DEPARTMENT OF COMPUTER APPLICATIONS AND TECHNOLOGY

PROGRAMME OUTCOMES (PO) FOR MCA

After the completion of programme the students are able to

- **PO1.** Choose modern computing tools, skills and techniques necessary for innovative software solutions
- **PO2.** Relate practical skills to provide solutions to industry, society and business.
- **PO3.** Enumerate the creative ideas with the emerging technologies in real time applications.
- **PO4.** Interpret complex business scenarios and contemporary issues in emerging technologies.
- **PO5.** Classify the computing systems through quantitative and qualitative technique.
- **PO6.** Associate techniques necessary for innovative software solutions.

PROGRAMME SPECIFIC OUTCOMES (PSO) FOR MCA

After the completion of programme the students are able to

- **PSO1.** Enumerate technical skills in computer application fields
- **PSO2.** Relate the innovative ideas in required real-time applications.
- **PSO3.** Integrate multi-disciplinary creativity in a modernized organization.

Revised Regulations (Effective from the academic year 2015 - 2016 onwards)

I Year & First Semester

Title of the Paper: **Programming in C and C++**

After the completion of this course the students are able to

- **CO1:** Identify C & C++ programming languages structure.
- **CO2:** Describe identifiers, constants, variables, data types and types of operators in C & C++ programming languages.
- **CO3:** Define string handling functions and concepts of pointers.
- **CO4:** Demonstrate category of functions and storage classes and their usage.
- **CO5**: Explain file handling concepts.
- **CO6:** Demonstrate the use of concepts with the help of C & C++ programs.

Title of the Paper: **Digital Computer Fundamentals**

After the completion of this course the students are able to

- **CO1:** Demonstrate various number systems, number base conversion, different codes and code conversions.
- **CO2:** Explain Logic Gates and its truth tables.
- **CO3:** Classify Boolean algebra and simplifications of Boolean functions.
- **CO4:** Acquire knowledge of Adders, Subtractors, Decoder & Encoder, Multiplexers & De-Multiplexers, ROM and PLA.
- **CO5:** Describe Flip Flops, Registers, Counters, ALU and Accumulator.
- **CO6:** Explain the fundamentals of Digital Logic and Computer Design.

Title of the Paper: **Open Source Software**

After the completion of this course the students are able to

- **CO1:** Explain fundamentals of open source and commercial software.
- **CO2:** Illustrate Linux, shell commands, standard I/O and redirection.
- **CO3:** Demonstrate C Shell, TCSH-Shell, Z-Shell and Shell variables.
- **CO4:** Define file and directories operations.
- **CO5:** Describe PHP and HTML commands.
- **CO6:** Develop Shell and PHP programs.

I Year & Second Semester

Title of the Paper: **Data Structures**

After the completion of this course the students are able to

- **CO1:** Analyze the asymptotic notations of algorithms.
- **CO2:** Implement the operations of Stack, Queue, Linked List and use them to solve computational problems.
- **CO3:** Explain the representation of tree and graph and their traversing techniques.
- **CO4:** Solve searching and sorting techniques.
- **CO5:** Demonstrate Tree concepts.
- **CO6:** Develop algorithms and step by step approach in solving problems with the help of fundamental data structures.

Title of the Paper: **Programming in Java**

After the completion of this course the students are able to

CO1: Identify the syntax and semantics of Java programming concepts.

CO2: Apply the concepts of multithreading, exception handling mechanisms to develop efficient program.

CO3: Describe JDBC to provide a program level interface for communicating with database.

CO4: Explain networking concepts including Socket, Datagram, URL, URL Connection and Internet Address.

CO5: Design event driven GUI using APPLET and AWT.

CO6: Write programs using classes, objects, inheritance, encapsulation and polymorphism.

Title of the Paper: **System Software**

After the completion of this course the students are able to

CO1: Explain the difference between Operating Systems software and Application Systems software along with components of system software.

CO2: Identify the function of Assemblers, Macros, Macro processors and the primary functions of an Operating System.

CO3: Describe the concept and process of compliers, programming languages, scanning and parsing.

CO4: Illustrate loaders and linkage editors.

CO5: Explain the concept of software tools, text editors and programming environment.

CO6: Discuss linkage editor for the IBM PC.

II Year & Third Semester

Title of the Paper: **Design and Analysis of Algorithms**

After the completion of this course the students are able to

CO1: Analyze the best-case, average-case and worst-case running times of algorithm using asymptotic notations and interpret the fundamental needs of algorithms in problem solving.

CO2: Demonstrate the steps involved in quick sort using divide and conquer techniques.

CO3: Describe the dynamic-programming paradigm.

CO4: Explain a wide range of 8 queens, sum of subset and graph coloring using backtracking.

CO5: Illustrate the importance of NP Hard and NP Complete problems with their diagrammatic.

CO6: Demonstrate an appropriate algorithm design techniques and algorithms for solving problems.

Title of the Paper: **Computer Graphics**

After the completion of this course the students are able to

- **CO1:** Explain the basics of computer graphics, different graphics systems and applications of computer graphics.
- **CO2:** Discuss algorithms for scan conversion and filling of basic objects and their comparative analysis.
- **CO3:** Use of geometric transformations on graphics objects and their application in composite form.
- **CO4:** Extract scene with different clipping methods and its transformation to graphics display device.
- **CO5:** Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.
- **CO6:** Render projected objects to naturalize the scene in 2D view and use of illumination models for this.

Title of the Paper: **Operating Systems**

After the completion of this course the students are able to

- **CO1:** Explain the basics of operating systems like kernel, shell, types and views of operating systems.
- **CO2:** Learn CPU scheduling algorithms and remove deadlocks.
- **CO3:** Discuss memory management techniques and concept of thrashing.
- **CO4:** Describe the disk management and disk scheduling algorithms for better utilization of external memory.
- **CO5:** Recognize file system interface, protection and security mechanisms.
- **CO6:** Learn features of distributed OS like UNIX, Linux, windows etc.

Title of the Paper: **Advanced Java Programming**

After the completion of this course the students are able to

- **CO1:** Demonstrate to access database through Java servlet programs, using Java Data Base Connectivity (JDBC).
- **CO2:** Describe JavaBeans programs and executing the programs using Bean Development Kit.
- **CO3:** Explain the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB).
- **CO4:** Identify the architecture of remote method invocation and Inter-ORB Protocol.
- **CO5:** Illustrate creating, sending and receiving e-mail programs
- **CO6:** Distinguish Web Server, Web Container and Application Server, Serialization, Internationalization, naming services and JNDI.

II Year & Fourth Semester

Title of the Paper: **Computer Networks**

After the completion of this course the students are able to

- **CO1:** Explain different types of networks, OSI and TCP/IP reference models.
- **CO2:** Illustrate 3G mobile phone networks and RFID sensor networks.
- **CO3:** Describe different types of switching techniques, error detection and error correction.
- **CO4:** Classify different network algorithms and different types of protocols.
- **CO5:** Explain connection management and network security.
- **CO6:** Identify general applications and technologies of computer networks.

Title of the Paper: **Database Management System**

After the completion of this course the students are able to

CO1: Describe the fundamental elements of relational database management systems.

CO2: Illustrate the use of ER Model in software applications and normal form techniques to design any database in software applications.

CO3: Explain the key notations of query evaluation and query optimization techniques.

CO4: Execute various advanced queries related to transaction processing and locking using concurrency control.

CO5: Demonstrate the client server architecture and distributed database architecture to a software application.

CO6: Design a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

Title of the Paper: **Software Engineering**

After the completion of this course the students are able to

CO1: Identify the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment.

CO2: Relate the data modeling, flow oriented modeling and behavioral modeling to the suitable applications.

CO3: Distinguish various design models like architectural design, user interface design and component level.

CO4: Explain software project scheduling, software project estimation, software measurement and RMMM activities.

CO5: Exhibit to use the software reviews, software quality assurance and software testing for software engineering development activities.

CO6: Interpret an individual and as part of a multidisciplinary team to deliver quality software.

Title of the Paper: **Multimedia Systems**

After the completion of this course the students are able to

CO1: Explain the types of media and define multimedia system.

CO2: Demonstrate the process of digitizing (quantization) of different analog signals (text, graphics, sound and video).

CO3: Use tools for image processing, video, sound and animation.

CO4: Apply methodology to develop a multimedia system.

CO5: Identify the field of multimedia in practice.

CO6: Describe applications and multimedia techniques.

Title of the Paper: **E – Commerce**

After the completion of this course the students are able to

CO1: Explain E-Commerce Framework and Electronic Commerce Applications.

CO2: Illustrate the business of Internet Commercialization, Network Security and Firewalls.

CO3: Describe about E–Commerce payment mechanisms, Inter-Organizational Commerce and Electronic Data Interchange (EDI).

CO4: Explain advertising, marketing on the Internet and Web-based marketing.

CO5: Demonstrate the Technological Components of Education on Demand Characteristics and Properties of Software Agents.

CO6: Use online shopping and mode of payment systems.

III Year & Fifth Semester

Title of the Paper: **Object Oriented Analysis and Design**

After the completion of this course the students are able to

CO1: Explain activities of object oriented system development life cycle using use case driven approach.

CO2: Design documents the requirements through use case driven approach.

CO3: Illustrate design processes, object storage and any real-time application.

CO4: Demonstrate application and limitation of the controls using user interface design.

CO5: Describe the SQA components that can be integrated into the project life cycle.

CO6: Develop the project skills of OOAD techniques.

Title of the Paper: **Web Based Application Development**

After the completion of this course the students are able to

CO1: Identify the basics of VB.NET and ASP.NET.

CO2: Explain the basic concepts of Visual Studio IDE fundamentals.

CO3: Develop web based programs with the help of VB.NET and ASP.NET.

CO4: DescribeADO.NET.

CO5: Identify the concept of ASP.NET application Fundamentals.

CO6: Build interactive web applications using AJAX.

Title of the Paper: **Software Testing**

After the completion of this course the students are able to

CO1: Illustrate the fundamental concepts in software testing and types of software testing.

CO2: Demonstrate the structural and functional testing strategies, techniques, static and dynamic testing.

CO3: Explain the importance of graphical user interface testing and documentation testing.

CO4: Describe the need for security testing and fundamentals of Web page testing.

CO5: Identify the benefits of automation testing, importance of random testing and test phases in the test planning.

CO6: Express test cases and the importance of bug reporting, importance of test metrics and the test case design procedure.

Title of the Paper: **Mobile Computing**

After the completion of this course the students are able to

CO1: Explain the functionality of Spread Spectrum and Cellular systems.

CO2: Illustrate the importance of GSM, UMTS and IMT and their architectures.

CO3: Identify the working principles of Bluetooth technology and their representations.

CO4: Demonstrate the Adhoc networks concepts and its routing protocols.

CO5: Describe the principles of snooping, congestion control and mobile transport layer.

CO6: Interpret Wireless application Protocols to develop mobile content application, social and ethical issues of mobile computing.

(Effective from the academic year 2020 - 2021 onwards**)**

I Year & First Semester

Title of the Paper: **C++ & Data Structures**

After the completion of this course the students are able to

- **CO1:** Illustrate the procedural and object oriented paradigm with concepts.
- **CO2:** Explain dynamic memory management techniques using pointers, constructors, destructors, etc.
- **CO3:** Demonstrate the concept of function overloading and operator overloading.
- **CO4:** Describe the concept of Dynamic memory management and algorithms.
- **CO5:** Explain basic data structures such as arrays, linked lists, stacks and queues.
- **CO6:** Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data.

Title of the Paper: **Digital Computer Fundamentals**

After the completion of this course the students are able to

- **CO1:** Demonstrate number systems, number base conversion, different codes and code conversions.
- **CO2:** Explain Logic Gates and its truth tables.
- **CO3:** Classify Boolean algebra and simplifications of Boolean functions.
- **CO4:** Acquire knowledge of Adders, Subtractors, Decoder & Encoder, Multiplexers & De-Multiplexers, ROM and PLA.
- **CO5:** Describe Flip Flops, Registers, Counters, ALU and Accumulator.
- **CO6:** Explain the fundamentals of Digital Logic and Computer Design.

Title of the Paper: **Database Management Systems**

After the completion of this course the students are able to

- **CO1:** Describe the fundamental elements of relational database management systems.
- **CO2:** Illustrate the use of ER Model in software applications and applying various normal form techniques to design any database in software applications.
- **CO3:** Explain the key notations of query evaluation and query optimization techniques.
- **CO4:** Execute advanced queries related to transaction processing and locking using concurrency control.
- **CO5:** Demonstrate the client server architecture and distributed database architecture to a software application.
- **CO6:** Design a simple database system and competence with the fundamental tasks involved with modeling.

Title of the Paper: **Operating Systems**

After the completion of this course the students are able to

- **CO1:** Explain the basics of operating systems like kernel, shell, types and views of operating systems.
- **CO2:** Identify CPU scheduling algorithms and remove deadlocks.
- **CO3:** Demonstrate various memory management techniques and concept of thrashing.
- **CO4:** Describe the disk management and disk scheduling algorithms for better utilization of external memory.
- **CO5:** Construct files system interface, protection and security mechanisms.
- **CO6:** Compose features of distributed OS like UNIX, Linux, windows and etc.

I Year & Second Semester

Title of the Paper: **Design and Analysis of Algorithms**

After the completion of this course the students are able to

CO1: Analyze the best-case, average-case and worst-case running times of algorithm using asymptotic notations.

CO2: Explain the steps involved in quick sort using divide and conquer techniques.

CO3: Describe the dynamic-programming paradigm and an algorithmic design situation calls for it.

CO4: Demonstrate a wide range of 8 queens, sum of subset and graph coloring using backtracking techniques.

CO5: Define the importance of NP Hard and NP Complete problems with their diagrammatic representation.

CO6: Construct appropriate algorithm design techniques for solving problems.

Title of the Paper: **Object Oriented Analysis and Design**

After the completion of this course the students are able to

- **CO1:** Explain activities of object oriented system development life cycle using use case driven approach.
- **CO2:** Design documents the requirements through use case driven approach.
- **CO3:** Demonstrate design processes, object storage and applying in any real-time application.
- **CO4:** Design any application and limitation of the controls using user interface design.
- **CO5:** Describe the SQA components that can be integrated into the project life cycle.
- **CO6:** Develop the project skills of OOAD techniques.

Title of the Paper: **Artificial Intelligence**

After the completion of this course the students are able to

- **CO1:** Explain fundamentals of AI and its environment.
- **CO2:** Illustrate problem solving agents, BFS, DFS and A*-heuristic functions.
- **CO3:** Describe local search and optimization problems along with optimal decision in games.
- **CO4:** Demonstrate Constraint satisfaction problem, the structure of problems and first order logic concept.
- **CO5:** Explain the concept of knowledge representation and reasoning, automated planning and quantifying uncertainty.
- **CO6:** Define artificial intelligence concepts along with methods and various architecture.

Title of the Paper: **Software Engineering**

After the completion of this course the students are able to

- **CO1:** Apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment.
- **CO2:** Classify the data modeling, flow oriented modelling and behavioral modeling to the suitable applications
- **CO3:** Illustrate design models like architectural design, user interface design and component level.
- **CO4:** Explain software project scheduling, software project estimation, software measurement and RMMM activities.
- **CO5:** Exhibit to use the software reviews, software quality assurance and software testing for software engineering development activities.
- **CO6:** Interpret an individual and as part of a multidisciplinary team to deliver quality software.

II Year & Third Semester

Title of the Paper: **Machine Learning**

After the completion of this course the students are able to

- **CO1:** Explain fundamentals of Machine learning and its working environments.
- **CO2:** Classify Supervised and unsupervised learning.
- **CO3:** Describe Tree models, Rule models and linear models.
- **CO4:** Demonstrate k-nearest neighbour classification, K-Means algorithm and Naïve bayes models.
- **CO5:** Explain the concept of features like Bagging and random forests, Boosting and its measures.
- **CO6:** Use Machine Learning algorithms and techniques.

Title of the Paper: **Software Project Management**

After the completion of this course the students are able to

- **CO1:** Develop the model from the conventional software product to the modern and analyze & design the software architecture.
- **CO2:** Define organizing and managing a software project.
- **CO3:** Design estimation levels of cost and effort.
- **CO4:** Explain managing, economics for conventional, modern and future software projects.
- **CO5:** Classify peer instruction levels.
- **CO6:** Sketch artifacts sets for better understanding of software development.

Title of the Paper: **Cloud Computing**

After the completion of this course the students are able to

- **CO1:** Explain the concepts of the cloud computing architecture.
- **CO2:** Classify the types of Cloud service development.
- **CO3:** Demonstrate the Collaborating on Schedules, To-Do Lists, Contact Lists, Community, Group Projects and Events.
- **CO4:** Illustrate the concepts of Collaborating on Calendars, Task management, Event management, Contact management, Project management, word processing and Databases.
- **CO5:** Describe the ways to collaborate online.
- **CO6:** State key technical and organizational challenges of cloud computing.

Title of the Paper: **Information Security**

After the completion of this course the students are able to

CO1: Explain the basics of computer security and its terminology.

CO2: Recapitulate various Attacks, Threats and Vulnerabilities in the system.

CO3: Determine software vulnerabilities and security solutions to reduce the risk of exploitation.

CO4: Assess Security risk management policies in order to adequately protect critical information and assets.

CO5: Describe the appropriate security technologies and policies to protect computers and digital information.

CO6: Demonstrate network security applications, IPSec, Firewall, IDS, Web Security, Email Security and Malicious software etc.,