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Tumkur University

Department of Studies and Research in MCA

Programme Outcome

On completion of MCA degree, the graduates will be able to:

- Apply the knowledge of mathematics and computing fundamentals to various real life applications for any given requirement
- Design and develop applications to analyze and solve all computer science related problems
- Design applications for any desired needs with appropriate considerations for any specific need on societal and environmental aspects
- Analyze and review literatures to invoke the research skills to design, interpret and make inferences from the resulting data
- Integrate and apply efficiently the contemporary IT tools to all computer applications
- Solve and work with a professional context pertaining to ethics, social, cultural and cyber regulations
- Involve in perennial learning for a continued career development and progress as a computer professional
- Function effectively both as a team leader and team member on multi-disciplinary projects to demonstrate computing and management skills
- Communicate effectively and present technical information in oral and written reports
- Utilize the computing knowledge efficiently in projects with concern for societal, environmental, and cultural aspects
- Function competently as an individual and as a leader in multidisciplinary projects
- Create and design innovative methodologies to solve complex problems for the betterment of the society
- Apply the inherent skills with absolute focus to function as an successful entrepreneur

Programme Specific Outcome (PSO)


- Develop an ability to apply knowledge in the computing discipline.
- Develop ability to design and conduct experiments, as well as interpret data
- Develop ability to demonstrate team work with the ability of leadership, analytical reasoning for solving time critical problems and strong human values for responsible professional
- Develop ability to use current technologies, skills and models for computing practice.

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- e. Develop ability to communicate ideas effectively
- f. Develop ability to use research, experiment, contemporary issues to solve industrial problems.
- g. Develop techniques to enhance ability for lifelong learning.
- h. Develop class environment congenial and competitive for generation of ideas, innovation and sharing.
- i. To make graduates understand cross cultural, societal, professional, legal and ethical issues prevailing in industry.

Course Outcomes

- a. Identify a task or problem relevant to computer science and/or IT
- b. Propose a solution to the task or problem
- c. Explore tools/technologies/languages that may enable design/develop the solution/application
- d. Develop a reasonable application/software in tune with the requirements
- e. Implement the solution/application in tune with the requirement.
- f. Develop ability to apply theoretical and practical tools/techniques to solve any real life problems
- g. Develop ability to apply theoretical and practical tools/techniques to solve any real life problems by undertaking the Complete problem definition and Evaluate a problem definition
- h. Develop ability to apply theoretical and practical tools/techniques to solve any real life problems by undertaking the Complete problem definition, determine how to collect information to determine requirements and Work on data collection methods for fact finding
- i. Develop ability to apply theoretical and practical tools/techniques to solve any real life problems by undertaking the complete problem definition, Schedule projects using relevant techniques and Software documentation.
- j. Develop ability to apply theoretical and practical tools/techniques to solve any real life problems by undertaking the complete problem definition, Prepare and evaluate a final report and developing the ability to communicate effectively.



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Course Outcomes


MCA

2.6.1

S.No	Semester- I Subject Title
1	<p>Problem Solving Using C</p> <ul style="list-style-type: none"> After the course the students are expected to be able to (this is what the exams will test) : Identify situations where computational methods and computers would be useful. Given a computational problem, identify and abstract the programming task involved. Approach the programming tasks using techniques learned and write pseudo-code. Choose the right data representation formats based on the requirements of the problem. Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand. Write the program on a computer, edit, compile, debug, correct, recompile and run it. Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task
2	<p>Unix Programming</p> <ul style="list-style-type: none"> Describe the architecture and features of UNIX Operating System and distinguish it from other Operating System Demonstrate UNIX commands for file handling and process control Applying Write Regular expressions for pattern matching and apply them to various filters for a specific task Applying Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem
3	<p>Web Technologies</p> <ul style="list-style-type: none"> Explain the history of the internet and related internet concepts that are vital in understanding web development. Discuss the insights of internet programming and implement complete application over the web. Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet. d) Utilize the concepts of JavaScript and Java


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	<ul style="list-style-type: none"> • Use web application development software tools i.e. Ajax, PHP and XML, etc. and identify the environments currently available on the market to design web sites
4	<p>Fundamentals of Computer Organization</p> <ul style="list-style-type: none"> • Interpret the functional architecture of computing systems. (Understanding) • Classify and compute the performance of machines. • Understand how to implement memory chips, boards, modules and caches. • Relate to arithmetic for ALU implementation. • Understand the basics of hardwired and micro-programmed control of the CPU. • Learn about various I/O devices and the I/O interface. • Appreciate advancements to architecture like pipelining and superscalar operation. • Identify, compare and assess issues related to ISA, memory, control and I/O functions. (Applying, Analyzing, Evaluating) • Estimate the performance of various classes of machines, memories, pipelined architectures etc. • Compare CPU implementations, I/O methods etc. • Analyze fast methods of ALU and FP unit implementations. • Design and analyze solutions in the area of computer architecture. (Analyzing, Creating) • Design an instruction encoding scheme for an ISA. • Build large memories using small memories for better performance.
5	<p>Discrete Mathematical Structures</p> <ul style="list-style-type: none"> • Perform operations on various discrete structures such as sets, functions, relations, and sequences. • Ability to solve problems using Counting techniques, Permutation and Combination, Recursion and generating functions. • Apply algorithms and use of graphs and trees as tools to visualize and simplify Problems. • Apply algorithms and use of graphs and trees as tools to visualize and simplify Problems. Use of K-Maps and Truth Tables to construct and verify correctness of a Boolean expression.


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	<ul style="list-style-type: none"> Understand the various properties of algebraic systems like Rings, Monoids and Groups
6	<p>C Programming Lab</p> <p>On completion of the course, students are able to:</p> <ul style="list-style-type: none"> Develop their programming skills. Be familiar with programming environment with C Program structure. Declaration of variables and constants. Understand operators, expressions and preprocessors. Understand arrays, its declaration and uses
7	<p>Unix Programming Lab</p> <p>Upon completion of this course, the student will be able to:</p> <ul style="list-style-type: none"> You will be able to run various UNIX commands on a standard UNIX/LINUX Operating system (We will be using Ubuntu flavor of the Linux operating system). You will be able to run C / C++ programs on UNIX. You will be able to do shell programming on UNIX OS. You will be able to understand and handle UNIX system calls
8	<p>Web Programming Lab</p> <p>Course Outcomes: The students will be able to</p> <ul style="list-style-type: none"> Analyze a webpage and identify its elements and attributes. Create webpages using XHTML and Cascading Style Sheets Build dynamic webpages using JavaScript (Client side programming) Create XML documents and Schemas

Semester- II	
S.No	Subject Title
1	<p>Operating Systems</p> <p>Upon successful completion of this course, students are expected to have the ability to:</p> <ul style="list-style-type: none"> Describe and explain the fundamental components of a computer operating system. [ABET (a), (i), (j), (k)] Assessment: Students will take midterm exams, final exams, and homework Describe and explain the fundamental components of a computer operating system. [ABET (a), (i), (j), (k)] Assessment: Students will take midterm exams, final exams, and homework. Define, restate, discuss, and explain the policies for scheduling, deadlocks, memory management, synchronization, system calls, and file systems. [ABET (a), (i), (j), (k)] Assessment: Students will take midterm exams, final exams, and

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	<p>homework.</p> <ul style="list-style-type: none"> Describe and extrapolate the interactions among the various components of computing systems. [ABET (a), (i), (j), (k)] Assessment: Students will take midterm exams, final exams, and homework.
2	<p>OOPS with C++</p> <ul style="list-style-type: none"> Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects. Understand dynamic memory management techniques using pointers, constructors, destructors, etc Describe the concept of function overloading, operator overloading, virtual functions and polymorphism. Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming. Demonstrate the use of various OOPs concepts with the help of programs
3	<p>DBMS</p> <ul style="list-style-type: none"> Describe DBMS architecture, physical and logical database designs, database modeling, relational, hierarchical and network models. Identify basic database storage structures and access techniques such as file organizations, indexing methods including B-tree, and hashing. Learn and apply Structured query language (SQL) for database definition and database manipulation. Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database. Understand various transaction processing, concurrency control mechanisms and database protection mechanisms
4	<p>Data Structures</p> <ul style="list-style-type: none"> Understand the concept of Dynamic memory management, data types, algorithms, Big O notation. Understand basic data structures such as arrays, linked lists, stacks and queues. Describe the hash function and concepts of collision and its resolution methods Solve problem involving graphs, trees and heaps Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data
5	<p>Computer Networks</p> <ul style="list-style-type: none"> Understand computer network basics, network architecture, TCP/IP and OSI reference models. Identify and understand various techniques and modes of transmission



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	<ul style="list-style-type: none"> Describe data link protocols, multi-channel access protocols and IEEE 802 standards for LAN d) Describe routing and congestion in network layer with routing algorithms and classify IPV4 addressing scheme. Discuss the elements and protocols of transport layer Understand network security and define various protocols such as FTP, HTTP, Telnet, DNS
6	OS Lab <ul style="list-style-type: none"> Know how data is transmitted and checking of errors.. Inter process communication including shared memory, pipes and messages Simulation of CPU Scheduling Algorithms. (FCFS, RR, SJF, Priority, Multilevel Queuing) Simulation of Banker's Algorithm for Deadlock Avoidance. Prevention Program for FIFO, LRU, and OPTIMAL page replacement algorithm. Pre requisite: Knowledge on Operating system principles and network principles.
7	Data Structures Lab Using C++ <ul style="list-style-type: none"> Write C programs using structures, unions, dynamic memory allocation functions and command line arguments Implement C/C++ linear data structures like stacks, queues, linked lists using static and dynamic allocation and their applications Implement C/C++ program for binary search tree using nonlinear data structure. Gain knowledge in concepts of C++ like classes, operator overloading, friend functions, constructor overloading.
8	DBMS Lab <ul style="list-style-type: none"> Define database system concepts and apply normalization to the database. Explain the basic processing and optimization techniques for high level query. Describe different transaction processing concepts and use different concurrency control techniques. Discuss different types of databases such as object oriented and distributed databases. Identify different types of database failures and techniques to recover from such failures. I) Discuss advanced database technologies and products used in enterprise


	Semester- III
SNo	Subject Title
1	Programming Using Java <ul style="list-style-type: none"> Knowledge of the structure and model of the Java programming language,

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	<p>(knowledge)</p> <ul style="list-style-type: none"> • Use the Java programming language for various programming technologies (understanding) . • Develop software in the Java programming language. (application) • evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis) • Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem (synthesis) • Choose an engineering approach to solving problems, starting from the acquired knowledge of programming and knowledge of operating systems. (evaluation)
2	<p>Analysis & Design of Algorithms</p> <ul style="list-style-type: none"> • Define the basic concepts of algorithms and analyze the performance of algorithms. • Discuss various algorithm design techniques for developing algorithms. Discuss various searching, sorting and graph traversal algorithms. • Understand NP completeness and identify different NP complete problems. • Discuss various advanced topics on algorithms
3	<p>Software Engineering</p> <ul style="list-style-type: none"> • Plan a software engineering process life cycle . including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements • Able to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project • Analyze and translate a specification into a design, and then realize that design practically, using an appropriate software engineering methodology. • Know how to develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice. • Able to use modern engineering tools necessary for software project management, time management and software reuse.
4	<p>Python Programming</p> <ul style="list-style-type: none"> • Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.



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	<ul style="list-style-type: none"> Express proficiency in the handling of strings and functions. Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets. Identify the commonly used operations involving file systems and regular expressions. Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python
5	<p>Computer Graphics</p> <ul style="list-style-type: none"> Understand the basics of computer graphics, different graphics systems and applications of computer graphics Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis. Use of geometric transformations on graphics objects and their application in composite form. Extract scene with different clipping methods and its transformation to graphics display device. Explore projections and visible surface detection techniques for display of 3D scene on 2D screen. Render projected objects to naturalize the scene in 2D view and use of illumination models for this
6	<p>Java Programming Lab</p> <ul style="list-style-type: none"> Apply the Set theory and Relation concepts. Apply the Functions and define the recursive functions. Apply Laplace transform to different applications. Apply Inverse Laplace transform to different applications. Identify the permutations and combinations. Define variable and also identify the mapping
7	<p>ADA Lab</p> <ul style="list-style-type: none"> Define the basic concepts of algorithms and analyze the performance of algorithms.


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	<ul style="list-style-type: none"> Discuss various algorithm design techniques for developing algorithms. Discuss various searching, sorting and graph traversal algorithms. d Understand NP completeness and identify different NP complete problems. Discuss various advanced topics on algorithms.
8	<p>Python Lab</p> <ul style="list-style-type: none"> Describe the Numbers, Math functions, Strings, <u>List</u>, Tuples and Dictionaries in Python Express different Decision Making statements and Functions Interpret Object oriented programming in Python Understand and summarize different File handling operations Explain how to design GUI Applications in Python and evaluate different database operations Design and develop Client Server network applications using Python

Semester- IV	
S.No	Subject Title
1	<ul style="list-style-type: none"> Advanced java Learn the internet programming. using java applets Create a full set of ui widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using abstract windowing toolkit (awt) & swings Apply event handling on awt and swing components. Learn to access database through java programs, using java data base connectivity (jdbc) Create dynamic web pages, using Servlets and JSP.
2	<p>Advanced Web Programming</p> <ul style="list-style-type: none"> Apply three-tier architecture concepts and advanced database techniques in web applications Use object-oriented techniques in web programming to develop rich interactive environments for the web Create sites that utilize data validation techniques and secure code Build sites that use session management


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3	Mobile Applications <ul style="list-style-type: none"> • Develop high-level plans for script solutions for mobile and evaluate the post-production outcome; • Design scripts to meet given interface and media control requirements; • Use variables, properties and other code elements appropriately to implement the code design; • Devise, carry out and evaluate functional test strategies of mobile design; • Implement and evaluate techniques for the installation of mobile applications and delivery via various channels; • Explain the principles of technologies which support media production and delivery on a variety of platforms
4	Elective-I

5	Elective-II
6	Adv. Java Lab <ul style="list-style-type: none"> • learn the Internet Programming, using Java Applets • create a full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) & Swings • apply event handling on AWT and Swing components • learn to access database through Java programs, using Java Data Base Connectivity (JDBC) • create dynamic web pages, using Servlets and JSP. • make a reusable software component, using Java Bean. • invoke the remote methods in an application using Remote Method Invocation (RMI) • understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB).
7	Adv. Web Lab <ul style="list-style-type: none"> • Students are able to develop a dynamic webpage by the use of java script and DHTML. • Students will be able to write a well formed/valid XML document. • Students will be able to connect a java program to a DBMS and perform insert, update and delete operations on DBMS table. • Students will be able to write a server side java application called Servlet to catch form data sent from client, process it and store it on database.


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	<ul style="list-style-type: none"> Students will be able to write a server side java application called JSP to catch form data sent from client and store it on database
8	<p>Mini Project-I</p> <ul style="list-style-type: none"> Students should be able to design and construct a hardware and software system, component, or process to meet desired needs. <ul style="list-style-type: none"> Students are provided to work on multidisciplinary Problems. Students should be able to work as professionals, with portfolio ranging from data management, network configuration, designing hardware, database and software design to management and administration of entire systems. several available literature in the preferred field of study Compare and contrast the several existing solutions for research challenge Demonstrate an ability to work in teams and manage the conduct of the research study. Formulate and propose a plan for creating a solution for the research plan identified To report and present the findings of the study conducted in the preferred domain

Elective-I	
Course Code	Title
1.	<ul style="list-style-type: none"> Basics of MIS & e-Commerce To understand the basic principles and working of information technology. Describe the role of information technology and information systems in business. To contrast and compare how internet and other information technologies support business processes. To give an overall perspective of the importance of application of internet technologies in business administration
2.	<p>ERP</p> <ul style="list-style-type: none"> Understand the basic concepts of ERP. Identify different technologies used in ERP. Understand and apply the concepts of ERP Manufacturing Perspective and ERP Modules. Discuss the benefits of ERP Understand and implement the ERP life cycle.


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	<ul style="list-style-type: none"> • . Apply different tools used in ERP
3.	<p>Introduction to AI</p> <ul style="list-style-type: none"> • Course outcomes: Upon successful completion of this course, the student shall be able to: • Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations. • Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning. • Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models. • Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool. • Demonstrate proficiency in applying scientific method to models of machine learning. Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications

Elective-II	
Course Code	Title
1.	<p>Principles of User Interface Design</p> <ul style="list-style-type: none"> • Students will be able to identify and criticize bad features of interface designs. • Students will be able to predict good features of interface designs. • Students will be able to illustrate and analyze user needs and formulate user design specifications. • Students will be able to interpret and evaluate the data collected during the process. • Students will be able to evaluate designs based on theoretical frameworks and methodological approaches. • Students will be able to produce/show better techniques to improve the user interaction design interfaces
2.	<p>IoT</p> <ul style="list-style-type: none"> • Interpret the vision of IoT from a global context. • Determine the Market perspective of IoT : Compare and Contrast the use of Devices, Gateways and Data Management in IoT. • Implement state of the art architecture in IoT. • Illustrate the application of IoT in Industrial Automation and identify

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3.	<p>Real World Design Constraints</p> <p>Multimedia Communications</p> <ul style="list-style-type: none"> • Describe technical characteristics and performance of multimedia system and terminals, • Design creative approach in application of multimedia devices, equipment and systems, • Carry out experiments and measurements on the multimedia systems in laboratory conditions on real components and equipment, • Interpret and analyze measurement results obtained on the multimedia system and components, • Describe the development process and applications of the multimedia systems, • Test multimedia communication systems and equipment in real conditions.
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