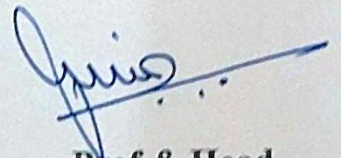


Dr. Ambedkar Institute of technology, Bengaluru-56
Department of Computer Science & Engineering

The enclosed documents are verified & approved.



Prof & Head

Dr. Siddaraju

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Dr. Ambedkar Institute of Technology, Bangalore
Department of Computer Science & Engineering

COURSE OUTCOMES

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|------------------------|--|
| Course Outcomes | Course Title: PROGRAMMING FOR PROBLEM SOLVING |
| | Course Code: 18CS13/23 |
| CO1 | Obtain knowledge about UNIX platform, understand basics of C Programming. Develops the ability to analyze a problem, develop an algorithm & flowchart to solve it. |
| CO2 | Define, analyze and interpret the concept of datatypes, operators, decision making, looping its declaration, initialization, and their usage. |
| CO3 | Design programs using pointers, arrays, strings, functions, structures and union, storage class specifiers, files in C. |

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|------------------------|--|
| Course Outcomes | COURSE TITLE: DIGITAL LOGIC AND COMPUTER DESIGN |
| | Course Code:18CS31 |
| CO1 | Demonstrate the various techniques like K-map, Quine-McCluskey method for minimization of combinational functions. |
| CO2 | Develop and Analyze different combinational and sequential circuits using Logic gates, Multiplexers Decoders, PLA, Flip flops. |
| CO3 | Describe the structure of CPU, memory and I/O unit |
| CO4 | Discuss the design of logic circuits for arithmetic operation in computer system |
| CO5 | Illustrate the use of timing and control signal in the execution of machine instructions of computer system |

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| Course Outcomes | Course Title : DATA STRUCTURES AND ALGORITHMS |
| | Course Code:18CS32 |
| CO1 | Interpret advance C programming techniques such as pointers, dynamic memory allocation, structures & unions to develop solutions for problems such as polynomials, sparse matrix etc. |
| CO2 | Analyse problem and propose solution by selecting appropriate data structures like stacks, Queues, Linked List, Trees, Graphs, Hash Tables. |
| CO3 | Implement linked list data structure and handle operations like searching, insertion, deletion, traversing mechanism. |
| CO4 | Interpret trees and graphs representations, tree traversal, Searching using BFS and DFS. |

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| Course Outcomes | Course Title: Operating System Course Code:18CS33 |
| CO1 | Illustrate the role of resource management, interfaces and system calls as handled by the operating system. |
| CO2 | Apply the process scheduling algorithms to select the processes for execution and compare their performances. |
| CO3 | Interpret the requirements for process synchronization and coordination handled by operating system. |
| CO4 | Describe and analyze the memory management and its allocation methods. |
| CO5 | Identify the storage management methods with respect to different storage management techniques. |

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|------------------------|--|
| Course Outcomes | Course Title: PYTHON PROGRAMMING Course Code: 18CS34 |
| CO1 | Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements. |
| CO2 | Express proficiency in the handling of strings and functions. |
| CO3 | Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets. |
| CO4 | Identify the commonly used operations involving file systems and regular expressions. |
| CO5 | Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python. |

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|------------------------|---|
| Course Outcomes | Course Title: WEB TECHNOLOGIES Course Code: 18CS35 |
| CO1 | Understand terminologies, tools and protocols used in web. |
| CO2 | Design, understand and analyze static web pages. |
| CO3 | Design, understand and analyze interactive, Dynamic web pages. |
| CO4 | Design, understand and analyze data Representation, management and display. |

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| Course Outcomes | Course Title: ALGORITHM DESIGN TECHNIQUES Course Code: 18CS41 |
| CO1 | Ability to analyze the performance of algorithms using different asymptotic notations. |
| CO2 | Identify the design techniques for engineering problems based on Divide & conquer and Greedy methods. |
| CO3 | Apply the ideas of dynamic programming and backtracking to solve the engineering problems and analyze their performance. |
| CO4 | Determine how space and time trade off technique is used to improve the performance of algorithm. |
| CO5 | Estimate the approximation algorithm and analyze the benefit of using them. |

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| Course Outcomes | COURSE TITLE: OOP Principles and Practices using C++ COURSE CODE: 18CS42 |
| CO1 | Identify the classes, objects, members of a class and the relationships among them to solve a specific problem. |
| CO2 | Illustrate the concept of constructors and destructors and describe the mechanism of overloading the operators. |
| CO3 | Examine the concept of data encapsulation, inheritance and function templates as used in C++ programming language. |
| CO4 | Discover the commonly used operations involving the file operations and manipulators. |
| CO5 | Interpret the concepts of exception handling and the built-in standard template library. |

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| Course Outcomes | COURSE TITLE: MICROCONTROLLER AND EMBEDDED SYSTEM COURSE CODE: 18CS43 |
| CO1 | Describe the architecture of ARM microcontroller. |
| CO2 | Write the assembly language program using ARM microcontroller instructions |
| CO3 | Illustrate the memory concepts and data representation in ARM microcontroller |
| CO4 | Identify and Analyze the applications of embedded systems |
| CO5 | Select the best components for the design of embedded systems. |

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| Course Outcomes | COURSE TITLE: Theoretical Foundation of Computer Science COURSE CODE: 18CS44 |
| CO1 | Design different finite state machines for regular languages, make conversion between them, construct the regular expression and study its applications. |
| CO2 | Obtain a minimized DFA, convert the given automata to regular expressions and vice-versa and prove languages not to be regular using pumping lemma. |
| CO3 | Know basic definitions in Grammar, Write CFGs, Construct parse trees, find and remove ambiguity in grammars. |
| CO4 | Study Pushdown Automata, Design NPDA and DPDA after the CFG conversion and convert PDAs to grammar. |
| CO5 | Convert grammar to Various Normal Forms, and simplify the Grammar, Prove that languages are not context free using pumping lemma. Design Turing machines and understand the working of various types of Turing machines. |

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| Course Outcomes | COURSE TITLE: Computer Organization and Architecture COURSE CODE: 18CS45 |
| CO1 | Describe the architecture and functionality of central processing unit. |
| CO2 | Exemplify in a better way the I/O and memory organization |

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| CO3 | Use different number systems, binary addition, subtraction, 2's complement representation, floating point representation and its operations. |
| CO4 | Demonstrate the execution of instruction and compare the architecture of RISC and CISC.. |
| CO5 | Outline the concepts of parallel processing, pipelining and interprocessor communication |

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| Course Outcomes | COURSE TITLE: Software Engineering COURSE CODE: 18CS51 |
| CO1 | Decompose the given project in various phases of a lifecycle. |
| CO2 | Choose appropriate process model depending on the user requirements. |
| CO3 | Perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance. |
| CO4 | Analyze various processes used in all the phases of the product. |
| CO5 | Apply the knowledge, techniques, and skills in the development of a software product. |

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| Course Outcomes | COURSE TITLE: JAVA PROGRAMMING COURSE CODE: 18CS52 |
| CO1 | Design Classes and establish relationship among Classes for various applications from problem definition. |
| CO2 | Analyze and implement reliable object-oriented applications using Java features such as Inheritance and Exception Handling. |
| CO3 | Write Java programs to implement Event Handling mechanisms, Multithreaded Programming, Networking concepts, and GUI Programming. |
| CO4 | Demonstrate the advanced Java concepts such as Servlets, JDBC and Java Server Pages. |

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| Course Outcomes | COURSE TITLE: DATABASE MANAGEMENT SYSTEM COURSE CODE: 18CS53 |
| CO1 | Understand the basic concepts and architecture associated with DBMS so as to employ the conceptual and relational models to design large database systems. |
| CO2 | Create, maintain and manipulate a relational database using SQL. |
| CO3 | Analyze the database design & normalize it so that the data conforms to design principles. |
| CO4 | Apply the characteristics of database transactions and assess how they affect database integrity and consistency. |

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| Course Outcomes | COURSE TITLE: Computer networks and internet protocols COURSE CODE: 18CS54 |
| CO1 | Understand the concepts of communication networks, OSI, and TCP/IP model and Identify the different types of network topologies and protocol models |
| CO2 | Differentiate between different access control methods to the shared transmission media |
| CO3 | Examine routing and congestion control protocols and analyze the concepts of packet switching networks |
| CO4 | Investigate the functionalities and services provided by layer 3 and above and analyze application layer protocols, internet routing protocols, transport layer protocols and different protocols used to implement internetworking |

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|------------------------|---|
| Course Outcomes | COURSE TITLE: ADVANCED WEB TECHNOLOGIES COURSE CODE: 18CS551 |
| CO1 | Build the Web Applications using JQuery, PHP for the given problem |
| CO2 | Design the Web Pages using AJAX for the given problem |
| CO3 | Analyze the advances in Web2.0 and demonstrate its usage for the problem considered |
| CO4 | Demonstrate applications of Angular JS and JQuery for the given problem |
| CO5 | Design responsive web applications using Bootstrap for the given problem. |

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| Course Outcomes | COURSE TITLE: Advanced Algorithm COURSE CODE: 18CS552 |
| CO1 | Understand the significance and concepts of time and space complexity analysis for designing optimal algorithms |
| CO2 | Analyze and solve the time complexity of iterative , recursive and graph based algorithms |
| CO3 | Apply mathematical models to implement secured and optimal algorithms |
| CO4 | Familiarize with operations, suitability and optimality of data structures in a given application |

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| Course Outcomes | COURSE TITLE: ARTIFICIAL INTELLIGENCE COURSE CODE: 18CS553 |
| CO1 | Describe and implement different types of agents for real time applications with proper understanding of agent programming |
| CO2 | Analyze and apply search methods of problem solving techniques in real time applications. |
| CO3 | Understand and derive agent's behavior and environment by applying predicate logic and propositional logic. |
| CO4 | Design and apply different planning methods and learning algorithms for improving agents performance |

| Course Outcomes | COURSE TITLE: Internet Of Things COURSE CODE: 18CS61 |
|------------------------|--|
| CO1 | Apply the knowledge of the internet and computer network on to IoT paradigm. |
| CO2 | Adequately learn and demonstrate the IoT communication. |
| CO3 | Apply the knowledge of embedded C in Tiva C series Launchpad and Energia Software. |
| CO4 | Analyze different configuration setups for connecting different types of sensors and upload the code on the board and communicate to the cloud. |
| CO5 | Analyse the Data Analytics applied to the IoT development. |

| Course Outcomes | COURSE TITLE: Machine Learning COURSE CODE: 18CS62 |
|------------------------|---|
| CO1 | Acquire knowledge about basic concepts of Machine Learning. |
| CO2 | Identify and apply machine learning techniques suitable for a given problem |
| CO3 | Design and implement machine learning solutions to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models. |
| CO4 | Evaluate and interpret the results of the machine learning algorithms. |

| Course Outcomes | COURSE TITLE: Unix Programming COURSE CODE: 18CS63 |
|------------------------|---|
| CO1 | Apply UNIX commands to create Shell Scripts |
| CO2 | Analyze and apply the knowledge of different UNIX system calls to manipulate system resources like files and processes to create new applications |
| CO3 | Create Networking, Client-Server or Distributed Applications using any IPC techniques. |

| Course Outcomes | COURSE TITLE: Distributed Operating System COURSE CODE: 18CS641 |
|------------------------|--|
| CO1 | Identify the issues involved in designing distributed systems, and their internal communication mechanism. |
| CO2 | Demonstrate message passing mechanism of distributed methods |
| CO3 | Compare various process migration approaches and distributed deadlock management approaches. |
| CO4 | Apply features distributed shared memory and file system. |
| CO5 | Examine the various resource management techniques for distributed systems. |

| Course Outcomes | COURSE TITLE: Digital Image Processing COURSE CODE: 18CS642 |
|-----------------|--|
| CO1 | Acquire fundamental concepts and applications of digital image processing. |
| CO2 | Interpret and Apply the two categories of image enhancement techniques. |
| CO3 | Explain image restoration by applying filters and analyze the use of color images. |
| CO4 | Apply suitable morphological operations for the given image and understand different techniques of Image compression. |
| CO5 | Develop algorithms for segmenting the given image and explain different methods of object recognition. |

| Course Outcomes | COURSE TITLE: COMPILER DESIGN COURSE CODE: 18CS643 |
|-----------------|---|
| CO1 | Understand the various phases of compiler and design the lexical analyzer. Demonstrate the phases of the compilation process and be able to describe the purpose and operation of each phase. |
| CO2 | Acquire the working principles of parser with its types and extend the knowledge by parsing LL parser and Operator Precedence parser. |
| CO3 | Design and describe the various LR parsers for a given CFG. |
| CO4 | Describe the storage organization of compiler's run time environment and demonstrate the algorithms to perform code optimization and code generation. |

| Course Outcomes | COURSE TITLE: PRINCIPLES OF ECONOMICS COURSE CODE: 18CS644 |
|-----------------|---|
| CO1 | Identify the determinants of supply and demand; demonstrate the impact of shifts in both market supply and demand curves on equilibrium price and output. |
| CO2 | Determine the roles that prices and markets play in organizing and directing economic activity. |
| CO3 | Calculate and graph the short-run and long-run costs of production, supply and demand elasticities. |
| CO4 | Describe governmental efforts to address market failure such as monopoly power, externalities, and public goods. |
| CO5 | Examine and interpret a nation's economic performance indicators such as economic growth, unemployment and inflation from a macroeconomic perspective. |
| CO6 | Articulate the mechanics and institutions of international trade and their impact on the macro economy. |

| Course Title: Android Programming Course Code: 18CS71 | |
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| CO1 | Understand the basic history, structure, software components of Android OS |
| CO2 | Apply the knowledge of Android application, Activity classes, UI elements, Intents and Adapters to create robust Android applications. |
| CO3 | Apply the knowledge of Native Android libraries to Store, Retrieve, and Share the data within the application that created them and between applications. |
| CO4 | Analyze and apply the knowledge of Threads and Services to implement an Android application that runs in the background. |

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| CO5 | Create location based, Multimedia and other Applications that provide low-level access to the hardware available on mobile devices using appropriate Application Frameworks. |
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| Course Outcomes | COURSE TITLE: Cloud Computing COURSE CODE: 18CS72 |
|-----------------|--|
| CO1 | Articulate the main concepts, key technologies, strengths, and limitations of cloud computing. |
| CO2 | Discuss virtualization and outline its role in enabling the cloud computing system model. |
| CO3 | Identify the architecture and infrastructure of cloud computing and explain the core issues of cloud computing such as security and privacy. |
| CO4 | Determine the appropriate cloud computing solutions and provide recommendations according to the applications used. |
| CO5 | Compute the performance of cloud systems under different scenarios. |

| Course Outcomes | COURSE TITLE: Introduction to Big Data Analytics COURSE CODE: 18CS73 |
|-----------------|---|
| CO1 | Explore the fundamentals and process of adopting Big Data analytics |
| CO2 | Explore Hadoop framework and NOSQL Data Management for Big Data |
| CO3 | Use Spark to process structured data to perform data engineering tasks |
| CO4 | Build distributed Machine Learning models with Spark's MLlib |
| CO5 | Create complex analytics on large datasets using Machine learning tools by building and evaluating models |

| Course Outcomes | COURSE TITLE: Business Intelligence COURSE CODE: 18CS741 |
|-----------------|--|
| CO1 | Establish Business Intelligence in the enterprise by defining the requirements for businesses that demand information. |
| CO2 | Employ a well architected foundation that provides information that helps in aligning the company's data with its business strategies. |
| CO3 | Articulate how the data and dimensional models are considered the cornerstone to building Business Intelligence applications. |
| CO4 | Illustrate the Data Integration workflow of source data as it is transformed to become actionable information. |
| CO5 | Develop Business Intelligence applications with user interfaces and standards that resonate with the intended audience and employ analytics for forecasting. |

| Course Outcomes | COURSE TITLE: Cyber Forensics COURSE CODE: 18CS742 |
|-----------------|---|
| CO1 | Discuss the various types of cyber crimes and Cyber Laws applicable to them |
| CO2 | Apply Forensic examination process |
| CO3 | Analyze and validate forensics data |
| CO4 | Use forensics tools |
| CO5 | Identify the best practices followed in the organization with respect to cyber security |

| Course Outcomes | COURSE TITLE: Software Project Management COURSE CODE: 18CS743 |
|-----------------|---|
| CO1 | Understand Project Management principles while developing software. |
| CO2 | Gain extensive knowledge about the basic project management concepts, framework and the process models. |
| CO3 | Obtain adequate knowledge about software process models and software effort estimation techniques. |
| CO4 | Estimate the risks involved in various project activities. |
| CO5 | Learn staff selection process and the issues related to people management |

| Course Outcomes | COURSE TITLE: Computer Vision COURSE CODE: 18CS751 |
|-----------------|--|
| CO1 | Acquire fundamental concepts and applications of computer vision and image processing. |
| CO2 | Interpret and Apply the various detectors and matching applications. |
| CO3 | Explain the importance motion and usage of its techniques. |
| CO4 | Apply the analysis on scene and recognizing all of its constituent objects. |
| CO5 | Develop motion estimation algorithms that can be used for wide variety of applications. |

| Course Outcomes | COURSE TITLE: INTRODUCTION TO ROBOTICS COURSE CODE: 18CS752 |
|-----------------|---|
| CO1 | Understand basic operations of robots and their sub-components involved in designing. |
| CO2 | To interpret the biological behaviours of human or animal and mapping them to different robot behaviours |
| CO3 | To Analyze and design the robot behaviours using different robot architectures that work in real-time environments. |
| CO4 | To use appropriate programming approaches to design and build the robot behaviours |

| Course Outcomes | COURSE TITLE: SOFT COMPUTING COURSE CODE: 18CS753 |
|-----------------|--|
| CO1 | Understand the basics of soft computing, ANN and Terminologies to relate and understand the real time problems |
| CO2 | Solve the real-time problems using ANN representations |
| CO3 | Analyze and adopt fuzzy logic in designing and implementing soft computing applications. |
| CO4 | Analyze and apply genetic algorithms to solve the optimization problems |