# ST. FRANCIS COLLEGE
Koramangala
Affiliated to Bengaluru City University

# PG DEPARTMENT OF COMPUTER APPLICATIONS
# MCA

## PROGRAM OUTCOMES

**PO1 : Computational Knowledge:**

Gain computing and optimization knowledge using mathematics and computational models for solving real world problems

**PO2 : Problem Analysis:**
Identify and formulate the problem, conduct feasibility study and solve real world problems through analysis which aiming for optimal solutions

**PO3 : Design / Development of Solutions:**

Design and develop solutions for real world problems, which provides user satisfaction in multi-disciplinary sector

**PO4 : Conduct investigations of complex Computing problems:**
conduct literature survey through research papers, survey techniques to extract information to understand complex problems and to gain knowledge on that sector and find solutions by using relevant experimental setup

**PO5 : Use of Modern Tool**

Develop or select, and apply relevant algorithms/techniques, resources, using modern IT tools to solve complex computing problems

**PO6 : Professional Ethics**
Understand professional ethics, cyber ACT/ regulations and responsibilities with societal concern

**PO7 : Life-long Learning**
Engage in lifelong learning experience to gain and improve knowledge and competency as a computing professional

**PO8 : Project management and finance**

Demonstrate knowledge and understanding of software engineering and management principles and manage projects efficiently as a leader considering economical parameters

**PO9 : Communication Efficacy**

Communicate effectively with the computing community and with society effectively by writing technical documentations, giving presentations and discuss instructions

**PO10: Societal and Environmental Concern**

Understand responsibilities and consequences based on societal, environmental based national or international issues relevant to computing techniques

**PO11: Individual and Team Work:**

Work effectively as an individual, as a member or leader in software development teams in multidisciplinary sectors

**PO12: Innovation and Entrepreneurship**
Identify an opportunity for innovation and entrepreneurship for the society at large

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## I SEM MCA

### 1MCA1 : THE ART OF PROGRAMMING

CO 1. Design algorithms for solving basic computational problems.
CO 2. Understand the basic programming constructs used in C programming language.
CO 3. Implement factoring methods and array operations in C programming language.
CO 4. Implement various sorting and searching techniques in C programming language.
CO 5. Implement text operations in C programming language.

### 1MCA2 : DISCRETE MATHEMATICS

CO 1. Ability to understand and apply the fundamental principles, concepts and methods of sets, relation & function, proposition, logical connectives & their various properties in key areas of Computer Applications and multidisciplinary fields.
CO 2. Ability to analyze real-time problems using various tools and techniques of counting, permutation & combination.
CO 3. Ability to explain the concept of probability and design and develop solutions to meet the desired needs.
CO 4. Ability to provide sustainable and innovative solutions for real-time problems using the concept of graphs, trees & its applications.
CO 5. Ability to engage in continuous reflective learning in the context of technological advancement.

### 1MCA3: COMPUTER ORGANIZATION & ARCHITECTURE

CO 1. Understand the basic concept of Computer organization & Architecture
CO 2. Design and explain the working of small computer components
CO 3. Apply and choose the best hardware model for best result
CO 4. Analyze the working of computer hardware components and conclude it

## 1MCA4: THEORY OF COMPUTATION

CO 1. Analyse and design finite automata, DFA,NFA.
CO 2. Recognise and Understand Regular Expression and its conversion to DFA and Normal form of context free Grammar.
CO 3. Explain and design model of computation including formal language, grammars and their connections and PDA
CO 4. State and explain Turing machine, undecidability problems.

## 1MCA5: OBJECT ORIENTED PROGRAMMING

CO 1. Understand the fundamental concepts of object oriented programming, appreciate the advantages of using Java, and learn the basic programming constructs of Java.
CO 2. Understand and implement OOPS concepts like inheritance, polymorphism, abstraction and interfaces.
CO 3. Appreciate the significance of packages, utilize arrays and strings, and create robust programs using exception handling in java.
CO 4. Appreciate the significance of multithreading and implement the same through classic problems like reader-writers problem, producer-consumer problem.
CO 5. Use java applets and streams and create programs for storing/retrieving data from Output and input streams.

## 1MCA6: DATA STRUCTURES

CO 1. Understand data structures, hashing techniques, mathematical and asymptotic notations.
CO 2. Understand the need of algorithms, problem-solving techniques and the need for optimization of algorithms.
CO 3. Analyse various problem-solving approaches for searching, sorting and optimization problems using different algorithm techniques in linear data structures.
CO 4. Solve different traversal algorithms for non-linear data structures.
CO 5. Calculate and compare efficiency of algorithms using different problem-solving techniques.

## 1MCA7: DATA STRUCTURES LAB

CO 1. Understand different types of error and corrections on it
CO 2. Implement problem-solving approaches for searching, sorting, evaluating and optimization problems using different algorithm techniques in linear data structures.

CO 3. Apply different traversal algorithms for non-linear data structures.
CO 4. Evaluate different operations by applying different data

**1MCA8: OBJECT ORIENTED LAB**

CO 1. Implement the object oriented concepts like encapsulation, polymorphism and inheritance through Java programs
CO 2. Develop reusable components using the concepts of inheritance, interfaces, and packages.
CO 3. Implement error-free, efficient and robust Java programs using exception handling features.
CO 4. Appreciate and apply the concepts of Multithreading in Java.
CO 5. Store and retrieve data on external storage media using Java streams.

## II SEM MCA

**2MCA1 : OPERATING SYSTEMS**

CO1. Understand the working of OS components

CO2.Design the program segments for different OS related concepts

CO3. Apply relevant algorithms on working of different OS components

CO4 Analyse and evaluate different algorithms used in OS components

**2MCA2 : DATABASE MANAGEMENT SYSTEMS**

CO1. Understand fundamentals of DBMS, DBMS architecture and concepts.

CO2. Understand and design Entity-Relationship diagrams and understand the theoretical concepts of record storage and primary file organisation.

CO3 .Appreciate the relational model concepts, functional dependencies, and normalization.

CO4. Understand and use SQL DDL, DML and DCL language

CO5 .Understand transaction processing concepts and concurrency control techniques.

## 2MCA3: COMPUTER NETWORKS

CO1. Understand the computer networking basics and networking terminologies.

CO2. Discuss the key technological components of the Network.

CO3. Appreciate the functionality of the components of computer networks, various protocols, modern technologies and their applications.

CO4. Recognize the technological trends of Computer Networking.

## 2MCA4: SOFTWARE ENGINEERING

CO 1. Understand the concepts of Agile Software Engineering and its principles used in software design and development.
CO 2. Learn time management and quality assurance principles for agile software projects.
CO 3. Understand the planning process used in agile software development.
CO 4. Learn the change introduction process for transition into agile methodology.

## 2MCA5: THE DESIGN AND ANALYSIS OF ALGORITHMS

CO 1. Achieve more comprehensive understanding of problem-solving techniques using algorithm.
CO 2. Analyse the asymptotic performance of algorithms.
CO 3. Synthesize algorithms using Brute force, decrease and conquer, divide-and-conquer paradigm and solve using recurrences
CO 4. Compare and synthesize algorithms using dynamic-programming and greedy paradigms.
CO 5. Understand the limitations of combinatorial problems and to find approximate solutions using backtracking and branch and bound methods.

## 2MCA6: ARTIFICIAL INTELLIGENCE

CO 1. Understand fundamentals of artificial intelligence (AI) and appreciate the relevance of heuristic search techniques in AI.
CO 2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
CO 3. Understand plan generation systems and insights into computer vision and robotics

CO 4. Discuss the principles of ANN and appreciate the significance of NLP techniques
CO 5. Obtain insights of the elements and working of Expert Systems through case studies

### 2MCA7: DATABASE MANAGEMENTS SYSTEMS LAB

CO 1. Understand and use the SQL DDL commands like Create and Alter. Understand the significance of table constraints and use them.
CO 2. Understand and execute DML commands like insert, delete and update
CO 3. Understand and use different types of queries including simple, queries, queries with aggregate conditions and joins
CO 4. Appreciate the relevance of sub-queries, correlated sub-queries and self-join and apply them
CO 5. Appreciate the relevance of views, create views and use the views

### 2MCA8: UNIX PROGRAMMING LAB

CO 1. Understand the architecture and features of UNIX Operating System
CO 2. Demonstrate UNIX commands for file handling and process control
CO 3. Create regular expressions for pattern matching and filtering
CO 4. Demonstrate operating system concepts like shared memory, file locking, inter process communication.

## III SEM MCA

### 3MCA1 : RESEARCH METHODOLGY

CO 1. Demonstrate the ability to choose methods appropriate to research aims and objectives.

CO 2. Develop skills in qualitative and quantitative data analysis and presentation.

CO 3. Develop advanced critical thinking skills.

CO 4. Understand the limitations of particular research methods

## 3MCA2 : SOFTCORE: QUANTITATIVE TECHNIQUES & RESEARCH APTITUDE

CO 6. To enhance problem-solving skills to improve basic mathematical skills and to help students to solve problems easily.

CO 7. To understand the importance of tables, and graphs in solving real-world problems.

CO 8. To understand the various aspects of teaching,learning, and research.

CO 9. To get an insight into the governance, policy, and administration of the higher education system in India

## ELECTIVE: CLOUD COMPUTING

CO 1. Recognize cloud computing its working, types of cloud, goals, challenges, their service models.

CO 2. Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.

CO 3. Recognize the different types of cloud programming models, programming support of various cloud service providers.

CO 4. Realize cloud security tools, infrastructure security, different types of cloud architecture.

## ELECTIVE: WEB PROGRAMMING

CO 5. Illustrate the Semantic Structure of HTML and CSS.

CO 6. Develops appropriate client-side scripting programs using Java Script.

CO 7. Derive and apply markup languages for processing, identifying, and presenting information in web pages.

CO 8. Apply scripting languages and web services to transfer data and add interactive components to web pages using DOM and AJAX.

## ELECTIVE: BIG DATA & ANALYTICS

CO 1. Understand the fundamental concepts of Big Data and get insights and relevance of Big Data Analysis.

CO 2. Understand the Preprocessing techniques and evaluate the need of Preprocessing of data and apply the relevant techniques.

CO 3. Obtain insights about Machine learning algorithms and understand the working of Classification algorithms, clustering algorithms and text,web and spatial mining.

CO 4. Understand the Hadoop ecosystem, the HDFS architecture and working of Mapreduce.

CO 5. Work on HIVE, HBASE, PIGLATIN and work practically on Analytics with R

## OPEN ELECTIVE: CYBERSPACE

CO 1. Conversant With The Social And Intellectual Property Issues Emerging From Cyberspace.

CO 2. Explore The Legal And Policy Developments In Various Countries To Regulate Cyberspace

CO 3. Develop The Understanding Of Relationship Between Commerce And Cyberspace

## PROJECT

CO 1. Explore the feasibility of developing a Software System and prepare the System Requirement Specification (SRS) document.

CO 2. Design the modules/components of a system and prepare the System Design Document(SDD)

CO 3. Develop code for individual modules/components and perform Unit testing.

CO 4. Perform Integration and Performance Testing, implement the system and prepare the relevant documents.

# IV SEM MCA

## PROJECT

CO 1. Explore the feasibility of developing a Software System and prepare the System Requirement Specification (SRS) document.
CO 2. Design the modules/components of a system and prepare the System Design Document(SDD)
CO 3. Develop code for individual modules/components and perform black-box testing and white-box testing for individual programs/modules
CO 4. Perform Integration and Performance Testing, implement the system and prepare the relevant documents pertaining to deployment and system usage.

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