RISE KRISHNA SAI GANDHI GROUP OF INSTITUTIONS::ONGOLE
(Approved by AICTE-NEW DELHI, Affiliated to JNTUK KAKINADA)
NH-16, Valluru,-523272, Ongole, Prakasam District, A.P

Department of Computer Science and Engineering

Year: I **Regulation: R23** **Academic Year: 2023-24** **Sem: I**

COURSE : Communicative English		
CO No.	Course Outcomes	**Taxonomy Level**
After successful completion of this course students will be able to:		
C111.1	Understand the context, topic, and pieces of specific information from social or Transactional dialogues	Understanding
C111.2	Apply grammatical structures to formulate sentences and correct word forms	Applying
C111.3	Analyze discourse markers to speak clearly on a specific topic in informal discussions	Analyzing
C111.4	Evaluate reading / listening texts and to write summaries based on global comprehension of these texts..	Evaluating
C111.5	Create a coherent paragraph, essay, and resume.	Creating

COURSE : Chemistry		
CO No.	Course Outcomes	**Taxonomy Level**
After successful completion of this course students will be able to:		
C112.1	Compare the materials of construction for battery and electrochemical sensors.	Applying
C112.2	Explain the preparation, properties, and applications of thermoplastics & thermosetting & elastomers conducting polymers.	Applying
C112.3	Explain the principles of spectrometry, slc in separation of solid and liquid mixtures.	Applying
C112.4	Apply the principle of Band diagrams in the application of conductors and semiconductors.	Applying
C112.5	Summarize the concepts of Instrumental methods.	understanding

COURSE: Linear Algebra & Calculus		
CO No.	Course Outcomes	Taxonomy Level
After successful completion of this course students will be able to:		
C113.1	Develop and use of matrix algebra techniques that are needed by engineers for practical applications..	Understanding
C113.2	Utilize mean value theorems to real life problems.	Applying
C113.3	Familiarize with functions of several variables which is useful in optimization.	Understanding
C113.4	Learn important tools of calculus in higher dimensions	Understanding
C113.5	Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates	Understanding

COURSE :Basic civil and mechanical engineering		
CO No.	Course Outcomes	Taxonomy Level
After successful completion of this course students will be able to:		
C114.1	Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society	Understanding
C114.2	Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying	Understanding
C114.3	Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.	Analyzing
C114.4	Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.	Analyzing
C114.5	Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.	Understanding

COURSE : Introduction to programming		
CO No.	Course Outcomes	Taxonomy Level
After successful completion of this course students will be able to:		
C115.1	Understand basics of computers, the concept of algorithm and algorithmic thinking	Understanding
C115.2	Analyse a problem and develop an algorithm to solve it ,	Analyzing
C115.3	Implement various algorithms using the C programming language	Applying
C115.4	Understand more advanced features of C language	Understanding
C115.5	Develop problem-solving skills and the ability to debug and optimize the code	Applying

COURSE :Communicative English lab		
CO No.	Course Outcomes	Taxonomy Level
After successful completion of this course students will be able to:		
C116.1	Understand the different aspects of the English language proficiency with emphasis on LSRW skills.	Understanding
C116.2	Apply communication skills through various language learning activities	Applying
C116.3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension	Analyzing
C116.4	Evaluate and exhibit professionalism in participating in debates and group discussions	Evaluating
C116.5	Create effective Course Objectives	Creating

COURSE : Chemistry lab		
CO No.	Course Outcomes	Taxonomy Level
After successful completion of this course students will be able to:		
C117.1	Determine the cell constant and conductance of solutions. .	Applying
C117.2	Prepare advanced polymer Bakelite materials	Applying
C117.3	Measure the strength of an acid present in secondary batteries	Applying
C117.4	Analyse the IR spectra of some organic compounds	Applying
C117.5	Calculate strength of acid in Pb-Acid battery.	Applying

COURSE: Engineering Workshop		
CO No.	Course Outcomes	Taxonomy Level
After successful completion of this course students will be able to:		
C118.1	Identify workshop tools and their operational capabilities.	Understanding
C118.2	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding.	Applying
C118.3	Apply fitting operations in various applications	Applying
C118.4	Apply basic electrical engineering knowledge for House Wiring Practice	Applying

CO No.	COURSE: Computer Programming Lab	Taxonomy Level
After successful completion of this course students will be able to		
C119.1	Read, understand, and trace the execution of programs written in C language	Understanding
C119.2	Select the right control structure for solving the problem	Applying
C119.3	Develop C programs which utilize memory efficiently using programming constructs like pointers.	Applying
C119.4	Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.	Applying

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CO No.	**COURSE: Health and Wellness , Yoga and Sports**	**Taxonomy Level**
After successful completion of this course students will be able to		
C1110.1	Understand the importance of yoga and sports for Physical fitness and sound health.	Understanding
C1110.2	Demonstrate an understanding of health-related fitness components	Applying
C1110.3	Compare and contrast various activities that help enhance their health	Applying
C1110.4	Assess current personal fitness levels	Analyzing
C1110.5	Develop Positive Personality	Applying

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Department of Computer Science and Engineering

Year: I **Regulation: R20** **Academic Year: 2022-23** **Sem: II**

CO No.	**COURSE: Engineering Physics**	**Taxonomy Level**
After successful completion of this course students will be able to		
C121.1	Analyze the intensity variation of light due to polarization, interference and diffraction	Analyzing
C121.2	Familiarize with the basics of crystals and their structures	Applying
C121.3	Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.	Understanding
C121.4	Summarize various types of polarization of dielectrics and classify the magnetic materials.	Analyzing
C121.5	Explain the basic concepts of Quantum Mechanics and the band theory of solids.	Understanding
C121.6	Identify the type of semiconductor using Hall effect	Understanding

CO No.	**COURSE: Differential Equations and vector calculus**	**Taxonomy Level**
After successful completion of this course students will be able to		
C122.1	Solve the differential equations related to various engineering fields.	Analyzing
C122.2	Identify solution methods for partial differential equations that model physical processes	Applying
C122.3	Interpret the physical meaning of different operators such as gradient, curl and divergence.	Understanding
C122.4	Estimate the work done against a field, circulation and flux using vector calculus	Analyzing

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CO No.	COURSE : Basic Electrical & Electronic Engineering	Taxonomy Level
After successful completion of this course students will be able to:		
C123.1	Describe fundamental laws, operating principles of motors/generators, MC/MI instruments	Understanding
C123.2	Demonstrate the working of electrical machines, measuring instruments and power generation stations.	Applying
C123.3	Apply mathematical tools and fundamental concepts to derive various equations related to electrical circuits and machines	Applying
C123.4	Calculate electrical load and electricity bill of residential and commercial buildings	Analyzing

CO No.	COURSE : Engineering Graphics	Taxonomy Level
After successful completion of this course students will be able to:		
C124.1	Understand the principles of engineering drawing, including	Understanding
C124.2	Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.	Creating
C124.3	Understand and draw projection of solids in various positions in first quadrant	Understanding
C124.4	Explain principles behind development of surfaces	Understanding
C124.5	Prepare isometric and perspective sections of simple solids	Analyzing

CO No.	COURSE : IT workshop	Taxonomy Level
After successful completion of this course students will be able to:		
C125.1	Perform Hardware troubleshooting..	Applying
C125.2	Understand Hardware components and inter dependencies.	Understanding
C125.3	Safeguard computer systems from viruses/worms	Applying
C125.4	Document/ Presentation preparation	Applying
C125.5	Perform calculations using spreadsheets	Applying

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CO No.	COURSE : Data structures	Taxonomy Level
After successful completion of this course students will be able to:		
C126.1	Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.	Understanding
C126.2	Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.	Applying
C126.3	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.	Applying
C126.4	Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data	Applying
C126.5	Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees.	Applying
C126.6	Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.	Understanding

CO No.	COURSE : Engineering Physics Lab	Taxonomy Level
After successful completion of this course students will be able to:		
C127.1	Operate optical instruments like travelling microscope and spectrometer.	Applying
C127.2	Estimate the wavelengths of different colours using diffraction grating	Applying
C127.3	Plot the intensity of the magnetic field of circular coil carrying current with distance	Applying
C127.4	Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively	Applying
C127.5	Calculate the band gap of a given semiconductor	Applying
C127.6	Identify the type of semiconductor using Hall effect	understanding

CO No.	COURSE: Electrical & Electronic Engineering Workshop	Taxonomy Level
After going through this course the student will be able to		
C128.1	Measure voltage, current and power in an electrical circuit	Evaluating
C128.2	Measure of Resistance using Wheat stone bridge	Evaluating
C128.3	Discover critical field resistance and critical speed of DC shunt generators	Creating
C128.4	Investigate the effect of reactive power and power factor in electrical loads	Remembering

CO No.	COURSE: Data Structures lab	Taxonomy Level
After going through this course the student will be able to		
C129.1	Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.	Understanding
C129.2	Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation	Creating
C129.3	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems	Creating
C129.4	Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues and apply them appropriately to solve data management challenges	Applying
C129.5	Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.	Understanding

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CO No.	COURSE: NSS/NCC/SCOUTS & GUIDES/Community Service	Taxonomy Level
After going through this course the student will be able to		
C1210.1	Understand the importance of discipline, character and service motto.	Understanding
C1210.2	Solve some societal issues by applying acquired knowledge, facts, and techniques.	Applying
C1210.3	Explore human relationships by analyzing social problems.	Applying
C1210.4	Determine to extend their help for the fellow beings and downtrodden people.	Applying
C1210.5	Develop leadership skills and civic responsibilities	Creating

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Department of Computer Science and Engineering

Year: II **Regulation: R20** **Academic Year: 2023-24** **Sem: I**

CO No.	**Course Name: Mathematics - III**	**Taxonomy Level**
After going through this course the student will be able to		
C211.1	Interpret the physical meaning of different operators such as gradient, curl and divergence, estimate the work done against a field.	Applying
C211.2	Apply the LaPlace transform for solving differential equations.	Applying
C211.3	Find or compute the Fourier series of periodic signals and be able to apply integral expressions for the Fourier and inverse Fourier transform to a range of non-periodic waveforms.	Applying
C211.4	Formation of partial differential equation and identify solution methods for first order partial differential equations.	Applying
C211.5	Classify higher order partial differential equations and solve heat flow and wave problems.	Applying

CO No.	**Course Name: Object Oriented Programming through C++**	**Taxonomy Level**
After going through this course the student will be able to		
C212.1	Compare the procedural and object-oriented paradigm with concepts of streams, classes, functions, data and objects.	Understanding
C212.2	Explain dynamic memory management techniques using pointers, constructors, destructors, etc	Understanding
C212.3	Experiment with the concept of function overloading, operator overloading, virtual functions and polymorphism.	Applying
C212.4	Use of inheritance with the understanding of early and late binding using pointer object.	Applying
C212.5	Demonstrate the use of generic programming, exception handling and Standard Template Library	Understanding

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CO No.	Course Name: Operating Systems	Taxonomy Level
After going through this course the student will be able to		
C213.1	Describe various generations of operating systems and functions of operating systems.	Understanding
C213.2	Describe the concept of program, process and thread and analyze various CPU scheduling algorithms and compare their performance.	Understanding
C213.3	Solve Inter Process Communication problems using Mathematical equations by various methods.	Applying
C213.4	Compare various Memory Management Schemes especially paging and Segmentation in OS and apply various Page replacement techniques.	Understanding
C213.5	Outline file systems in operating system like UNIX/Linux and Windows.	Understanding

CO No.	Course Name: Software Engineering	Taxonomy Level
After going through this course the student will be able to		
C214.1	Ability to transform an object-oriented design into high quality, executable code.	Creating
C214.2	Compare conventional and agile software methods.	Understanding
C214.3	Skills to design, implement and execute test cases at the unit and integration level.	Applying

CO No.	Course Name: Mathematical Foundation for Computer Science	Taxonomy Level
After going through this course the student will be able to		
C215.1	Demonstrate skills in solving mathematical problems.	Understanding
C215.2	Comprehend mathematical principles and logic.	Understanding
C215.3	Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software.	Understanding
C215.4	Manipulate and analyze data numerically and /or graphically using appropriate software.	Applying
C215.5	Communicate effectively mathematical ideas/results verbally or in writing.	Understanding

CO No.	Course Name: OOP Through C++ Lab	Taxonomy Level
After going through this course the student will be able to		
C216.1	Able to apply the various OOPs concepts with the help of programs.	Applying

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CO No.	Course Name: Operating Systems Lab	Taxonomy Level
After going through this course the student will be able to		
C217.1	Able to use Unix utilities and perform basic shell control of the utilities.	Remembering
C217.2	Able to use Unix file system and file access control.	Understanding
C217.3	Able to use of an operating system to develop software.	Applying
C217.4	Able to use Linux environment efficiently.	Applying
C217.5	Able to solve problems using bash for shell scripting.	Understanding

CO No.	Course Name: Software Engineering Lab	Taxonomy Level
After going through this course the student will be able to		
C218.1	Able to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project.	Analyzing
C218.2	Able to prepare SRS document, design document, test cases and software configuration management and risk management related document.	Understanding
C218.3	Able to develop function-oriented software design using tools like rational rose.	Applying
C218.4	Able to use modern engineering tools necessary for software project management, estimations, time management and software reuse.	Applying
C218.5	Generate test cases for software testing.	Applying

CO No.	Course Name: WAD Using Full Stack Module I	Taxonomy Level
After going through this course the student will be able to		
C219.1	Analyze a web page and identify its elements and attributes.	Understanding
C219.2	Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet	Understanding
C219.3	Implement MVC and responsive design to scale well across PC, tablet and Mobile Phone.	Applying
C219.4	Create web pages using HTML and Cascading Style Sheets.	Creating

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Department of Computer Science and Engineering

Year: II **Regulation: R20** **Academic Year: 2023-24** **Sem: II**

CO No.	**Course Name: Probability & Statistics**	**Taxonomy Level**
After going through this course the student will be able to:		
C221.1	Compare various discrete probability distributions.	Understanding
C221.2	Compare various continuous probability distributions.	Understanding
C221.3	Find the confidence interval for mean of a population.	Remembering
C221.4	Make use of test of hypothesis for the null hypothesis concerning mean and proportions and perform ANOVA for one way and two-way classification.	Applying
C221.5	Apply correlation and regression lines of two variables for real life problems.	Applying

CO No.	**Course Name: Database Management Systems**	**Taxonomy Level**
After going through this course the student will be able to:		
C222.1	Describe a relational database and object-oriented database.	Understanding
C222.2	Create, maintain and manipulate a relational database using SQL.	Applying
C222.3	Describe ER model and normalization for database design.	Understanding
C222.4	Examine issues in data storage and query processing and can formulate appropriate solutions.	Understanding
C222.5	Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage.	Applying

CO No.	**Course Name: Formal Languages and Automata Theory**	**Taxonomy Level**
After going through this course the student will be able to:		
C223.1	Classify machines by their power to recognize languages.	Understanding
C223.2	Summarize language classes and grammars relationship among them with the help of Chomsky Hierarchy.	Understanding
C223.3	Employ finite state machines to solve problems in computing.	Applying
C223.4	Illustrate deterministic and non-deterministic machines.	Understanding
C223.5	Quote the hierarchy of problems arising in the computer science.	Applying

CO No.	**Course Name: Java Programming**	**Taxonomy Level**
After going through this course the student will be able to:		
C224.1	Able to realize the concept of OOP and Java Programming Constructs.	Understanding
C224.2	Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, enumerations and various keywords.	Understanding
C224.3	Apply the concept of exception handling and input or output operations.	Applying
C224.4	Able to design the applications of Java and Java Applet.	Applying
C224.5	Able to analyze and design the concept of event handling and abstract window tool kit.	Applying

CO No.	**Course Name: Managerial Economics and Financial Accountancy**	**Taxonomy Level**
After going through this course the student will be able to:		
C225.1	Equipped with the knowledge of estimating the demand and demand elasticities for a product and relate economic principles with business practices for getting successful outcomes.	Remembering
C225.2	The knowledge of understanding of the input-output-cost relationships and estimation of the least cost combination of inputs and also make use of cost analysis to find Break Even Point (BEP) of an enterprise in order to avoid losses.	Understanding
C225.3	Understand the nature of different markets and price output determination under various market conditions and also to have the knowledge of different business units.	Understanding
C225.4	Prepare financial statements and the usage of various accounting tools for analysis.	Applying
C225.5	Evaluate various investment project proposals with the help of capital budgeting techniques for decision making.	Evaluating

CO No.	**Course Name: Database Management Systems Lab**	**Taxonomy Level**
After going through this course the student will be able to:		
C226.1	Utilize SQL to execute queries for creating database and performing data manipulation operations.	Applying
C226.2	Examine integrity constraints to build efficient databases.	Understanding
C226.3	Apply Queries using Advanced Concepts of SQL.	Applying
C226.4	Build PL/SQL programs including stored procedures, functions, cursors and triggers.	Creating

CO No.	Course Name: R Programming Lab	Taxonomy Level
After going through this course the student will be able to:		
C227.1	Access online resources for R and import new function packages into the R workspace.	Understanding
C227.2	Import, review, manipulate and summarize data-sets in R.	Understanding
C227.3	Explore data-sets to create testable hypotheses and identify appropriate statistical tests.	Understanding
C227.4	Perform appropriate statistical tests using R.	Applying
C227.5	Create and edit visualizations with R.	Creating

CO No.	Course Name: Java Programming Lab	Taxonomy Level
After going through this course the student will be able to:		
C228.1	Evaluate default value of all primitive data type, Operations, Expressions, Control flow, Strings.	Understanding
C228.2	Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism.	Understanding
C228.3	Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism.	Applying
C228.4	Construct Threads, Event Handling, implement packages, developing applets.	Applying

CO No.	Course Name: WAD Using Full Stack Module II	Taxonomy Level
After going through this course the student will be able to:		
C229.1	Develop of the major Web application tier- Client-side development.	Applying
C229.2	Participate in the active development of cross-browser applications through JavaScript.	Creating
C229.3	Develop JavaScript applications that transition between states.	Applying

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Department of Computer Science and Engineering

Year: III **Regulation: R20** **Academic Year: 2023-24** **Sem: I**

CO No.	**Course Name: Computer Networks**	**Taxonomy Level**
After going through this course the student will be able to:		
C311.1	Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and get knowledge about various communication techniques, methods, and protocol standards.	Understanding
C311.2	Discuss different transmission media and different switching networks.	Understanding
C311.3	Analyze data link layer services, functions, and protocols like HDLC and PPP.	Analyzing
C311.4	Compare and classify medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols.	Understanding
C311.5	Determine application layer services and client server protocols working with the client server paradigms like WWW, HTTP, FTP, e-mail, and SNMP etc.	Understanding

CO No.	**Course Name: Design and Analysis of Algorithms**	**Taxonomy Level**
After going through this course the student will be able to:		
C312.1	Analyze the performance of a given algorithm, denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms.	Analyzing
C312.2	List and describe various algorithmic approaches and Solve problems using divide and conquer & greedy Method.	Applying
C312.3	Synthesize efficient algorithms dynamic programming approaches to solve in common engineering design situations.	Applying
C312.4	Organize important algorithmic design paradigms and methods of analysis: backtracking, branch and bound algorithmic approaches.	Analyzing
C312.5	Demonstrate NP- Completeness theory, lower bound theory and String Matching.	Understanding

CO No.	**Course Name: Data Warehousing and Data Mining**	**Taxonomy Level**
After going through this course the student will be able to:		
C313.1	Illustrate the importance of Data Warehousing, Data Mining and its functionalities and Design schema for real time data warehousing applications.	Understanding
C313.2	Demonstrate on various Data Preprocessing Techniques viz. data cleaning, data integration, data transformation and data reduction and Process raw data to make it suitable for various data mining algorithms.	Applying
C313.3	Choose appropriate classification technique to perform classification, model building and evaluation.	Applying
C313.4	Make use of association rule mining techniques viz. Apriori and FP Growth algorithms and analyze on frequent item sets generation.	Analyzing
C313.5	Identify and apply various clustering algorithm (with open-source tools), interpret, evaluate and report the result.	Evaluating

CO No.	**Course Name: Optimization in Operations Research**	**Taxonomy Level**
After going through this course the student will be able to:		
C314.1	State and formulate the optimization problem, without and with constraints, by using design variables from an engineering design problem.	Analyzing
C314.2	Apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints, and arrive at an optimal solution.	Analyzing
C314.3	Apply and Solve transportation and assignment problem by using Linear programming Simplex method.	Analyzing
C314.4	Apply gradient and non-gradient methods to nonlinear optimization problems and use interior or exterior penalty functions for the constraints to derive the optimal solutions.	Analyzing
C314.5	Formulate and apply Dynamic programming technique to inventory control, production planning, engineering design problems etc. to reach a final optimal solution from the current optimal solution.	Analyzing

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CO No.	**Course Name: Software Project Management**	**Taxonomy Level**
After going through this course the student will be able to:		
C315.1	Apply the process to be followed in the software development life-cycle models.	Applying
C315.2	Apply the concepts of project management & planning.	Applying
C315.3	Implement the project plans through managing people, communications and change.	Applying
C315.4	Conduct activities necessary to successfully complete and close the Software projects.	Analyzing
C315.5	Implement communication, modeling, and construction & deployment practices in software development.	Analyzing

CO No.	**Course Name: Data Warehousing and Data Mining Lab**	**Taxonomy Level**
After going through this course the student will be able to:		
C316.1	Design a data mart or data warehouse for any organization.	Understanding
C316.2	Extract knowledge using data mining techniques and enlist various algorithms used in information analysis of Data Mining Techniques.	Applying
C316.3	Demonstrate the working of algorithms for data mining tasks such as association rule mining, classification for realistic data.	Applying
C316.4	Implement and Analyze on knowledge flow application on data sets and Apply the suitable visualization techniques to output analytical results.	Applying

CO No.	**Course Name: Computer Networks Lab**	**Taxonomy Level**
After going through this course the student will be able to:		
C317.1	Know how reliable data communication is achieved through data link layer.	Understanding
C317.2	Suggest appropriate routing algorithm for the network.	Understanding
C317.3	Provide internet connection to the system and its installation.	Applying
C317.4	Work on various network management tools.	Analyzing

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CO No.	Course Name: CONTINUOUS INTEGRATION AND CONTINUOUS DELIVERY USING DevOps	Taxonomy Level
After going through this course the student will be able to:		
C318.1	Understand the why, what and how of DevOps adoption	Understanding
C318.2	Attain literacy on Devops	Understanding
C318.3	Align capabilities required in the team	Applying
C318.4	Create an automated CICD pipeline using a stack of tools	Creating

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Year: III **Regulation: R20** **Academic Year: 2023-24** **Sem: II**

CO No.	**Course Name: Machine Learning**	**Taxonomy Level**
After going through this course the student will be able to:		
C321.1	Explain the fundamental usage of the concept of machine learning system.	Understanding
C321.2	Demonstrate on various regression techniques.	Applying
C321.3	Analyze the ensemble learning methods.	Analyzing
C321.4	Illustrate the clustering techniques and dimensionality reduction models in machine learning.	Applying
C321.5	Discuss the neural network models and fundamental concepts of Deep Learning.	Understanding

CO No.	**Course Name: Compiler Design**	**Taxonomy Level**
After going through this course the student will be able to:		
C322.1	Demonstrate phases in the design of compiler.	Remembering
C322.2	Organize Syntax Analysis, Top Down and LL (1) grammars.	Understanding
C322.3	Design Bottom-Up Parsing and Construction of LR parsers.	Applying
C322.4	Analyze synthesized, inherited attributes and syntax directed translation schemes.	Applying
C322.5	Determine algorithms to generate code for a target machine.	Understanding

CO No.	**Course Name: Cryptography and Network Security**	**Taxonomy Level**
After going through this course the student will be able to:		
C323.1	Explain different security threats and countermeasures and foundation course of cryptography mathematics.	Understanding
C323.2	Classify the basic principles of symmetric key algorithms and operations of some symmetric key algorithms and asymmetric key cryptography.	Understanding
C323.3	Revise the basic principles of Public key algorithms and Working operations of some Asymmetric key algorithms such as RSA, ECC and some more.	Understanding
C323.4	Design applications of hash algorithms, digital signatures and key management techniques.	Applying
C323.5	Determine the knowledge of Application layer, Transport layer and Network layer security Protocols such as PGP, S/MIME, SSL,TSL, and Ipsec.	Applying

CO No.	**Course Name: Object Oriented Analysis and Design**	**Taxonomy Level**
After going through this course the student will be able to:		
C324.1	Analyze the nature of complex system and its solutions.	Analyzing
C324.2	Illustrate & relate the conceptual model of the UML, identify & design the classes and relationships.	Understanding
C324.3	Analyze &Design Class and Object Diagrams that represent Static Aspects of a Software System and apply basic and Advanced Structural Modeling Concepts for designing real time applications.	Analyzing
C324.4	Analyze & Design behavioural aspects of a Software System using Use Case, Interaction and Activity Diagrams.	Analyzing
C324.5	Analyze & Apply techniques of State Chart Diagrams and Implementation Diagrams to model behavioural aspects and Runtime environment of Software Systems.	Analyzing

CO No.	**Course Name: Basic Electronics**	**Taxonomy Level**
After going through this course the student will be able to:		
C325.1	Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation	Understanding
C325.2	Know the construction, working principle and how it can be used as a p-n junction as diode in different modes of operation	Applying
C325.3	Understand the construction, principle of operation of transistors	Understanding
C325.4	Understand the characteristics of transistors	Understanding
C325.5	Know the construction, principle and operations of thyristors	Understanding

CO No.	**Course Name: Machine Learning using Python Lab**	**Taxonomy Level**
After going through this course the student will be able to:		
C326.1	Implement procedures for the machine learning algorithms.	Applying
C326.2	Design and Develop Python programs for various Learning algorithms.	Creating
C326.3	Apply appropriate data sets to the Machine Learning algorithms.	Applying
C326.4	Develop Machine Learning algorithms to solve real world problems.	Creating

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CO No.	Course Name: Compiler Design Lab	Taxonomy Level
After going through this course the student will be able to:		
C327.1	Design simple lexical analysers.	Creating
C327.2	Determine predictive parsing table for a CFG.	Understanding
C327.3	Apply Lex and Yacc tools.	Applying
C327.4	Examine LR parser and generating SLR Parsing table.	Understanding
C327.5	Relate Intermediate code generation for subset C language.	Understanding

CO No.	Course Name: Cryptography and Network Security Lab	Taxonomy Level
After going through this course the student will be able to:		
C328.1	Apply the knowledge of symmetric cryptography to implement encryption and decryption using Caeser Cipher, Substitution Cipher, Hill Cipher.	Applying
C328.2	Demonstrate the different algorithms like DES, BlowFish, and Rijndael, encrypt the text "Hello world" using Blowfish Algorithm.	Applying
C328.3	Analyze and implement public key algorithms like RSA, Diffie-Hellman Key Exchange mechanism, the message digest of a text using the SHA-1 algorithm.	Analyzing

CO No.	Course Name: MEAN Stack Technologies Lab	Taxonomy Level
After going through this course the student will be able to:		
C329.1	Develop professional web pages of an application using HTML elements like lists, navigations, tables, various form elements, embedded media which includes images, audio, video and CSS Styles.	Creating
C329.2	Utilize JavaScript for developing interactive HTML web pages and validate form data.	Applying
C329.3	Build a basic web server using Node.js and also working with Node Package Manager (NPM).	Creating
C329.4	Build a web server using Express.js.	Creating
C329.5	Make use of Typescript to optimize JavaScript code by using the concept of strict type checking.	Applying

Coordinator

IQAC

IQAC Co-ordinator
RISE Krishna Sai Gandhi Gr
of Institutions, Valluru 523 2

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Department of CSE
RISE Krishna Sai Gandhi Group of
itutions,VALLUR,A.P.-523 27

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Department of Computer Science and Engineering

Year: IV **Regulation: R20** **Academic Year: 2023-24** **Sem: I**

CO No.	**Course Name: Cloud Computing**	**Taxonomy Level**
After going through this course the student will be able to:		
C411.1	Illustrate the key dimensions of the challenge of Cloud Computing	Understanding
C411.2	Classify the Levels of Virtualization and mechanism of tools.	Understanding
C411.3	Analyze Cloud infrastructure including Google Cloud and Amazon Cloud	Analyzing
C411.4	Create Combinatorial Auctions for cloud resource and design scheduling algorithms for computing cloud	Creating
C411.5	Assess control storage systems and cloud security, the risks involved its impact and develop cloud application	Applying

CO No.	**Course Name: Social Networks & Semantic Web**	**Taxonomy Level**
After going through this course the student will be able to:		
C412.1	Demonstrate social network analysis and measures.	Applying
C412.2	Analyze random graph models and navigate social networks data	Analyzing
C412.3	Apply the network topology and Visualization tools	Applying
C412.4	Analyze the experiment with small world models and clustering models.	Analyzing
C412.5	Compare the application driven virtual communities from social network Structure	Understanding

CO No.	**Course Name: Ethical Hacking**	**Taxonomy Level**
After going through this course the student will be able to:		
C413.1	Explain the concepts related to hacking, ports and protocols, pen testing and virtualization	Understanding
C413.2	Determine the applicable foot printing techniques and scanning methods	Applying
C413.3	Explain the process of system hacking and Explain the concepts Trojans, backdoors, worms and virus and it's countermeasures	Understanding
C413.4	Demonstrate systematic understanding of the concepts of Sniffing and Social Engineering and it's attacks	Applying
C413.5	Determine the applicable methods of cryptography, stegnography and Vulnerability Assessment	Applying

CO No.	**Course Name: Basic Electronics**	**Taxonomy Level**
After going through this course the student will be able to:		
C414.1	Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.	Understanding
C414.2	Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.	Understanding
C414.3	Understand the construction, principle of operation of transistors	Analyzing

CO No.	**Course Name: Internet of Things**	**Taxonomy Level**
After going through this course the student will be able to:		
C415.1	Understand internet of Things and its hardware and software components.	Understanding
C415.2	Interface I/O devices, sensors & communication modules	Applying
C415.3	Remotely monitor data and control devices	Analyzing
C415.4	Design real time IoT based applications	Creating

CO No.	**Course Name: Universal Human Values 2: Understanding Harmony**	**Taxonomy Level**
After going through this course the student will be able to:		
C416.1	Become more aware of themselves and their surroundings	Understanding
C416.2	Become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.	Applying
C416.3	Become sensitive to their commitment towards what they have understood (human values, human relationship and human society).	Applying
C416.4	Apply what they have learnt to their own self in different day-to-day settings in real life,	Applying

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CO No.	Course Name: Mean Stack Technologies-Module II Lab	Taxonomy Level
After going through this course the student will be able to:		
C417.1	Build a component-based application using Angular components and enhance their functionality using directives.	creating
C417.2	Utilize data binding for developing Angular forms and bind them with model data	Understanding
C417.3	Apply Angular built-in or custom pipes to format the rendered data	Applying
C417.4	Develop a single page application by using synchronous or asynchronous Angular routing	Applying
C417.5	Make use of MongoDB queries to perform CRUD operations on document database	Applying

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IQAC Co-ordinato
RISE Krishna Sai Gandhi
of Institutions, Valluru 523

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Department of CSE
RISE Krishna Sai Gandhi Group of
stitutions,VALLUR,A.P.-523 272

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Year: IV **Regulation: R20** **Academic Year: 2023-24** **Sem: II**

CO No.	**Course Name: Major Project Work, Seminar Internship**	**Taxonomy Level**
After going through this course the student will be able to:		
C411.1	Summarize the contemporary scholarly literature, activities, and explored tools for hands-on in the respective project area.	Understanding
C411.2	List out the specific requirements to develop the workable solution for the identified computing problem.	Analyzing
C411.3	Develop a workable computing solution for the identified problem.	Applying
C411.4	Evaluate the performance of the developed solution.	Evaluating
C411.5	Compile the results and findings of the project in written and verbal formats.	Creating

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