## DEPARTMENT OF INFORMATION TECHNOLOGY

## VELAGAPUDI RAMAKRISHNA SIDDHARTHA ENGINEERING COLLEGE

## VR20 REGULATIONS – COURSE OUTCOMES

| Course Code | Course Name | Course outcomes |
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| **20BS1101** | **MATRICES AND DIFFERENTIAL CALCULUS** | 1. Determine Eigen values, Eigen vectors of a matrix.<br>2. Estimate Maxima and Minima of Multivariable functions.<br>3. Solve the Linear differential equations with constant coefficients.<br>4. Solve the Linear differential equations with variable coefficients. |
| **20BS1102B** | **APPLIED PHYSICS** | 1. Understand the importance of quantum mechanics.<br>2. Analyse and understand various types of lasers and their applications.<br>3. Elaborate different types of optical fibers and understand the concept of Superconductivity.<br>4. Understand the fabrication of nanomaterials and carbon Nanotubes. |
| **20ES1103** | **PROGRAMMING FOR PROBLEM SOLVING** | 1. Understand the different types of problem solving approaches<br>2. Apply the selections, loops, arrays, and string concepts in C to solve problems.<br>3. Apply functions and pointer concepts in C to solve problems.<br>4. Solve problems using enum, structures, unions, and file handling functions. |
| **20ES1104** | **BASICS OF ELECTRICAL ENGINEERING** | 1. Analyze Electric Circuit fundamentals.<br>2. Understand the basic concepts of Alternating Quantities and MagneticCircuits.<br>3. Analyze the basic concepts of Electric Machines.<br>4. Understand Measuring Instruments & Solar Photo Voltaic System concepts. |
| 20HS1105 | **TECHNICAL ENGLISH AND COMMUNICATION SKILLS** | 1. Develop administrative and professional compilations with felicity of expression<br>2. Demonstrate Proficiency in advanced reading and context oriented writing<br>3. Apply the elements of functional English with sustained understanding for authentic use of language in any given academic and/or professional environment<br>4. Execute tasks in Technical communication with competence |

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| 20MC1106 | **TECHNOLOGY AND SOCIETY** | 1. Understand the origins of technology and its role in the history of human progress.<br>2. Know the Industrial Revolution and its impact on Society<br>3. Interpret the developments in various fields of technology till Twentieth Century.<br>4. Distinguish the impacts of Technology on the Environment and achievements of great scientists. |
| 20BS1151A | **ENGINEERING PHYSICS LABORATORY** | 1. Use function generator, spectrometer and travelling microscope in various experiments.<br>2. Test optical components using principles of interference and diffraction of light.<br>3. Determine the V-I characteristics of solar cell and photo cell and appreciate the accuracy in measurements. |
| 20ES1152 | **PROGRAMMING FOR PROBLEM SOLVING LABORATORY** | 1. Implement the use of programming constructs in a structural programming language.<br>2. Apply the selections, loops, arrays, and string concepts in C to solve problems.<br>3. Apply functions, pointer, and Enum concepts in C to solve problems.<br>4. Solve problems using structures, Unions, and file handling functions. |
| 20HS1153 | **TECHNICAL ENGLISH AND COMMUNICATION SKILLS LABORATORY** | 1. Develop active and authentic listening comprehension skills relevant for the professional world.<br>2. Execute web related(On-line) communication with felicity of expression<br>3. Apply relevant speech patterns including standard pronunciation.<br>4. Demonstrate Proficiency in Interpersonal Communication with fluency and accuracy. |
| 20ES1154 | **COMPUTING AND PERIPHERALS LABORATORY** | 1. Able to assemble a PC and install operating system and other software.<br>2. Able to trouble shoot hardware and software issues.<br>3. Able to configure network settings to connect to internet.<br>4. Able to create documents, presentations and spread sheets using office productivity tools. |

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| 20BS2101 | **LAPLACE TRANSFORMS AND INTEGRAL CALCULUS** | 1. Solve the Linear differential equations using Laplace Transforms.<br>2. Evaluate areas and volumes using Double, Triple Integrals.<br>3. Evaluate Grad, Div & Curl of scalar and vector point functions.<br>4. Convert Line Integrals to Area Integrals and Surface Integrals to Volume Integrals. |
| 20BS2102 | **ENGINEERING CHEMISTRY** | 1. Analyze various water treatment methods and boiler troubles.<br>2. Apply the concept of phase equilibrium to different materials and the knowledge of working of electrodes and batteries in various technological fields.<br>3. Evaluate corrosion processes as well as protection methods.<br>4. Apply the knowledge of conventional fuels and mechanistic aspects of conducting polymers for their effective and efficient utilisation. |
| 20ES2103A | **OBJECT ORIENTED PROGRAMMING USING PYTHON** | 1. Interpret the python syntax and semantics of control flow statements<br>2. Apply functions, modules and string handling in Python to solve problems<br>3. Determine the methods to create and manipulate programs with Python data structures<br>4. Analyse the concepts of object oriented approach to solve problems |
| 20ES2104A | **BASIC ELECTRONICS ENGINEERING** | 1. Comprehend the fundamentals of electronic components, devices, transducers<br>2. Understand and apply the principles of digital electronics<br>3. Learn the principles of various communication systems. |
| 20ES2105 | **ENGINEERING GRAPHICS** | 1. Understand the Scales and conics.<br>2. Draw Orthographic projections of points, Lines and Planes.<br>3. Draw Orthographic projections of Solids and to understand basics of Auto CAD.<br>4. Understand the sections, Developments of solids and draw isometric views using Auto CAD. |

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| 20MC2106 | **PROFESSIONAL ETHICS & PRACTICE** | 1. Know the moral autonomy and uses of ethical theories.<br>2. Understand Engineering as Experimentation<br>3. Understand about safety, risk and professional rights.<br>4. Know the ethics regarding Global issues related to Environment, Computers and weapon's development. Understand general principles of contracting. |
| 20BS2151B | **ENGINEERING CHEMISTRY LABORATORY** | 1. Analyze ores, commercial samples, quality parameters of water samples from different sources<br>2. Perform quantitative analysis using instrumental methods.<br>3. Apply the knowledge of preparation of polymers, separation of ions, mechanism of corrosion and photochemical reactions. |
| 20ES2152A | **OBJECT ORIENTED PROGRAMMING USING PYTHON LABORATORY** | 1. Demonstrate the usage of Python syntax and semantics in solving the problems<br>2. Develop python programs using functions and built in modules<br>3. Implement Python data structures to solve the complex problems<br>4. Apply object oriented concepts to design solution to real world scenarios |
| 20ES2153 | **ENGINEERING WORKSHOP** | 1. Understand the basic joints using wood and familiarize with various fundamental aspects of house wiring.<br>2. Prepare basic models using sheet metal and practice joining of metals using arc welding technique.<br>3. Familiarize with various manufacturing processes such as injection moulding and 3D printing<br>4. Understand the preparation of PCB<br>5. Understand simple IOT Applications using Arduino |
| **20BS3101** | **COMPLEX ANALYSIS AND NUMERICAL METHODS** | 1. Determine analytic, non-analytic functions and evaluate complex integrals.<br>2. Analyze Taylor, Laurent series and apply residue theorem for computing real definite integrals.<br>3. Find solutions for algebraic, transcendental, system of equations and estimate functions using polynomial interpolation. |

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| **20ES3102** | **DISCRETE MATHEMATICS FOR INFORMATION TECHNOLOGY** | 1. Solve initial value problems numerically.<br>2. Understand the logical inference and counting techniques<br>3. Solve problems involving recurrence relations and generating functions<br>4. Apply abstract algebra and evaluate the algebraic structures |
| **20IT3303** | **DATA STRUCTURES** | 1. Classification of graphs and interpret their applications.<br>2. Illustrate various techniques for searching, sorting and hashing.<br>3. Demonstrate the operations on linear data structures like stack, queue and linked list.<br>4. Analyze various operations on nonlinear data structures – binary tree, binary search tree, AVL and B-trees. |
| **20IT3304** | **COMPUTER ORGANIZATION** | 1. Apply data structures to solve real-time problems efficiently.<br>2. Understand register transfer operations, Multiprocessors, CPU organizations and various Addressing Modes<br>3. Identify the design requirements in organization of hardware that enables the CPU to fetch and execute instructions.<br>4. Illustrate Fixed Point and Floating point Arithmetic Operations. |
| **20IT3305** | **OPERATING SYSTEMS** | 1. Analyze different ways of communicating with I/O devices and Memory organizations.<br>2. Understand the concepts of operating system operations services, Process, Multithreading,file, directory and RAID structures.<br>3. Apply synchronization, Page Replacement, CPU scheduling algorithms.<br>4. Analyze the techniques for handling IPC, deadlocks & memory management |
| 20TP3106 | **LOGIC AND REASONING** | 1. Illustrate various file allocation, free space management and disk scheduling techniques<br>2. Think reason logically in any critical situation<br>3. Analyze given information to find correct solution<br>4. To reduce the mistakes in day to day activities in practical life<br>5. Develop time management skills by approaching different shortcut methods<br>6. Use mathematical based reasoning to |

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| | | make decisions |
| 20MC3107A | **ENVIRONMENTALSTUDIES** | 1. Apply logical thinking to solve problems and puzzles in qualifying exams for companies and in other competitive exams<br>2. Identify various factors causing degradation of natural resource and Control Measures<br>3. Identify various ecosystem and need for biodiversity<br>4. Realize and explore the problems related to environmental pollution and its management |
| **20IT3308** | **OBJECT ORIENTED PROGRAMMING USING C++** | 1. Apply the information and technology to analyze social issues, use acts associated with environment<br>2. Outline the essential features and elements of the C++ programming language<br>3. Identify class hierarchies using the object-oriented design process<br>4. Apply exception handling mechanism to handle errors occur at runtime |
| 20ES3351- | **WEB PROGRAMMING LAB** | 1. Summarize generic classes with C++ templates.<br>2. Develop static web pages using open source technologies.<br>3. Analyze different types of Cascading Style sheets<br>4. Design web application that interacts with a web server<br>5. Implement Model-View-Controller pattern for web applications development<br>6. Apply custom validations to validate web forms. |
| **20IT3352** | **DATA STRUCTURES LAB** | 1. Create websites using Django framework with interactive server side scripting.<br>2. Implement various searching and sorting algorithm techniques<br>3. Demonstrate various operations of stack and queue data structures for problem solving<br>4. Implement different types of operations on lists.<br>5. Implement operations on basic tree data |

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| | | structures.<br>6. Perform operations on balanced data structures - AVL and B-trees |
| **20IT3353** | **OBJECT ORIENTED PROGRAMMING USING C++ LABORATORY** | 1. Solve scenario based problems using appropriate data structures<br>2. Demonstrate an understanding of the overall syntax and semantics of C++ programs by writing programs from specifications given in class.<br>3. Develop C++ programs to implement overload of functions, constructors and operators<br>4. Implement inheritance and its variants using C++<br>5. Apply virtual and pure virtual function & complex programming situation.<br>6. Apply the knowledge of exception handling to design error free applications |
| **20BS4101** | **STATISTICS WITH R** | 1. Create programs using generic classes and Standard Template Libraries for solving real time scenarios.<br>2. Understand the fundamental syntax of R through readings, practice exercises, demonstrations, writing R code and Visualize data attributes using ggplot2 and other R packages.<br>3. Manipulate numeric and textual data types using the R programming language and R Studio.<br>4. Apply the knowledge of Probability and conduct Tests of Hypothesis for Statistical Inference. |
| **20IT4302** | **JAVA PROGRAMMING** | 1. Fit some basic types of Statistical Models.<br>2. Understand object-oriented programming principles to build classes and create objects<br>3. Analyze assertions and exception handling techniques to debug correctness and handle run time errors<br>4. Apply the knowledge of generics, collections and multi-threading to solve the problems |

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| **20IT4303** | **ADVANCED DATA STRUCTURES AND ALGORITHMS** | 1. Demonstrate the knowledge of lambda expressions and Stream API operations to solve the problems.<br>2. Understand the asymptotic performance of algorithms and various operations on data structures<br>3. Synthesize design techniques and choose appropriate technique to solve problems.<br>4. Analyze algorithm design techniques to provide optimal solution for given problem. |
| **20IT4304** | **DATABASE MANAGEMENT SYSTEMS** | 1. Distinguish deterministic and non-deterministic algorithms and their performances.<br>2. Demonstrate DBMS architecture and conceptual database modeling for database design<br>3. Formulate solutions to handle databases using indexing, SQL, relational algebra and NOSQL<br>4. Develop database schemas using normalization approaches. |
| **20HS4105** | **UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY** | 1. Apply the concepts relevant to transaction processing in database systems.<br>2. Understand and aware of themselves and their surroundings (family, society and nature).<br>3. Handle problems with sustainable solutions, while keeping human relationships and human nature in mind.<br>4. Exhibit critical ability and become sensitive to their commitment towards their understanding of human values, human relationship and human society. |
| **20IT4351** | **JAVA PROGRAMMING LAB** | 1. Apply what they have learnt to their own self in different day-to-day settings in real life.<br>2. Design solutions to applications using object oriented approach using Java<br>3. Implement java technology to solve runtime errors and test the correctness of programs using exception handling and assertions<br>4. Develop java applications to make use of collections framework and generics to solve real world problems<br>5. Apply the knowledge of delegation event model to handle semantic and low level events<br>6. Solve real world problems using Java legacy classes |

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| **20IT4351** | **DATABASE MANAGEMENT SYSTEMS LAB** | 1. Design graphical user interface applications using Java Swings<br>2. Experiment DDL and DML statements with integrity constraints<br>3. Apply various SQL functions and operators in RDBMS<br>4. Develop solutions to query problems using nested queries with various operators. |
| 20IT4353 | **ADVANCED PROGRAMMING LAB-I** | 1. Implement PL/SQL on stored databases.<br>2. Demonstrate the knowledge of problem solving and to find solutions that use different types of programming paradigms.<br>3. Apply the knowledge of number theory to solve problems and generate solutions.<br>4. Design solutions to the problems by applying linear and non-linear data structures.<br>5. Develop combinatory solutions to the real world problems.<br>6. Execute basic algorithmic ideas using greedy approach to solve competitive programming problems. |
| **20TP4106** | **ENGLISH FOR PROFESSIONALS** | 1. Analyze dynamic programming approaches to generate solution to the problems .<br>2. Present themselves effectively in the professional world by shedding off their inhibitions about communicating in English<br>3. Introduce themselves as well as others appropriately<br>4. Use vocabulary to form sentences and narrate stories by using creative thinking skills<br>5. Involve in practical activity oriented sessions and respond positively by developing their analytical thinking skills. |
| **20MC4108B** | **INDIAN CONSTITUTION** | 1. Learn about various expressions to be used in different situations.<br>2. Know the fundamental law of the land<br>3. Understand how fundamental rights are protected<br>4. Perceive the structure and formation of the Indian Government System |

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| **20IT3501** | **COMPUTER NETWORKS** | 1. Explain when and how an emergency can be imposed and what are the consequences.<br>**2.** Understand the functioning of the network components in wired and wireless communication<br>**3.** Apply error detection, correction and security methods in a network<br>4. Analyze different protocols functioning at Application layer, Transport layer and Network layer. |
| **20IT5302** | **SOFTWARE ENGINEERING** | 1. Evaluate the shortest path in data transfer with Routing algorithms<br>2. Understand the basic fundamentals of software development life cycle.<br>3. Apply process models and testing techniques to real time applications.<br>4. Analyze requirements, specifications to build system architecture. |
| **20HS5103** | **ENGINEERING ECONOMICS AND MANAGEMENT** | 1. Create UML diagrams that represent static and dynamic aspects of a software.<br>2. Understand various forms of organizations and principles of management<br>3. Understand the various aspects of business economics.<br>4. Perceive the knowledge on Human resources and Marketing functions |
| **20IT5404A** | **DATA MINING** | 1. Evaluate various alternatives economically.<br>2. Understand the basic concepts of warehousing and mining.<br>3. Derive various interesting patterns and associations in datasets.<br>4. Design classifier models to predict future trends. |

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| 20IT5404B | **DOT NET TECHNOLOGIES** | 1. Apply unsupervised learning techniques for a given application.<br>2. Understand the Microsoft .NET Framework Architecture and its features such as delegates and Lambda expressions.<br>3. Apply the object oriented features of Dot Net frame work in solving Real world applications.<br>4. Implement modern database interactivity using the Entity framework for database connectivity. |

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| **20IT5404C** | **BLOCKCHAIN TECHNOLOGIES** | 1. Develop a dynamic web application using ASP.net core Razor pages.<br>2. Understand block chain terminologies and its properties and the emerging models for blockchain technology<br>3. Familiarize with the functional/operational aspects of cryptocurrency ecosystem and identify major challenges and technical gaps existing between theory and practice in cryptocurrency domain<br>4. Design Smart Contracts of blockchain Technology using Solidity and Remix IDE |
| **20IT5205A** | **AI TOOLS, TECHNIQUES AND APPLICATIONS.** | 1. Build private-permissioned block chain-based applications for enterprises and businesses<br>2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.<br>3. Analyze Reinforcement Learning to real life planning problems.<br>4. Evaluate techniques for computer-based representation and manipulation of complex information, and uncertainty. |
| **20IT5205B** | **MOBILE APPLICATION DEVELOPMENT** | 1. Create chat bots for various application using AI tools.<br>2. Interpret features of android environment and development tools.<br>3. Design rich user interfaces by using various controls & views.<br>4. Apply the knowledge of fragment and activity life cycles to design apps |
| 20IT5205C | **INTRODUCTION TO DATABASEMANAGEMENT SYSTEMS** | 1. Analyze various layout managers and widgets to develop Android applications.<br>**2.** Understand functional components of the DBMS and ER Modelling.<br>3. Design different data models for real-time applications.<br>4. Develop queries using Structured Query Language. |
| **20IT5351A** | **DATA MINING LAB** | 1. Apply normalization technique for schema refinement.<br>2. Create a Data warehouse for the given database.<br>3. Implement data preprocessing to the given dataset.<br>4. Design a model to extract the patterns from the data. |

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| **20IT5351B** | **DOTNET TECHNOLOGIES LAB** | 1. Evaluate the model designed for pattern extraction.<br>2. Implement the Console Applications in C#.<br>3. Implement the object oriented features of Dot Net frame work in solving Real-world Applications.<br>4. Design web application with variety of web controls and validation controls. |
| **20IT5351C** | **BLOCKCHAIN TECHNOLOGIES LAB** | 1. Develop dynamic web applications that include database interactivity.<br>2. Build smart contracts using Remix IDE, Ganache and Myether Wallet in Ethereum Platform.<br>3. Build private-permissioned block chain-based applications for enterprises and businesses.<br>4. Develop IPFS file system using peer to peer networks |
| 20IT5352 | **ADVANCED PROGRAMMING LAB - II** | 1. Build a block chain raffle using Solidity programming language<br>2. Combine fundamental data structures and algorithmic techniques in building a complete solution to a given problem<br>3. Solve recurrences describing the performance of string algorithms.<br>4. Develop combinatory solutions to the real-world problems .<br>5. Analyze dynamic programming strategies to solve a given problem.<br>6. Derive solutions to the problems based on Computational Geometry. |
| **20TP1507** | **PERSONALITY DEVELOPMENT** | 1. Evaluate new techniques for solving specific problems in line with space and time requirements.<br>2. Understand the corporate etiquette.<br>3. Make presentations effectively with appropriate body language<br>4. Be composed with positive attitude |
| **20IT5607** | **REACT PROGRAMMING** | 1. Understand the core competencies to succeed in professional and personal life<br>2. Understand the client-side JavaScript application development through React library<br>3. Apply React features such as forms, reuse and nest components<br>4. Develop functional front-end web application using React |

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| **20IT5607** | **GOOGLE GO** | 1. Implement state management, routing and data incorporation in React<br>2. Understand the Go Language Environment and its features.<br>3. Manipulate GO language data types such as Arrays, Strings and Pointers.<br>4. Implement code reusability, modularity, and flexibility to solve complex compositions. |
| **20IT6301** | **CLOUD COMPUTING** | 1. Analyze predefined and user defined packages, servers to develop real time applications<br>2. Interpret the concepts of cloud computing and its standards.<br>3. Analyze cloud models, security and storage accessibility in different cloud ecosystems<br>4. Illustrate cloud services offered by various cloud vendors for an enterprise |
| **20IT5302** | **MACHINE LEARNING** | 1. Implement cloud environment for various real time applications.<br>2. Understand the fundamental concepts of machine learning<br>3. Apply linear, distance based, and decision tree based models<br>4. Analyze probabilistic, neural network models |
| **20IT6303** | **WEB PROGRAMMING AND DEVELOPMENT** | 1. Design a suitable machine learning model for a given scenario<br>2. Understand features of Spring Boot, Spring Framework, Spring cloud and process involved to connect to Java Database Connectivity<br>3. Apply concepts of Servlets to develop server side applications<br>4. Design web applications with Spring Boot Annotations and connecting to JPA with Spring MVC and Spring Boot |
| **20IT5404A** | **DATA VISUALIZATION** | 1. Develop Representational State Transfer services in Spring Boot applications<br>2. Illustrate visualizations that represent the relationships contained in complex data sets and their interpretation.<br>3. Analyze data to create a visualization for a particular research application.<br>4. Identify appropriate visualization chart to present and represent design solutions. |

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| **20IT6404B** | **BIG DATA** | 1. Choose leading open source software packages to create and publish visualizations that enable clear interpretations of big, complex and real world data.<br>2. Understand Big data characteristics, Hadoop, Hive, HDFS and Map Reduce architectures.<br>3. Use Nosql Databases to process different varieties of Data.<br>4. Apply Pig Latin, Hive Scripts and Map Reduce programming on real time applications. |
| **20IT6404C** | **INTERNET OF THINGS** | 1. Develop In-Memory Data Analytics with Spark and Spark Streaming.<br>2. Analyze various protocols, privacy and security of Internet of Things.<br>3. Apply the methods of data acquiring, organizing and analytics using<br>4. Cloud platform for IoT applications.<br>5. Design portable IoT system using Rasperry Pi and Arduino. |
| **20IT6404D** | **INFORMATION RETRIEVAL SYSTEM** | 1. Apply the steps of the design methodology in developingIoT applications.<br>2. Understand the basic concepts and techniques in Information Retrieval<br>3. Evaluate information retrieval system performance and queries formulation<br>4. Infer relevance feedback and query operations on a text database |
| **20IT6205A** | **AGILE SOFTWARE DEVELOPMENT** | 1. Analyze the web characterization and digital libraries implications<br>2. Apply software development methods for time management of agile projects.<br>3. Analyze agile software development processes, quality and team work in learning.<br>4. Evaluate measures that suit agile software development environments to process and product quality which delves into the details of TDD implementation. |

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| **20IT6205B** | **AUTOMATA AND COMPILER DESIGN** | 1. Build teams to establish a professional software development that promotes team members accountability and responsibility.<br>2. Understand the concepts of abstract machines, compiler design, language classes & grammar relationships and variants of syntax trees.<br>3. Apply code generation and code optimization techniques, top down and bottom up parsing techniques on context free grammars<br>4. Construct finite state machines, Parsing Tables and regular expressions for modeling and solving computation problems. |
| **20IT6205C** | **INTRODUCTION TO DATA STRUCTURES** | 1. Design Context free grammars, Pushdown Automata and Turing machines for the formal languages.<br>2. Apply linear data structures to solve different applications.<br>3. Develop algorithms to solve a given problem using appropriate data structure.<br>4. Implement operations on binary trees, binary search trees and sorting. |
| **20IT6351** | **WEB PROGRAMMING AND DEVELOPMENT LAB** | 1. Solve problems using algorithm design methods such as the divide and conquer, greedy method and dynamic programming.<br>2. Implement Java Database Connectivity Application Programming Interface to connect to relational databases<br>3. Build server side applications to interact with server using Java Servlets<br>4. Design Web applications that interact with server as well as the relational databases<br>5. Implement dependency injection and inversion of control to solve problems in Spring Boot<br>6. Apply Spring Boot annotations to provide solutions to real world problems |
| **20IT6352A** | **DATA VISUALIZATION LAB** | 1. Create Spring Boot applications that uses Representational State Transfer services<br>2. Understand the visualization pipeline with its relationship to other data analysis pipelines<br>3. Design considerations for the components of the good visualization<br>4. Construct visualizations for effective data analysis |

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| **20IT6352B** | **BIG DATA LAB** | 1. Build interactive dashboards for better decision making<br>2. Implement Map Reduce programming on real time applications.<br>3. Apply NOSQL Concepts on real time applications.<br>4. Apply Pig Latin and Hive Script programming on real time applications. |
| **20IT6352C** | **INTERNET OF THINGS LAB** | 1. Solve various business applications using Big data concepts.<br>2. Understanding of IoT value chain structure (device, data cloud), application areas and technologies involved.<br>3. Choose the right sensors and actuators for an application.<br>4. Test and experiment different sensors for application development.<br>5. Develop IoT applications using Arduino/Raspberry Pi/open platform.<br>6. Develop smart IoT Applications using smart sensor devices cloud systems. |
| **20IT6352D** | **INFORMATION RETRIEVAL SYSTEM LAB** | 1. Explore and learn about Internet of Things with the help of preparing projects designed for Raspberry Pi<br>2. Demonstrate genesis and diversity of information retrieval situations for text and hypermedia.<br>3. Interpret different types of algorithms to provide better search results<br>4. Analyze the functions of web search engines. |
| **20IT6353** | **ADVANCED PROGRAMMING LAB – III** | 1. Apply techniques for compressing dictionaries and inverted indexes<br>2. Understand the basic concepts such as Stacks, Queues, Linked Lists and Hashing Techniques in the programming language.<br>3. Demonstrate the use of stacks, queues and sequences in solving real world scenarios.<br>4. Apply tries and trees in solving network related scenarios.<br>5. Solve the problems with given test cases.<br>6. Analyze the solutions for the problems using algorithm analysis concepts |

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| 20MC6107A | **INNOVATION, IPR AND ENTREPRENEURSHIP** | 1. Apply programing skills for optimized code and derive the solutions according to the provided constraints.<br>2. To learn the innovation concepts related to business organizations.<br>3. To understand the importance of innovation in new start-ups.<br>4. To know fundamental aspects of Intellectual property Rights.<br>5. To learn the basic concepts of entrepreneurship and its benefits. |

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| **20IT5404C** | **BLOCKCHAIN TECHNOLOGIES** | 1. Develop a dynamic web application using ASP.net core Razor pages.<br>2. Understand block chain terminologies and its properties and the emerging models for blockchain technology<br>3. Familiarize with the functional/operational aspects of cryptocurrency ecosystem and identify major challenges and technical gaps existing between theory and practice in cryptocurrency domain<br>4. Design Smart Contracts of blockchain Technology using Solidity and Remix IDE |
| **20IT5205A** | **AI TOOLS, TECHNIQUES AND APPLICATIONS.** | 1. Build private-permissioned block chain-based applications for enterprises and businesses<br>2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.<br>3. Analyze Reinforcement Learning to real life planning problems.<br>4. Evaluate techniques for computer-based representation and manipulation of complex information, and uncertainty. |
| **20IT5205B** | **MOBILE APPLICATION DEVELOPMENT** | 1. Create chat bots for various application using AI tools.<br>2. Interpret features of android environment and development tools.<br>3. Design rich user interfaces by using various controls & views.<br>4. Apply the knowledge of fragment and activity life cycles to design apps |
| 20IT5205C | **INTRODUCTION TO DATABASEMANAGEMENT SYSTEMS** | 1. Analyze various layout managers and widgets to develop Android applications.<br>**2.** Understand functional components of the DBMS and ER Modelling.<br>3. Design different data models for real-time applications.<br>4. Develop queries using Structured Query Language. |
| **20IT5351A** | **DATA MINING LAB** | 1. Apply normalization technique for schema refinement.<br>2. Create a Data warehouse for the given database.<br>3. Implement data preprocessing to the given dataset.<br>4. Design a model to extract the patterns from the data. |

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| **20IT5351B** | **DOTNET TECHNOLOGIES LAB** | 1. Evaluate the model designed for pattern extraction.<br>2. Implement the Console Applications in C#.<br>3. Implement the object oriented features of Dot Net frame work in solving Real-world Applications.<br>4. Design web application with variety of web controls and validation controls. |
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| **20IT5607** | **REACT PROGRAMMING** | 1. Understand the core competencies to succeed in professional and personal life<br>2. Understand the client-side JavaScript application development through React library<br>3. Apply React features such as forms, reuse and nest components<br>4. Develop functional front-end web application using React |

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| **20IT5607** | **GOOGLE GO** | 1. Implement state management, routing and data incorporation in React<br>2. Understand the Go Language Environment and its features.<br>3. Manipulate GO language data types such as Arrays, Strings and Pointers.<br>4. Implement code reusability, modularity, and flexibility to solve complex compositions. |
| **20IT6301** | **CLOUD COMPUTING** | 1. Analyze predefined and user defined packages, servers to develop real time applications<br>2. Interpret the concepts of cloud computing and its standards.<br>3. Analyze cloud models, security and storage accessibility in different cloud ecosystems<br>4. Illustrate cloud services offered by various cloud vendors for an enterprise |
| **20IT5302** | **MACHINE LEARNING** | 1. Implement cloud environment for various real time applications.<br>2. Understand the fundamental concepts of machine learning<br>3. Apply linear, distance based, and decision tree based models<br>4. Analyze probabilistic, neural network models |
| **20IT6303** | **WEB PROGRAMMING AND DEVELOPMENT** | 1. Design a suitable machine learning model for a given scenario<br>2. Understand features of Spring Boot, Spring Framework, Spring cloud and process involved to connect to Java Database Connectivity<br>3. Apply concepts of Servlets to develop server side applications<br>4. Design web applications with Spring Boot Annotations and connecting to JPA with Spring MVC and Spring Boot |
| **20IT5404A** | **DATA VISUALIZATION** | 1. Develop Representational State Transfer services in Spring Boot applications<br>2. Illustrate visualizations that represent the relationships contained in complex data sets and their interpretation.<br>3. Analyze data to create a visualization for a particular research application.<br>4. Identify appropriate visualization chart to present and represent design solutions. |

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| **20IT6404B** | **BIG DATA** | 1. Choose leading open source software packages to create and publish visualizations that enable clear interpretations of big, complex and real world data.<br>2. Understand Big data characteristics, Hadoop, Hive, HDFS and Map Reduce architectures.<br>3. Use Nosql Databases to process different varieties of Data.<br>4. Apply Pig Latin, Hive Scripts and Map Reduce programming on real time applications. |
| **20IT6404C** | **INTERNET OF THINGS** | 1. Develop In-Memory Data Analytics with Spark and Spark Streaming.<br>2. Analyze various protocols, privacy and security of Internet of Things.<br>3. Apply the methods of data acquiring, organizing and analytics using<br>4. Cloud platform for IoT applications.<br>5. Design portable IoT system using Rasperry Pi and Arduino. |
| **20IT6404D** | **INFORMATION RETRIEVAL SYSTEM** | 1. Apply the steps of the design methodology in developingIoT applications.<br>2. Understand the basic concepts and techniques in Information Retrieval<br>3. Evaluate information retrieval system performance and queries formulation<br>4. Infer relevance feedback and query operations on a text database |
| **20IT6205A** | **AGILE SOFTWARE DEVELOPMENT** | 1. Analyze the web characterization and digital libraries implications<br>2. Apply software development methods for time management of agile projects.<br>3. Analyze agile software development processes, quality and team work in learning.<br>4. Evaluate measures that suit agile software development environments to process and product quality which delves into the details of TDD implementation. |

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| **20IT6205B** | **AUTOMATA AND COMPILER DESIGN** | 1. Build teams to establish a professional software development that promotes team members accountability and responsibility.<br>2. Understand the concepts of abstract machines, compiler design, language classes & grammar relationships and variants of syntax trees.<br>3. Apply code generation and code optimization techniques, top down and bottom up parsing techniques on context free grammars<br>4. Construct finite state machines, Parsing Tables and regular expressions for modeling and solving computation problems. |
| **20IT6205C** | **INTRODUCTION TO DATA STRUCTURES** | 1. Design Context free grammars, Pushdown Automata and Turing machines for the formal languages.<br>2. Apply linear data structures to solve different applications.<br>3. Develop algorithms to solve a given problem using appropriate data structure.<br>4. Implement operations on binary trees, binary search trees and sorting. |
| **20IT6351** | **WEB PROGRAMMING AND DEVELOPMENT LAB** | 1. Solve problems using algorithm design methods such as the divide and conquer, greedy method and dynamic programming.<br>2. Implement Java Database Connectivity Application Programming Interface to connect to relational databases<br>3. Build server side applications to interact with server using Java Servlets<br>4. Design Web applications that interact with server as well as the relational databases<br>5. Implement dependency injection and inversion of control to solve problems in Spring Boot<br>6. Apply Spring Boot annotations to provide solutions to real world problems |
| **20IT6352A** | **DATA VISUALIZATION LAB** | 1. Create Spring Boot applications that uses Representational State Transfer services<br>2. Understand the visualization pipeline with its relationship to other data analysis pipelines<br>3. Design considerations for the components of the good visualization<br>4. Construct visualizations for effective data analysis |

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| **20IT6352B** | **BIG DATA LAB** | 1. Build interactive dashboards for better decision making<br>2. Implement Map Reduce programming on real time applications.<br>3. Apply NOSQL Concepts on real time applications.<br>4. Apply Pig Latin and Hive Script programming on real time applications. |
| **20IT6352C** | **INTERNET OF THINGS LAB** | 1. Solve various business applications using Big data concepts.<br>2. Understanding of IoT value chain structure (device, data cloud), application areas and technologies involved.<br>3. Choose the right sensors and actuators for an application.<br>4. Test and experiment different sensors for application development.<br>5. Develop IoT applications using Arduino/Raspberry Pi/open platform.<br>6. Develop smart IoT Applications using smart sensor devices cloud systems. |
| **20IT6352D** | **INFORMATION RETRIEVAL SYSTEM LAB** | 1. Explore and learn about Internet of Things with the help of preparing projects designed for Raspberry Pi<br>2. Demonstrate genesis and diversity of information retrieval situations for text and hypermedia.<br>3. Interpret different types of algorithms to provide better search results<br>4. Analyze the functions of web search engines. |
| **20IT6353** | **ADVANCED PROGRAMMING LAB – III** | 1. Apply techniques for compressing dictionaries and inverted indexes<br>2. Understand the basic concepts such as Stacks, Queues, Linked Lists and Hashing Techniques in the programming language.<br>3. Demonstrate the use of stacks, queues and sequences in solving real world scenarios.<br>4. Apply tries and trees in solving network related scenarios.<br>5. Solve the problems with given test cases.<br>6. Analyze the solutions for the problems using algorithm analysis concepts |

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| 20MC6107A | **INNOVATION, IPR AND ENTREPRENEURSHIP** | 1. Apply programing skills for optimized code and derive the solutions according to the provided constraints.<br>2. To learn the innovation concepts related to business organizations.<br>3. To understand the importance of innovation in new start-ups.<br>4. To know fundamental aspects of Intellectual property Rights.<br>5. To learn the basic concepts of entrepreneurship and its benefits. |

## DEPARTMENT OF INFORMATION TECHNOLOGY

## VELAGAPUDI RAMAKRISHNA SIDDHARTHA ENGINEERING COLLEGE

## B.TECH VR17 REGULATIONS – COURSE OUTCOMES

| Course Code | Course Name | Course Outcomes |
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| 17MA1101 | Matrices And Differential Calculus | 1. Determine Eigen values, Eigen vectors of a matrix.<br>2. Estimate Maxima and Minima of Multi Variable Functions.<br>3. Solve the Linear differential equations with constant coefficients.<br>4. Solve the Linear differential equations with variable coefficients. |
| 17PH1102B | Applied Physics | 1. Understand the importance of quantum mechanics.<br>2. Analyse and understand various types of lasers and their applications.<br>3. Elaborate different types of optical fibers and understand holography.<br>4. Understand the fabrication of nanomaterials and carbon Nanotubes. |
| 17CS1103 | Problem Solving Methods | 1. Understand the Computer problem solving approaches, efficiency and analysis of algorithms<br>2. Apply the factoring methods to solve the given problem<br>3. Apply the array techniques to find the solution for the given problem<br>4. Solve the problems using MATLAB |
| 17EE1104 | Basics of Electrical Engineering | 1. Analyze Electric Circuit fundamentals.<br>2. Understand the basic concepts of Alternating Quantities and Magnetic Circuits<br>3. Analyze the basic concepts of Electric Machines<br>4. Understand Measuring Instruments & Solar Photo Voltaic System concepts |
| 17HS1105 | Technical English and Communication Skills | 1. Develop administrative and professional compilations including web related(On-line) communication with felicity of expression<br>2. Demonstrate Proficiency in Interpersonal Communication, in addition to standard patterns of Pronunciation<br>3. Apply the elements of functional English with sustained understanding for authentic use of language in any given academic and/or professional environment<br>4. Execute tasks in Technical communication with competence |
| 17PH1151 | Applied Physics | 1. Use function generator, spectrometer and travelling |

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| | Laboratory | microscope in various experiments<br>2. Test optical components using principles of interference and diffraction of light<br>3. Determine the V-I characteristics of solar cell and photo cell and appreciate the accuracy in measurements |
| 17CS1152 | Computing and Peripherals Laboratory | 1. Understand and Apply MS Office tools<br>2. Configure the components on the motherboard and install different operating systems<br>3. Understand and configure different storage media<br>4. Perform Networking, troubleshooting and system administration tasks |
| 17ME1153 | Basic Workshop | 1. Model and develop various basic prototypes in the Carpentry trade.<br>2. Develop various basic prototypes in the trade of Welding.<br>3. Model and develop various basic prototypes in the trade of Tin Smithy.<br>4. Familiarize with various fundamental aspects of house wiring. |
| 17MC1106A | Technology and Society | 1. Understand the origins of technology and its role in the history of human progress.<br>2. Know the Industrial Revolution and its impact on Society<br>3. Interpret the developments in various fields of technology till Twentieth Century.<br>4. Distinguish the impacts of Technology on the Environemnt and achievements of great scientists. |
| 17MA1201 | Laplace Transforms And Integral Calculus | 1. Solve Linear Differential Equations using Laplace Transforms.<br>2. Examine the nature of the Infinite series.<br>3. Evaluate areas and volumes using Double, Triple Integrals.<br>4. Convert Line Integrals to Area Integrals and Surface Integrals to Volume Integrals. |
| 17CH1202 | Engineering Chemistry | 1. Analyze various water treatment methods and boiler troubles.<br>2. Apply the principles of spectroscopic techniques to analyse different materials and apply the knowledge of conventional fuels for their effective utilisation.<br>3. Apply the knowledge of working principles of conducting polymers, electrodes and batteries for their application in various technological fields.<br>4. Evaluate corrosion processes as well as protection methods. |
| 17CS1203 | Programming in C | 1. Understand the fundamentals and structure of a C |

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| | | programming language<br>2. Apply the loops, arrays, functions and string concepts in C to solve the given problem.<br>3. Apply the pointers and text input output files concept to find the solution for the given applications.<br>4. Use the Enumerated, Data types, Structures and Unions. |
| 17EC1204A | Basic Electronic Engineering | 1. Fundamentals of electronic components, devices, transducers<br>2. Principles of digital electronics<br>3. Principles of various communication systems. |
| 17ME1205 | Engineering Graphics | 1. Understand the Scales, conics and Cycloidal curves.<br>2. Draw Orthographic projections of points, Lines, Planes and Solids<br>3. Understand Sectional views of Solids, Development of surfaces and their representation<br>4. Construct isometric scale, isometric projections ,isometric views and convert pictorial views to orthographic projections |
| 17CH1251 | Engineering Chemistry Laboratory | 1. Analyze quality parameters of water samples from different sources<br>2. Perform quantitative analysis using instrumental methods.<br>3. Apply the knowledge of mechanism of corrosion inhibition, metallic coatings and photochemical reactions. |
| 17CS1252 | Computer Programming Laboratory | 1. Implement the use of programming constructs in a structured oriented programming language<br>2. Analyze and implement user defined functions to solve real time problems<br>3. Implement the usage of pointers and file operations on data<br>4. Implement the user defined data types via structures and unions to solve real life problems |
| 17MC1206B | Professional Ethics& Human Values | 1. Know the moral autonomy and uses of ethical theories.<br>2. Understand morals, Honesty and character.<br>3. Understand about safety, risk and professional rights.<br>4. Know the ethics regarding Global issues related to Environment, Computers and weapon's development. |
| **17MA1301** | Complex Analysis and Numerical Methods | 1. Determine analytic, non-analytic functions and evaluate complex integrals.<br>2. Analyze Taylor, Laurent series and evaluate real |

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| | | definite integrals using residue theorem.<br>3. Solve Algebraic, transcendental, system of equations and estimate functions using polynomial interpolation.<br>4. Solve initial and boundary value problems numerically. |
| **17IT3302** | **Discrete Mathematical Structures** | 1. Understand the logical inference and counting techniques<br>2. Classify functions, relations and concepts of generating functions.<br>3. Solve recurrence relations and understand the concepts of Groups and their properties.<br>4. Classify Groups and Graph isomorphism. |
| **17IT3303** | **Data Structures** | 1. Analyze operations on linear data structures like stack, queue and linked<br>2. Develop algorithms to solve a given problem using appropriate data structure<br>3. Demonstrate the algorithms for operations on binary, binary search, AVL and B-trees<br>4. Implement searching& sorting techniques and assess its performance. |
| **17IT3304** | **Computer Organization** | 1. Design combinational & sequential circuits,digital components, arithmetic logic and control units<br>2. Analyze the basic organization of computer, different instruction formats and addressing modes.<br>3. Apply computer algorithms for performing arithmetic operations on binary number system.<br>4. Analyze components of memory organization and modes of data transfer between CPU and I/O devices |
| **15IT3305A** | **Yoga& Meditation** | 1. Equip better attitude and behaviour.<br>2. Imbibe set of values enabling a balanced life focused on an ethical material life.<br>3. Develop levels of concentration through mediation<br>4. Apply conscience for the missions of life |
| **17HS2305D** | **Philosophy** | 1. Understand major philosophical issues.<br>2. Appreciate the philosophical doctrines of western thinkers.<br>3. Understand the eminence of Indian classical thought.<br>4. Appreciate relation between science and values. |
| **17HS2305I** | **Foreign Language - German** | 1. Learn basics of German Language.<br>2. Write German Writing<br>3. Understand German Hearing<br>4. Form sentence in Present , past and future tense |
| **17HS2305J** | **Psychology** | 1. Relate biological and socio-cultural factors in understanding human Behaviour.<br>2. Understand the nature of sensory processes, types of |

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| | | attentions.<br>3. Explain different types of learning and the procedures, distinguishes between different types of memory,<br>4. Demonstrate an understanding of some cognitive processes involved in Problem solving and decision-making. |
| **17TP1306** | **Logic & Reasoning** | 1. Think reason logically in any critical situation<br>2. Analyze given information to find correct solution<br>3. Reduce the mistakes in day to day activities in practical life<br>4. Develop time management skills by approaching different shortcut methods<br>5. Use mathematical based reasoning to make decisions<br>6. Apply logical thinking to solve problems and puzzles in qualifying exams for companies and in other competitive exams |
| **17IT3308** | **Object Oriented Programming** | 1. Examine the characteristics of object oriented approach<br>2. Demonstrate the concept of polymorphism in overload of functions and operators<br>3. Construct object oriented programs through inheritance and templates<br>4. Apply exception handling mechanism to handle errors occur at runtime |
| **17IT3351** | **Data Structures Lab** | 1. Implement various operations of stack, queue and linked list data types.<br>2. Analyze and solve a given problem using appropriate data structure.<br>3. Implement operations on different trees data structures like binary, binary search, AVL and Btrees.<br>4. Design various searching and sorting algorithms. |
| **17HS1352** | **Communication Skills Lab** | 1. Execute rational pronunciation of speech sounds including accentuation.<br>2. Apply elements of listening comprehension in professional environments.<br>3. Develop the abilities of rational argumentation and skills of public speaking.<br>4. Demonstrate proficiency in the elements of professional communication including the competitive examination |
| **17MC1307** | **Environmental Studies** | 1. Understand the various natural resources, analyze and explore degradation management<br>2. Understand the Ecosystems and need of Biodiversity<br>3. Realize and Explore the Problems related to |

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| | | Environmental pollution and its management<br>4. Apply the Role of Information Technology and analyze social issues, Acts associated with Environment. |
| **17IT3401** | **Statistics With R** | 1. Comprehend the semantics, data handling and control statements in R<br>2. Analyze the libraries for data manipulation and to data visualization in R<br>3. Demonstrate the knowledge of probability and conduct hypothesis tests for statistical inference<br>4. Synthesize data to fit linear and nonlinear models |
| **17IT3402** | **Database Management Systems** | 1. Analyze the characteristics, architecture of DBMS and constraints of relational model<br>2. Formulate solutions to a broad range of query problems using SQL and relational algebra<br>3. Design the databases using ER model and normalization for a given requirement specification<br>4. Implement the isolation property using serializabilty and concurrency control techniques |
| **17IT3403** | **Design And Analysis of Algorithms** | 1. Analyze the performance of algorithms using time and space complexities.<br>2. Synthesize design techniques like Divide & Conquer, Greedy and choose appropriate technique to solve novel problems.<br>3. Apply algorithm design techniques using non-linear data structures to solve problems.<br>4. Classify problems as P, NP, NP-hard and NP-complete and analyze the significance |
| **17IT3404** | **Python Programming** | 1. Understand the basic building blocks in python programming language to construct different applications.<br>2. Apply the necessary data structures to solve a given problem.<br>3. Extract and import packages for developing different solutions for real time problems.<br>4. Implement the problems in terms of real-world objects using concept of OOPS. |
| **17TP1405** | **English For Professionals** | 1. Present themselves effectively in the professional world by shedding off their inhibitions aboutcommunicating in English<br>2. Introduce themselves as well as others appropriately.<br>3. Use vocabulary to form sentences and narrate stories by using creative thinking skills<br>4. Involve in practical activity oriented sessions.<br>5. Learn about various expressions to be used in |

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| | | different situations.<br>6. Respond positively by developing their analytical thinking skills. |
| **17IT3406** | **Operating Systems** | 1. Analyze different Operating Systems and its Services & Functions<br>2. Implement CPU scheduling & synchronization algorithms<br>3. Demonstrate the techniques for handling deadlock & memory management<br>4. Analyze various I/O management, File systems and disk scheduling techniques |
| **17IT3451** | **Database Management Systems Lab** | 1. Experiment DDL and DML commands with different integrity constraints<br>2. Apply functions and operators in SQL queries<br>3. Formulate solutions to query problems using nested queries and aggregate operators<br>4. Demonstrate PL/SQL concepts on the given database |
| **17IT3452** | **Python Programming Lab** | 1. Implement python programming constructs to build small to large scale applications.<br>2. Implement the problems in terms of real-world objects usingOOPs technology.<br>3. Evaluate and handle the errors during runtime involved in a program.<br>4. Extract and import packages for developing different solutions for real time problems. |
| **17IT3453** | **Web Programming Lab** | 1. Understand the importance of the web as an effective medium of communication<br>2. Develop basic skills in analyzing the usability of a web site using HTML.<br>3. Develop hands on experience using open source technologies such as HTML, CSS,<br>4. JavaScript, PHP and MySQL<br>5. Generate an application based upon the concepts of HTML & PHP |
| **17MC1407B** | **Indian Constitution** | 1. Know the fundamental law of the land<br>2. Understand how fundamental rights are protected<br>3. Perceive the structure and formation of the Indian Government System<br>4. Explain when and how an emergency can be imposed and what are the consequences. |
| **17IT3501** | **Software Engineering** | 1. Identify an appropriate software model that would implement the customer requirements.<br>2. Analyze the requirements and identify the suitable architecture for the problem.<br>3. Discriminate the specifications at each stage of |

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| | | Software Development Life Cycle.<br>4. Implement various software testing strategies for verification and validation of the software products. |
| **17IT3502** | **Data Mining** | 1. Understand the basic concepts of warehousing and mining.<br>2. Derive various interesting patterns and associations in datasets.<br>3. Design and develop classifier models to predict future trends.<br>4. Apply unsupervised learning techniques for a given application. |
| **17IT3503** | **Computer Networks** | 1. Analyze the reference models and physical connections of network systems<br>2. Apply different protocols functioning at Application layer and Transport layer.<br>3. Evaluate various Routing algorithms for finding the optimal path.<br>4. Understand the concepts of wireless communication , mobility and security |
| **17IT2504A** | **Ai Tools, Techniques And Applications** | 1. Identify problems that are amenable to solution by AI methods and Represent knowledge of the world using logic and Infer new facts from that knowledge<br>2. Demonstrate the capability to create simple AI applications using Natural Language Processing and machine learning.<br>3. Elucidate the best practices for Chatbot development<br>4. Explicate the purpose of Reinforcement Learning and apply Reinforcement Learning to real life planning problems. |
| **17IT2504B** | **Linux Programming** | 1. Apply Linux utilities and Shell scripting language (bash) to solve Problems.<br>2. Develop the skills necessary for working with files<br>3. Understanding of Linux environment which includes program arguments and Environment variables.<br>4. Familiar with the skills necessary for memory Management, process management and Locks. |
| **17IT2504C** | **Mobile Application Development** | 1. Comprehend the basics of Android development framework.<br>2. Develop an application using the interfaces, Intents & Layouts<br>3. Create the User Interface Programmatically.<br>4. Demonstrate the saving of data & Navigation using Maps. |
| **17IT2505A** | **Database Management Systems** | 1. Analyze the information storage issues and derive aninformation model in the form of an entity relation<br>diagram. |

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| | | 2. Transform information model into a relational database schema.<br>3. Formulate solutions to a broad range of query problems using formal and<br>4. Informal query languages.<br>5. Understand the normalization theory and construct normalized databases. |
| **17IT2505B** | **Object Oriented Programming** | 1. Examine the characteristics of object oriented approach<br>2. Demonstrate the concept of polymorphism in overload of functions and operators<br>3. Construct object oriented programs through inheritance and templates<br>4. Apply exception handling mechanism to handle errors occur at runtime |
| **17IT2505C** | **Python Programming** | 1. Analyze the constructs, conditional and iterative statements in python<br>2. Demonstrate the applicability of file and string handling in python<br>3. Interpret the knowledge of python modules and packages<br>4. Synthesize data structures such as list, dictionary, set and tuple to solve a given problem |
| **17TP1507** | **Personality Development** | 1. Understand the corporate etiquette.<br>2. Make presentations effectively with appropriate body language<br>3. Be composed with positive attitude<br>4. Understand the core competencies to succeed in professional and personal life |
| **17IT3509** | **Java Programming** | 1. Paraphrase the fundamental concepts of object oriented approach<br>2. Analyze exception handling techniques and I/O streams to handle user input and output<br>3. Demonstrate the usage of multi threads and collection framework for structures<br>4. Synthesize Graphical User Interfaces using applets and event handling |
| **17IT3551** | **Java Programming Lab** | 1. Design Java Applications on object oriented concepts<br>2. Implement techniques to handle run time errors and different types of inheritance<br>3. Develop java applications on multithreading and collection classes<br>4. Design GUI applications through Swing components and handle the raised events. |
| **17IT3552** | **Advanced** | 1. Demonstrate the knowledge to find solutions that |

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| | **Programming Lab I** | uses structured and object oriented languages<br>2. Implement data structures linear, non-linear and python structures to solve real world problems |
| **17MC1508A** | **Biology For Engineers** | 1. Describe the fundamental Principles and methods of engineering<br>2. Identify the functions of different types in bio-molecules<br>3. Describe mechanisms underlying the working of molecular biological processes including enzyme catalysis, metabolic pathways, gene expression.<br>4. Use Excel, MATLAB and other computational tools to quantitatively analyze biological processes. |
| **17IT3601** | **Machine Learning** | 1. Recognize the characteristics of machine learning , binary classification and Bayesian learning<br>2. Solve classification problems using concept learning and decision trees<br>3. Apply Linear and distance based learning models<br>4. Analyze Genetic and Neural network algorithms |
| **17IT3602** | **Web Programming And Development** | 1. Develop secure and dynamic web pages using JavaScript<br>2. Design applications that interact with relational databases through Java Database Connectivity<br>3. Develop and deploy Servlets and JSP technologies<br>4. Design single page web applications through Angular technology |
| **17IT4603A** | **Fundamentals of Data Science** | 1. Understand the need and significance of data life cycle.<br>2. Apply statistical techniques to visualize the data and evaluate Type I and II errors.<br>3. Design classifier model to predict future trends and validate accuracy of the classifier and to implement clustering techniques on the datasets.<br>4. Implement Linear model selection methods for real time applications/<br>5. Analyze algorithms for dimensionality reduction on data. |
| **17IT4603B** | **Network Security** | 1. Understand security attacks, services, mechanisms and encryption algorithms to mitigate security issues in a network<br>2. Apply authentication techniques to safeguard the data transfer.<br>3. Analyze security practices in IP and web based systems.<br>4. Identify malicious activities and incorporate counter measures on digital data. |
| **17IT4603C** | **Automata And** | 1. Construct finite state machines and regular |

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| | **Compiler Design** | expressions for modeling and solving computation problems.<br>2. Implement top down and bottom up parsing techniques on context free grammars<br>3. Apply techniques for code generation and code optimization.<br>4. Design Pushdown Automata and Turing machines for the given grammar or language. |
| **17IT4603D** | **Agile Software Development** | 1. Understand the nature of agile software development to establish a professional software development environment and build teams.<br>2. Analyze the customer role and time related problems in agile development environments.<br>3. Apply measures for quality assurance and Test Driven Development in agile software development environments.<br>4. Analyze the abstraction levels in agile software development and develop trust among team members in learning environment. |
| **17IT4604A** | **Big Data** | 1. Analyze Hadoop Architecture—Name Node, Big Data Lifecycle.<br>2. Master the concepts of Hadoop Distributed File System.<br>3. Acquire knowledge on Map Reduce Framework.<br>4. Apply Pig and Hive concepts for Data Processing. |
| **17IT4604B** | **Internet of Things** | 1. Understand the design concepts, protocols, privacy and security of Internet of Things<br>2. Analyze the methods of data acquiring, organizing and analytics using<br>3. Cloud platform for IoT applications.<br>4. Design IoT applications using Raspberry Pi board using Python interfacing various sensors.<br>5. Apply the steps of the design methodology in developing IoT applications. |
| **17IT4604C** | **Dot Net Technologies** | 1. Understanding the architecture and benefits of Dot Net Frame work..<br>2. Analyze the importance of object oriented features in Dot Net frame work.<br>3. Design dynamic web applications using web Controls and validation controls.<br>4. Build web applications that include database interactivity with different databases. |
| **17IT4604D** | **Software Testing Methodologies** | 1. Understand the differences between testing and debugging<br>2. Analyze the testing techniques for performing |

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| | | Transaction-Flow and Data-Flow testing<br>3. Implement transaction flow testing, domain testing and state testing for a given application and apply in commercial environments.<br>4. Interpret the control flow graph and identify the path products, path sums and path expressions. |
| **17IT2605A** | **Cyber Security** | 1. Identify the assets of information and significance of security.<br>2. Apply data leakage, protection and security policies on digital systems.<br>3. Analyze log files and backup strategies for securing the data in real time environment.<br>4. \|Implement the issues in handling web vulnerabilities. |
| **17IT2605B** | **Data Visualization** | 1. Illustrate visualizations that represent the relationships contained in complex data sets and their interpretation.<br>2. Analyze and select appropriate data that can be used in order to create a visualization<br>3. that answers a particular research application<br>4. Identify the statistical analysis needed to validate the trends present in data visualizations.<br>5. Choose leading open source software packages to create and publish visualizations that enable clear interpretations of big, complex and real world data. |
| **17IT2605 C** | **M Commerce** | 1. Understand the application of tools and services to the development of small scale E-Commerce applications<br>2. Identify the benefits and limitations of M-Commerce to support mobile marketing<br>3. Recognize the impact of technology advances in Wireless devices for M-Commerce<br>4. Analyze the factors influencing the adoption of Mobile Gaming Services and M-Commerce Business Models. |
| **17TP1606** | **Quantitative Aptitude** | 1. Solve various Basic Mathematics problems by following different methods<br>2. Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems<br>3. Confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.<br>4. Analyze, summarize and present information in quantitative forms including table, graphs and formulas |

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| **17IT3651 A** | **Big Data Lab** | 1. Understand the concepts and challenges in analyzing big data.<br>2. Learn to work with ecosystems available in Hadoop.<br>3. Understand the impact of big data for business strategies & decisions. |
| **17IT3651B** | **IoT Lab** | 1. Analyze the architecture of various embedded platforms<br>2. Implement basic IoT applications on embedded platform reading the data from analog and digital sensors |
| **17IT3651C** | **Dot Net Technologies Lab** | 1. Develop applications that make use of data types and control strutures<br>2. Implement object oriented features in Dot Net frame work.<br>3. Design dynamic web applications using web Controls and validation controls.<br>4. Build web applications that include database interactivity with different databases. |
| **17IT3651D** | **Software Testing Methodologies Lab** | 1. Develop test suits for applications.<br>2. Understand the JUnit tool to perform testing.<br>3. Understand Selenium tool to perform testing.<br>4. Analyze bug tracking and QTP tool. |
| **17IT3652** | **Web Programming And Development Lab** | 1. Develop secure and dynamic web pages using JavaScrip and Angular<br>2. Implement the basics of XML and JDBC Objects<br>3. Develop and deploy Servlets, JSP technologies |
| **17IT3654** | **Advanced Programming Lab II** | 1. Demonstrate the knowledge to find solutions that uses structured and object oriented languages<br>2. Implement data structures linear, non-linear and python structures to solve real world problems |
| **17IT5653** | **Project Work** | 1. Identify societal problem from the villages or towns with well-defined objectives.<br>2. Build a model for the problem chosen using modern tools and technology.<br>3. Organize the Technical report effectively. |
| **17IT3701** | **Cloud Computing** | 1. Analyze the architecture, services and models of cloud computing<br>2. Deploy applications for storing data and accessibility in different cloud ecosystems<br>3. Interpret local cloud and virtualization techniques based on application requirements<br>4. Identify real time cloud applications in different scenarios appropriate to society |
| **17IT4702 A** | **Data Analytics** | 1. Understand the basics and Life cycle of Data Analytics<br>2. Apply probability and Sampling distributions for |

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| | | data modeling.<br>3. Develop forecasting and Monte Carlo simulation models<br>4. Solve linear optimization and Decision problems |
| **17IT4702B** | **Computer Vision** | 1. Understand the basic concepts and methods in computer vision<br>2. Analyze various feature extraction and image segmentation techniques.<br>3. Apply various clustering and classification techniques for different applications.<br>4. Explore video processing methods in computer vision. |
| **17IT4702C** | **Routing And Switching Essentials** | 1. Determine the role of dynamic routing protocols in the context of modern network design.<br>2. Apply the configuration steps for static and dynamic routing in the topology.<br>3. Compare the working of various routing protocols.<br>4. Apply distance routing protocols in network communication. |
| **17IT4703A** | **Deep Learning** | 1. Understand linear and non linear activation functions, over fitting, different neural network architectures, dimensionality reduction<br>2. Analyze feed forward neural network and auto encoder architecture for various applications<br>3. Apply convolution, pooling operations in convolution neural networks and choose various encoding frameworks for a given application.<br>4. Identify a suitable RNN architecture for the given sequence modeling. |
| **17IT4703B** | **Blockchain Technologies** | 1. Understand blockchain terminologies and its properties and the emerging models for blockchain technology<br>2. Familiarize with the functional/operational aspects of crypto currency ecosystem.<br>3. Design, code, deploy and execute a smart contract – the computational element of the blockchain technology using Solidity and Remix IDE<br>4. Build private-permissioned blockchain-based applications for enterprises and businesses |
| **17IT4703C** | **Information Retrieval System** | 1. Interpret the functional processes and effectiveness of information storage and retrieval systems<br>2. Utilize techniques and architectures necessary to speed up the retrieval process for information retrieval systems<br>3. Apply metadata organization for effective information access. |

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| | | 4. Evaluate and use different information retrieval techniques in various application areas |
| **17IT4704 A** | **Natural Language Processing** | 1. Comprehend the concepts of natural language processing, its applications and language modeling techniques<br>2. Evaluate probabilistic language models and Solve NLP sub problems using tokenizing and tagging<br>3. Analyze linguistic structure in text using parsing and CFG<br>4. Interpret Methods to recognize syntactic and semantics structures of a sentence |
| **17IT4704B** | **Cloud Based CRM Platform (Salesforce)** | 1. Understand the basic concepts and framework of salesforce platform.<br>2. Explore data modelling and management techniques.<br>3. Analyze various levels to control data access and issues in lightining flow & apex programming<br>4. Apply testing for various functionalities of applications. |
| **17IT4704C** | **Devops Essentials** | 1. Understand the basic concepts of Devops, Kubernetes and trends of microservices.<br>2. Apply Docker file syntax for developing a Dockerfile.<br>3. Analyze Kubernetes resources, objects, namespaces which is a portable, extensible open-source platform for managing.<br>4. Create kubernetes namespaces for monitoring and logging external resources. |
| **17HS1705** | **Engineering Economics And Finance** | 1. Understand various forms of organizations and principles of management.<br>2. Understand the various aspects of business economics<br>3. Acquire knowledge on Human resources and Marketing functions<br>4. Understand different methods used in calculating depreciation and evaluating alternatives economically |
| **17IT3751** | **Cloud Computing Lab** | 1. Analyze the applications in cloud environment<br>2. Develop applications in IaaS, PaaS and SaaS cloud models.<br>3. Develop applications in different cloud ecosystems. |
| **17IT4752 A** | **Deep Learning Lab** | 1. Understand the installation process and basics of tensor flow<br>2. Construct a Multi Layer Neural Network<br>3. Build a convolution neural network model for image classification |

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| | | 4. Implement a sentiment analysis model using LSTM |
| **17IT4752 B** | **Blockchain Technologies Lab** | 1. Build smart contracts using Remix IDE, Ganache and Myether Wallet in Ethereum Platform.<br>2. Build private-permissioned blockchain-based applications for enterprises and businesses.<br>3. Develop IPFS file system using peer to peer networks |
| **17IT4752C** | **Information Retrieval System Lab** | 1. Demonstrate genesis and diversity of information retrieval situations for text and hyper media.<br>2. Analyze the usage of different data/file structures in building computational search engines..<br>3. Implement applications for the performance of information retrieval using classification, clustering,and filtering over multimedia. |
| **17IT5753** | **Mini Project** | 1. Identify the problem, define objectives and scope of the project.<br>2. Analyse the problem from state of the art for arriving at feasible solutions.<br>3. Prepare an organized report employing elements of technical writing & critical thinking.<br>4. Summarize and communicate the content to audience in an effective manner. |
| 17IT4801A | **Business Intelligence** | 1. Describe the concepts and components of business intelligence<br>2. Evaluate the use of BI for supporting decision making in an organization.<br>3. Discover the requirements need to design a business intelligence model.<br>4. Implement a behavioural model to assess the behaviour of the customer.. |
| 17IT4801B | **Mobile Computing** | 1. Understand the concept of mobile computing paradigm, its novel applications and access techniques.<br>2. Analyze cellular systems that adapt mobility for wireless data transmissions<br>3. Analyze wireless data transmission techniques in mobile communications<br>4. Evaluate mechanisms extended in network layer for mobility and satellite systems for supporting mobile communications |
| 17IT4801C | **Service Oriented Architecture** | 1. Build applications based on XML using Document Object Model and Simple API for XML<br>2. Understand the basic principles and standards of Service-Oriented Architecture<br>3. Analyze web services using technology elements<br>4. Build SOA-based applications for intra-enterprise |

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| | | and inter-enterprise applications. |
| 17IT4801D | **Software Metrics And Quality Management** | 1. Understand different metrics associated with Software Development and evaluation<br>2. Apply quality measurement , metrics and quality plan for software projects.<br>3. Analyze various SQA standards and software process assessments<br>4. Identify quality factors, quality metrics and SQA models and their impact on the final product. |
| **17IT5851** | **Major Project** | 1. Apply appropriate research methodology to provide a solution to the chosen problem<br>2. Design, develop and test software using current techniques.<br>3. Prepare a comprehensive report of the project work using modern tools<br>4. Demonstrate and Communicate the project objectives and outcomes in an effective manner. |