DEPARTMENT OF MCA

Attainment of Programme outcome, Programme Specific outcome with Course outcome

HOD   **DIRECTOR**   **IQAC**   **PRINCIPAL**

PROGRAM OUTCOME:

I. Apply the knowledge of mathematics and computer fundamentals to various real life applications for any given requirements.
II. Design and develop applications to analyze and solve all computer science related problems.
III. Integrate and apply efficiently the contemporary IT Tools to all computer application.

PROGRAM SPECIFIC OUTCOMES:

I. Design, develop and implement inter-disciplinary application software projects to meet the demands of industry requirements using modern tools and technologies.
II. Analyze the societal needs to provide novel solution through technological based research.

COURSE OUTCOMES:

I. Design and develop platform independent applications using a variety of component based frameworks

II. To apply the concepts of BPR, SCM and CRM. To demonstrate knowledge of SAP and Oracle Apps.

III. Make basic use of Enterprise software, and its role in integrating business functions

IV. Analyze the strategic options for ERP identification and adoption.

V. Design the ERP implementation strategies.

VI. Create reengineered business processes for successful ERP implementation.

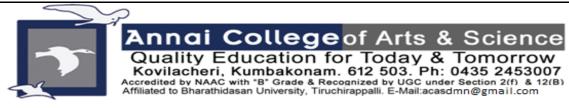VII. Students will understand how to apply combinatorial ideas to practical problems.

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Semester	Course Title and Course Code	Course Outcomes
I	Programming in C++ P16MCA1	Demonstrate an understanding of algorithms in the problem-solving process. Identify the necessary properties of good problem-solving techniques. Create and analyze algorithms for solving simple problems. Use incremental program development to create, test, and debug algorithms for solving simple problems.
	Operating Systems P16MCA2	The student will be able to Understand the fundamental concepts of an Operating systems; Design and solve synchronization, deadlock problems; understand and analyse theory concepts of Memory Management; ability to analyse the structure and basic architectural components involved in file System; acquire knowledge about protection and security mechanisms in Operating system
	Computer Organization & Architecture P16MCA3	To understand the structure, function and characteristics of computer systems. To understand the design of the various functional units and components of computers. To identify the elements of modern instructions sets and their impact on processor design.
	Data Structures and Algorithms P16MCA4	Understand the fundamentals of Data Structures and basic concepts of String Processing, Linear Arrays. Analyze the representation of Linked Lists in memory, Stack, Queues and implement real time applications in Stack and Queues. Explore the structure of Trees, basic operations of Trees, analyze and illustrate the algorithms. Analyze the various algorithm designs and implementations. Develop solutions using advanced algorithms for various kinds of problems.
	OOAD & UML P16MCA5	Recognize the concepts and principles of object oriented programming concepts. Understand the purposes, major components and key mechanisms of Class and Object Diagram. Describe the basic resource management responsibilities of Interaction Diagram. Knowledge on State-chart Diagram. Applying the techniques for Component and Deployment Diagrams.
	C++ Programming Lab P16MCA6P	C++ Programming assignments based on class, inheritance, abstraction, encapsulation, dynamic binding, polymorphism, I/O systems, exception handling should be covered DS using C++ assignments should be based on Stacks, Queue, Linked List and mainly it should cover Tree , Binary Threaded Tree & Graph programs
	Shell Programming Lab P16MCA7P	Identify and use UNIX/Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.

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II	Programming in Java P16MCA8	The students will be able to work efficiently in the following areas. Object Oriented Programming, Packages, Interfaces and write simple Applets in Java, design User Interfaces using SWING Components and able to handle errors in programs, develop Threaded applications and perform Data Access using JDBC and develop distributed applications using RMI, Servlets and Cookies.
	Database Systems P16MCA9	Excellent understanding of basic concepts of database systems and fundamental relational algebraic operations. Explain, Apply SQL queries, Create ER model for any database applications. Explain the normalization techniques, compare the file organization techniques; compare Indexing & Hashing techniques and Discuss the concepts of Transaction and Concurrency control.
	Software Engineering P16MCA10	Students would have acquired knowledge in various software development models, Capable of extracting and analyzing software requirements specifications for different projects; Develop skills in basic architecture/design and apply standard coding practices; Ability to define the basic concepts and importance of software project management concepts like cost estimation, scheduling and reviewing progress; Identify and implement of the software metrics; Apply different testing and debugging techniques and analyzing their effectiveness; Critically analyse and provide; recommendations to improve the operations of the development of the project; Demonstrate the need for appropriate decision making, control and performance evaluation of a project.
	Computer Graphics P16MCA11	computer graphics, including viewing, projection, perspective, modelling and transformation in two and three dimensions. apply the concepts of colour models, lighting and shading models, textures, ray tracing, hidden surface elimination, anti-aliasing, and rendering.
	e-Commerce P16MCAE1	Analyze the impact of E-commerce on business models and strategy. Describe the major types of E-commerce. Explain the process that should be followed in building an E-commerce presence. Identify the key security threats in the E-commerce environment. Describe how procurement and supply chains relate to B2B E-commerce.
	Software Project Management P16MCAE2	The students would have become familiar with the basic concepts of SPM, project evaluation, planning, monitoring and controlling a software project, team management and ISO standards.
	Pervasive Computing P16MCAE3	Upon Completion of the course, the students will be able to Be able to theoretically analyse the Pervasive Computing system. Model the networks using graph theory. Utilise the system and network resources using various optimization techniques.
	Java Programming Lab P16MCA12P	The learners would have had training in solving real world problems using OOP techniques; design GUI based applications using SWING; to develop Applets and Servlets for distributed web applications, to perform Database Operations using JDBC, to design and Develop a Java Application for real time environment.
	Database Systems Lab P16MCA13P	On completion of the course the student will be able to create tables with all possible integrity constraints; write complex SQL queries; generate reports by using SQL plus commands; use cursors, functions, procedures, packages and triggers in the back end; design and Develop forms to interact with the database

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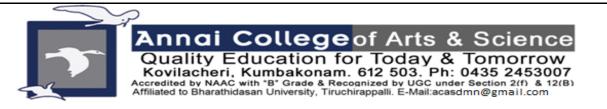|		
	Distributed Technologies P16MCA14	Identify advance concepts of java programming with database connectivity. Design and develop platform independent applications using a variety of component based frame works Able to implement the concepts of Hibernate, XML& EJB for building enterprise applications.
	Accounting and Financial Management P16MCA15	Know and apply accounting and finance theory Explain and apply international accounting standards Critically evaluate financial statement information Evaluate and compare different investments Define bookkeeping and accounting Explain the general purposes and functions of accounting Explain the differences between management and financial accounting Describe the main elements of financial accounting information – assets, liabilities, revenue and expenses Identify the main financial statements and their purposes.
	Discrete Mathematics P16MCA16	Write an argument using logical notation and determine if the argument is or is not valid. Demonstrate the ability to write and evaluate a proof or outline the basic structure of and give examples of each proof technique described. Understand the basic principles of sets and operations in sets. Prove basic set equalities. Apply counting principles to determine probabilities. Demonstrate an understanding of relations and functions and be able to determine their properties.
III	Enterprise Resource Planning P16MCA17	Examine systematically the planning mechanisms in an enterprise, and identify all components in an ERP system and the relationships among the components; To describe the Generic Model of ERP and General ERP Implementation Methodology. To apply the concepts of BPR, SCM and CRM. To demonstrate knowledge of SAP and Oracle Apps. Make basic use of Enterprise software, and its role in integrating business functions Analyze the strategic options for ERP identification and adoption. Design the ERP implementation strategies. Create reengineered business processes for successful ERP implementation.
	Artificial Intelligence P16MCAE4	The learners would have become familiar with the following concepts; AI and ML; simple linear regression, multiple regression, logistic regression, Bayesian networks and Genetic algorithms.
	Computer Simulation and Modelling P16MCAE5	After successful completion of the course the students would be able to create a relevant model for a multitude of problems from science, by extracting the necessary and relevant information regarding the problem
	Mobile Communication P16MCAE6	• To make students familiar with various generations of mobile communications • To understand the concept of cellular communication • To understand the basics of wireless communication • Knowledge of GSM mobile communication standard, its architecture, logical channels, advantages and limitations. • Knowledge of IS-95 CDMA mobile communication standard, its architecture, logical channels, advantages and limitations. • Knowledge of 3G mobile standards and their comparison with 2G technologies. • To under multicarrier communication systems. • To differentiate various Wireless LANs.
	Distributed Technologies Lab P16MCA18P	The learners would have had training in solving real world problems using OOP techniques; design GUI based applications using SWING; to develop Applets and Servlets for distributed web applications, to perform Database Operations using JDBC, to design and Develop a Java Application for real time environment.
	Accounting and Financial Management Lab P16MCA19P	Enter the accounting transactions in computerized format and find the financial result concern. Acquire the skill of financial decision making in a systemized manner. Interpret the financial statements as well as evaluation of stock at the end

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IV	Web Technologies P16MCA20	Analyze a web page and identify its elements and attributes. Create web pages using XHTML and Cascading Style Sheets. Build dynamic web pages using JavaScript (Client side programming). Create XML documents and Schemas.
	Data Mining & Warehousing P16MCA21	The candidate will get knowledge of: - Data preprocessing and data quality. - Modeling and design of data warehouses. - Algorithms for data mining. Skills: - Be able to design data warehouses.
	Organizational Dynamics P16MCA22	• Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization. • Demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization. • Analyze the complexities associated with management of the group behavior in the organization. • Demonstrate how the organizational behavior can integrate in understanding the motivation (why) behind behavior of people in the organization.
	Probability & Statistics P16MCA23	Apply key concepts of probability, including discrete and continuous random variables, probability distributions, conditioning, independence, expectations, and variances. Define and explain the different statistical distributions (e.g., Normal, Binomial, Poisson) and the typical phenomena that each distribution often describes. Apply the basic rules and theorems in probability including Bayes's theorem and the Central Limit Theorem (CLT). Define and demonstrate the concepts of estimation and properties of estimators. Apply the concepts of interval estimation and confidence intervals. Apply the concepts of hypothesis testing and p-value. Apply the method of least squares to estimate the parameters in a regression model.
	Web Technologies Lab P16MCA24P	Analyze a web page and identify its elements and attributes. Create web pages using XHTML and Cascading Style Sheets. Build dynamic web pages using JavaScript (Client side programming). Create XML documents and Schemas.
	Data Mining Lab P16MCA25P	The data mining process and important issues around data cleaning, pre-processing and integration. The principle algorithms and techniques used in data mining, such as clustering, association mining, classification and prediction.
	Parallel Processing P16MCAE7	optimize sequential code for fastest possible execution. analyze sequential programs and determine if they are worthwhile to parallelize. develop, analyze, and implement algorithms for parallel computers. This applies both to computers with shared memory and with distributed memory.
	Cloud Computing P16MCAE8	• Articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing • Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc. Explain the core issues of cloud computing such as security, privacy, and interoperability. • Choose the appropriate technologies, algorithms, and approaches for the related issues. • Identify problems, and explain, analyze, and evaluate various cloud computing solutions. • Provide the appropriate cloud computing solutions and recommendations according to the applications used. Attempt to generate new ideas and innovations in cloud computing. • Collaboratively research and write a research paper, and present the research online. • Effectively communicate course work in writing and oral presentation
	Soft Computing P16MCAE9	understanding of the basic areas of Soft Computing including Artificial Neural Networks, Fuzzy Logic and Genetic Algorithms. Provide the mathematical background for carrying out the optimization associated with neural network learning.
	Managerial Skills P16MCAEMS	Managerial skills encompass several key areas including leadership, direction, coordinating, oversight, planning and organization. Within these key areas, managerial skills combine hard and soft skills that professionals in management roles must have to succeed in their careers

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V	Computer Networks P16MCA26	• Describe the functions of each layer in OSI and TCP/IP model. Explain the functions of Application layer and Presentation layer paradigms and Protocols. Describe the Session layer design issues and Transport layer services. Classify the routing protocols and analyze how to assign the IP addresses for the given network. Describe the functions of data link layer and explain the protocols. Explain the types of transmission media with real time applications
	Smart Devices Programming P16MCA27	Demonstrate their understanding of the fundamentals of Android operating systems demonstrate their skills of using Android software development tools demonstrate their ability to develop software with reasonable complexity on mobile platform demonstrate their ability to deploy software to mobile devices demonstrate their ability to debug programs running on mobile devices By the end of the course, student will be able to write simple GUI applications, use built-in widgets and components, work with the database to store data locally, and much more.
	Optimization Techniques P16MCA28	Ability to apply the theory of optimization methods and algorithms to develop and for solving various types of optimization problems. Ability to go in research by applying optimization techniques in problems of Engineering and Technology.
	Smart Devices Programming Lab P16MCA29P	The students would have familiarised themselves in the usage and application development of small applications as listed above.
	Open Source Lab P16MCA30P	At the end of the module students have acquired basics and advanced knowledge in working with Open Source projects and contributing to them. The students have understood how to start their own Open Source projects and select a proper License. Furthermore, the students have understood which tools like static analysis, continuous integration and linter they could use to validate their contribution before creating an actual pull request.
	Big Data Analytics P16MCAE10	Identify Big Data and its Business Implications. List the components of Hadoop and Hadoop Eco-System Access and Process Data on Distributed File System Manage Job Execution in Hadoop Environment Develop Big Data Solutions using Hadoop Eco System Analyze Infosphere BigInsights Big Data Recommendations.
	Network Security P16MCAE11	Provide security of the data over the network. Do research in the emerging areas of cryptography and network security. Implement various networking protocols. Protect any network from the threats in the world.
	Digital Image Processing P16MCAE12	Review the fundamental concepts of a digital image processing system. Analyze images in the frequency domain using various transforms. Evaluate the techniques for image enhancement and image restoration. Categorize various compression techniques. Interpret Image compression standards. Interpret image segmentation and representation techniques.
	Compiler Design P16MCAE13	The students would be familiar with the various phases of a compiler; know the various parsing techniques; know the code optimization techniques; know the structure and various phases of compiler; able to implement lexical analyser; know the basic parsing techniques; develop skills in generating intermediate code.
	Human Computer Interaction P16MCAE14	• Knowledge and understanding: explain why it is important to design interactive products that are usable define key terms used in interaction design explain key theories used in the design of interactive products explain the importance of iteration, evaluation and prototyping in interaction design
	Medical Informatics P16MCAE15	Demonstrate knowledge of the terminology and paradigms used in different areas of medical informatics for representing and interpreting data, by being able to apply them to sample data-intensive medical problems. Demonstrate understanding of different representations of biomedical data. Demonstrate knowledge of the basic techniques for interpreting and processing biomedical data, by being able to demonstrate how these techniques work for synthetic data sets.
VI	Major Project P16MCAPW	To provide the hands on experience in analyzing, designing and implementing various projects, students are assigned major projects based on the languages they have learned so far. Based on the project work a project report should be prepared under the guidance of faculty and submitted to department for evaluation.

DEPARTMENT OF MCA

Mapping of Programme Outcome with Course Outcome

Programme outcomes	Programming in Java (CO1)	Database Systems (CO2)	Data Structures and Algorithms (CO3)	Mathematical Foundations (CO4)	Accounting and Financial Management (CO5)	Operating Systems (CO6)	Distributed Technologies (CO7)	Programming in Python (CO8)	Programming Smart Devices (CO9)	Compiler Design (CO10)	Principles of Data Science (CO11)	Organisational Behaviour (CO12)	Internet of Things (CO13)
Disciplinary Knowledge (PO1)													
Communication skills (PO2)				✓				✓					
Critical Thinking (PO3)	✓	✓	✓			✓	✓		✓	✓		✓	✓
Analytical Thinking (PO4)	✓	✓	✓				✓		✓		✓		✓
Problem Solving (PO5)	✓	✓	✓				✓		✓		✓	✓	✓
Research Relatedskills (PO6)				✓	✓	✓	✓	✓		✓	✓	✓	
Information Literacy (PO7)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
Digital Literacy (PO8)	✓			✓	✓	✓	✓	✓		✓	✓	✓	
Self- directed Learning (PO9)	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓
Lifelong Learning (PO10)		✓		✓	✓	✓		✓		✓	✓	✓	
Professional Skills (PO11)	✓					✓						✓	
Applicational skills (PO12)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Experimental learning (PO13)	✓			✓	✓	✓		✓			✓	✓	
Employability options (PO14)	✓	✓				✓				✓		✓	

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