JAMAL MOHAMED COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI - 620 020
P.G. & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

Course Learning Outcomes (CLO) (2018-2019)

B.Sc. (Computer Science)

Programme Outcomes :

On completion of the B.Sc. Computer Science Programme the students are able to :

- Serve as the programmers or the software engineers with the sound knowledge of practical and theoretical concepts for developing software.
- Serve as the computer Engineers with enhanced knowledge of computers and its building blocks.
- Work as the Hardware Designers/Engineers with the knowledge of Networking concepts.
- Work as the System Engineers and System integrators serve as the System Administrators with thorough knowledge of DBMS.
- To give Technical support for the various systems.
- Work as the support Engineers and the Technical writers work as consultant and management officers for system management.
- Work as IT sales and marketing person.
- Serve as the IT officers in Banks and cooperative societies.
- Work as DTP operator in small-scale industries.
- Serve as the web designers with latest web development technologies.

SEM	COURSE CODE	COURSE	COURSE TITLE	Course Learning Outcomes (CLO)
SEMESTER - I				
I	17UCS1C1	Core - I	Programming in C	After completion of the course the student should able to: 1. Understand the fundamentals of C programming 2. Select the suitable loops and decision making statements to solve problems 3. Know the concepts of arrays and string handling functions 4. Understand functions, structures and unions 5. Use the concepts of Pointers and Files
	17UCS1C2P	Core - II	C Programming Lab	After completion of the course the student should able to: 1. Understand the usage of variables, constants, operators in programs 2. Develop programs for manipulating decision making and looping constructs 3. Perform operations on functions, arrays and structures 4. Apply pointers for developing simple programs 5. Handle file for real time application
	17UMA1A1	Allied - I	Calculus	After completion of the course the student should able to: 1. Understand the differentiation, integration and trigonometric functions for improving their problem solving ability 2. Solve the complex problems using successive differentiation 3. Understand the properties of definite integrals 4. Derive the partial differential equations by elimination of arbitrary constants and arbitrary functions
	17UMA1A2	Allied - II	Numerical Methods	After completion of the course the student should able to: 1. Understand the algebraic equations and solve this using bisection method, False Position Method and Newton's methods 2. Find an exact solution of algebraic equations using Gauss Elimination and Gauss Jordan methods. 3. Understand the basic concepts of numerical integration and solve the relevant problems using Simpson and Trapezoidal rules 4. Understand how to solve ordinary differential equations using numerical methods such as Runge-kutta's and Euler's methods 5. Analyze and evaluate the accuracy of common numerical methods.

SEMESTER – II				
II	17UCS2C3	Core - III	Object Oriented Programming with C++	After completion of the course the student should able to: 1. Understand the basic concepts of OOP 2. Acquire the knowledge about data types, operators, expressions and control structures 3. Know the basics of Functions, Overloading, Class and Objects 4. Apply the concept of Constructors, Destructors and Overloading Operators 5. Understand Inheritance, Pointers and Virtual Functions 6. Use Console I/O operations, Stream Classes and Files
	17UCS2C4P	Core - IV	C++ Programming Lab	After completion of the course the student should able to: 1. Understand how to write and use simple programs using functions and inline functions 2. Use classes and objects for implementing banking applications 3. Develop programs using the concept of overloading, friend functions, arrays of objects and constructors 4. Apply the concept of unary and binary operator Overloading 5. Familiar with the concept related pointers, inheritance and file
	17UMA2A3	Allied - III	Operation Research	After completion of the course the student should able to: 1. Identify the need of Operations Research in problem solving 2. Understand the advantages and limitations of OR 3. Use the knowledge of operations research to solve problems like linear programming problem (LPP), transportation problem, assignment, and sequencing problems. 4. Understand different application areas of operations research .
	17UMA2A4	Allied - IV	Statistics	After completion of the course the student should able to: 1. Understand the basic elements of mathematical statistics. 2. Acquire a concise and clear description of a statistical problems. 3. Understand the need of various statistical formulae for problem solving 4. Apply the mean, median, mode, correlation and regression for analysis.
SEMESTER – III				
III	17UCS3C5	Core - V	Database Management Systems	After completion of the course the student should able to: 1. Understand the features of database management systems and Relational database. 2. Design conceptual models of a database using ER modeling for real life applications and also construct queries in Relational Algebra. 3. Understand the storage techniques and indexing mechanism 4. Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database. 5. Retrieve any type of information from a data base by formulating complex queries in SQL. 6. Use the SQL in Procedural Language for simple applications.
	17UCS3C6P	Core - VI	RDBMS Lab	After completion of the course the student should able to: 1. Understand the DDL commands, Primary key and Candidate keys 2. Apply the various DML commands for retrieval of information 3. Perform all the Table join operations 4. Develop simple applications using PL/SQL procedure.
	17UPH3A5	Allied - V	Electricity and Magnetism	After completion of the course the student should able to: 1. Understand the static characteristics of electric charges and electromagnetic effect 2.Understand the AC circuits and magnetic properties of materials 3. Understand the laws of electromagnetic induction .

	17UPH3A6P	**Allied - VI**	**Applied Physics Practicals – I**	After completion of the course the student should able to: 1. Understand the LCR series and characteristics of Zener diodes. 2. Implement Op-amp as Adder and Subtractor 3. Understand the wave shaping circuits 4. Find the figure of merit using Table calvanometer
	17UCS3N1	**Non Major Elective - I**	**Internet Basics**	After completion of the course the student should able to: 1. Understand the fundamental concepts of Internet 2. Understand the services of Internet 3. Design the colorful web pages using HTML tags 4. Understand the functions of search engines 5. Develop the networking skills and use the internet based applications
SEMESTER – IV				
IV	**17UCS4C7**	**Core - VII**	**Data Structures and Algorithms**	After completion of the course the student should able to: 1. Understand the basic concepts of data structures and Select appropriate data structures as applied to Specified problem definition. 2. Implement operations like searching, insertion and deletion, traversing mechanism etc. on various data structures. 3.Iimplement Linear data structures like stack and queues. 4 Design advance data structure like trees and graphs. 5. Implement appropriate sorting/searching technique for Given problem 6.Determine and analyze the complexity of given Algorithms using sorting and searching methods
	17UCS4C8	**Core - VIII**	**Data Structures Lab**	After completion of the course the student should able to: 1. Manipulate various operations on arrays 2. Perform various sorting and searching techniques on set of given values 3. Understand the operations of Stack and Queue 4. Know about the basic concepts of Link-list.
	17UPH4A7	**Allied - VII**	**Electronics**	After completion of the course the student should able to: 1. learn about the characteristics of semiconductor devices under forward and reverse biasing 2. Understand the principle of laser 3. Understand the functions of op-amp 4. Understand the characteristics of FET, LED, LCD and 7-segment displays 5. Classify the different types of lasers
	17UPH4A8P	**Allied - VIII**	**Applied Physics Practicals – II**	After completion of the course the student should able to: 1. Understand the characteristics of Transistor 2. Demonstrate the calibration of Ammeter and potentiometer 3. Implement Op-amp as Integrator and differentiator 4. Construct Astable multivibrator 5. Design basic components using discrete component
	17UCS4N2	**Non Major Elective - II**	**Web Design**	After completion of the course the student should able to: 1. Understand fundamental concepts of Internet, Internet technologies 2. Differentiate the features of different browsers 3.Develop the colorful web pages using tags 4. Use bullets and alignment on texts 5. Understand the table handling tags, Frames and Frameset for designing web pages
SEMESTER – V				
	17UCS5C9	**Core - IX**	**Java Programming**	After completion of the course the student should able to: 1.Understand basic concepts of Object Oriented Programming and Java Programming Constructs like constants, variables, operators and control statements. 2.Understand the concepts of classes, objects, method overloading, inheritance, arrays , strings and vectors. 3. Understand the need for interfaces and how to achieve multiple inheritance in Java and the concepts of multi threading by using thread class and implementing Runnable interface. 4.Understand the concepts of errors and exceptions, keywords that are used to manage Exceptions and various stream classes like byte streams and character stream classes. 5. Understand the concept of applets by how to create and run applets and Graphics programming by various classes in the graphics class.

V	**17UCS5C10P1**	**Core – X(a)**	**Java Programming Lab**	After completion of the course the student should able to: 1. Understand the basic concepts such as function Overloading, array and string manipulation in Java 2. Use utility classes in the real time applications 3. Understand the types of inheritance 4. Implement packages, manipulate threads and exception handling techniques 5. Develop Applet programs and manipulate the IO streams
	17UCS5C10P2	**Core – X(b)**	**HTML Lab**	After completion of the course the student should able to: 1. Design the webpages using hyper links 2. Format the document in the web pages 3. Use Frames and Framesets in their web page design 4. Manipulate tables with rowspan and columspan 5. Design the colorful web pages according to their creativity
	17UCS5C11	**Core - XI**	**Computer Organization and Architecture**	After completion of the course the student should able to: 1.Perform number conversions from one number system to another 2.Understand the arithmetic operations with various number systems 3.Understand the usage of various binary codes. 4.Apply Boolean laws and theorems to simplify Boolean expressions 5.Implement Boolean expressions using gate networks 6.Understand the working of combinational circuits and sequential circuits 7.Understand the various micro-operations and the internal operation of a processor
	17UCS5C12	**Core - XII**	**Operating Systems**	After completion of the course the student should able to: 1. Understand the important computer system resources and the role of operating system in their management policies and algorithms. 2. Understand the process management policies and scheduling of processes by CPU 3. Evaluate the requirement for process synchronization and coordination handled by operating system 4. Analyze the memory management and its allocation policies. 5. Identify the storage management policies with respect to different storage management technologies.
	17UCS5M1A/ B	**Major Based Elective - I**	**Software Engineering**	After completion of the course the student should able to: 1. Understand the fundamental concepts of software model, design and testing 2. Distinguish the system engineering modeling approaches 3. Familiar with various software testing 4. Understand the software quality concept and metrics for software quality
	17UCS5S2A	**Skill Based Elective - II**	**VB .Net**	After completion of the course the student should able to: 1. Understand .NET framework and can realize some of the major enhancements in the new version of VB 2. Understand the basic structure of VB.Net and features of IDE 3. Develop programs using primitives and constructs in VB .NET 4. Handle controls in Forms(message Box, InputBox), Windows MDI forms and Controls (Textbox, Creating MultiLine,Word Wrap textboxes) 5.Understand various controls in VB.NET and able to develop programs using controls 6.Connect database by using ADO.NET and manipulate the database.
	17UCS5S3A P	**Skill Based Elective - III**	**VB .Net Lab**	After completion of the course the student should able to: 1. Understand the VB .NET environment and how to develop small programs 2. Develop menu based program for text manipulation 3. Understand ADO .NET and develop database applications 4. Develop the applications using DataGrid for displaying records

SEMESTER – VI				
VI	17UCS6C13	Core - XIII	Computer Graphics and Multimedia	After completion of the course the student should able to: 1. Understand the structure of modern computer graphics systems 2. Understand the basic principles of implementing computer graphics primitives 3. Familiarity with key algorithms for modelling and rendering graphical data (line drawing algorithm, circle drawing algorithm…) 4. Develop design and problem solving skills with application to computer graphics 5. Gain experience in constructing interactive computer \ graphics programs using OpenGL4. 6. Define the fundamentals of animation, virtual reality and their related technologies. 7. To understand a typical graphics pipeline 8. To design an application with the principles of virtual reality
	17UCS6C14	Core - XIV	Computer Networks	After completion of the course the student should able to: 1. Understand the functions of each layer in OSI and TCP/IP model. 2. Understand the various types of transmission media and their purposes 3. Describe the functions of data link layer and explain the protocols. 4. Classify the routing protocols and analyze how to assign the IP addresses for the given network 5. Understand the purpose of Transport layer protocols 6. Know the functions of Application layer and Presentation layer paradigms and Protocols.
	17UCS6C15	Core - XV	Microprocessor Fundamentals	After completion of the course the student should able to: 1. Understand the basics of microprocessors. 2. Distinguish between the various types of computer architectures. 3. Understand the internal operation of Intel 8085 microprocessor. 4. Classify the various instructions and their usage. 5. Develop simple assembly language programs. 6. Understand the concept of interfacing memory and I/O devices with a microprocessor. 7. Understand the working of Programmable Peripheral Interface and its use in interfacing 7-segment displays.
	17UCS6C16	Core – XVI (a)	Digital and Microprocessor Lab	After completion of the course the student should able to: 1. Understand the functions of Basic Logic Gates and Universal Gates 2. Perform Half Adder, Full Adder, Half Subtractor and Full subtractor functions using Gates 3. Understand the K-Map Reduction of Boolean expression 4. Perform practical hands-on experience with Gates and MSI devices for 4-bit addition 5.Understand 8085 microprocessor kit, knowledge of 8085 instruction set and ability to utilize it in basic ALP of Addition, subtraction multiplication and division. 6.Understand real mode Memory addressing and ability to perform sum of series, Block data transfer, finding biggest and smallest number in an array and sorting numbers
		Core – XVI (b)	Multimedia Lab	After completion of the course the student should able to: 1. Handle different file formats, changing the resolution, RGB color to gray-scale image and multicolor images 2. Design brochure and multilayer of images 3. Perform transformation and filtering on images 4. Perform some basic operations such as painting, strokes and grouping objects 5. Animate using shapes, tweening and actions
	17UCS6M2	Major Based Elective - II	Open Source Technology	After completion of the course the student should able to: 1. Understand the features of OSS over Commercial s/w 2. Develop simple shell programs using simple commands 3. Apply the DDL and DML commands for their simple Applications with MySQL as backend 4. Classify the usage of different operators and functions in PHP 5. Implement the web pages for manipulating files

	17UCS6M3P	**Major Based Elective - III**	**Mobile Application Development**	After completion of the course the student should able to: 1. Understand the installation of Android Development Kit 2. Design GUI for their simple applications 3. Perform multiscreen applications 4. Working with images and text files 5. Develop client server application using ServerSocket and Socket classes

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Course Learning Outcomes (CLO) (2018-2019)

MCA

Programme Outcomes :

On completion of the MCA Programme the students are able work as :

- Programmer or Software Engineer
- Computer Engineer
- Web Designer
- Hardware Designer/Engineer
- System Engineer
- Administration Technical Support
- Support Engineer
- Technical Writer
- Administration
- IT Officer
- IT Sales and Marketing
- Computer Scientist in Research and R&D laboratories
- System Analyst
- Logic Designer

SEM	COURSE CODE	COURSE	COURSE TITLE	Course Learning Outcomes (CLO)
SEMESTER - I				
I	**17MCA1C1**	**Core - I**	**Programming in C**	After completion of the course the student should able to: 1. Understand the significances of C programming 2. Understand the syntax of statements and basic concepts of programming 3. Classify and understand various decision making and looping statements 4. Develop the programming skills using various constructs in C 5. Build small software by applying concepts of C language.
	17MCA1C2	**Core - II**	**Mathematical Foundations**	After completion of the course the student should able to: 1. Understand the basic features of Mathematical foundations 2. Understand the concept of mathematical logic and theory of inference. 3. Understand the importance of sets, relations and functions in mathematical foundations 4. Understand the role and properties of lattices 5. Understand the concept of Graph theory using cutsets and cut vertices and various ways of representing graphs in matrix form
	17MCA1C3	**Core - III**	**Computer Organization and Architecture**	After completion of the course the student should able to: 1. Perform number conversions from one number system to another 2. Understand the usage of various binary codes. 3. Apply Boolean laws and theorems to simplify Boolean expressions 4. Implement Boolean expressions using gate networks 5. Demonstrate the construction and working of combinational circuits and sequential circuits 6. Identify and illustrate the basic working of a computer 7. Distinguish between CISC and RISC.

	17MCA1C4	**Core - IV**	**Computer Graphics**	After completion of the course the student should able to: 1. Understand the structure of modern computer graphics systems 2. Understand the basic principles of implementing computer graphics primitives 3. Familiarity with key algorithms for modelling and rendering graphical data (line drawing algorithm,circle drawing algorithm) 4. Develop design and problem solving skills with application to computer graphics 5. Gain experience in constructing interactive computer graphics programs using OpenGL
	17MCA1C5	**Core - V**	**Data Structures and Algorithms**	After completion of the course the student should able to: 1. Understand the basic concept of Stack and Queue with their applications 2. Understand the basic and advanced concepts of data structures likes AVL and B Tree. 3. Perform various sorting operations using Quick, Merge and Selection sort methods for real time applications 4. Implement the searching technique on various data records. 5. Apply the various algorithm design methods to solve problems
	17MCA1C6P	**Core - VI**	**C Programming Lab**	After completion of the course the student should able to: 1. Understand the usage of decision making statements and looping statements 2. Develop the programs by using C programming constructs 3. Differentiate the use of different looping constructs 4. Perform operations on functions, arrays and structures 5. Apply pointers for developing simple programs 6. Handle file for real time application
SEMESTER - II				
II	**17MCA2C8**	**Core VIII**	**Object Oriented Programming with C++**	After completion of the course the student should able to: 1. Understand the fundamentals and basic concepts of OOP 2. Acquire the knowledge of functions, class, objects, pointers and references 3. Define and use the constructor function overloading and various operator overloading 4. Apply the concepts of Inheritance, Virtual Base Class and Formatted I/O Functions 5. Understand and Implement advanced features of C++ including manipulators, virtual functions, polymorphism, files, templates and exception handling
	17MCA2C9	**Core IX**	**Numerical and Statistical Methods**	After completion of the course the student should able to: 1. understand the concept of errors and solving non-linear and transcendental equations using bisection method, False Position Method, Newton's methods and method of successive approximation 2. Find an approximate solution of algebraic equations using 3. Gauss Elimination and Gauss Seidel methods. 4. Understand the basic concepts of interpolation using Newton's and Lagranges methods, 5. Understand how to solve integration problem using numerical methods 6. Understand how to solve ordinary differential equations using numerical methods 7. Understand and apply the basic concepts of probability, random variables and probability distribution. 8. Apply basic statistical inference techniques, including confidence intervals, hypothesis testing and analysis of variance, to science/engineering problems. 9. Use statistical methodology in the engineering problem solving process. 10. Compute and interpret descriptive statistics using numerical and graphical techniques
	17MCA2C10	**Core X**	**Principles of Operating Systems**	After completion of the course the student should able to: 1. Understand the functions of Operating System 2. Classify the different types of OS 3. Understand the memory management policies, allocation and scheduling of processes 3. Evaluate the requirement for process synchronization and coordination handled by operating system 5. Understand the virtual memory and their policies 6. Understand the I/O management, File management and disk scheduling

	17MCA2C11	**Core XI**	**Database Systems**	After completion of the course the student should able to: 1. Master the data terminology, differentiate between database system and file system, levels of data abstraction and relationship between entities 2. Understand the data definition language and data Manipulatio Language 3. Retrieve any type of information from a data base by formulating complex queries in SQL. 4. Knowledge about normalization technique and its play in the database design process. 5. Know the basic transactions and their properties, locking protocols and recovers from crashes. 6. To understand the principles of distributed database systems, including design and architecture, query processing, transaction management, locking, recovery, and Replication
	17MCA2C12	**Core XII**	**Enterprise Resource Planning**	After completion of the course the student should able to: 1. Learn fundamental concepts of ERP system and ERP related technologies. 2. Provide students knowledge of different ERP modules and manufacturing perspectives of ERP. 3. Use ERP system in different business organizations by having knowledge of latest scenario of ERP market in e-business.
	17MCA2C13P	**Core XIII**	**Object Oriented Programming Lab**	After completion of the course the student should able to: 1. Use classes and objects, functions, friend functions and arrays of objects 2. Understand the constructors, destructors and overloading 3. Implement the concept of inheritance 4. Illustrate the use of virtual base class and manipulators 5. Write program related to file
	17MCA2C14P	**Core XIV**	**Shell Programming Lab**	After completion of the course the student should able to: 1. Apply the basic file manipulation commands 2. Develop the program for pattern matching 3. Understand merging files, sorting elements in the file 4. Prepare EB Bill, Student Mark list using simple commands
SEMESTER - III				
III	**17MCA3C15**	**Core XV**	**Programming in Java**	After completion of the course the student should able to: 1. Understand the basic concepts of OOP and various basic constructs for Java programming 2. Understand the concept of inheritance, packages, interfaces and the keywords that are used to manage exceptions 3.Know what is multi threading and implement multithreading using Thread class and Runnable interface 4. Understand various Collection classes and inerfces like Map, Set, Vector, LinkedList etc. 5. Understand the concept of stream classes like ByteStream and Character stream and also use these classes to implement network programming using TCP and UDP 6. To understand the concept of Applet and various GUI classes to develop GUI appliocations
	17MCA3C16	**Core XVI**	**Optimization Techniques**	After completion of the course the student should able to: 1. Know the features and applications of Operations Research 2. Formulate and solve the LPP by graphical and simplex methods 3. Apply the MODI method for solving transportation problems 4. Apply the Hungarian method for solving assignment problems 5. Develop a network diagram and solve the project scheduling problems using CPM and PERT 6. Understand the benefits of inventory control system and use the appropriate EOQ models 7. Apply the suitable queueing models for real life applications
	17MCA3C17	**Core XVII**	**Computer Networks**	After completion of the course the student should able to: 1. Master the terminology and concepts of OSI and TCP/IP reference model 2. Understand reliable data transfer by transmitting frames with the necessary synchronization, error control and flow control. 3. Use IP addressing and apply routing algorithms to find shortest paths for network-layer packet delivery 4. Understand the transport protocols TCP and UDP and analyse network activity and its applications. 5. Understand the applications protocols and use of network security services to the users.

	17MCA3C18	**Core XVIII**	**Accounting and Financial Management**	After completion of the course the student should able to: 1. Understand accounting principles and concepts 2. Understand the Journal, Ledger and prepare Trial Balance 3. Classify the methods and techniques of Cost accounting 4. Understand the managerial costing and Decision making 5. Differentiate the type of Budgeting and understand the budgetary control
	17MCA3CE1A	**Core Based Elective – I #**	**Multimedia Systems and Design**	After completion of the course the student should able to: 1. Understand about various latest interactive multimedia devices, the basic concepts about images and image formats. 2. Understand the data compression techniques, image compression techniques like JPEG, video compression techniques like MPEG, and the basic concepts about animation. 3. Develop an interactive multimedia presentation by using multimedia devices and identify theoretical and practical aspects in designing multimedia applications surrounding the emergence of multimedia technology
	17MCA3C19P	**Core XIX**	**Java Programming Lab**	After completion of the course the student should able to: 1. Develop Java applications for manipulation of arrays 2. Understand and define Class and objects 3. Develop applications using Packages, interfaces and exception handling mechanism 4. Understand multithreading and apply it on real time Problems 5. Develop applications using Files, Swing and Applets
	17MCA3C20P	**Core XX**	**RDBMS Lab**	After completion of the course the student should able to: 1. Understand and apply DDL commands on database 2. Perform opearations on table using DML commands 3. Perfrom operations such as ordering, string manipualtion, set operation and aggregate functions on tables 4. Understand the neted queries, views and Join operations 5. Develop PL/SQL procedure for payroll and student marksheet preparation
	17MCA4S2	**Skill Based Course – II**	**Quantitative Aptitude**	After completion of the course the student should able to: 1. Solve the basic numerical and trigonometrical problems 2. Develop their problem solving skills in accounting domain 3. Understand the problems related to the banking, Share market and real-time applications. 4. Develop the problem solving skills in probability, permutation and combination 5. Understand the problems on different graphs and solve them in short-cut ways
SEMESTER - IV				
IV	**17MCA4C21**	**Core XXI**	**.Net Technology**	After completion of the course the student should able to: 1. Understand the concepts of .NET Frame work 2. Understand the decision making statements and user interfacing controls 3. Understand the concept of class, constructor and access modifiers 4. Realize the exception handling mechanism 5. Develop the applications using VB.NET and ASP.NET
	17MCA4C22	**Core XXII**	**Computer Simulation and Modeling**	After completion of the course the student should able to: 1. Understand the concept of simulation, real-time application of simulation in various areas, types of system models and steps in simulation study 2. Understand various simulation software like Java, GPSS,SSF and Experimental and Statistical Analysis Tools 3. Understand various statistical models used in simulation, Poisson process and characteristics of queuing systems 4.Understand the need for random numbers and random variates in discrete event system simulation, method of generating random numbers and uniformity and independence tests for random numbers 5. Understand the data collection methods used in simulation and verification and validation of simulation models

	17MCA4C23	**Core XXIII**	**Microprocessors, interfacing and Applications**	After completion of the course the student should able to: 1. Understand the internal operation of Intel 8086 and 8088 microprocessors. 2. Understand the memory segmentation of Intel 8086 microprocessor. 3. Distinguish between minimum and maximum modes of operation. 4. Classify and understand the various instructions and their usage. 5. Develop simple assembly language programs. 6. Understand the architecture and operation of various programmable interfacing devices. 7. Apply programming knowledge to develop simple real time applications using a microprocessor.
	17MCA4C24	**Core XXIV**	**Artificial Intelligence and Expert Systems**	After completion of the course the student should able to: 1. Solve the problems using AI Techniques 2. Apply AI Techniques in Game playing 3. Understand the use of predicate logic in knowledge representation 4. Represent the knowledge with certainty , uncertainty and various logics 5. Understand the architectural components of Expert System and its development process 6. Understand the non-formal knowledge representation
	17MCA4CE2 A/B/C	**Core Based Elective– II #**	**Software Engineering**	After completion of the course the student should able to: 1. Study a body of knowledge relating to Software Engineering, Software reengineering, and maintenance; 2. Understand the principles of large scale software systems, and the processes that are used to build them; 3. Have skills in the most widely used approach to software construction – object orientation (OO), including OO requirement specifications, analysis, design, programming, testing and maintenance; 4. Use tools and techniques for producing application software solutions 5. Acquire and develop many valuable skills such as the ability to use computer aided software 6. Engineering tools to analyze, evaluate, select and synthesize information sources for the purpose of developing a software system; 7. Develop an appreciation of the cost, quality, and management issues involved in software construction; 8. Develop an awareness of the role and responsibilities of the professional software engineer;
	17MCA4C25P	**Core XXV**	**Web Technology Lab**	After completion of the course the student should able to: 1. Write programs for simple web based applications using JavaScript Code 2. Add the products that are selected from a web page using PHP program 3. Develop programs for creating database and perform various operations in a table using PHP programs 4. Upload a file to the server and create directory and read the contents using PHP programs 5. Change the extension of a file and find the details of user session using shell programs
	17MCA4C26P	**Core XXVI**	**.Net Lab**	After completion of the course the student should able to: 1. Handle the various controls for user interfacing 2. Validate the field elements using validator control 3. Make database connection using proper controls 4. View the data in grid view control 5. Develop applications using VB.NET and ASP .NET
SEMESTER – V				
	17MCA5C27	**Core - XXVII**	**Distributed Technology**	After completion of the course the student should able to: 1. Recognize the architecture of various distributed technologies 2. Understand the software components of distributed programming 3. Develop simple client-server applications using java technologies 4. Differentiate the web entities from enterprise components 5. Distinguish between intra-process and inter-process software components 6. Develop the enterprise applications using EJBs.

V	**17MCA5C28**	**Core - XXVIII**	**Principles of Compiler Design**	After completion of the course the student should able to: 1. Use the knowledge of patterns, tokens & regular expressions for solving a problem in the field. 2. Design & conduct experiments for Intermediate Code Generation in compiler. 3. Learn the new code optimization techniques to improve the performance of a program in terms of speed & space. 5.
	17MCA5C29	**Core -XXIX**	**Organizational Dynamics**	After completion of the course the student should able to: 1. Understand the ob, basic approaches, various models of OB, managing communication. 2. Know about social system, motivation and rewards system, appraisal system 3. Understand nature of leadership, employee attitudes and their effects 4. Acquire knowledge about rights, quality work life, discipline 5. Handle conflict in organization, power and politics 6. Understand Formal and informal organization, teams and team building 7. Know that how to manage changes and its effects, stress and counseling
	17MCA5CE3A	**Core Based Elective– III #**	**Principles of E-Commerce**	After completion of the course the student should able to: 1. Acquire the knowledge in Electronic Commerce 2. Understand the Electronic Payment systems 3. Realize the Security systems 4. understand the Advertising and Marketing on the internet 5. Know the digital copy rights
	17MCA5CE4A	**Core Based Elective– IV#**	**Parallel Processing**	After completion of the course the student should able to: 1. Understand the Parallel Computer Architecture 2. Understand pipelining 3. Understand Array processing 4. Understand Multiprocessing 5. Understand the intercommunication networks on array processing and multiprocessing system
	17MCA5C30P	**Core XXX**	**Distributed Technology Lab**	After completion of the course the student should able to: 1. Understand the distributed computing systems 2. Develop chatting programs using TCP and UDP model 3. Design and develop distributed programs using RMI 4. Understand the use Servlets and JSP technologies 5. Understand the session tracking techniques 6. Develop the stateful and stateless real-time enterprise components
SEMESTER - VI				
VI	**17MCA6PW**	**Industrial Experience and Project Work**		After completion of the course the student should able to: 1. Understand the software development process, models and software engineering principles and develop an ability to apply them to software design of real life problems. 2. Plan, analyze, design and implement a software project using programming languages like Java, ASP, PHP etc. 3. Gain the confidence at working major project with their team 4. Get the skill exposure in the corporate environment

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P.G. & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

Course Learning Outcomes (CLO) (2018-2019)

M.Phil. Computer Science

Programme Outcomes :

On completion of the M.Phil. Computer Science Programme the students are able work as :

- Lecturer in educational institution
- Trainer in the corporate
- a researcher to perform Ph.D.

SEM	COURSE CODE	COURSE	COURSE TITLE	Course Learning Outcomes (CLO)
SEMESTER - I				
I	17MPCS1C1	CORE I	Research Methodology	After completion of the course the student should able to: 1. Understand the objectives of the research 2. Distinguish the different types of research 3. Acquire basic concepts on sampling theory and reliability which are required for research 4. Understand the literature survey and how to publish the Publications 5. Realize the thesis writing procedures 6. Apply the research tools for solving their problems
	17MPCS1C2	CORE II	Advanced Concepts in Computer Science	After completion of the course the student should able to: 1. Design the algorithm for their proposed research work 2. Apply the searching and sorting techniques in their research work 3. Understand the combinational and Sequential circuits 4. Understand the parallel processing applications and Pipelining 5. Apply the genetic algorithm in their problem domain 6. Understand the interactive I/O devices characteristic 7. Understands design rules of Interaction devices 8. Apply the evaluation techniques with expert analysis
	17MPCS1C3E	CORE III	Digital Image Processing	After completion of the course the student should able to: 1. Understand the different phases of Image Processing 2. Realize the working principle of Digital Camera 3. Classify the various color models and their significances 4. Understand the histogram equalization, spatial filtering and segmentation algorithms 5. Understand the mathematical foundations for digital image representation, image acquisition, image transformation, and image enhancement 6. Understand the various compression techniques and their standards
	17MPCS1C3C	CORE III	Data Mining	After completion of the course the student should able to: 1. Understand the fundamental concepts that provide the foundation of data mining. 2. Mining the Frequency pattern, Cluster analysis, and data streams. 3. Distinguish the various classification and prediction Techniques 4. Understand the various Association rules and apply them in their research areas
SEMESTER - II				
II	17MPCS2PW	Project Work	Dissertation	During the course the Project work the research scholars should able to: 1. survey on various methods in their research domain 2. Understand the merits and demerit of earlier approaches 3. Identify the problem from the series survey 4. Present their papers in the conference and attend the Workshop to sharpening their knowledge 5. Publish the survey or review or work papers in the peer reviewed Journals

JAMAL MOHAMED COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI - 620 020
P.G. DEPARTMENT OF INFORMATION TECHNOLOGY

BACHELOR OF COMPUTER APPLICATIONS	
PROGRAMME OUTCOMES	The Program enables the student to: ✓ Understand the fundamental concepts of Computers, Business environment and IT Applications in Business ✓ Successfully understand & analyze technical data to reach actionable conclusions, including technological solutions to the business. ✓ Learn technologies & IT languages, so the business problems could be addressed. ✓ Develop competent technical writing skills so as to enable the graduate to communicate business ideas to senior management and general public. ✓ To identify and sharpen their IT/ programming skills.
PROGRAMME SPECIFIC OUTCOMES	Our graduates will have ✓ The necessary technical, scientific as well as basic managerial and financial procedures to analyze and solve real world problems within their work domain ✓ Clarity on both conceptual and application oriented skills in commerce, Finance & Accounting and IT Applications in Business context. ✓ Improved communication and business management skills, especially in providing tech support. ✓ Awareness on ethics, values, sustainability and creativity aspects. the ability and the mindset to continuously update and innovate.

Course Learning Outcomes (CLO) (2018-2019)

B.C.A

SEM	COURSE CODE	COURSE	COURSE TITLE	Course Learning Outcomes (CLO)
SEMESTER - I				
I	17U1LT1 17U1LA1 17U1LF1 17U1LH1 17U1LU1	Language -I	----	On successful completion of this course the students are able to know about traditions and literature written in the language as well as social, cultural, theoretical, and historical contexts.
	17UCA1C1	**Core - I**	HTML Fundamentals	On successful completion of this course the students are able to understand the fundamentals of web design and how to program using HTML and DHTML.
	17UCA1C2P	**Core - II**	HTML Lab	On successful completion of this course the students are able to write the programs using HTML and CSS.
	17UCA1A1	**Allied - I**	Numerical and Statistical Methods	On successful completion of this course the students are able to get knowledge on algebraic equations solved by Numerical Methods as well as basic concepts of probability and statistics embedded in the subject.
	17UCA1A2	**Allied - II**	Entrepreneurship Development	On successful completion of this course the students are able to think outside the box and nurture unconventional skills as well as instill confidence and stimulate the economy.

SEMESTER – II				
II	17U2LT2 17U2LA2 17U2LF2 17U2LH2 17U2LU2	Language - II	----	On successful completion of this course the students are able to know about traditions and literature written in the language as well as social, cultural, theoretical, and historical contexts.
	17UCA2C3	**Core - III**	Programming in C	On successful completion of this course the students have the programming ability in C Language.
	17UCA2C4P	**Core - IV**	C Programming Lab	On successful completion of this course the students are able to develop programs using C.
	17UCA2A3	**Allied - III**	Operations Research	On successful completion of this course the students are able to get knowledge on maximize the profit and minimize the cost in every place.
	17UCA2A4	**Allied - IV**	PC Administration	On successful completion of this course the students are able to acquire the knowledge of basic computer system, Primary memory, Secondary memory and administration of PC.
SEMESTER - III				
III	17U3LT3 17U3LA3 17U3LF3 17U3LH3 17U3LU3	Language - III	----	On successful completion of this course the students are able to know about traditions and literature written in the language as well as social, cultural, theoretical, and historical contexts.
	17UCA3C5	**Core – V**	Data Structures	On successful completion of this course the students should have programming ability on data structures dealing with Stacks, Queues, List, Searching and Sorting algorithms etc.,
	17UCA3C6	**Core - VI**	Multimedia and its Applications	On successful completion of this course the students are able to understand various concepts of multimedia and its applications.
	17UCA3A5	**Allied - V**	Programming in C++	On successful completion of this course the students are able to acquire knowledge on Object-oriented programming concepts using C++.
	17UCA3A6P	**Allied - VI**	C++Programming Lab	On successful completion of this course the students are able to write programs using OOPS in C++.
	17UCA3N1	**Non Major Elective - I**	Office Automation	On successful completion of this course the students are able to understand the basic concepts of MS-Word, MS-Excel, MS-PowerPoint and MS-Access.
	17UCN3S1	**Skill Based Elective - I**	Soft Skills Development	On successful completion of this course the students are able to acquire teamwork and collaboration, decision-making, problem-solving, time management and critical thinking skills which may also help improve their employment perspectives.
SEMESTER - IV				
IV	17U4LT4 17U4LA4 17U4LF4 17U4LH4 17U4LU4	Language - IV	----	On successful completion of this course the students are able to know about traditions and literature written in the language as well as social, cultural, theoretical, and historical contexts.
	17UCA4C7	**Core– VII**	Java Programming	On successful completion of this course the students are able to acquire knowledge of Programming logic concepts, which enables the students to create wide range of Applications and Applets using Java by understanding and fundamentals of object oriented programming in Java, including defining classes, invoking methods, using class libraries, etc..
	17UCA4C8P	**Core– VIII**	Java Programming Lab	On successful completion of this course the students are able to develop programs using Java with OOPS and APPLET.
	17UCA4A7	**Allied– VII**	Principles of Accountancy	On successful completion of this course the students are able to acquire basic knowledge of the financial accounting including double entry book keeping, preparation of journal, subsidiary book, ledger, trial balance and balance sheet.
	17UCA4A8P	**Allied–VIII**	Accounting Package Lab	On successful completion of this course the students are able to create the ledger and prepare the Trail balance, Balance sheet, Profit and Loss statement, Bank reconciliation statement.
	17UCA4N2	**Non Major Elective - II**	Principles of Programming	On successful completion of this course the students are able to understand the basics of programming and acquire the programming skills in C.

SEMESTER - V				
V	17UCA5C9	**Core – IX**	VB .Net	On successful completion of this course the students are able to understand .NET Framework and VB.NET fundamentals.
	17UCA5C10	**Core – X**	Scripting Languages	On successful completion of this course the students are able to understand the basic concepts of Scripting Languages and to give the knowledge on designing interactive web pages using DHTML, VBScript, JavaScript, JSP and ASP technologies.
	17UCA5C11T	**Core – XI A**	General Aptitude	On successful completion of this course the students are able to learn and master the basic techniques of arithmetic operations.
	17UCA5C11P	**Core – XI B**	Scripting Languages Lab	On successful completion of this course the students are able to develop the scripting programs using HTML, VBScript, JavaScript.
	17UCA5C12P1	**Core – XII A**	VB .Net Lab	On successful completion of this course the students are able to develop programs in VB.NET using MS-Access.
	17UCA5C12P2	**Core – XII B**	RDBMS Lab	On successful completion of this course the students are able to write queries for DDL and DML and develop programs using PL/SQL procedure.
	17UCA5M1A	**Major Based Elective –I**	Database Management Systems	On successful completion of this course the students are able to understand the fundamental concepts of database systems and its architecture.
	17UCA5M1B		RDBMS	On successful completion of this course the students are able to understand the concepts of RDBMS.
	17UCA5S2A	**Skill Based Elective– II**	Shell Programming	On successful completion of this course the students should have a deep insight about Linux file systems, VI editor and C shell.
	17UCA5S2B		Ubuntu Basics	On successful completion of this course the students should have a deep insight about Ubuntu operating systems.
	17UCA5S3AP	**Skill Based Elective – III**	Shell Programming Lab	On successful completion of this course the students are able to write simple and complex shell scripts using C shell and Vi editor.
	17UCA5S3BP		Ubuntu Lab	On successful completion of this course the students are able to work in the Ubuntu environment and write a simple shell script using bash shell.
	17UCA5EC1	**Extra Credit – I**	Java Servlets	On successful completion of this course the students are able to understand the basic concepts of Java Servlet.
SEMESTER - VI				
VI	17UCA6C13	**Core– XIII**	Data Communications and Networking	On successful completion of this course the students are able to learn the concepts of data communications, functions of OSI layers and the security aspects in networks.
	17UCA6C14	**Core– XIV**	Operating Systems	On Successful completion of this course the students are able to get sufficient knowledge on various system Resources.
	17UCA6C15	**Core – XV**	Software Engineering	On successful completion of this course the students are able to know the requirements of developing software and aware of various models required for software development.
	17UCA6C16P	**Core –XVI**	Software Development Lab	On successful completion of this course the students are able to design the website using HTML, CSS and JavaScript. On successful completion of this course the students are able to develop the real time applications using java and MySQL.
	17UCA6M2 A	**Major Based Elective –II**	PHP Programming	On successful completion of this course the students are able to understand the basic concepts of PHP and MySQL.
	17UCA6M2 B		C# and .NET Programming	On successful completion of this course the students are able to understand the basic concepts of C# and .NET Programming.
	17UCA6M3 AP	**Major Based Elective – III**	PHP Programming Lab	On successful completion of this course the students are able to develop the programs using PHP and MySQL.
	17UCA6M3 BP		C# and .Net Programming Lab	On successful completion of this course the students are able to develop the C# programs using Microsoft Visual Studio.
	17UCA6EC2	**Extra Credit – II**	Open Source Computing	On successful completion of this course the students are able to acquire skills in various open source technologies such as Linux, MySQL, PHP and AJAX.

BACHELOR OF SCIENCE OF INFORMATION TECHNOLOGY	
PROGRAMME OUTCOMES	The Program enables the student to: ✓ Computing Skills and Ethics: Utilize modern and advanced technological tools for performing problem solving, analysis and synthesis by identifying various computer technical solutions. ✓ Analyze a problem, and identify and define the Computing requirements appropriate to its solution. ✓ Follow professional software engineering practice by applying contextual knowledge to assess societal and legal issues. ✓ Lifelong Learning: Actively involved in social and professional service at local, national and global levels. ✓ Recognize the social and ethical responsibilities of a professional working in the discipline.
PROGRAMME SPECIFIC OUTCOMES	Our graduates will have ✓ The Programming skill and technical skill meets the requirements of the IT based industries. ✓ Follow professional software engineering practice by applying contextual knowledge to assess societal and legal issues. ✓ Acquire the learning skills in collecting, analyzing, evaluating the problems and applying it in the real time applications.

Course Learning Outcomes (CLO) (2018-2019)

B.Sc Information Technology

SEM	COURSE CODE	COURSE	COURSE TITLE	Course Learning Outcomes (CLO)
SEMESTER - I				
I	17U1LT1 17U1LA1 17U1LF1 17U1LH1 17U1LU1	Language -I	----	On successful completion of this course the students are able to know about traditions and literature written in the language as well as social, cultural, theoretical, and historical contexts.
	17UIT1C1	**Core - I**	Programming in C	On successful completion of this course the students have the programming ability in C Language.
	17UIT1C2P	**Core - II**	C Programming Lab	On successful completion of this course the students are able to develop programs using C.
	17UIT1A1	**Allied - I**	Mathematics for IT	On successful completion of this course the students are able to acquire knowledge on algebraic equations solved by Numerical Methods as well as basic concepts of probability and statistics embedded in the subject.
	17UIT1A2	**Allied - II**	Entrepreneurship Development	On successful completion of this course the students are able to think outside the box and nurture unconventional skills as well as instill confidence and stimulate the economy.
SEMESTER - II				
II	17U2LT2 17U2LA2 17U2LF2 17U2LH2 17U2LU2	Language - II	----	On successful completion of this course the students are able to know about traditions and literature written in the language as well as social, cultural, theoretical, and historical contexts.
	17UIT2C3	**Core - III**	Programming in C++	On successful completion of this course the students are able to understand Object-oriented programming concepts using C++.
	17UIT2C4P	**Core - IV**	C++ Programming Lab	On successful completion of this course the students are able to write the programs using OOPS in C++.
	17UIT2A3	**Allied - III**	Resource Management Techniques	On successful completion of this course the students are able to get an overall idea about the various operations research techniques and their applications.

	17UIT2A4	**Allied - IV**	Digital Electronics	On successful completion of this course the students are able to acquire the knowledge of basic logic gates, Boolean algebra simplification and number systems.
SEMESTER - III				
III	17U3LT3 17U3LA3 17U3LF3 17U3LH3 17U3LU3	Language - III	----	On successful completion of this course the students are able to know about traditions and literature written in the language as well as social, cultural, theoretical, and historical contexts.
	17UIT3C5	**Core – V**	Java Programming	On successful completion of this course the students are able to acquire knowledge of Programming logic concepts, which enables the students to create wide range of Applications and Applets using Java by understanding and fundamentals of object oriented programming in Java, including defining classes, invoking methods, using class libraries, etc..
	17UIT3C6P	**Core – VI**	Java Programming Lab	On successful completion of this course the students are able to develop programs using Java with OOPS and APPLET.
	17UIT3A5	**Allied– V**	Shell Programming	On successful completion of this course the students should have a deep insight about Linux file systems, VI editor and C shell.
	17UIT3A6P	**Allied–VI**	Shell Programming Lab	On successful completion of this course the students are able to write simple and complex shell scripts using C shell and Vi editor.
	17UIT3N1	**Non Major Elective – I**	Multimedia Basics	On successful completion of this course the students are able to understand basics concepts of multimedia.
	17UCN3S1	**Skill Based Elective – I**	Soft Skills Development	On successful completion of this course the students are able to acquire teamwork and collaboration, decision-making, problem-solving, time management and critical thinking skills which may also help improve their employment perspectives.
SEMESTER - IV				
IV	17U4LT4 17U4LA4 17U4LF4 17U4LH4 17U4LU4	Language - IV	----	On successful completion of this course the students are able to know about traditions and literature written in the language as well as social, cultural, theoretical, and historical contexts.
	17UIT4C7	**Core– VII**	Database Management Systems	On successful completion of this course the students are able to understand the fundamental concepts of database systems and its architecture.
	17UIT4C8P	**Core – VIII**	RDBMS Lab	On successful completion of this course the students are able to write queries for DDL and DML and develop programs using PL/SQL procedure.
	17UIT4A7	**Allied– VII**	Web Design	On successful completion of this course the students are able to acquire knowledge in web design concepts and functioning of internet.
	17UIT4A8P	**Allied–VIII**	Web Design Lab	On successful completion of this course the students are able to write the programs using HTML and CSS.
	17UIT4N2	**Non Major Elective – II**	Information and Communication Technologies	On successful completion of this course the students are able to understand the basic concepts of ICT and Information Technology.
SEMESTER - V				
V	17UIT5C9	**Core – IX**	VB .Net	On successful completion of this course the students are able to understand .NET Framework and VB.NET fundamentals.
	17UIT5C10	**Core – X**	Operating Systems	On Successful completion of this course the students are able to get sufficient knowledge on various system Resources.
	17UIT5C11	**Core – XI**	Data Structures and Algorithms	On successful completion of this course the students should have Writing programming ability on data structures dealing with Stacks, Queues, List, Searching and Sorting algorithms etc.,
	17UIT5C12T	**Core – XII A**	PC Hardware and Troubleshooting	On successful completion of this course the students are able to understand the concepts of computer hardware, memory, trouble shooting.
	17UIT5C12P	**Core – XII B**	VB .Net Lab	On successful completion of this course the students are able to develop programs in VB.NET using MS-Access.
	17UIT5M1 A	**Major Based Elective –I**	PHP Programming	On successful completion of this course the students are able to understand the basic concepts of PHP and MySQL.

	17UIT5M1 B		Python Programming	On successful completion of this course the students are able to understand the fundamental concepts of python programming.
	17UIT5S2 AP	**Skill Based Elective– II**	PHP Programming Lab	On successful completion of this course the students are able to develop the programs using PHP and MySQL.
	17UIT5S2 BP		Python Programming Lab	On successful completion of this course the students are able to develop programs using regular expressions and GUI programming.
	17UIT5S3 AP	**Skill Based Elective – III**	PC Hardware and Trouble Shooting Lab	On successful completion of this course the students are able to get the practical knowledge of computer hardware, memory and trouble shooting.
	17UIT5S3 BP		Ubuntu Lab	On successful completion of this course the students are able to work in the Ubuntu environment and write a simple shell script using bash shell
	17UIT5EC1	**Extra Credit – I**	C# and .Net Programming	On successful completion of this course the students are able to understand the basic concepts of C# and .NET Programming.
SEMESTER - VI				
VI	17UIT6C13	**Core– XIII**	Wireless Communication	On successful completion of this course the students are able to understand the basic concepts of telecommunication and wireless LAN.
	17UIT6C14	**Core– XIV**	Software Engineering	On successful completion of this course the students are able to know the requirements of developing software and aware of various models required for software development.
	17UIT6C15	**Core – XV**	Multimedia Systems	On successful completion of this course the students are able to understand various concepts of multimedia and its applications.
	17UIT6C16P	**Core –XVI**	Software Development Lab	On successful completion of this course the students are able to design the website using HTML, CSS and JavaScript. On successful completion of this course the students are able to develop the real time applications using java and MySQL.
	17UIT6M2 A	**Major Based Elective –II**	Mobile Application Development	On successful completion of this course the students are able to understand the knowledge of mobile applications and standards using android studio.
	17UIT6M2 B		Open Source Technologies	On successful completion of this course the students are able to acquire skills in various open source technologies such as Linux, MySQL, PHP and AJAX.
	17UIT6M3 AP	**Major Based Elective – III**	Mobile Application Development Lab	On successful completion of this course the students are able to develop mobile applications using android studio.
	17UIT6M3 BP		Open Source Lab	On successful completion of this course the students are able to develop programs using Linux, MySQL, PHP and AJAX.
	17UIT6EC2	**Extra Credit – II**	Embedded Systems	On successful completion of this course the students are able to understand the fundamental concepts of embedded systems, programming and real time operating systems.

MASTER OF SCIENCE IN COMPUTER SCIENCE	
PROGRAMME OUTCOMES	✓ An ability to understand computer science concepts, designs, and solutions effectively and professionally ✓ An ability to apply knowledge of computing to produce effective designs and solutions for specific problems ✓ An ability to identify, analyze and synthesize scholarly literature relating to the field of computer science ✓ An ability to use software development tools, software systems, and modern computing platforms. ✓ An ability to apply design and development principles in the construction of software systems of varying complexity.
PROGRAMME SPECIFIC OUTCOMES	✓ Ability to demonstrate understanding of the principles and working of the hardware and software aspects of computer systems. ✓ Ability to understand the structure and development methodologies of the software systems. ✓ Be acquainted with the contemporary issues, latest trends in technological development and thereby innovate new ideas and solutions to existing problems.

Course Learning Outcomes (CLO) (2018-2019)

M.Sc Computer Science

SEM	COURSE CODE	COURSE	COURSE TITLE	Course Learning Outcomes (CLO)
SEMESTER - I				
I	17PCS1C1	**Core– I**	Advanced Java Programming	On successful completion of this course the students are able to acquire skill in advanced java programming.
	17PCS1C2	**Core – II**	Python Programming	On successful completion of this course the students are able to understand the fundamental concepts of python programming
	17PCS1C3	**Core– III**	Mathematical Foundations	On successful completion of this course the students are able to understand the notation of mathematical thinking, mathematical proofs, and algorithmic thinking and able to apply them in problem solving.
	17PCS1C4P1	**Core– IV A**	Advanced Java Programming Lab	On successful completion of this course the students are able to develop various java programs using JDBC, EJB, Servlets, Struts etc.
	17PCS1C4P2	**Core– IV B**	Python Programming Lab	On successful completion of this course the students are able to develop programs using regular expressions and GUI programming.
	17PCS1CE1A	**Elective– I**	Advanced Computer Architecture	On successful completion of this course the students are able to understand the concepts of advanced computer architecture, theories of parallel computing, network properties and applications of cost effective computer systems.
	17PCS1CE1B		Embedded Systems	On successful completion of this course the students are able to understand the fundamental concepts of embedded systems, programming and real time operating systems.
SEMESTER - II				
II	17PCS2C5	**Core– V**	Distributed Database Systems	On successful completion of this course the students are able to understand the fundamental concepts of distributed database systems and its architecture.
	17PCS2C6	**Core– VI**	Open Source Technology	On successful completion of this course the students are able to acquire skills in various open source technologies such as Linux, MySQL, PHP and AJAX.
	17PCS2C7	**Core– VII**	Design and Analysis of Algorithms	On successful completion of this course the students are able to understand the concepts of algorithms and analysis of algorithms using divide and conquer, greedy method, dynamic programming, backtracking, and branch and bound techniques.
	17PCS2C8P1	**Core– VIII A**	RDBMS Lab	On successful completion of this course the students are able to develop programs using PL/SQL procedure and SQL forms.

	17PCS2C8P2	**Core– VIII B**	Open Source Lab	On successful completion of this course the students are able to develop programs using Linux, MySQL, PHP and AJAX.
	17PCS2CE2A	**Elective– II**	Computer Networks	On successful completion of this course the students are able to understand the concepts of communication networks and network security.
	17PCS2CE2B		Cryptography and Network Security	On Successful completion of this course the students are able to implement cryptographic algorithms.
SEMESTER - III				
III	17PCS3C9	**Core– IX**	.Net Technologies	On successful completion of this course the students are able to understand .NET Framework, VB.NET, and ASP.NET
	17PCS3C10	**Core– X**	Principles of Compiler Design	On successful completion of this course the students should have a deep insight about compiler, Finite automata and parsing techniques.
	17PCS3C11	**Core– XI**	Distributed Operating Systems	On successful completion of this course the students are able to understand the fundamentals of distributed operating systems and message passing, distributed shared memory, synchronizations and distributed file systems
	17PCS3C12P1	**Core– XII A**	.Net Technologies Lab	On successful completion of this course the students are able to develop programs in VB.NET and ASP.NET.
	17PCS3C12P2	**Core– XII B**	Microprocessor Lab	On successful completion of this course the students are able to acquire practical knowledge on digital circuits, microprocessor architecture and interfacing of various components.
	17PCS3CE3A	**Elective– III**	Microprocessors and Microcontrollers	On successful completion of this subject the students are able to understand the microprocessor concepts and skills from two different disciplines: hardware concepts from electronics and programming skills from computer science.
	17PCS3CE3B		Cloud computing	On successful completion of this course the students are able to understand the basic concepts of Cloud Computing, types of Cloud, architecture and its applications.
	17PCS3EC1	**Extra Credit - I**	J2EE Technology	On successful completion of this course the students are able to understand the concepts of JavaBeans, JSP and RMI.
SEMESTER - IV				
IV	17PCS4C13	**Core– XIII**	Middleware Technology	On successful completion of this course the students are able to understand the concepts of middleware technologies such as EJB, ASP.NET, JSP, RMI and CORBA.
	17PCS4C14P	**Core– XIV**	Middleware Technology Lab	On successful completion of this course the students are able to develop programs using J2EE, ASP.NET and RMI.
	17PCS4PW	**Project**	----------	The aim of the Project work is to acquire practical knowledge on the implementation of the programming concepts studied.
	17PCS4EC2	**Extra Credit - II**	Software testing and Quality Assurance	On successful completion of this course the students are able to understand the concepts of software testing fundamentals and types of testing.

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY	
PROGRAMME OUTCOMES	✓ An ability to apply the knowledge of Technology, Mathematics, Networks and computing in the core information technologies. ✓ An ability to identify, design and analyze complex computer systems and implement and interpret the results from those systems. ✓ An ability to analyze the local and global impact of computing on individuals, organizations, and society.
PROGRAMME SPECIFIC OUTCOMES	✓ Ability to integrate new software and hardware technologies and extend their knowledge in specific areas of interest in academia and the industry. ✓ Ability to apply standard Software Engineering practices and strategies in software project development using open-source programming environment to deliver a quality product for business success. ✓ Ability to work in an IT or computing environment with the opportunity to enhance their career prospects by gaining additional knowledge and skills in selected areas of IT.

Course Learning Outcomes (CLO) (2018-2019)

M.Sc Information Technology

SEM	COURSE CODE	COURSE	COURSE TITLE	Course Learning Outcomes (CLO)
SEMESTER - I				
I	17PIT1C1	**Core– I**	Web Technology	On successful completion of this course the students are able to understand the fundamentals of Web design and how to program using HTML, JavaScript,XML and Python
	17PIT1C2	**Core – II**	Data Structures and Algorithms	On successful completion of this course the students are able to design and implement the various basic and advanced data structures.
	17PIT1C3	**Core– III**	RDBMS	On successful completion of this course the students are able to understand the concepts of RDBMS.
	17PIT1C4P1	**Core– IV A**	Web Technology Lab	On successful completion of this course the students are able to develop programs using HTML, JavaScript, XML and Python
	17PIT1C4P2	**Core– IV B**	RDBMS Lab	On successful completion of this course the students are able to develop programs using PL/SQL procedure and SQL forms.
	17PIT1CE1 A	**Elective– I**	Mobile Communications	On successful completion of this course the students are able to understand various concepts like GSM, CDMA, and 3G of Mobile Communications.
	17PIT1CE1 B		Computer Networks	On successful completion of this course the students are able to understand the Networking concepts and technologies like wireless, broadband and Bluetooth.
SEMESTER - II				
II	17PIT2C5	**Core– V**	Advanced Java Programming	On successful completion of this course the students are able to acquire skill in advanced java programming.
	17PIT2C6	**Core– VI**	Distributed Operating Systems	On successful completion of this course the students are able to understand the fundamentals of distributed operating systems and message passing, distributed shared memory, synchronizations and distributed file systems
	17PIT2C7	**Core– VII**	Software Testing	On successful completion of this course the students are able to understand the concepts of software testing fundamentals and types of testing.
	17PIT2C8P	**Core– VIII**	Advanced Java Programming Lab	On successful completion of this course the students are able to develop various java programs using JDBC, EJB, Servlets, Struts etc.
	17PIT2CE2 A	**Elective– II**	Data Mining	On Successful completion of this course the students are able to understand the Association rules, Clustering techniques and Data warehousing
	17PIT2CE2 B		Cryptography and Network Security	On Successful completion of this course the students are able to implement cryptographic algorithms.

SEMESTER - III				
III	17PIT3C9	**Core– IX**	Mobile Standard and Architecture	On successful completion of this course the students are able to understand the knowledge of mobile applications and standards using android studio.
	17PIT3C10	**Core– X**	Web Services	On successful completion of this course the students are able to understand the XML Revolutions and Technologies in practice and impart the significances of SOAP for Web Services.
	17PIT3C11	**Core– XI**	Cloud Computing	On successful completion of this course the students are able to understand the basic concepts of Cloud Computing, types of Cloud, architecture and its applications.
	17PIT3C12P1	**Core– XII A**	Mobile Application Development Lab	On successful completion of this course the students are able to develop mobile applications using android studio.
	17PIT3C12P2	**Core– XII B**	Web Services Lab	On successful completion of this course the students are able to develop the .NET and J2EE client to access the web services.
	17PIT3CE3 A	**Elective– III**	Big Data Analytics	On successful completion of this course the students are able to understand the basic concepts of Big Data, YARN, Map Reduce and Hadoop.
	17PIT3CE3 B		TCP/IP Programming	On successful completion of this course the students are able to understand the basic concepts of TCP/IP programming and Domain Name System.
	17PIT3EC1	**Extra Credit - I**	Information Security	On successful completion of this course the students are able to understand the basic concepts of information security, security management and the technical components of security.
SEMESTER - IV				
IV	17PIT4C13	**Core– XIII**	Open Source Technology	On successful completion of this course the students are able to acquire skills in various open source technologies such as Linux, MySQL, PHP and AJAX.
	17PIT4C14P	**Core– XIV**	Open Source Technology Lab	On successful completion of this course the students are able to develop programs using Linux, MySQL, PHP and AJAX.
	17PIT4PW	**Project**	----------	The aim of the Project work is to acquire practical knowledge on the implementation of the programming concepts studied.
	17PIT4EC2	**Extra Credit - II**	Enterprise Resource Planning	On successful self study of this course the students are able to learn the emergence of ERP systems, supply chain management and e-Marketplace.