Programme Specific Outcomes (PSO) and Course Outcomes (CO)

Department Name : PG Department of Computer Applications

Programme Name : MCA

Programme Specific Outcomes (PSO)

PSO1: Ability to incorporate standard practices and technological advancements in software development life cycle

PSO2: Expertise in providing optimized algorithmic solutions

PSO3: Expertise in recent technologies like SMAC(Social , Mobile, Analytics, Cloud), Machine Learning and IOT

PSO4: Demonstrate skills in ideation, innovation and commercialization of IT products and services

Course Outcomes (CO)

Course Code	Course Name	Course Outcomes
PMC1801	Mathematical Foundations of Computer Science	CO1: Apply Mathematical thinking, Mathematical proofs, and algorithmic thinking, and be able to apply them in problem solving. CO2: Explain the concept of Sets, Relations and Functions and their properties. CO3: Describe logical arguments and logical constructs. CO4: Describe basic properties of graphs and related discrete structures, and be able to relate these to practical examples. CO5: Describe the use of graphs as models and learn to apply graphs and trees in Computer Science
	Digital Systems and Logic Design	CO1: Describe the various structure of various number systems and

PMC1802		its application in digital design CO2: Develop the appropriate truth table from a description of a combinational logic function. CO3: Implement combinational logic function described by a truth table using and/or/inv gates, muxes or ROMs, and analyze its timing behavior. CO4: Describe the operation and timing constraints for latches and registers. CO5: Design memory organization that uses banks for different word size operations.
PMC1803	Computer Organization and Architecture	CO1: Understand the basic structure of computer. CO2: Familiarize the instructions in central processing unit of a computer. CO3: Understand memory organization in a computer. CO4: Understand input/output mechanisms. CO5: Understand parallel processing in a computer.
PMC1804	Structured Programming with C	CO1: Basic knowledge of computing fundamentals CO2: Able to develop algorithms for given problems CO3: Ability to develop simple C programs CO4: Ability to develop C programs that uses arrays, functions, structures and unions CO5: Ability to develop basic C programs that uses pointers and files
PMC1805	Principles of Management and Accounting	CO1: Describe core concept management and its functions CO2: Describe historical development of management theories CO3: Describe the human resource management concepts CO4: Describe core concepts of Marketing Management CO5: Demonstrate the basic accounting skills and develop financial statements
PMC1806	Programming Lab in C	CO1: Develop C programs for manipulation of numbers CO2: Develop C programs for manipulating strings CO3: Develop C programs for summation of sine, cosine and

		exponential series CO4: Develop C programs for manipulating multidimensional arrays CO5: Develop C programs for manipulating structures
PMC1807	Mini Project – I	CO1: Understand the basics of programming CO2: Able to interpret real world problems into software solutions in C CO3: Able to identify the workflow of a project CO4: Present the project work in front of an audience.
PMC1808	Communication Skill Enhancement Training	CO1: Recognize the importance of gaining effective communication skills. CO2: Practice effectively use the theoretical and practical aspects of effective listening. CO3: Perform and demonstrate effective communication in English, with enhanced presentation skills. CO4: Utilize non-verbal communication strategies.
PMC1809	Object Oriented Programming with C++	CO1: Compare OOPS with other programming techniques CO2: Implement C++ programs with constructors and destructors CO3: Develop OOP involving polymorphism using operator overloading and method overloading CO4: Implement programs with code reusability using inheritance CO5: Develop Programs with file handling and templates
PMC1810	Probability and Statistics	CO1: Calculate measures of central tendency, dispersion and moments. CO2: Understand regression and correlation analysis. CO3: Recall the basics of probability theory. CO4: Understand mathematical expectations. CO5: Discuss the different probability distributions. CO6: Acquire knowledge on sampling and Theory of estimation. CO7: Discuss the different sampling distributions. CO8: Perform hypotheses testing
PMC1811	Microprocessors and Embedded Systems	CO1: Describe the architecture of 8086 CO2: Develop simple program using 8086 CO3: Describe the basic peripheral devices and its applications CO4: Differentiate various microprocessor architectures CO5: Describe concepts of embedded systems like IO, timers, interrupts, interaction with peripheral devices
PMC1812	Operating Systems	CO1: Learn operating system structures and processor management.

		CO2: Familiarize inter process synchronization in operating systems. CO3: Familiarize concepts of memory management including virtual memory. CO4: Master concepts file system implementation and disk management. CO5: Familiarize with Linux, its commands and utilities.
PMC1813	Paper Presentation Practice	CO1: Identify and summarize a topic pertaining to recent advancements in Computer Science CO2: Prepare a report based on the formatting guidelines CO3: Present the topic before an audience with the help of multi-media slides
PMC1814	Programming Lab in C++	CO1: Implement Classes and Objects. CO2: Implement Constructors and Destructors with array of Objects. CO3:Implement Passing and returning parameters as objects by reference. CO4: Demonstrate Function Overloading; overload different operators – incr and decr operators with post and pre forms; CO5: Demonstrate friend functions and friend classes. Implement String manipulation functions. CO6: Implement different types of inheritances like Multiple, Multilevel and Hybrid. CO7: Demonstrate the use of Virtual Functions
PMC1815	HTML and CSS	CO1: Identify the concepts of the World Wide Web CO2: Distinguish and practice markup languages CO3: Practice CSS CO4: Distinguish and practice on client side Internet Programming CO5: Identify the concepts of JavaScript
PMC1816	Mini Project – II	CO1: Analyze a real life problem and prepare a questionnaire CO2: Conduct a survey CO3: Analyze results using Statistical methods and draw conclusions CO4: Write report in specific format

PMC1817	Programming in Java	CO1: Describe the features of Java CO2: Design classes with object-oriented features CO3: Describe advanced features of Java like exception handling, multi-threading etc. CO4: Write programs in JAVA featuring its core capabilities
PMC1818	Database Management Systems	CO1: List the different issues involved in the design and implementation of a database system. CO2: Give a Study report on the physical and logical database designs, database modeling, relational model. CO3: Use data manipulation language to query, update, and manage a database CO4: Understand and database normalization concepts and design a normalized database CO5: Develop an understanding of essential DBMS concepts such as: database security, integrity, CO6: Concurrency, distributed database, Client/Server (Database Server).
PMC1819	Software Engineering	CO1: Understand different software process models. CO2: Identify software requirements engineering activities. CO3: Develop the skills necessary for software design. CO4: Assimilate the knowledge of different software testing strategies. CO5: Enumerate different software estimation and project scheduling techniques.
PMC1820	Introduction to Data Science	CO1: Able to explain basic data mining concepts CO2: Expertise in Excel and Tableau for data analysis and validation CO3: Generate frequent itemsets using association rules and classify items using classification rules CO4: Summarize the different clustering techniques CO5: Experiment Hadoop, Apache Spark, Scala, R and Python
PMC1821	Networking and System Administration	CO1: Manage user accounts and files in Linux . CO2: Practice basic backup and restore file system. CO3: Describe basic network architecture and protocols.

		CO4: Describe Single-tier and Multi-tier Server architectures and configurations. CO5: Describe General purpose cloud infrastructures and various design principles.
PMC1822	Entrepreneurship and Innovation	CO1: Describe the concept of Entrepreneurship CO2: Identify and develop Entrepreneurship talents. CO3: Identify Innovation and generate innovative business ideas in IT CO4: Recognize Digital Marketing techniques CO5: Demonstrate Presentation Skills. CO6: Demonstrate effective communication Skills with special preference to Business communication
PMC1823	Internet of Things and Hardware	CO1: Identify various hardware components and assemble a PC. CO2: Design and develop IoT based prototypes.
PMC1824	Programming Lab in Java	CO1: Solve simple problems using the fundamental syntax and semantics of Java CO2: Analyze and design Java programs using object-oriented principles CO3: Develop simple GUI interfaces with event handling capabilities CO4: Develop and debug java programs using an IDE
PMC1825	Mini Project – III	CO1: Analyze the problem and formulate a solution CO2: Illustrate UML diagram for the problem CO3: Design database with normalization for the problem CO4: Reproduce the code based on the problem CO5: Write report in specific format
PMC1826	Domain Expertise Workshop	CO1: Develop an intensive educational experience in a short period of time CO2: Create hands-on skills CO3: Develop better understanding about the recent domains in the IT industry
PMC1827	Programming in Python	CO1: Read, write, and execute simple Python programs. C02: Write simple Python programs for solving problems.

		CO3: Decompose a Python program into functions, lists etc. CO4: Read and write data from/to files in Python Programs CO5: Underline the use of package
PMC1828	Internet Technology and Data Communication	CO1: Understand the basic concept of Data communication. CO2: Familiarize with LAN connecting devices and Network Layer. CO3: Learn different Network Layer Protocols. CO4: Understand the concept of Domain Name System (DNS). CO5: Master the concepts of Multimedia.
PMC1829	Data Structure and Analysis of Algorithms	CO1: Learn to analyze worst-case running times of algorithms using asymptotic analysis. Understand operations and applications of Stack and Queue. CO2: Be able to analyze and use some fundamental data structures such as Binary search trees. Understand the concept of linked list. CO3: Explain the major algorithms for sorting and searching. CO4: Describe and synthesize the divide and conquer paradigm, dynamic programming paradigm and greedy paradigm. CO5: Understand the concept of backtracking, deterministic and non-deterministic algorithms.
PMC1830(A)	Big Data Analytics	CO1: Describe various analytical platforms and basic technical terms CO2: Compare and evaluate different statistical models CO3: Evaluate various streaming technique for real time application. CO4: Describe various mining models for frequent itemset CO5: Compare and evaluate various clustering methods
PMC1830(B)	Storage and Data Centre Management	CO1: Identify different types of storage. CO2: Learn how to set Access Control Lists (ACL) and disk quotas for users and groups. CO3: Learn to use a Ceph storage cluster to provide servers and cloud resources. CO4: Understand data center designing and types of servers. CO5: Able to understand the concept of hosting a web server.
PMC1831	Presentation and Communication	CO1: Qualify to take part in GDs and Debates, ensuring effective presentation skills.

	Skills	CO2: Perform at par with industry standards in Group Discussions. CO3: Build a sense of positive approach towards life. Self confidence level of students are also enhanced in an exceptional way.
PMC1832	Digital and Social Media Marketing	CO1: Use various concepts of Digital Marketing including design tools including Photoshop to design posters and images optimized for web. CO2: Integrate SEO concepts into social media marketing. CO3: Perform facebook accounts management along with page and FB group management effectively. CO4: Experiment and propose 'keyword research' strategies for optimized search engine visibility of pages.. CO5: Design a PPC advertising strategy with special emphasis to managing and enabling google ads on websites.
PMC1833	Programming Lab in Python	CO1: Practice the Python programming language from its scratch: its syntax, idioms, patterns and styles CO2: Illustrate the essentials of the Python library, and learn how to learn about other parts of the library when you need them CO3: Demonstrate simple python programming using DatabasesCO4: Recognize the IDE Jupyter
PMC1834	Mini Project - IV and Project Presentation	CO1: Practical application of theoretical knowledge gained in order to develop real time software applications. CO2: To analyse the industrial line of work and corporate work culture. CO3: Deep understanding regarding a particular domain or software platform CO4: Exploring challenging work areas in their area of interest. CO5: To illustrate the presentation skills of an individual by project presentation.
PMC1835	Social Initiatives	CO1: Experiment socially responsibility CO2: Develop a corporative nature CO3: Organize to active in global communities
PMC1836	Artificial Intelligence	CO1: Define an AI problem and find a solution for it. CO2: Represent Knowledge using various knowledge representation schemes. CO3: Understand Artificial Neural Networks and its applications

		CO4: Understand the basic knowledge acquisition methods. CO5: Apply OpenCV in computer Vision
PMC1837	Computer Graphics	CO1: Describe the core concepts of computer graphics CO2: Demonstrate the 2D transformation concepts CO3: Demonstrate the 3D transformation concepts CO4: Describe the 3D object representation using primitives structures, curve structures etc CO5: Explain the various illumination models
PMC1838	Operations Research	CO1: Understand how to translate a real-world problem, given in words, into a Mathematical formulation. CO2: Demonstrate the ability to optimize with tools from Linear Programming, Probability, Statistics, Simulation, Game Theory, Queuing Theory etc. in contexts involving uncertainty and scarce or expensive resources. CO3: Formulate and solve Mathematical models (Linear programming problems) by applying the concept of Simplex method and its extensions. CO4: Identify the resources required for a project and generate a plan and work schedule. CO5: Learn to apply project management tools like CPM/PERT that ensures successful completion of projects.
PMC1839(A)	Machine Learning	CO1: Design and develop a basic machine learning system. CO2: Implement a perceptron learning algorithm in Python. CO3: Predict classification or regression outcomes, with scikit-learn models in Python. CO4: Solve Non-linear problems using SVM. CO5: Apply machine learning algorithms to solve problems of moderate complexity.
PMC1839(B)	Cloud Computing	CO1: Elaborating the basic concepts of cloud computing and defining the basic terms CO2: Understanding the various cloud implementations and migration techniques

		CO3: To define the various industrial applications of cloud virtualization. CO4: In depth learning of security challenges and preventive measures in cloud computing CO5: Practical implementation of cloud computing and live case studies.
PMC1839(C)	Mobile Application Development	CO1: Describe the general features and architecture of android operating system CO2: Demonstrate the features of Android Studio CO3: Analyse the anatomy of a basic android application CO4: Develop and debug simple applications using basic GUI layouts and controls
PMC1840(A)	Data Analytics with R	CO1: Configure R environment for development of application CO2: Develop functional application in using r scripting CO3: Develop application which process CSV,XML,JSON,XML etc CO4: Develop application with visualisation - bar Chart, line graph, box plot , Histogram and Scatter Plots CO5: Apply basic statistical operation using R.
PMC1840(B)	Network and Information Security	CO1: Evaluate the security treats in modern computer era CO2: Define and identify firewall and network filtering CO3: List and recognize various VPN CO4: Identify different technique of sandboxing CO5: Distinguish various ethical hacking and testing procedures
PMC1840(C)	Web Programming using PHP	CO1: Understand basics of internet CO2: Develop simple websites using html, JavaScript and CSS. CO3: Read , write and execute PHP programs CO4: Develop PHP programs using database CO5: Develop simple PHP applications using Codeignitor frame works
PMC1841	Mini Project – V	CO1: Practical application of theoretical knowledge gained in order to develop real time software applications. CO2: To explore the industrial line of work and corporate work culture.

		CO3: Deep understanding regarding a particular domain or software platform CO4: To explore challenging work areas in their area of interest. C05: Enhancing the presentation skills of an individual by project presentation.
PMC1842	Domain Expertise Workshop	CO1: Develop an intensive educational experience in a short period of time CO2: Create hands-on skills CO3: Develop better understanding about the recent domains in the IT industry
PMC1843	Internship	CO1: Apply latest techniques and tools prevailing in software industry CO2: Perform under pressurizing situations CO3: Enhance their business and personal communication skills CO4: Describe roles and responsibilities of individuals in an organization CO5: Describe the functioning of a business organization
PMC1844	Innovative Initiatives	CO1: Integrate the technological and industrial knowledge into the curriculum. CO2: Understand the roles of skill, experience, motivation and culture in creative endeavor. CO3: Understand why and how innovation is important. CO4: Recognize the benefits which innovation can confer on an innovating organization. CO5: Reflect on experiences of creativity and innovation at work.
PMC1845	Familiarizing Open Source Software	CO1: Defining the architecture and implementation of open source based Learning Management Systems. CO2: Installing and administrating the cloud based content management system and hence develop the expertise in cloud hosting, migration etc. C03: Gaining knowledge about installation customization and access control of open source software through Library Management Systems.

		CO4: Identifying backup and recovery strategies by learning the working of repository structure.
PMC1846	Competency Enhancement Training	CO1: Understand, analyze and solve various mathematical problems and thereby improve their problem solving skills. CO2: Understand verbal and non-verbal reasoning problem solving skills. CO3: Improve technical aptitude on C, C++, Data structures, etc. CO4: Understand how to develop entrepreneurship skills.
PMC1847	Domain Expertise Workshop	CO1: Gather and document (SRS) the requirement of use case. CO2: Model the application using UML CO3: Design the data store layout CO4: Implement solution using suitable tools and technologies CO5: Validate and verify the solution
PMC1848	Main Project	CO1: Able to implement software engineering process models. CO2: Able to gather and document the requirement of real world. CO3: Able to design architecture of the application CO4: Able to develop the data store layout CO5: Able to implement solution using programming language
PMC1849	Viva Voce	CO1: Assess themselves regarding knowledge gained during programme. CO2: Face a prospective technical interview