughts in the discussions and express views without reticence. 2. Identify the central theme and arrange the scrambled sentences into a meaningful passage. Draft emails with appropriate subject-lines and relevant content. Compare different pairs of words, recognize the relationship between the head words and the options to siphon correct analogy Choose an appropriate word to make a sentence meaningful. Infer the meaning of the picture by thinking out of the box and speak without inhibitions and face interviews with aplomb. 3. Analyze appropriate methods of logical thinking on Ratio and Proportion, Partnership, LCM and HCF, Number System, Areas & Volumes.

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		4. Demonstrate problem solving skills through the concepts of Percentages, Profit and loss, Simple Interest & Compound Interest and Allegation. 5. Calculate the end results of Cubes, Dice and Data Analysis, Time & Work, Time & Distance, Race & Games.
VI Semester	V20CST13 **Computer Networks**	**After Successful completion of the Course, the student will be able to:** 1. Discuss fundamentals of network concepts and Reference Models. 2. Discuss Communication media and switching techniques. 3. Demonstrate Error control and Data link layer protocols. 4. Apply Routing algorithms and congestion control algorithms. 5. Discuss Transport layer protocols and Application layer protocols.
VI Semester	V20CST14 **Machine Learning**	**After Successful completion of the Course, the student will be able to:** 1. Explain the Basics of Machine Learning. 2. Demonstrate Classification and Clustering Techniques. 3. Construct Decision Trees and Random Forest. 4. Illustrate the Working of Neuron and Perceptron Algorithm. 5. Demonstrate the working of Multi-Layer Perceptron algorithm.
VI Semester	V20CST15 **Automata and Compiler Design**	**After Successful completion of the Course, the student will be able to:** 1. Construct Finite Automata and Regular Expressions. 2. Describe the Compilation Process and Lexical Analysis. 3. Construct Top down and Bottom up Parsing Techniques. 4. Produce Intermediate Code Generation and Runtime Environments. 5. Explain Code Optimization and Code Generation.
VI Semester	V20CSTPE05 **Object Oriented Software Engineering (Professional Elective-II)**	**After Successful completion of the Course, the student will be able to:** 1. Describe Software process and different life cycle models. 2. Discuss Project Planning, and organization. 3. Apply OO concepts along with their applicability contexts. 4. Demonstrate object oriented analysis and design. 5. Describe Implementation, Integration and Maintenance phases.
VI Semester	V20CSTPE06 **Advanced Data Structures (Professional Elective-II)**	**After Successful completion of the Course, the student will be able to:** 1. Explain external sorting method. 2. Discuss pattern matching Algorithms. 3. Illustrate various hash functions with appropriate examples. 4. Illustrate various priority queues with appropriate examples. 5. Construct self-balanced tree with appropriate examples.
VI Semester	V20CSTPE07 **Data Science (Professional Elective-II)**	**After Successful completion of the Course, the student will be able to:** 1. Discuss the fundamental concepts of Data Science. 2. Illustrate Exploratory Data Analysis. 3. Explain the Concepts of Recommendation Engines. 4. Explain various Anomaly Detection Techniques. 5. Discuss Feature Selection techniques.
VI Semester	V20CSTPE08 **Cryptography and Network Security (Professional Elective-II)**	**After Successful completion of the Course, the student will be able to:** 1. Discuss fundamentals and mathematical support of Cryptography and Network Security. 2. Discuss symmetric and asymmetric cryptosystems. 3. Discuss about HASH functions & Digital Signatures to provide authentication and integrity. 4. Demonstrate various methods of Mutual trust and mail security. 5. Review the Network& Internet Security Scenarios.

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VI Semester	V20CSL11 **Computer Networks Lab**	**After Successful completion of the Course, the student will be able to:** 1. Implement Error detection technique and Sliding window protocol. 2. Implement Routing and congestion control Algorithms. 3. Implement socket programming.
VI Semester	V20CSL12 **Machine Learning Lab using Python**	**After Successful completion of the Course, the student will be able to:** 1. Identify various Python libraries used in Machine Learning. 2. Implement probabilistic classifiers using Python Programming. 3. Construct non-probabilistic classifiers using Python Programming. 4. Demonstrate the process of clustering using the K-Means algorithm. 5. Illustrate the working of a Multi-layer perceptron network.
VI Semester	V20CSL13 **Unified Modeling Language Lab**	**After Successful completion of the Course, the student will be able to:** 1. Develop Class diagrams. 2. Develop Use case diagrams. 3. Construct Interaction diagrams. 4. Develop State chart, Activity diagrams. 5. Develop Component and Deployment diagrams.
VI Semester	V20CEMC02 **Professional Ethics & Human Values**	**After Successful completion of the Course, the student will be able to:** 1. Discuss the importance of human values and their context. 2. Generalize the professional ethics and norms of engineering practice. 3. Review the contextual knowledge of engineering as social experimentation. 4. Identify the engineer‘s responsibility for Safety & Risks. 5. Clarify the professional rights & responsibilities at global level.
VII Semester	V20CSTPE09 **Advanced Computer Architecture (Professional Elective-III)**	**After Successful completion of the Course, the student will be able to:** 1. Explain the different types of parallel computer models. 2. Describe various Processor and Memory organizations. 3. Illustrate Pipelining, Multiprocessors and Multicomputer concepts. 4. Explain Multivector, SIMD Computers and Multithreaded, Dataflow Architectures. 5. Illustrate the Parallel Programming models and instruction level parallelism.
VII Semester	V20CSTPE10 **BigData Analytics (Professional Elective-III)**	**After Successful completion of the Course, the student will be able to:** 1. Discuss the challenges of Big Data using Hadoop. 2. Apply data modelling techniques to large data sets using map reduce programs. 3. Describe the Hadoop I/O classes. 4. Examine the use of Pig Framework to work with Big Data. 5. Develop a data analytical system using HIVE.
VII Semester	V20CSTPE11 **Deep Learning (Professional Elective-III)**	**After Successful completion of the Course, the student will be able to:** 1. Describe the fundamentals of deep learning. 2. Illustrate the working of deep feed forward neural networks. 3. Discuss regularization and optimization techniques used in deep neural networks. 4. Illustrate the working of convolution neural networks. 5. Explain about recurrent and recursive neural networks.

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VII Semester	V20CSTPE12 **Human Computer Interaction (Professional Elective-III)**	**After Successful completion of the Course, the student will be able to:** 1. Describe the principles and characteristics of GUI. 2. Describe how a computer system may be modified to include human diversity. 3. Select an effective style and screen design for a specific business application. 4. Discuss System Menus & Navigation Schemes**.** 5. Select Device and Screen based controls
VII Semester	V20CSTPE13 **Design Patterns (Professional Elective-IV)**	**After Successful completion of the Course, the student will be able to:** 1. Describe the design patterns view and its applications. 2. Demonstrate Creational Patterns. 3. Construct Structural Patterns for a given Scenario. 4. Construct Behavioural Patterns for a given Scenario. 5. Examine various Case Studies in utilizing Software Architectures.
VII Semester	V20CSTPE14 **NOSQL Databases (Professional Elective-IV)**	**After Successful completion of the Course, the student will be able to:** 1. Discuss four types of NoSQL Databases (Document-oriented, KeyValue Pairs, Column oriented and Graph). 2. Illustrate Replication and sharding. 3. Explain NoSQL Key/Value databases using MongoDB. 4. Demonstrate Column- oriented NoSQL databases using Apache HBASE. 5. Explain Graph NoSQL databases using Neo4.
VII Semester	**V20CSTPE15 Reinforcement Learning (Professional Elective-IV)**	**After Successful completion of the Course, the student will be able to:** 1. Discuss Elements of Reinforcement Learning and Multi-armed Bandits. 2. Illustrate Finite Markov Decision Process and Dynamic Programming. 3. Explain Monte Carlo Methods and *n*-step Bootstrapping. 4. Explain Off-policy Methods with Approximation. 5. Discuss Policy Gradient Methods.
VII Semester	V20CSTPE16 **Cloud Computing (Professional Elective-IV)**	**After Successful completion of the Course, the student will be able to:** 1. Explain the basic concepts of cloud computing. 2. Describe the Virtualization and Migration concepts of Cloud. 3. Explain the Cloud Application Design methodologies. 4. Illustrate the Security aspects of Cloud. 5. Illustrate the SLA Management aspects of Cloud.
VII Semester	V20CSTPE17 **Software Project Management (Professional Elective-V)**	**After Successful completion of the Course, the student will be able to:** 1. Describe Software Project Management Terminology. 2. Explain various Software development process Models and software Life cycle phases. 3. Illustrate various Effort Estimation Techniques and activity network models for Software Project Planning. 4. Demonstrate Risk Management Concepts and resource allocation. 5. Explain the importance of Project monitoring and control for accomplishing project goals and software Quality.
VII Semester	V20CSTPE18 **Scripting Languages (Professional Elective-V)**	**After Successful completion of the Course, the student will be able to:** 1. Develop dynamic webpages and validate with java Script. 2. Discuss fundamentals of PHP. 3. Develop web applications using PHP. 4. Demonstrate Perl Programming concepts. 5. Illustrate AngularJS frame work.

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VII Semester	V20CSTPE19 **Natural Language Processing (Professional Elective-V)**	**After Successful completion of the Course, the student will be able to:** 1. Illustrate Natural Language Processing tasks in syntax, semantics, and pragmatics. 2. Classify Morphology and Finite State Transducers, Markov Models and Entropy Models. 3. Explain about Statistical parsing and probabilistic CFGs. 4. Demonstrate semantic analysis. 5. Explain Discourse Analysis and Lexical Resources.
VII Semester	V20CSTPE20 **Social Networks and Semantic Web (Professional Elective-V)**	**After Successful completion of the Course, the student will be able to:** 1. Demonstrate knowledge by explaining the three different named‖ generations of the web. 2. Construct a social network. 3. Relate knowledge representation methods for semantic web. 4. Describe web services and its Applications. 5. Develop ―Linked Data‖ Applications using Semantic Web Technologies.
VII Semester	V20CSTPE20 **Management Science**	**After Successful completion of the Course, the student will be able to:** 1. Understand various approaches to Management. 2. To get familiarity with operations management in an organization. 3. Understand the Functions of Human Resource Management, Marketing Management and Financial Management. 4. To Sketch the networks for better project management. 5. Understand the Concept of Strategic Management and to get familiarity with contemporary developments in business management.
V - VII Semester	V20CSTJE01 **Master Coding and Competitive Programming - Part-1 (Job Oriented Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Apply Mathematical reasoning and number theory to solve real world problems in linear time. 2. Use of modular arithmetic, to solve complex problems in linear time , logarithmic. 3. Use of Prime Factorization and complex solve problems. 4. Analyse different techniques including sieve to find prime numbers and evaluate efficiency of these methods. 5. Experiment with Hashing and searching techniques to solve problems on Arrays in Linear time.
V - VII Semester	V20CSTJE02 **Master Coding and Competitive Programming - Part-2 (Job Oriented Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Apply Divide and Conquer algorithm technique to solve complex in logarithmic time. 2. Apply Greedy method to solve Optimization and decision making problems. 3. Apply Backtracking Algorithm technique to find combinatorial problems. 4. Experiment with Dynamic Programming Algorithm technique to solve Problems that uses Optimal substructures. 5. Develop programs using Linked List Graphs, DFS and BFS techniques.
V - VII Semester	V20CSTJE03 **Full Stack Technologies (Job Oriented Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Demonstrate IDE tools Installation. 2. Develop programs using servlets. 3. Illustrate MVC architecture. 4. Demonstrate applications of Hibernate. 5. Illustrate Spring MVC Framework.

Semester	Course Code & Name	Course Outcomes
V - VII Semester	V20CSTJE04 **DevOps (Job Oriented Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Discuss the traditional software development. 2. Discuss the concepts of rise of agile methodologies. 3. Discuss the concept of DevOps and Agile. 4. Demonstrate the purpose of DevOps. 5. Illustrate the Operations of CAMS.
V - VII Semester	V20CSTJE05 **Blockchain Technologies (Job Oriented Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Discuss the Cryptographic primitives used in Blockchain. 2. Discuss about various technologies borrowed in Blockchain. 3. Illustrate various models for Blockchain. 4. Discuss about Ethereum. 5. Discuss about Hyperledger Fabric.
V - VII Semester	V20CEOE01 **Repair and Rehabilitation of Structures (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Develop various maintenance and repair strategies. 2. Evaluate the existing buildings through field investigations. 3. Understand and use the different techniques for structural rehabilitation and various techniques of repair. 4. Understand the importance of advanced concretes mixes. 5. Understand the importance of high performance concretes.
V - VII Semester	V20CEOE02 **Ground Improvement Techniques (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Employ the in-situ densification methods at ground surface and at depth. 2. Relate the importance of dewatering and different methods of stabilization. 3. Illustrate the reinforced earth technology and soil nailing to obviate the problems posed by conventional retaining walls. 4. Use the geosynthetics to improve the engineering performance of soils. 5. Select different techniques of grouting to solve the ground problems.
V - VII Semester	V20CEOE03 **Environmental Pollution and Control (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Describe the air pollution and its control methods. 2. Explain industrial waste water and ways to control it. 3. Generalize the solid, hazardous waste and control methods. 4. Illustrate the importance of Environmental sanitation methods. 5. Illustrate the importance of Sustainable development.
V - VII Semester	V20CEOE04 **Building Materials and Construction (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Describe different building materials and their importance in building construction. 2. Relate various components of cement and lime. 3. Generalize the brick and stone masonry in construction. 4. Interpret different aggregates and their specifications. 5. Describe the importance of different building components.
V - VII Semester	V20CEOE05 **Remote Sensing and GIS (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Generalize the basic principles of Remote Sensing and GIS, including ground, air and satellite basedsensor platforms. 2. Interpret the aerial photographs and satellite imageries. 3. Relate the process of data entry and preparation. 4. Examine the Spatial Data for a variety of applications. 5. Employ RS and GIS for diverse applications.

Semester	Course Code & Name	Course Outcomes
V - VII Semester	V20CEOE06 **Solid Waste Management (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Generalize Solid Waste and its management. 2. Assess different elements for managing Solid Waste. 3. Employ different methods for transportation and transformation of solid waste. 4. Organize different methods for processing and treatment of municipal solid waste. 5. Practice suitable disposal methods with respect to solid waste.
V - VII Semester	V20CEOE07 **Disaster Management (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Describe different natural hazards and disaster management. 2. Generalize the risk and vulnerability of disaster. 3. Illustrate the role of technology in disaster management. 4. Relate the importance of education and community preparedness to disaster recovery. 5. Organize the multi-sectional issues created by disaster.
V - VII Semester	V20CEOE08 **Water Quality and Conservation Systems (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Describe different parameters of Engineering Hydrology. 2. Relate different sources of surface and ground water. 3. Assess the importance of water supply systems and quality of water in reference to IS and WHOstandards. 4. Develop different systems of plumbing. 5. Employ different conservation techniques.
V - VII Semester	V20EEOE1 **Non-Conventional Energy Sources (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Understand the concepts of solar radiation data, extra terrestrial radiation, and radiation on earth‘s surface. 2. Understand the operation of various solar thermal Systems. 3. Choose suitable maximum power point tracking technique in solar PV and wind application. 4. Explain basic principle and working of hydro and tidal power systems. 5. Explain the basic principle of biomass, fuel cell and geothermal systems.
V - VII Semester	V20EEOE2 **Basics of Control systems (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Construct the transfer function of various mechanical and electrical systems using block diagramalgebra and signal flow graphs. 2. Find the time response specifications of second order systems and absolute, relative stability of LTI systems using routh‘s stability criterion and the root locus method. 3. Assess the stability of LTI systems using frequency response methods. 4. Construct the lag, lead, lag-lead compensators from bode diagrams to improve the system performance. 5. Understand the concepts in state space representation of LTI systems, controllability and observability.
V - VII Semester	V20EEOE3 **Principles of Electric Power Conversion (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Understand the basic operation of various power electronic devices and converters. 2. Apply the suitable power electronic converter for different electrical machines. 3. Understand the operation of various renewable energy sources. 4. Understand the operation of different energy storage systems and their applications. 5. Choose the suitable heating and welding method for different domestic and industrial applications.

Semester	Course Code & Name	Course Outcomes
V - VII Semester	V20EEOE4 **Programmable Logic Controller and Applications (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Understand the basic concepts of PLCs and their I/O modules. 2. Construct the control algorithms to PLC using ladder logic. 3. Illustrate the PLC registers for effective utilization in different applications. 4. Understand the function of various program control instructions. 5. Apply the suitable controller in real time applications.
V - VII Semester	V20EEOE5 **Energy Storage Systems (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Classify different energy storage systems. 2. Understand the operation of different energy storage systems. 3. Illustrate the role of electrical energy storage systems in various aspects. 4. Understand the operation of different Electrical Energy Storage (EES) systems. 5. Apply suitable EES system to various applications.
V - VII Semester	V20EEOE6 **Soft Computing Techniques (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Understand the basic concepts of different soft computing techniques like fuzzy, GA and neuralnetwork. 2. Understand the fundamental concepts of artificial neural networks. 3. Explain the basic concepts & convergence of GA. 4. Explain the basic concepts of fuzzy systems and its applications. 5. Apply different evolutionary algorithms to various applications.
V - VII Semester	V20EEOE7 **Electric Vehicles (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Understand the fundamentals of an electric vehicle. 2. Explain the technical characteristics and properties of batteries. 3. Estimate the ratings and requirements of electrical machines. 4. Illustrate the regenerative braking system of an electric vehicle. 5. Estimate the sizing of components of hybrid electric vehicles.
V - VII Semester	V20EEOE8 **Indian Electricity Act, 2003. (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Understand the national policy, plan and the joint responsibilities of state and central governments. 2. Illustrate the process of licensing and the provisions related to transmission and distribution of electricity. 3. Understand the regulatory commissions and Central Electricity Authority (CEA). 4. Illustrate the Appellate Tribunal, Reorganization of boards, offences and penalty. 5. Understand the constitution procedures of special courts and dispute resolution.
V - VII Semester	V20EEOE9 **Power Systems for Data Centers (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Understand the basics of power in the data centre. 2. Illustrate the uninterrupted power supply. 3. Illustrate the operation of generators and various power devices. 4. Estimate the power required in the data centre. 5. Describe the different methods to improve data centre energy efficiency.
V - VII Semester	V20EEOE10 **Concepts of Power System Engineering (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Understand the working of thermal and nuclear power generating stations. 2. Estimate the R,L and C parameters of transmission lines (Nominal T and π models). 3. Find the parameters of DC and AC distribution systems along with voltage drop. 4. Understand the operation of fuses and circuit breakers. 5. Illustrate the speed/time characteristics of different types of traction motors.

Semester	Course Code & Name	Course Outcomes
V - VII Semester	V20EEOE11 **Fundamentals of Smart Grid Technologies (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Understand the basic structure of an electricity marketing conditions. 2. Illustrate the developing technologies in DC distribution and smart grid. 3. Understand the concepts of dynamic energy systems. 4. Illustrate the development of smart domestic system. 5. Illustrate the development of intelligent domestic system.
V - VII Semester	V20EEOE12 **Distribution Automation (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Understand the basic principles of distribution and automation. 2. Describe the working functions of distribution automation. 3. Select appropriate Communication Technology for various parts of Distribution System for their automation. 4. Illustrate the technical benefits of Distribution Automation (DA). 5. Select an appropriate method for Economic Evaluation of DA plans.
V - VII Semester	V20MEOE1 **Basic Mechanical Engineering (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Discuss different types of materials, their properties and testing with applications. 2. Interpret concepts of thermodynamics, Refrigeration, air conditioning and working of IC engines and air conditioners. 3. Illustrate different manufacturing, joining, machining processes and machines with applications. 4. Explain concepts of force, power transmission and power plants. 5. Discuss the classification and working of pumps, turbines and gas turbines.
V - VII Semester	V20MEOE2 **Green Engineering Systems (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Illustrate the concept of Solar Radiation, Collection, Storage and Applications. 2. Discuss the construction and working of wind energy and bio-energy conversion systems. 3. Describe the construction and working of Geothermal and Ocean Energy conversion systems. 4. Illustrate the principles of environmental impact of current manufacturing practices. 5. Discuss the features and benefits of green building materials and its applications.
V - VII Semester	V20MEOE3 **Computational Fluid Dynamics (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Apply techniques in the numerical solution of fluid equations. 2. Apply numerical modeling and its role in the field of heat transfer and fluid flow. 3. Develop methodologies used in CFD. 4. Compare various discretization methods and solving methodologies. 5. Apply skills in the actual implementation of CFD methods (e.g. boundary conditions, different numerical schemes etc., Finite element methods in the application of CFD analysis to real life engineering designs.
V - VII Semester	V20MEOE4 **Rapid Prototyping (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Understand virtual prototyping and testing of technology. 2. Construct CAD modeling for rapid prototyping 3. Examine different types of process in rapid prototyping. 4. Explain Rapid Manufacturing errors. 5. Express the applications of rapid prototyping.

Semester	Course Code & Name	Course Outcomes
V - VII Semester	V20MEOE5 **Computer Aided Design (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Explain the basic fundamentals of CAD tools. 2. Find the characteristics of curves, Representation and continuity requirements. 3. Illustrate the Geometric Transformations and demonstrate various types of surfaces and Representation. 4. Differentiate between the methods of representing Solid Modelling**.** 5. Apply the local and global properties for product development.
V - VII Semester	V20MEOE6 **Mechatronics (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Understand the elements of Mechatronics & levels and explain various types of sensors , transducers andMechatronics design process. 2. Sketch and explain various types of solid state devices like Diode, BJT,MOSFET, etc. 3. Illustrate and explain basic principles of Hydraulic, pneumatic, electro hydraulic, electro hydraulic servoactuating systems. 4. Illustrate and explain microprocessors, microcontrollers and PLC. 5. Sketch and explain System interfacing and data acquisition systems.
V - VII Semester	V20ECTOE01 **Internet of Things (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Describe M2M and IOT Technologies. 2. Identify the layers and protocols in IOT. 3. Describe various communication technologies used in IOT**.** 4. Demonstrate various hardware components required for IOT applications. 5. Identify the cloud technologies & explain the applications of IoT**.**
V - VII Semester	V20ECTOE02 **Communication Systems (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Demonstrate the fundamentals of communication systems. 2. Compare the various analog modulation and demodulation schemes. 3. Compare the various digital modulation and demodulation schemes. 4. Explain the wireless communication system concepts. 5. Outline the satellite & Optical communication system principles.
V - VII Semester	V20ECTOE03 **Principles of Image Processing (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Understand the different Transforms Techniques & their use in Image Processing Applications. 2. Describe Spatial and frequency domain filtering like smoothing and sharpening operations on Images. 3. Describe Restoration operations/techniques on Images. 4. Describe the Image compression Techniques and Image segmentation. 5. Explain the different color Image Processing Techniques.
V - VII Semester	V20ECTOE04 **Medical Electronics (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Explain the basics concepts of Bio-Medical Instrumentation. 2. Explain the concepts of electrode theory, classification of Electrodes and Transducers used in Bio- Medical Applications. 3. Explain the Anatomy and Physiology of Cardiovascular system and Illustrate the application of Bio- Medical Instruments to measure the Physiological parameters of Cardiovascular System. 4. Discuss the elements used for Patient‘s Health care &monitoring. 5. Classify different types of monitors, discuss the principals of recorders and Illustrate the methods of accident preventions.

Semester	Course Code & Name	Course Outcomes
V - VII Semester	V20ECTOE05 **Principles of Wireless Communications (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Discuss the cellular system evolution of mobile radio systems. 2. Illustrate the basic cellular concepts. 3. Explain the Various Propagation models. 4. Discuss the need of modulation, diversity and equalization in cellular & Mobile Communication. 5. Demonstrate the knowledge about GSM architecture, &upcoming technologies like 3G, 4G etc.
V - VII Semester	V20ECTOE06 **Basics of VLSI Design (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Identify the CMOS layout levels, and the design layers used in the process sequence. 2. Describe the general steps required for processing of CMOS integrated circuits. 3. Outline static CMOS combinational and sequential logic at the transistor level. 4. Demonstrate different logic styles such as complementary CMOS logic, pass-Transistor Logic, dynamic logic, etc. 5. Interpret the need for testability and testing methods in VLSI.
V - VII Semester	V20ECTOE07 **Concepts of Embedded Systems (Open Elective)**	**After Successful completion of the Course, the student will be able to:** 1. Describe the Basic Concepts of embedded systems. 2. Describe the characteristics of Application & Domain-Specific Embedded Systems. 3. Explain the various elements of embedded hardware and their design principles. 4. Explain various software design approaches in embedded environment. 5. Discuss various tools used for Embedded system implementation and testing.