



**MALINENI LAKSHMAIAH WOMEN'S ENGINEERING COLLEGE**  
**B.Tech (COMPUTER SCIENCE AND ENGINEERING)**

**Course Outcomes:**

| <b>Course Outcomes for Second Year First Semester Course</b>  |          |   |
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| <b>Course Title with Code</b>                                 | <b>#</b> | <b>Statement</b>  |
| C201<br>Statistics with<br>R<br>Programming                   | CO1      | List motivation for learning a programming language   |
|   | CO2      | To Access online resources for R and import new function packages into the R workspace  |
|   | CO3      | Import, review, manipulate and summarize data-sets in R   |
|   | CO4      | Explore data-sets to create testable hypotheses and identify appropriate statistical tests  |
|   | CO5      | Able to perform appropriate statistical tests using R Create and edit visualizations.   |
|   | CO5      |   |
| C202<br>Mathematical<br>Foundations of<br>Computer<br>Science | CO1      | Apply mathematical logic and rules of inferences to check consistency of premises and reduce the given statement into normal forms  |
|   | CO2      | Apply theory of inference for statement calculus and predicate calculus to derive the conclusions.know the basic concepts of sets,relations ,functions , lattices and their properties. |
|   | CO3      | Know the basic concepts of properties of integers and groups  |
|   | CO4      | Use fundamental counting principle to determine the number of out comes.  |
|   | CO5      | Devolp and solve the recurrence relations . Know the basic concepts of graphs and determine the minimal spanning tree for a given weighted graph  |
| C203<br>Digital Logic Design                                  | CO1      | <b>Illustrate</b> various number systems, binary addition and subtraction, data complements which are useful for various operations.  |
|   | CO2      | <b>Solve</b> logic functions by using different switching algebra theorems  |
|   | CO3      | <b>Apply</b> various karnaugh maps to minimize logic functions  |

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|  | CO4 | Design combinational, sequential logic circuits for logic functions  |
|  | CO5 | Design various registers and counters for logic functions  |
| C204<br>PYTHON<br>PROGRAMMING          | CO1 | Apply the core concepts of python programming language to solve real world problems                                      |
|  | CO2 | Develop Python programs by applying basic types, operations and expressions and decision and loops in Python environment |
|  | CO3 | Examine different data structures and functions in python to develop solutions engineering problems                      |
|  | CO4 | Categorize modular programming concepts of python programming language.  |
|  | CO5 | Apply the core object oriented concepts of python to model solutions to problems.  |
|  | CO6 | Examine standard library in python and compare different types of testing mechanisms to solve real world problems        |
| C205<br>DATA STRUCTURES<br>THROUGH C++ | CO1 | Illustrate the ADTs of Polynomial, Sparse matrix, transposing of matrix and matrix multiplications by using arrays.      |
|  | CO2 | Apply various operations of stack and queue by using arrays.   |
|  | CO3 | Implement various matrices, polynomials, stack and queue by using linked lists.  |
|  | CO4 | Implement different hierarchical forms of data and perform various operations in BST, tree traversals.                   |
|  | CO5 | Analyze graph traversal techniques of DFS, BFS and minimum cost spanning Trees.  |
|  | CO6 | Compare various searching and sorting techniques with their complexities.  |
| C206<br>COMPUTER<br>ORGANIZATION       | CO1 | Illustrate structure and types of computer.  |
|  | CO2 | Describe about computer instructions, addressing modes.  |
|  | CO3 | Realize about input/output organization.   |
|  | CO4 | Design memory mapping processors.  |
|  | CO5 | Describe about micro programmed control  |

| <b>Course Outcomes for Second Year Second Semester Course</b> |         |  |
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| C209<br>SOFTWARE<br>ENGINEERING                               | CO<br>1 | Discuss about process and various s/w process models in software development               |
|   | CO<br>2 | Analyze requirements analysis, specifications and design process.                          |
|   | CO<br>3 | Utilize Function oriented design and user interface design                                 |
|   | CO<br>4 | Evaluate software using various testing techniques.  |
|   | CO<br>5 | Analyze CASE tools, reliability, quality management, maintenance and reuse of s/w systems. |
| C210<br>JAVA<br>PROGRAMMING                                   | CO<br>1 | Demonstrate Various Concepts of Object Oriented Programming language                       |
|   | CO<br>2 | Apply principles of object oriented programming to model/design real world problems        |
|   | CO<br>3 | Apply Exception handling mechanisms to develop fault-tolerant applications                 |
|   | CO4     | Analyze the concepts of multi threaded programming and synchronization                     |
|   | CO<br>5 | Build programs using String API and use different keywords while developing a program      |
|   | CO<br>6 | Make use of Awt and Applet and event handling to design GUI applications.                  |
| C211<br>ADVANCED<br>DATA<br>STRUCTURE<br>S                    | CO<br>1 | Classify the different types of sorting techniques with their time complexities            |
|   | CO<br>2 | Apply and implementation of hashing techniques   |
|   | CO<br>3 | Implement various operations in queue by using heap  |
|   | CO<br>4 | the search efficiency in binary search trees   |
|   | CO<br>5 | Analyze the search efficiency in multi way search trees.                                   |
|   | CO<br>6 | Develop Data structures.   |

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| C212<br>Computer<br>Organization                       | CO<br>1 | Illustrate structure and types of computer.                                  |
|  | CO<br>2 | Describe about computer instructions, addressing modes.                      |
|  | CO<br>3 | Realize about input/output organization.                                     |
|  | CO<br>4 | Design memory mapping processors.  |
|  | CO<br>5 | Describe about micro programmed control                                      |
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| C213<br>FORMAL<br>LANGUAGES<br>&<br>AUTOMATA<br>THEORY | CO<br>1 | Design automata for any given pattern  |
|  | CO<br>2 | Specify regular expression of string pattern                                 |
|  | CO<br>3 | Write context free grammar for any language                                  |
|  | CO<br>4 | Design PDA for the given language  |
|  | CO<br>5 | Apply Turing machine to propose computationsolutions                         |
|  | CO<br>6 | Interpret whether a problem is decidable or not                              |
| C214<br>Principles of<br>Programming Languages         | CO<br>1 | Describe the syntax, semantics and basic constructs of programming languages |
|  | CO<br>2 | Design of sub programs in various programming languages                      |
|  | CO<br>3 | Apply object oriented concepts   |
|  | CO4     | Analyze functional program using ML(meta language)                           |
|  | CO<br>5 | Analyze logic paradigm in prolog   |

#### Course Outcomes for Third Year FIRST Semester Course

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| C301<br>COMPILER DESIGN | CO1 | Apply concepts and different phases of Compiler.   |
|                         | CO2 | Compare top down with bottom up parsers, and develop appropriate parser to produce parse tree representation of the input. |
|                         | CO3 | Design syntax directed translation schemes for a given context free grammar  |
|                         | CO4 | Generate intermediate code for statements in high level language.  |
|                         | CO5 | Apply optimization techniques to intermediate code and generate machine code for high level language program.              |

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| C302<br>Unix Programming                              | CO1 | At the End of this course student will be able to explain various Unix basic concepts, like accessing Unix , components , Unix commands syntax and semantics etc.... |
|   | CO2 | At the End of this course student will be able to organize the files and directories   |
|   | CO3 | At the end of this course use various Meta characters to access/display the required data  |
|   | CO4 | At the End of this course student will be able to apply insert ,retrieve & search methods on the required data by using various Unix commands .                      |
|   | CO5 | At the end of this course build simple & effective shell scripts   |
|   | CO6 | At the end of the course differentiate the different types of processes & also explain their purpose   |
| C303<br>Object Oriented Analysis and Design using UML | CO1 | Model the solutions for complex problems using object oriented approach.   |
|   | CO2 | Examine the relationships and use notations to design class diagrams.  |
|   | CO3 | Analyse behavioural modelling concepts of the system.  |
|   | CO4 | Evaluate concepts of events, signals for state chart diagrams.   |
|   | CO5 | Apply the concepts of architectural design for various case studies and applications.  |
| C304<br>Database Management Systems                   | CO1 | Demonstrate database management system and its architecture levels in relation with all types of users and query optimization.                                       |
|   | CO2 | Build a database system with specified constraints and normalization levels for a given real world problem.  |
|   | CO3 | Construct Queries in Relational algebra, relational calculus and Structured Query Language efficiently.  |
|   | CO4 | Schedule the transactions properly to maintain concurrency control.  |
|   | CO5 | Analyze various recovery methods to keep data base consistent.   |
|   | CO6 | Choose appropriate storage and indexing techniques for the fast retrieval of data.   |
| C305<br>OPERATING SYSTEM                              | CO1 | Apply the operating system resources, services and scheduling algorithms for system management   |
|   | CO2 | Compare various memory management schemes for efficient storage of data  |
|   | CO3 | Apply the principles of concurrency, deadlock prevention and avoidance algorithm to increase the system performance  |

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|  | CO4 | Solve issues related to file system interface, file system implementation and disk management                                       |
|  | CO5 | Analyze administrative tasks on Linux Server and Android operating system for developing applications                               |
| <b>Course Outcomes for Third Year SECOND Semester Course</b> |     |   |
| C309<br>COMPUTER NETWORKS                                    | CO1 | Utilize the network topologies for various models   |
|  | CO2 | Apply different types of transmission media and techniques for error detection and correction.                                      |
|  | CO3 | Analyze MAC protocols for channel allocation  |
|  | CO4 | Classify the routing and congestion control algorithms.   |
|  | CO5 | Apply the various protocols for security, Authentication and data transmission. .   |
| C310<br>DATAWARE HOUSING<br>&<br>DATA MINING                 | CO1 | Understand stages in building a Data Warehouse  |
|  | CO2 | Understand the need and importance of pre-processing techniques   |
|  | CO3 | Understand the need and importance of Similarity and dissimilarity techniques   |
|  | CO4 | Analyze and evaluate performance of algorithms for Association Rules.   |
|  | CO5 | Analyze Classification and Clustering algorithms.   |
| C311<br>Design and Analysis of<br>Algorithms                 | CO1 | Evaluate the correctness of algorithms using inductive proofs and invariants  |
|  | CO2 | To solve the Graphs, Data Structures, Decomposition problems by using Greedy, Divide and Conquer and Dynamic Programming Techniques |
|  | CO3 | Apply the Back Tracking technique on Graphs, 8 Queen and Sum of Subset Problems.  |
|  | CO4 | To solve the LC and FIFO searching problems using Branch and Bound technique.   |
|  | CO5 | Analyze the running time of algorithms using asymptotic notations   |
| C312<br>SOFTWARE TESTING<br>METHODOLOGIES                    | CO1 | <b>Know</b> the basic concepts of software testing and its essentials   |
|  | CO2 | <b>Perform</b> functional testing using transaction flow and control flow graphs.   |
|  | CO3 | <b>Test</b> a domain or an application and identifying the nice and ugly domains.   |
|  | CO4 | <b>Classify</b> a path expression and reduce them very well when needed.  |
|  | CO5 | <b>Apply</b> an effective, step-by-step process for identifying needed areas of testing, designing test conditions and              |

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|   |     | building and executing test cases.   |
|   | CO6 | <b>Apply</b> appropriate software testing tools, techniques and methods for even more effective systems during both the test planning and test execution phases of a software development project.       |
| C313<br>Artificial Intelligence                                     | CO1 | Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.  |
|   | CO2 | Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc). |
|   | CO3 | Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).   |
|   | CO4 | Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports  |
|   | CO5 |  |
| <b>Course Outcomes for Fourth Year First Semester Course</b>        |     |  |
| C401<br>CRYPTOGRAPHY<br>&<br>NETWORK SECURITY<br>(R1641051)         | CO1 | Apply the Mathematics of Cryptography and Cryptographic attacks to find message.   |
|   | CO2 | Apply the algorithms of cryptography, including encryption/decryption and hash functions efficiently.  |
|   | CO3 | Use of different authentication, digital signature schemes and key management for security of data.  |
|   | CO4 | Analyze the network, transport and application layers and outline appropriate security protocols for security issues   |
|   | CO5 | Identify various intrusion detection systems and be able to achieve highest system security.   |
| C402<br>Software Architecture<br>&<br>Design Patterns<br>(R1641052) | CO1 | Apply the basic concepts of architecture structures and designing software architecture.   |
|   | CO2 | Analyzing the software architectures   |
|   | CO3 | Study of pattern oriented approach for real world problems   |
|   | CO4 | Study of Creational, Behavioral and Structural Patterns for real world problems  |
|   | CO5 | Implementation of architecture structures and design problems.   |
| C403<br>Web Technologies  | CO1 | Make use of HTML tags for designing static pages and separate design from content using Cascading Style sheet  |
|   | CO2 | Demonstrate how to validate XML documents and how to transfer the XML documents.   |

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|   | CO3 | Apply various PHP constraints to develop server side web applications.   |
|   | CO4 | Make use of CSS and JavaScript Constructs to perform Client side validation and designing of dynamic webpages.       |
|   | CO5 | Build the Connection between PHP and database to perform Persistence operations on database through dynamic webpages |
|   | CO6 | Develop web application using Ruby on Rails.   |
| <b>C404</b><br>Managerial Economics and<br>Financial Analysis | CO1 | Describe Managerial Economics & state different types of demand  |
|   | CO2 | Explain different types of Production functions & Cost Concepts  |
|   | CO3 | Recall the nature of Markets and different Pricing methods   |
|   | CO4 | State different forms of Business organizations and phases in Business Cycles  |
|   | CO5 | Assess the Financial position of a company by using different techniques   |
|   | CO6 | Illustrate different Investment proposals with help of Capital budgeting   |
| C405<br>Big Data Analytics                                    | CO1 | Data summarization, query and analysis and Use of Data Collection objects for Data operations.                       |
|   | CO2 | Applying data modelling techniques to large data sets.   |
|   | CO3 | Creating applications for Big Data analytics for analyzing the data.   |
|   | CO4 | Building a complete business data analytic solution.   |
|   | CO5 | Knowledge of Writing PIG & HIVE Scripts for understanding the data analysis.   |
|   | CO6 | Understanding of Big Data and Hadoop Eco System.   |
| C406<br>Cloud Computing                                       | CO1 | Explain the basic principles of cloud computing  |
|   | CO2 | Analyze the cloud architecture , various deployment and service models   |
|   | CO3 | Examine the different virtualization techniques  |
|   | CO4 | Determine the real world cloud service model and their data centers  |
|   | CO5 | Determining the techniques of cloud resource scheduling mechanisms   |
| <b>COURSE OUTCOMES FOR THE FOURTH YEAR SECOND SEMESTER</b>    |     |  |



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| <p style="text-align: center;"><b>C409</b></p> <p style="text-align: center;">Distributed Systems</p>        | CO1 | Analyze important characteristics and the salient architectural features for construction of distributed systems.  |
|  | CO2 | Develop using Java API for interprocess communication in the Internet to provide both datagram and stream communication.   |
|  | CO3 | Analyze the concepts of RMI to communicate between distributed objects.  |
|  | CO4 | Construct processes and threads to examine the design and implementation of multithreaded processing and communication facilities in distributed environment.  |
|  | CO5 | Analyze the File system architecture, peer-to-peer systems, multicast communication, transaction recovery and replications for how processes coordinate their actions and agree on shared values in distributed systems. |
| <p style="text-align: center;"><b>C410</b></p> <p style="text-align: center;">Management Science</p>         | CO1 | Apply the concept of Management, Motivational theories, and design different organizational structures in business organizations.  |
|  | CO2 | Examine the quality of products using SQC and also maintain Inventory  |
|  | CO3 | Analyze different functions of an organization and strategies of product lifecycles and channels of distribution   |
|  | CO4 | Designing project schedules with the help of network analysis  |
|  | CO5 | Differentiating Vision, Mission, and Goals of an organization and formulating strategies.  |
|  | CO6 | Applying different concepts of management at contemporary issues of an organization.   |
| <p style="text-align: center;"><b>C411</b></p> <p style="text-align: center;">MACHINE LEARNING</p>           | CO1 | Apply the ingredients of machine learning techniques to solve real world problems  |
|  | CO2 | Analyze machine learning techniques for classification, regression, and clustering problems  |
|  | CO3 | Categorize the machine learning techniques in to various models to develop solutions to complex engineering problems   |
|  | CO4 | Extend the machine learning concept to construct, transform and select features of different models.   |
|  | CO5 | Apply Dimensionality Reduction (PCA) to reduce the number of features in the large dataset, Artificial Neural Networks (ANNs) as a machine learning tool to solve real world problems                                    |
|  | CO6 | Model Neuron and Neural Network, and to analyze ANN learning, and its applications.  |
| <p style="text-align: center;"><b>C412</b></p> <p style="text-align: center;">ARTIFICIAL NEURAL NETWORKS</p> | CO1 | Apply Mathematical Concepts Matrix Algebra, Calculus, With a Basic Knowledge of Optimization in Neural Networks  |
|  | CO2 | Model Neuron and Neural Network, and to Analyze ANN learning, and its applications.  |
|  | CO3 | Perform Pattern Recognition, Linear classification.  |
|  | CO4 | Develop different single layer/multiple layer Perception learning algorithms   |

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|  | CO5 | Design of another class of layered networks Radial Basis Functions and Support Vector Machines. |
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