

SEMESTER-I

Course Code: MCA001A

Course Name: Programming Fundamentals Using C

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Objective:

This is a first subject in the course as an introductory sequence for students with no prior programming experience. It explores major concepts of computer science and the process of computer programming, including programming, procedural and data abstraction and program modularity. After the course students will be able to analyze and find the solution of computer specific problems.

Unit-I

Introduction covering, Introduction to computer organization; Evolution of Operating Systems; Machine languages, Assembly Languages and High Level Languages; Key Software and Hardware Trends, Procedural & Object Oriented Programming Methodologies; Program Development in C, Structured Programming - Algorithm, Pseudo code; The C Standard Library, Data types in C, Arithmetic operators, Control Structures – If else, While, for, do-while, Switch, break and continue statements; Formatted input-output for printing Integers, floating point numbers, characters and strings; Simple C Programming examples;

Unit-II

Designing Structured Programs in C covering, Top Down Design and Stepwise refinement; Program Modules in C, Math Library Functions, Function Definition, Prototypes; Header files, Parameter passing in C, Call by Value and Call by Reference; Standard functions, Recursive functions, Preprocessor commands, Example C programs; Scope, Storage classes; Arrays covering, Declaring arrays in C, Passing arrays to functions, Array applications, Two – dimensional arrays, Multidimensional arrays, C program examples;

Unit-III

Pointers in C, declaration of pointer variable, initialization. Pointer operators, Pointer expressions and Arithmetic, Relationship between pointers and arrays; Strings including Concepts, String Conversion functions, C Strings, String Manipulation Functions and String Handling Library;

Unit-IV

Derived types covering, Structures – Declaration, definition and initialization of structures, accessing structures, structures in functions, self-referential structures, unions; Data

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Structures including Introduction to Data Structures, Stacks, Queues, Trees, representation using arrays, Insertion and deletion operations;

Unit-V

Dynamic Memory Allocation covering Linked List Implementation, Insertion, Deletion and Searching operations on linear list; Searching and Sorting – Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort, Searching-linear and binary search methods;

Text Books:

1. Dietel&Dietel (2000), C – How to Program, Pearson Education
2. Ellis Horowitz, SartajSahni, Susan Anderson (1993), Fundamentals of Data Structures in C, Prentice Hall of India
3. B.W. Kernighan and Dennis M.Ritchie (1988), the C Programming Language, Pearson Education
4. J.R. Hanly and E.B. Koffman (2007), Problem Solving and Program Design in C, Pearson Education

Upon successful completion of this subject students should be able to:

1. Edit, compile and run C programs and Create algorithms to solve basic programming problems including robust input validation, searching, and sorting
2. Write programs that receive formatted input and generate formatted output
3. Write programs that use one- and two-dimensional arrays, including character strings and arrays of strings
4. Apply testing and debugging techniques to C programs

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Course Code: MCA002A

Course Name: Information Technology

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Objective: Explain to students why information systems are so important today for business and management; Evaluate the role of the major types of information systems in a business environment and their relationship to each other; Assess the impact of the Internet and Internet technology on business-electronic commerce and electronic business; Identify the major management challenges to building and using information systems and learn how to find appropriate solutions to those challenges.

Unit-I

Information concepts and processing: Evolution of information processing, data information language and communication. Elements of a computer processing system: Hardware - CPU, storage devices and media, VDU, input-output devices, data communication equipment Software- system software, application software.

Unit-II

Programming languages: Classification, machine code, assembly language, higher level languages, fourth generation languages. Operating systems: Concept as resource manager and coordinator of processor, devices and memory.

Unit-III

Concept of priorities, protection and parallelism. Command interpreter, Typical commands of DOS/ UNIX/Network, Gul- Windows. Computers and Communication: Single user, multi-user, work station, client server systems, Computer networks, network protocols, LAN, WAN, Internet facilities through WWW, Mosaic, Gopher, html, elements of Java.

Unit-IV

Information integrity definition ensuring integrity Computer security: Perverse software, concepts and components of security, Preventive measures and treatment.

Unit-V

Productivity Software: Commercial Software, Freeware and Public Domain Software, Open-Source Software. Understanding the Need for Security Measures: Overview, Need for Computer Security, Basic security concepts, Threats to users, hacking, hacking methods. Protective Measures: keeping system safe, avoiding Identity Theft; keeping data secure (Limiting Physical access, Firewall), Managing cookies, spyware & other bugs.

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Text Books

1. Rajaraman V, "Fundamental of Computers" (2nd edition), Prentice Hall of India, New Delhi. 1996.
2. Sanders, D.H .. "Computers Today" McGraw Hill. 1988.

Upon completion of the subject, students will be able to:

1. Understand the basic concepts and processing of information
2. Identify computer hardware components and describe their function;
3. Understand the input, output, storage, programming languages and operating system concepts
4. Describe the concepts related to Computer Networking, Computer Security & Productivity Software

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Course Code: MCA003A

Course Name: Computer Organization & Architecture

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Objective:

1. To have a thorough understanding of the basic structure and operation of a digital computer, discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division
2. To study the different ways of communicating with I/O devices and standard I/O interfaces.

UNIT-I

Digital Logical, Boolean algebra, Logic Gate

UNIT-II

Digital Circuits: Flip-flops and counters, Combinational circuits, Decoders, Multiplexers, Flip-flops, Sequential circuits.

UNIT-III

Basic Computer Organization and Design:

Computer registers, Common bus system, Instruction set, Control and Timing, Instruction cycle, Instruction formats and Types of instructions, Interrupt cycle.

UNIT-IV

Micro programmed Organization: Micro programmed control, Instruction formats, Arithmetic and logical micro-operations Central Processing Unit: Register organization, Stack organization, Instruction format, Addressing modes.

UNIT-V

Memory Organization: Random Access Memory, ROM, EPROM, Associative memory, Cache memory. Input-output Organization: Input / Output: External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels.

Text Books

1. M. Mano, Computer System Architecture, 3rd Edition, Prentice Hall of India, 2008.
2. W. Stallings, Computer Organization and Architecture- Designing for Performance, 7th Edition, Pearson Education/PHI, Inc., 2008.

Upon successful completion of this subject, students should:

1. be able to demonstrate and appropriately use computer organisation and architecture terminologies;
2. be able to apply Boolean algebra and digital logic to design and interpret complex digital circuits;
3. be able to investigate the internal operation of the Central Processing Unit (CPU) and describe how it is used to execute instructions;
4. be able to investigate and describe in detail the essential elements of computer organization including internal bus, memory, Input/Output (I/O) organizations and interfacing standards and discuss how these elements function;

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Course Code: MCA004A

Course Name: Mathematical Foundation

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Objective: Students are able to know the topics include solving applied problems with whole numbers, decimals and fractions; ratios and proportions; rates; percentages and applications in sales tax, interest, commissions, and discounts; determining numerical averages; exponents and square roots; measurement; and geometry.

Unit-I

Mathematical Logic: Notation. Connectives Normal forms. Theory of inference for statement calculus.

Unit-II

Predicate calculus. Inference theory of the predicate calculus. Relations and ordering.

Unit-III

Functions. Recursion. Algebraic Structures: Groups. Application of residue arithmetic to computers. Group codes.

Unit-IV

Graph theory: Definition. Paths, reach ability, connectedness. Matrix representation of graphs. Trees.

Unit-V

Storage representation and manipulation of graphs: Trees. List structures and graphs. Pert and related techniques.

Text Books

1. Kolman, B., and Busby. R., "Discrete Mathematical Structures for Computer Science", Prentice Hall. 1987.
2. Sahni, S., "Concepts in Discrete Mathematics". Camelot Publisher. U.S.A. 1981.
3. Tremblay, J.P., et al. "Discrete Mathematical Structures with Applications to Computer Science" McGraw Hill, 1987.

Upon successful completion of this subject, students should:

1. Develop fluent knowledge, skills and understanding of mathematical methods and concepts
2. Acquire, select and apply mathematical techniques to solve problems
3. Understand the concepts like Functions, Recursion, Algebraic Structures & Graph theory

MCA Syllabus at JECRC University

Course Code: MCA005A

Course Name: Information System Analysis, Design Implementation

L (Hr.)	T/P (Hr.)	Pr (Hr.)		C
3	1			4

Objective: This course provides an understanding and application of system analysis and design processes centered on the systems development life cycle. Core topics include: project management and cost-benefit analysis; information systems planning and project identification and selection; the course emphasizes interpersonal skill development with clients, users, team members, and others associated with development, operation, and maintenance of systems.

Unit-I

Overview of Systems Analysis and Design: Systems Development Life Cycle. Concept and Models: requirements determination. Logical design. Physical design, test planning implementation planning and performance evaluation; communication, interviewing, presentation skills; group dynamics; risk and feasibility analysis; group-based approaches. JAD, structures walkthroughs, and design and code reviews; prototyping; database design; software quality metrics; application categories software package evaluation and acquisition.

Unit-II

Information requirement Analysis: Process modelling with physical and logical data flow diagrams, data modelling with logical entity relationship diagrams; developing a Proposal: Feasibility study and cost estimation.

Unit-III

System Design: Design of input and control, design of output and control, file design/database design, Process design, user interface design; prototyping; software constructions; documentation.

Unit-IV

Application Development Methodologies and CASE tools: Information engineering, structured systems analysis and design and object oriented methodologies for application development data modeling, process modeling, user interface design and prototyping; use of computer aided software engineering (CASE) tools in the analysis, design and implementation of information systems.

Unit-V

Design and Implementation of OO platforms: Object oriented analysis and design through object modeling technique, object modeling, dynamic modeling and functional modeling, object oriented design and object oriented programming systems for implementation, object oriented data bases.

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Managerial Issues in Software Projects: Introduction to software markets; planning of software projects, size and cost estimations; project scheduling; measurement of software quality and productivity; ISO and capability maturity models for organizational growth.

Text Books

1. Rajaraman, V, "Analysis and Design of Information Systems". Prentice Hall of India, 1991
2. Haryszkiewicz, LT., "Introduction of Systems Analysis and Design". Prentice Hall of India, 1989.
3. Senn, LA., "Analysis and Design of Information Systems". Tata McGraw Hill Book Company,
4. Whiten, I.K., Bentley, L.D., Beslow, V.M., "Systems Analysis and Design Methods". Galgotia Publications Pvt. Ltd. 1994.

Upon successful completion of this subject, students should be able to:

1. Describe Information System Analysis
2. Explain the purpose of Information System Analysis
3. Understand System Designing & Implementation
4. Solve Managerial Issues in Software Projects

MCA Syllabus at JECRC University

Course Code: MCA006A

Course Name: Programming fundamental using C lab

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective:

Student will be able to analyze a problem and identify and define the computing requirements to solution. Ability to design, implement and evaluate a computer-based system, process, component or program to meet desired needs.

1. Convert the following algorithms using C: Exchange the values of two variables with and without temporary variable.
2. Write a program to reverse a number.
3. Write a program to compute the sum of n terms of the following series $S = 1 + 1/2 + 1/3$
4. Write a program to compute the sum of n terms of the following series $S = 1 - 2 + 3 - 4 +$
5. Write a program using iteration
 - i. Display Fibonacci Series
 - ii. Calculate Factorial of a number.
 - iii. Calculate GCD of two numbers.
6. Convert the following algorithms using C: Counting positive numbers from a set of integers.
7. Convert the following algorithms using C: Summation of set of numbers.
8. Convert the following algorithms using C : Reversing the digits of an integer.
9. Convert following algorithms using C: Find smallest positive divisor of an integer other than 1.
10. Convert the following algorithms using C: Find G.C.D. and L.C.M. of two as well as three positive integers.
11. Convert the following algorithms using C: Generating prime numbers.
12. Write a program to find the
 - i. Sum of two matrices of order $m \times n$ and transpose of order $m \times n$ where $m, n \leq 3$.
 - ii. Multiplication of two matrices of order m, where $m \leq 3$, finding square and cube of a square matrix.
 - iii. Inverse of a matrix(d) $|A|, |B|$ and verify the identity $|B A| = |A| |B|$, where $||$ denote determinant of the matrix and A and B of size 3×3 .
13. Write a program to
 - i. Input a sentence
 - ii. Count the number of occurrences of the given pattern of letters (for instance 'est or 'ed')

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- iii. Find the position of the rightmost or leftmost character occurred from the pattern of letters
14. Write a program which counts the number of
 - i. Paragraphs occurred.
 - ii. Times the word “the” appears in a short story
15. Write a program to create structure to
 - i. Find and print the average marks of five subjects along with the name of student.
 - ii. Store names of the states (within India) and their capital cities. Show the capital by inserting state from the keyboard.
16. Write a function to find whether a given no. is Prime or not. Use the same to generate prime numbers less than 100.
17. Write a program to compute the factors of a given number.
18. Write a program to print the triangle of stars as follows (take number of lines from user)

```
*
***
*****
*****
```
19. Write a function that checks whether a given string is a palindrome or not. Use this function to find whether the string entered by user is palindrome or not.
20. Sort the list of numbers using selection sort.
21. Write a menu driven program to perform following operations on strings (using String class, functions):
 - i. Concatenate two strings
 - ii. Compare two strings.
 - iii. Calculate the length of the string
 - iv. Calculate the number of vowels.

Upon successful completion of this subject, students should be able to:

1. Acquire knowledge about the basic concept of writing a program.
2. Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
3. Know the role of Functions involving the idea of modularity.
4. Use of Array and pointers dealing with memory management.
5. Trace the execution of program logic to determine program output or validate program correctness

MCA Syllabus at JECRC University

Course Code: MCA007A

Course Name: Information Technology Lab

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective: Identify the major challenges to building and using information systems and learn how to find appropriate solutions to those challenges.

1. Familiarizing with PC, MS DOS and MS WINDOWS commands.
2. File creation, editing and directory creation
3. Mastery of MS DOS commands
4. To implement Unix commands.
5. Learning to use MS office: MS WORD
6. Implementing the use of database and spread sheet.
7. Slide creation with Powerpoint.
8. To get familiarize with LAN
9. WAN, Internet facilities through WWW

Upon successful completion of this Lab. students should be able:

1. To get hands on experience of Operating Systems like DOS & Unix
2. To explore MS-Word, MS-Excel, and MS-Power Point softwares
3. To know the basic concepts of Networking

MCA Syllabus at JECRC University

Course Code: MCA008A

Course Name: Computer Organization & Architecture Lab

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective:

To learn how computers work, basic principles How to analyze their performance (or how not to how computers are designed and built Issues affecting modern processors Issues affecting modern processors (caches, pipelines, etc.)

1. Create a machine based on the following architecture:

Register Set									
IR	DR	AC	AR	PC	FGI	FGO	S	I	E
0	0	0	0	0	1	1 Bit	1 Bit	1 bit	1 Bit
15	15	15	11	11	Bit				Bit

Memory 4096 words 16 bits per word	Instruction format <div style="display: flex; justify-content: space-around; align-items: center;"> 0 3 4 </div> <div style="margin-top: 10px;"> 15 </div> <div style="display: flex; justify-content: center; align-items: center; border: 1px solid black; width: fit-content; margin: 0 auto;"> <div style="border-right: 1px solid black; padding: 2px 10px;">Opcode</div> <div style="padding: 2px 10px;">Address</div> </div>
--	--

Memory Reference		Register Reference		Input-Output		Optional
Symbol	Hex	Symbol	Hex	Symbol	Hex	
AND	0xxx	CLA	E800	INP	F800	
ADD	2xxx	CLE	E400	OUT	F400	
LDA	4xxx	CMA	E200	SKI	F200	
STA	6xxx	CME	E100	SKO	F100	
BUN	8xxx	CIR	E080	ION	F080	
BSA	Axxx	CIL	E040	IOF	F040	
ISZ	Cxxx	INC	E020			
AND_I	1xxx	SPA	E010			
ADD_I	3xxx	SNA	E008			
LDA_I	5xxx	SZA	E004			
STA_I	7xxx	SZE	E002			

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BUN_I	9xxx	HLT	E001		
BSA_I	Bxxx				
ISZ_I	Dxxx				

2. Create the micro operations and associate with instructions as given in the chapter (except interrupts). Design the register set, memory and the instruction set. Use this machine for the assignments of this section.
3. Create a Fetch routine of the instruction cycle.
4. Write an 8085 assembly level program to add two hexadecimal numbers.
5. Write an 8085 assembly level program to do even number counting till a specific number.
6. Write an 8085 assembly level program to do odd number counting till a specific number.
7. Write an 8085 assembly level program to find whether the number is prime or not.
8. Write an 8085 assembly level program to find all prime numbers from 1 to a given number.

Course Code: MCA009A

Course Name: Seminar-I

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	0	0	3

A seminar presentation will be on any technical topics.

MCA Syllabus at JECRC University

Course Code: BMC114A

Course Name: Communication Skills

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Objective: The main focus of the course is to facilitate the learner to acquire adequate writing, speaking and presentation skills required for various aspects of professional by bridging the gap between his thought process and actual rendering of the language. The course aims at making the students able

- i. To understand the concept and basics of communication.
- ii. To find out the possible barriers to communication and to chalk out the strategies to overcome it.
- iii. To divulge better writing skills by briefing the learners to the dynamics of effective writing and to acquire the understanding of effective letter writing and its various formats.
- iv. To understand the concept of memorandum, notices and e-mails.

Unit-I

Essentials of Grammar

1. Parts of Speech
2. Articles
3. Question Tags
4. Conditional Sentences
5. Modal Verbs

Unit-II

Applied Grammar

1. Tenses
2. Passive Voice
3. Indirect Speech
4. Relative Clauses

Unit-III

Composition

1. Dialogue Writing
2. Paragraph Writing
3. Precise Writing
4. Report, its importance and Report Writing

Unit-IV

Poems

1. The Character of A Happy Life: Sir Henry Wotton

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2. No Men are Foreign: James Kirkup
3. If : Rudyard Kipling

Unit-V

Short Stories

1. How Much Land Does a Man Need?: Leo Tolstoy
2. The Last Leaf: O. Henry

Learning Outcomes:

Students have the capability to apply an ability to properly carry out the purpose and significance of the channels of Communication. Students have the capability to write and speak confidently about their own ideas, correctly and avoiding Indianism of English. Avoiding barriers of communication and using proper filters effectively. Using Interpersonal communication effectively. To use grammar correctly. Students have the capability to Enhancing employability skills and facing the corporate world with full confidence.

Suggested Readings

1. Communication Skills for Engineers and Scientists, Sangeeta Sharma & Binod Mishra, PHI Learning Pvt. Ltd.
2. English for Engineers: Made Easy, Aeda Abidi & Ritu Chaudhary, Cengage Learning, (New Delhi)
3. A Practical Course for Developing Writing Skills in English, J.K. Gangal, PHI Learning Pvt. Ltd., New Delhi.
4. Intermediate Grammar, Usage and Composition, Tickoo, A. E. Subramaniam & P. R. Subramaniam, Orient Longman (New Delhi)
5. The Written Word, Vandana R. Singh, Oxford University Press (New Delhi) R.T.U., Kota Scheme and
6. The Great Short Stories edited by D.C. Datta, Ram Narain Lal Publishers (Allahabad)
7. Professional Communication, Kavita Tyagi & Padma Misra, PHI Learning Pvt. Ltd., New Delhi.
8. "Learn Correct English: Grammar, Usage and Composition" by Shiv K. Kumar & Hemalatha Nagarajan, Pearson (New Delhi).
9. "Current English Grammar and Usage with Composition" by R.P. Sinha, Oxford University Press (New Delhi).

Upon successful completion of this subject. students should be able:

1. Understand communication processes and practices in academic and professional contexts.
2. Use information for communicative tasks.
3. Participate in oral presentations and group work.
4. Produce written academic and professional documents.

MCA Syllabus at JECRC University

Course Code: BMC115A

Course Name: Communication Skills –I Lab

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective: Student will be able to present themselves professionally, they can understand how to communicate in industry, enhance their vocabulary

Building Advanced Vocabulary

- Word Formation
- Affixes
- Words often Mis-spelt and Mis- Pronounced
- Words often Confused
- Homonyms and Homophones
- One Word for Many.
- Synonyms and Antonyms.
- Jumbled sentences
- Practice Exercise of Linking Words (Conjunctions) on soft ware
- Practice Exercise of Tenses on soft ware
- Practice Exercise of passive voice on soft ware
- Dialogue conversation Practice on soft ware

Upon successful completion of this Lab. students should be able:

1. Actively participate in group discussions, Seminars and Presentations.
2. Use Telephonic Etiquettes, art of writing professional correspondences.

SEMESTER-II

Course Code: MCA010A

Course Name: Operating System

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Objective: The general understanding of structure of modern computers purpose, structure and functions of operating systems illustration of key OS aspects by example. By the end of the course you should be able to describe the general architecture of computers describes, contrast and compare differing structures for operating systems.

Unit-I

Evolution of operating systems. Types of operating systems. Different views of the operating system, operating system concepts and structure. Processes: The Process concept, systems programmer's view of processes. The operating system services for process management. Scheduling algorithms. Performance evaluation.

Unit-II

Memory Management: Memory management without swapping or paging, swapping, virtual memory, page replacement algorithms, Segmentation, Demand Paging, Page fault trap.

Unit-III

Interprocess Communication and synchronization: The need for intercrosses synchronization, mutual exclusion, semaphores, and hardware sport for mutual exclusion. Critical section and problems, Deadlocks. Conditions, Deadlock detection, recovery, deadlock avoidance- Banker Algorithm.

Unit- IV

File Systems File systems, directories, file system implementation, security protection mechanisms. Input/output Principles of I/O Hardware: I/O devices, device controllers, direct memory access. Principles of I/O Software: Goals, interrupt handlers, device drivers, device independent I/O software. User space I/O software.

Unit-V

Disks: Disk hardware, Disk scheduling algorithms, Error handling, RAM Disks. Clocks: Clock hardware, memory mapped terminals, I/O software. Case Studies: MS, DOS. MS WINDOWS, LINUX (UNIX) operating system.

Text Books

1. Galvin, Peterson, J.L. Abraham Silberschatz. "Operating System Concepts". Addison Wesley Publishing Company. 1989.

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2. Tanenbaum, A.S., "Modern Operating Systems", Prentice Hall of India Pvt. Ltd. 1995.
3. Deitel. H.M .. "An Introduction to Operating Systems". Addison Wesley Publishing Company

Upon successful completion of this subject, students should be able:

1. Resource management provided by operating systems
2. Concepts and theories of operating systems
3. Case studies of different operating systems

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Course Code: MCA011A

Course Name: Programming in Java

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Objectives: Familiarize the student with good design and programming

Unit-I

Java Fundamentals, Features of Java, OOPs concepts, Java virtual machine, Reflection byte codes, Byte code interpretation, Data types, variable, arrays, expressions, operators, and control structures, Objects and classes.

Unit-II

Java Classes: Abstract classes, static classes, Inner classes, Packages, Wrapper classes Interfaces, This, Super, Access control

Unit-III

Exception handling: Exception as objects, Exception hierarchy, Try catch finally, Throw, throws

Unit-IV

IO package: Inputstreams, Outputstreams, Object serialization, Deserialization, Sample programs on IO files, Filter and pipe streams.

Unit-V

Multi-threading: Thread Life cycle ,Multi-threading advantages and issues ,Simple thread program ,Thread synchronization .GUI: Introduction to AWT programming, Layout and component managers ,Event handling ,Applet class ,Applet life-cycle ,Passing parameters embedding in HTML

Text Books

1. Programming with Java A Primer, E.Balaguruswamy Tata McGraw Hill Companies
2. Java Programming John P. Flynt Thomson 2nd
3. The complete reference JAVA2, Herbert schildt. TMH

After successfully completing this subject, students will be able to:

1. Understand the principles of object oriented design.
2. Apply Java in object oriented software development.
3. Use the exception handling mechanism, input/output API
4. Describe the Multi-threading & GUI concepts

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Course: MCA012A

Course Name: Data Structures and Algorithms Using C

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Objective: Familiarize the student with good programming design methods, particularly Top Down design. Develop algorithms for manipulating stacks, queues, linked lists, trees, and graphs. Develop the data structures for implementing the algorithms familiarize the student with the issues of Time complexity and examine various algorithms from this perspective.

Unit-I

Introduction to algorithms, Flow charts, Tracing flow charts, Problem solving methods, Need for computer languages, Reading programs written in C language, C character set, Identifiers and keywords, Data types, Declarations, Expressions, statements and symbolic constants, Input-Output: get char, put char, scanf, printf, gets, puts, functions, Pre-processor command: # include, define, ifdef. Preparing and running a complete C program.

Unit-II

Single and Multidimensional arrays, Sequential Allocation, Address Calculations, Sparse matrices and their efficient representation.

Unit-III

Functions: Defining and accessing: passing arguments, Function prototypes, Recursion, Recursion, and Application of stacks to recursion problems. Singly & Double Linked Lists, Operations on all these structures and applications of these structures.

Unit-IV

Circular Linked Lists, Self-Organizing Lists Stacks, and Applications of stacks e.g.: Infix to Postfix. Queues, Overview of priority queue

Trees, Binary Trees, Complete Binary trees and almost complete Binary trees, BST, Tree traversal algorithms, searching in Binary Search Tree. Introduction to Threaded Trees

Unit-V

BST Insertion & Deletion Sorting Techniques (without efficiency): Bubble Sort, Selection Sort, Insertion Sort. Searching Techniques (without efficiency): Linear search, Binary search, Hashing with Collision handling methods. Multiway trees – B-Tree, B+ Tree.

Text Book

1. Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub
2. Hutchison, R., "Programming in C". McGraw Hill, New York, 1990.

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3. Johnsonbaugh, R., and Kalin, M., "Applications Programming in C", Prentice Hall of India, 1989. Rajaraman, V, "Computer Programming in C", Prentice Hall of India, New Delhi, 1995.

Upon successful completion of this subject students should be able to:

1. Understand the properties of various data structures;
2. Identify the strengths and weaknesses of different data structures;
3. Design and employ appropriate data structures for solving computing problems;
4. Possess the knowledge of various existing algorithms;
5. Implement these data structures and algorithms in the C language.

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Course Code: MCA060A

Course Name: Web Designing Techniques

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0		4

Objective:

- To gain the skills and project-based experience needed for entry into web design and development careers.
- To use a variety of strategies and tools to create websites.
- To develop awareness and appreciation of the myriad ways that people access the web and will be able to create standards-based websites that are accessible and usable by a full spectrum of users.

Unit-I

The Internet – Basic of internet, file transfer, telnet, usenet, gopher, wais, archie and veronica. Basics of World Wide Web (WWW)

Web Servers, Browsers and Security – Web Browser and its architecture, The web server, the proxy server, How does web server work, How does web browser work, the fast ready connections on the web, web browsers, netscape communication suite, Microsoft internet explorer, the virus menace in the internet, firewalls, data security.

Unit-II

The World Wide Web (WWW): HTML History, Hypertext and Hypertext Markup Language.

HTML Documents: Tags, Elements of an HTML Document: Text Elements, Tag Elements, Structural elements of HTML documents, Header tags, Body tags, Paragraphs, Title.

List: Numbered list, Non-Numbered lists, Definition lists

Unit-III

Formatting HTML Documents: Logical styles (source code, text enhancements, variables), Physical Styles (Bold, Italic, underlined, crossed),

Managing images in html: Image format (quality, size, type), Importing images (scanners), Tags used to insert images.

Frames Tables in HTML documents: Tags used in table definition, Tags used for border thickness, Tags used for cell spacing, Tags used for table size, Dividing table with lines, Dividing lines with cells, Cell types: Titles cells, Data cells

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Unit-IV

Hypertext and Link in HTML Documents URL/FTP/HTTP, Types of links: Internal Links, External Link, Link Tags, Links with images and buttons, Links that send email messages
Special effects in HTML documents.

Unit-V

Web Designing with PHP (Introduction): Introduction to PHP, Installation of PHP and MySQL, PHP configuration in IIS & Apache Web Server and features of PHP, Writing PHP, How PHP code is parsed, Embedding PHP and HTML Executing PHP and viewing in Browser.

Text Books

1. Internet and web technology by Raj Kamal, TMH Publication
2. [Steven Holzner](#), The Complete Reference PHP, Tata McGraw - Hill Education
3. [Steve Suehring](#), [Tim Converse](#), [Joyce Park](#), [PHP6 And My SQL Bible](#), Wiley India Pvt Ltd

Upon successful completion of this subject students should be able to:

1. Develop awareness and appreciation of the myriad ways that people access the web and will be able to create standards-based websites that are accessible and usable by a full spectrum of users.
2. Able to design front end web page and connect to the back end databases.
3. Understand the fundamentals of Web Hosting.

MCA Syllabus at JECRC University

Course Code: MCA014A

Course Name: Introduction to DBMS

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Objective: This course aims to cover the basics Deliver successful software projects that support organization's strategic goals. Match organizational needs to the most effective database management system.

Unit I

Database Concepts, Applications and Purpose of DBMS, Data abstraction, Data Models, Database System Architecture- Storage Manage, Query Processor, Transaction Manager, Database Users and Administrator, Introduction to the relational model- Structure, Database Schema, Keys.

Unit II

Structured Query Language (SQL)- Overview, DDL, DML, Relational Algebra-Fundamental Operations- Select, Project, Composition of relational operations, Set Operations, Cartesian Product, Rename, Natural Join

Unit III

Entity Relationship (ER) Modeling: Entity types, entity set, attribute and key, relationships, relation types, entity relationship, ER diagrams, database design using ER diagrams. Enhanced Entity-Relationship (EER) model. Database Design: database design by ER and EER-to-Relational Mapping.

Unit IV

Transactions- Concept, Various states of Transactions, Serializability, Type of Schedules- Recoverable, Cascadeless. Introduction to Concurrency Control- Lock Based Protocols. Query Processing, Deadlock Handling- Deadlock Prevention, Deadlock Detection and Recovery.

Unit V

Database Design- Design guidelines- Relational database design – Integrity Constraints – Domain Constraints- Referential integrity – Functional Dependency- Normalization using Functional Dependencies, Normal forms based on primary keys- general definitions of Second and Third Normal Forms. Boyce Codd Normal Form– Multivalued Dependencies, Pitfalls in Relational Database Design.

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Text Books:

1. A.Silberschatz, H. Korth and S. Sudarshan, *Database System Concepts*, 5th Edition, McGraw Hill,.
2. R.Ramakrishnan, J. Gehrke, *Database Management Systems*, 3rd edition, McGraw Hill International Edition, 2007.

After successfully completing this subject, students will be able to:

1. Acquire knowledge in fundamentals of Data Base Management System and analyze the difference between traditional file system and DBMS, able to handle with different Data Base languages.

MCA Syllabus at JECRC University

Course Code: MCA015A

Course Name Software Engineering

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0	0	4

Unit-I

Software life cycle Models: Waterfall, Spiral, Prototyping Fourth generation techniques, SW Process. Software requirements specification (SRS) Fact-Finding Techniques, Characteristics of a good SRS: Unambiguous. Complete. Verifiable, Consistent. Modifiable. Traceable and usable during the operation and Maintenance phase. Prototype outline for SRS.

Unit-II

SW Inspection Communication Skills for the System Analyst. Review/Inspection Procedure: Document. Composition of the inspection team, check list, reading by the inspectors. Recording of the defects and action recommended. Students should practice inspecting small requirement specifications for good characteristics.

Unit-III

System Analysis SA tools & Techniques, DFD, Entity Relationship Diagrams. Project Dictionary. SW Design System Design Tools and Techniques, Prototyping, Structured Programming. User Interface Design Elements of good design, Design issues, Features of a modern GUI. Menus, scrolling, windows, Icons, Panels, Error messages, etc

Unit-IV

Software Configuration Management Base Line, SCM process, Version Control, Change Management.

Unit-V

Computer Aided Software Engineering CASE, Tools for Project management Support, Analysis & design, Programming. Prototyping, Maintenance. Future of CASE.

Text Books

1. Pressman, R.S., "Software engineering" A Practitioner's Approach", Third Edition, Jalote, P., "An Integrated Approach to Software Engineering". Narosa 1991.

Upon completion of the subject, students will be able to

1. Understand the process to be followed in the software development life cycle
2. Find practical solutions to the problems
3. Manage a project from beginning to end
4. Define, formulate and analyse a problem

MCA Syllabus at JECRC University

Course Code: MCA016A

Course Name: Programming in Java Lab

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

1. Operators and Expressions
 - i. To write a java program to find the area of rectangle
 - ii. To write a java program to find the result of the following expressions
 - a. $(a \ll 2) + (b \gg 2)$
 - b. $(b > 0)$
 - c. $(a + b * 100) / 10$
 - d. $a \& b$Assume $a=10$ and $b=5$
 - iii. To write a java program to print the individual digits of a 3 digit number.
2. Decision Making Statements
 - i. Write a java program to read two integers and print the larger number followed by the words “is larger “If the numbers are equal print the message “These numbers are equal”.
 - ii. To write a java program to read an integer and find whether the number is odd or even
 - iii. To write a java program find the biggest of three integers
3. Looping Statements
 - i. To write a java program to find the sum of digits of a given number
 - ii. To write a java program to find the first 15 terms of Fibonacci sequence.
 - iii. To write a java program to print the Armstrong numbers.
4. Array
 - i. To write a java program to find the largest and smallest number in an array.
5. Strings
 - i. To write a java program that creates a string object and initializes it with your name and performs the following operations
 - a. To find the length of the string object using appropriate String method.
 - b. To find whether the character ‘a’ is present in the string. If yes find the number of times ‘a’ appear in the name and the location where it appears
6. String Buffer
 - i. To write a java program to create a StringBuffer object and illustrate how to append characters and to display the capacity and length of the string buffer
 - ii. To write a java program to create a StringBuffer object and illustrate how to insert characters at the beginning
 - iii. To write a java program to Create a StringBuffer object and illustrate the operations of the append () and reverse () methods.
7. Classes and Objects

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- i. To write a java program to display total marks of 5 students using student class. Given the following attributes: Regno(int), Name(string), Marks in subjects(Integer Array), Total (int).
 - ii. To write a program in java with a class Rectangle with the data fields width, length, area and colour. The length, width and area are of double type and colour is of string type. The methods are get_length(), get_width(), get_colour() and find_area().
 - iii. Create two objects of Rectangle and compare their area and colour. If the area and colour both are the same for the objects then display “Matching Rectangles”, otherwise display “Non-matching Rectangle”.
8. Inheritance
 - i. write a java program to create a Player class and inherit three classes Cricket_Player, Football_Palyer and Hockey_Player.
9. Interfaces
 - i. To write a java program to show how a class implements two interfaces.
 - ii. To write a java program to show that the variables in an interface are implicitly static and final and methods are automatically public
10. Packages
 - i. To write a java program to create a package for Book details giving Book name, Author name, price and year of publishing.
11. Applets & AWT
 - i. To write a java applet program to change the color of a rectangle using scroll bars to change the value of red, green and blue
 - ii. To write an applet program for creating a simple calculator to perform Addition, subtraction, Multiplication and Division using Button, Label and TextField component.
12. Exception Handling
 - i. To write a java program to catch more than two exception
 - ii. To write a java program to create our exception subclass that throws exception if the sum of two integers is greater than 99.
13. Multithreading
 - i. To write a java program for generating two threads, one for generating even number and one for generating odd number.

After successfully completing this subject, students will be able to:

1. Able to understand the Programming in Java
2. Comfortable in software development using JAVA platform.

MCA Syllabus at JECRC University

Course Code: MCA017A

Course Name: DBMS lab

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective: An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs .An ability to function effectively on teams to accomplish a common goal.

1. DDL Command- Create table, Alter Table, Drop Table, desc
2. DDL Command- Domain Integrity, Check Constraints, Entity Integrity(unique key and primary key)
3. DCL Commands- Grant Command, Revoke command
4. DML Commands- Insert , Select, Update, Delete
5. TCL Commands – Save point, Commit, Rollback
6. In-Build functions- Date functions
7. In-Build functions- Numerical functions
8. In-Build functions- Character functions
9. In-Build functions- Conversation functions
10. In-Build functions- Aggregate functions, Group by Clause
11. Special Operators: Between / not between, Like / not like, Rename
12. Nested Queries and Joins
13. Set Operators
14. Creating and Manipulating Views
15. PL/SQL- Control Structure and Functions
16. A Small Project

After successfully completing this subject, students will be able to:

1. Use the knowledge in Database creation, management.
2. Have Knowledge of Back-end and can implement this in project work.
3. Having knowledge of different databases enable them in selection of efficient database.
4. Include these queries in implementation of a project.

MCA Syllabus at JECRC University

Course Code: MCA018A

Course Name: Data Structure and algorithm using C -Lab

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective: In this lab, we will implement a simple version of some data structures, namely Linked List and Array List, and use them to implement a simple sorting algorithm. This exercise will help us to explore the effect of data structures on the complexity of the algorithm and also understand the details involved in creating data structures from scratch.

1. Write a simple C program on a 32 bit compiler to understand the concept of array storage, size of a word. The program shall be written illustrating the concept of row major and column major storage. Find the address of element and verify it with the theoretical value. Program may be written for arrays upto 4-dimensions.
2. Simulate a stack, queue, circular queue and dequeue using a one dimensional array as storage element. The program should implement the basic addition, deletion and traversal operations.
3. Represent a 2-variable polynomial using array. Use this representation to implement addition of polynomials.
4. Represent a sparse matrix using array. Implement addition and transposition operations using the representation.
5. Implement singly linked lists.
6. Implementing doubly linked list.
7. Implementing circularly connected linked lists.
8. Illustrating operations like addition at different locations,
9. Implementing deletion from specified locations and traversal.
10. Repeat exercises 2, 3 & 4 with linked structures.
11. Implementation of binary tree with operations like addition, deletion, traversal.
12. Depth first and breadth first traversal of graphs represented using adjacency matrix and list.
13. Implementation of binary search in arrays and on linked Binary Search Tree.
14. Implementation of insertion, quick, heap, topological and bubble sorting algorithms.

Upon successful completion of the Lab. course students should be able to:

1. Design and employ appropriate data structures for solving computing problems
2. Implement these data structures and algorithms in the C language.

MCA Syllabus at JECRC University

Course Code: MCA 019A

Course Name: Web Designing Techniques Lab

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective: This course demonstrates an in-depth understanding of the tools and Web technologies necessary for business application design and development. The course covers client side scripting like HTML, JavaScript.

1. Create an admission form of your college which includes: College name and its website address that links to the website numbered list of various fields Check boxes,
2. Create form having image for photograph combo box and submit button
3. Design a set of web pages to organize the content on the topic 'Web Designing Techniques' or any other topic of your choice using frames.
4. Create a table with different data in different rows and Head.
5. Create a form using different forms tag.
6. Create a page using different HTML tags with background images.
7. Put validation checks on all possible fields on admission form (Practical 1) using JavaScript.
8. Create an interactive multiple-choice quiz using JavaScript.
9. Create an HTML page for accepting a user ID and password from the user, and check if the user ID and password are correct.
10. Create own domain name and make a web site using different HTML tags.
11. Write a PHP program to store current date-time in a COOKIE and display the 'Last visited on' date-time on the web page upon reopening of the same page.
12. Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.

Upon successful completion of the Lab. course students should be able to:

1. The students will be able to learn & implement the Web Scripting for websites development.
2. The students will be able to learn & implement the XML and Javascript for their dynamic web pages development.
3. The students will be able to learn & implement the CSS for webpages development.

Course Code: MCA020A

Course Name: Seminar-II

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	0	0	3

SEMESTER-III

Course Code: MCA 021A

Course Name: Advance Database Management System

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Objective: Knowledge of DBMS, both in terms of use and implementation/design Experience with SQL Experience working as part of team Experience with analysis and design of (Database) software. A variety of topics will be covered that are important for modern databases (see below) in order to prepare the students for real life applications of databases.

Unit-I

Physical Database Design

Overview of Physical Storage Media, Magnetic Disks, RAID, Tertiary Storage , Storage Access, File Organization, Organization of Records in Files, Data-Dictionary Storage, Storage Structures for Object-Oriented Databases, Basic Concepts, Ordered Indices , B⁺-Tree Index Files, B-Tree Index Files, Static Hashing, Dynamic Hashing , Comparison of Ordered Indexing and Hashing , Index Definition in SQL, Multiple-Key Access

Unit-II

Object Relational Databases

Complex Data Types and Object Orientation, Structured Data Types and Inheritance in SQL, Table Inheritance, Array and Multiset Types in SQL, Object Identity and Reference Types in SQL, Implementing O-R Features, Persistent Programming Languages, Comparison of Object-Oriented and Object-Relational Database

Unit-III

Internet Databases

World Wide Web, User Interfaces and Tools, Web Interfaces to Databases, Web Fundamentals, Servlets and JSP, Building Large Web Applications

XML Databases

Structure of XML Data, XML Document Schema, Querying and Transformation, Application Program Interfaces to XML, Storage of XML Data, XML Applications

Unit-IV

Transaction Management

Transaction Concept, ACID Properties, Transaction State, Concurrent Executions, Schedules, Serializability, Conflicting Instructions, Conflict Serializability, View Serializability, Testing for Serializability, Test for Conflict Serializability, Test for View Serializability, Recoverable Schedules, Cascading Rollbacks, Cascadeless Schedules, Concurrency Control, Recovery Subsystems.

Unit-V

Parallel and Distributed Databases

Database System Architectures: Centralized and Client-Server Architectures, Server System Architectures, Parallel Systems, Distributed Systems, Parallel Databases: I/O Parallelism, Inter and Intra Query Parallelism, Inter and Intra operation Parallelism, Distributed Database Concepts, Distributed Data Storage

Mobile Databases

Mobile Databases: Location and Handoff Management, Effect of Mobility on Data Management, Location Dependent Data Distribution, Mobile Transaction Models

Multimedia Databases

Multidimensional Data Structures, Image Databases, Text/Document Databases, Video Databases, Audio Databases, Multimedia Database Design.

Text Books:

1. A.Silberschatz, H. Korth and S. Sudarshan, *Database System Concepts*, 5th Edition, McGraw Hill.
2. R.Elmasri, S.B. Navathe, *Fundamentals of Database Systems*, 6th edition, Pearson Education, 2010.

After successfully completing this subject, students will be able to:

1. Understand practical implications of distributed databases.
2. Understand the fundamentals of Object Oriented databases
3. Gain about the fundamentals of xml databases
4. Understand the practical implications about the fundamentals of mobile databases

MCA Syllabus at JECRC University

Course Code: MCA022A

Course Name: Programming in C++-II

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Objective: To teach students how to program using the C++ Programming Language and prepare students with the necessary programming background to proceed with C++ object-oriented programming, to prepare object-oriented design for small/medium scale problems to demonstrate the differences between traditional imperative design and object-oriented design to explain class structures as fundamental, modular building blocks.

Unit-I

C++ Overview, C++ Characteristics, Object-Oriented Terminology, Polymorphism, Object-Oriented Paradigm, Abstract Data Types, I/O Services, Standard Template Library, Standards Compliance, Functions and Variables.

Unit-II

Functions: Declaration and Definition, Variables: Definition, Declaration, and Scope, Variables: Dynamic Creation and Derived Data, Arrays and Strings in C++, Qualifiers, Classes in C++, Defining Classes in C++, Classes and Encapsulation, Member Functions, Instantiating and Using Classes,

Unit-III

Working with I/O Streams: Predefined console streams, hierarchy of console stream classes, unformatted I/O operations, formatted console I/O operations, manipulators, custom/user-defined manipulators, stream operator with user-defined classes.

Working with File Streams: Introduction, Hierarchy of file stream classes, opening and closing of files, testing for errors, file pointers and their descriptors /manipulators, sequential access to a file, object retrieval, random access to a file.

Unit-IV

Generic Programming with Templates: Introduction, function templates revisited, overloaded function templates, user defined template arguments. Class templates, inheritance of class template, class template containership, class template with overloaded operators.

Exception Handling: Introduction, Error handling, exception handling model, Exception handling constructs, List of pre-defined exceptions, catch all handler, Exceptions in constructors and destructors, Handling uncaught exceptions, Exceptions in overloaded operators and functions.

Unit-V

Introduction to VC++ -Windows basic concepts, window API, DEF files, creating windows, message, x-windows, Mouse and keyboard. Designing and creating menus, pop-up menus.

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Bitmaps and dialogues; windows animation; Font basics; window controls; Font display; static controls, edit controls, list boxes, psychic windows. Introduction to resources, user defined resources.

Text Books

1. Let Us C: BalaGuruswamy, TATA McGraw Hill.
2. Programming with C, C++: YashwantKanitkar

At the end of this subject, students should be able to:

1. Apply fundamental principles of problem solving in software engineering.
2. Apply basic & advance programming principles using C++ language.
3. Apply basic C++ program structure in software development.

MCA Syllabus at JECRC University

Course Code: MCA023A

Course: Advance Computer Networks

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Objectives: To describe how networks impact our daily lives. To identify the key components of any data network. Describe the characteristics of network architectures: fault tolerance, scalability, quality of service and security. Rules and processes that govern network communications. Tools and commands for constructing and maintaining networks.

UNIT –I Introduction

Introduction to Networks: Types, Protocols Standards, Switching, Guided and Unguided Media, Protocol Layering: OSI Model, TCP/IP Protocol Suite, ATM Networks.

UNIT –II Networking Protocols

Protocol Architecture: Transmission Control Protocol, User Datagram Protocol, Internet Protocol, Next Generation IP – Ipv6, IPv4 v/s IPv6, ICMPv6, Stream Control Transmission Protocol.

UNIT –III High Speed Networks

Frame Relay – Packet Switching Networks, Frame Relay Networks, Asynchronous Transfer Mode – ATM Protocol Architecture, ATM Logical Connections, ATM Cells, ATM Service Categories, ATM Adaptation Layer (AAL), SONET/SDH – Architecture, Sonet Layers, Sonet Frames, ISDN, B-ISDN

UNIT –IV Wired & Wireless LAN's

Wired LAN's Ethernet – IEEE Standards, Standard Ethernet, Changes in the standard, Fast Ethernet, Gigabit Ethernet, 10GB Ethernet, IEEE 802.11, BLUETOOTH, Connecting Devices, Backbone Networks, Virtual LAN's.

UNIT - V

Routing Algorithms – Distance Vector, Link State, RIP, OSPF, Flow Control and Congestion Control, Cellular Telephony, Mobile IP, Satellite Network, Wi-Max

Text/ Reference Books:

1. Data Communication and Networking, by Behrouz A. Forouzan, Fifth Edition
2. High Speed Networks and Internets: Performance and Quality of service by William Stallings Pearson Education India.

At the end of this subject, students should be able to:

1. Deal with complex issues in computer networks both systematically and creatively
2. Advanced knowledge and understanding of Computer networks and their application;

MCA Syllabus at JECRC University

Course Code: MCA024A

Course Name: Object Oriented Analysis & Design

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Objectives: To acquaint the students with the basics of a design language .UML is introduced as a modeling language which helps the students to provide a complete understanding of how to Architect and design a S/W System.

Unit-I

Introduction to object oriented systems, Classes, Objects, Abstraction, Inheritance, Polymorphism, Encapsulation, Message Sending, Association, Aggregation, Iterative development and the Unified Process (UP), UP phases: Inception, Elaboration, Construction and Transition, Object-oriented metrics

Unit-II

Introduction to UML, Use Cases and functional requirements, Identifying and writing Use Cases, Decomposition of use cases, Modeling System Workflows using Activity Diagrams, Modeling a System's Logical Structure using Classes and Class Diagrams, Modeling Interactions using Sequence Diagrams and Communication Diagrams, Timing Diagrams, Interaction Overview Diagrams, Component Diagram, Package diagram, State Machine Diagrams, Deployment Diagrams.

Unit-III

Introduction to Patterns, GoF Patterns, Creational Patterns, Structural Patterns, Behavioral Patterns, Software Architectural patterns, The Observer Pattern, The Template Method Pattern , Factory Patterns: Factory Method and Abstract Factory , The Singleton Pattern , The Iterator Pattern , The Composite Pattern , The Facade Pattern , The State and Strategy patterns , Command Pattern , The Adapter Pattern , The Proxy Pattern , The Decorator Pattern, The Visitor Pattern , AntiPatterns, Patterns for Assigning Responsibilities: GRASP Patterns

Unit-IV

Domain modeling, assigning responsibility using sequence diagrams, mapping design to code, CASE tools, Unit, Cluster, and System-level testing of Object-oriented programs, Aspect- oriented and Service-oriented software.

Text Books:

1. Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and iterative development, by Craig Larman, Pearson Education. (1998)
2. Design Patterns - Elements of Reusable Object-Oriented Software, Gamma, et. al., Addison-Wesley. (1994)

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Upon successful completion of this subject students should be able to:

1. Explain the object oriented software development process, including object-oriented methodologies and work flows.
2. Justify designs based on design principles, patterns, and heuristics
3. Know about Domain modeling, System-level testing of Object-oriented programs, Aspect- oriented and Service-oriented software.

MCA Syllabus at JECRC University

Course Code: MCA025A

Course Name: Statistical Computing

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Objectives:

Statistical computing help to design data collection plans, analyze data appropriately and interpret and draw conclusions from analyses. The central objective of the undergraduate major in Statistics is to equip students with consequently requisite quantitative skills that they can employ and build on in flexible ways.

Major objectives are to learn concepts and tools for working with data and have experience in analyzing real data, understand the fundamentals of probability theory, statistical reasoning, inferential methods, statistical modeling and its limitations, and have skill in description, interpretation and exploratory analysis of data by graphical and other means.

Unit-I

Basic Statistics: Measures of central tendencies. Measures of dispersion. Frequency distributions. Moments. Correlation coefficient. Regression.

Unit-II

Sampling: Theory of sampling, population and sample Survey methods and estimation Statistical inference. Testing of hypothesis and inference.

Unit-III

Computing frequency charts. Regression analysis.

Unit-IV

Time series and forecasting.

Unit-V

Statistical Quality control methods: Factor analysis. Tests of significance X test and F test Applications.

Text/Reference Books

1. Affi, A.A., "Statistical Analysis: A Computer Oriented Approach". Academic Press, New York, 1979. Hogg, R. v..Et. Al., "Introduction to Mathematical Statistics", American Publishing, New York. 1980.

Upon successful completion of this subject students should be able to:

1. Use the computer to conduct a statistical analysis of data, including how to acquire, clean and organize data, analyze data using computationally intensive statistical methods.
2. To express statistical ideas and computations

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3. To learn about different data technologies and tools.
4. To acquire skills in basic numeracy, graphics, modern computationally intensive methods, and simulation.
5. To test hypothesis and methodology such as sampling, goodness-of-fit testing, analysis of variance, and least squares estimation.
6. To acquire the skills and knowledge to take better decision in given circumstances.
7. To design data collection plans, analyze data appropriately and interpret and draw conclusions from those analyses.

MCA Syllabus at JECRC University

Course Code: BMC116A

Course Name: Business Communication Skills

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective:

- To apply an ability to develop communication theories and be highly skilled in the use of quantitative methods to evaluate them.
- To apply ability to how people create, transmit, interpret, evaluate and respond to messages to inform, relate to, and influence one another interpersonally, in small groups, in organizations, in public settings and across cultures.
- To build a firm knowledge of communication so as to facilitate its application for employability skills.
- To enhance employability skills and facing the corporate world with full confidence.

Unit I: Basics of Communication

1. Introduction: What is Communication?
2. The Process of Communication : sender, receiver, channel, code, topic, message, context, feedback, 'noise'
3. Filters & Barriers to Communication
4. Different Types of Communication
5. The importance of communication
6. Verbal and non-verbal communication
7. Comparing general' communication and business communication

Unit II: Composition

1. Resume Writing
2. Job application

Unit III: Written Communication

1. Report Writing
 - i. Definition and characteristics of report,
 - ii. Need of reports
 - iii. Types of reports: Technical Reports, Progress report, ,Event reporting,
 - iv. Newsletters
 - v. Summer project report
2. Technical proposal writing
 - i. Definition and characteristics of technical proposal writing,
 - ii. Types of proposal
 - iii. Making a proposal

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Unit IV Speaking Skills

1. Seminar Presentation. :
 - i. Verbs often Required in Presentations
 - ii. Importance of Body Language in Presentations
 - iii. Preparing an Outline of a Presentation Pronunciation
 - iv. Structure of Presentation
 - v. Ending the Presentation
2. Group Discussion.
 - i. Definition,
 - ii. Advantages,
 - iii. Qualities Required,
 - iv. General Dos and Don'ts,
 - v. Body languages,
 - vi. Acting as a moderator
3. Interview:
 - i. Types of interview,
 - ii. Getting ready for an interview,
 - iii. Interview phases

Unit V

1. Written Analysis of Cases/Case study
2. The research paper/the process of research

Suggested Readings

1. Communication Skills for Engineers and Scientists, Sangeeta Sharma and BinodMishra, PHI Learning Pvt. Ltd.(New Delhi)
2. English Grammar and Composition, Gurudas Mukherjee, Ane Books Pvt. Ltd.(New Delhi)
3. Current English Grammar and Usage with Composition, R.P. Sinha, Oxford University Press (New Delhi)
4. Effective Technical Communication, M Ashraf Rizvi, Tata McGraw Hill (New Delhi)
5. Business Communication, Meenakshi Raman & Prakash Singh, Oxford University Press (New Delhi)
6. Professional Communication, ArunaKoneru, Tata McGraw Hills, New Delhi.
7. “Communicative English for Engineers and Professionals”, by Nitin Bhatnagar&MamtaBhatnagar, Pearson (New Delhi).
8. “The Ace of Soft Skills”, by Gopalswamy Ramesh &Mahadevan Ramesh, Pearson (New Delhi)

Upon successful completion of this subject students should be able to:

1. Understand communication processes and practices in professional and academic contexts.
2. Research and use information for communicative tasks.

MCA Syllabus at JECRC University

Course Code: MCA 026A

Course Name: Advance Database Management Systems Lab

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective: An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs .An ability to function effectively on teams to accomplish a common goal.

1. Create and use the following database scheme to answer the given queries.

EMPLOYEE Scheme

Field	Type	NULL	KEY	DEFAULT
Eno	Char(3)	NO	PRI	NIL
Ename	Varchar(50)	NO		NIL
Job_type	Varchar(50)	NO		NIL
Manager	Char(3)	Yes	FK	NIL
Hire_date	Date	NO		NIL
Dno	Integer	YES	FK	NIL
Commission	Decimal(10,2)	YES		NIL
Salary	Decimal(7,2)	NO		NIL

EMPLOYEE State

Eno	Ename	Job_type	Manager	Hire_date	Dno	Commission	Salary
765	Martin	Sales_man	198	1981-04-22	30	1400.00	1250.00
756	Jones	Manager	783	1981-04-02	20	0.00	2300.00
752	Ward	Sales_man	769	1981-02-22	30	500.00	1300.00
749	Allan	Sales_man	769	1981-02-20	30	300.00	2000.00
736	Smith	Clerk	790	1980-12-17	20	0.00	1000.00
793	Miller	Clerk	788	1982-01-23	4	0.00	1300.00
792	Ford	Analyst	756	1981-12-03	20	0.00	2600.00
790	James	Clerk	769	1981-12-03	30	0.00	950.00
787	Adams	Clerk	778	1983-01-12	20	0.00	1150.00
784	Turner	Sales_man	769	1981-09-08	30	0.00	1450.00
783	King	President	NULL	1981-11-17	10	0.00	2950.00
788	Scott	Analyst	756	1982-12-09	20	0.00	2850.00
778	Clark	Manager	783	1981-06-09	10	0.00	2900.00
769	Blake	Manager	783	1981-05-01	30	0.00	2870.00

DEPARTMENT Scheme

Field	Type	NULL	KEY	DEFAULT
Dno	Integer	No	PRI	NULL
Dname	Varchar(50)	Yes		NULL
Location	Varchar(50)	Yes		New Delhi

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DEPARTMENT State

Dno	Dname	Location
10	Accounting	New York
20	Research	Dallas
30	Sales	Chicago
40	Operation	Boston
50	Marketing	New Delhi

Query List

1. Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first.
2. Query to display unique Jobs from the Employee Table.
3. Query to display the Employee Name concatenated by a Job separated by a comma.
4. Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT.
5. Query to display the Employee Name and Salary of all the employees earning more than \$2850.
6. Query to display Employee Name and Department Number for the Employee No= 7900.
7. Query to display Employee Name and Salary for all employees whose salary is not in the range of \$1500 and \$2850.
8. Query to display Employee Name and Department No. Of all the employees in Dept 10 and Dept 30 in the alphabetical order by name.
9. Query to display Name and Hire Date of every Employee who was hired in 1981.
10. Query to display Name and Job of all employees who don't have a current Manager.
11. Query to display the Name, Salary and Commission for all the employees who earn commission. Sort the data in descending order of Salary and Commission.
12. Query to display Name of all the employees where the third letter of their name is 'A'.
13. Query to display Name of all employees either have two 'R's or have two 'A's in their name and are either in Dept No = 30 or their Manger's Employee No = 7788.
14. Query to display Name, Salary and Commission for all employees whose Commission Amount is greater than their Salary increased by 5%.
15. Query to display the Current Date.
16. Query to display Name, Hire Date and Salary Review Date which is the 1st Monday after six months of employment.
17. Query to display Name and calculate the number of months between today and the date each employee was hired.
18. Query to display the following for each employee:-
<E-Name> earns < Salary> monthly but wants < 3 * Current Salary >.
Label the Column as Dream Salary.
19. Query to display Name with the 1st letter capitalized and all other letter lower case and length of their name of all the employees whose name starts with 'J', 'A' and 'M'.

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20. Query to display Name, Hire Date and Day of the week on which the employee started.
21. Query to display Name, Department Name and Department No for all the employees.
22. Query to display Unique Listing of all Jobs that are in Department # 30.
23. Query to display Name, Dept Name of all employees who have an 'A' in their name.
24. Query to display Name, Job, Department No. And Department Name for all the employees working at the Dallas location.
25. Query to display Name and Employee no. Along with their Manger's Name and the Manager's employee no; along with the Employees' Name who do not have a Manager.
26. Query to display Name, Dept No. And Salary of any employee whose department No. And salary matches both the department no. And the salary of any employee who earns a commission.
27. Query to display Name and Salaries represented by asterisks, where each asterisk (*) signifies \$100.
28. Query to display the Highest, Lowest, Sum and Average Salaries of all the employees
29. Query to display the number of employees performing the same Job type functions.
30. Query to display the no. Of managers without listing their names.
31. Query to display the Department Name, Location Name, No. Of Employees and the average salary for all employees in that department.
32. Query to display Name and Hire Date for all employees in the same dept. As Blake.
33. Query to display the Employee No. And Name for all employees who earn more than the average salary.

Upon successful completion of this subject students should be able to:

1. Use the knowledge in Database creation, management.
2. Have Knowledge of Back-end and can implement this in project work.
3. Having knowledge of different databases enable them in selection of efficient database.
4. Include these queries in implementation of a project.

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Course Code: MCA 027A

Course Name: Programming in C++ Lab II

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective: To understand the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code and to write small/medium scale C++ programs with simple graphical user interface.

1. Write a function using variables as arguments to swap the values of a pair of integers.
2. An election is contested by five candidates. The candidates are numbered 1 to 5 & voting is done by marking the candidate number on the ballot paper. Write a program to read the ballot & count the votes cast for each candidate using an array, variable count. In case, a number read is outside the range 1 to 5, the ballot should be considered as a 'spoilt ballot' and the program should also count the number of spoilt ballot.
3. Write a program to read a matrix of size m*n from the keyboard and display the same on the screen.
4. Define a class to represent a bank account including the following members: - Data members
 - a. Name of the depositors
 - b. Account number
 - c. Type of account
 - d. Balance amount in the account Member function
 - To assign initial values
 - To deposit an amount
 - To withdraw an amount after checking the balance
 - To display the name and balance.
5. Modify the class and the program of practical 4 for handling 10 customers.
6. Create 2 classes OM and DB which store the value of distance. DM store distances in meters and cm and DB in feet and inches. Write a program that can read values for the class objects and add 1 object OM with another object of DB. Use a friend function to carry out the addition operation the object that stores the results may be a DM object or a DB object, depending upon the units in which the results are required. The display should be in the format of feet and inches or meters and cms depending on the object on display.
7. A book shop maintains the inventory of books that are being sold at the shop the list includes details such as author, title and publisher and stock position. Whenever a customer wants the book, the sales person inputs the title and author and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed, if it is, then the system displays the book details and requests for the number of copies required. If the requested are available, the total cost of the required copies is displayed; otherwise the message "Required copies not in stock" is displayed. Design a system using a class called books with suitable member functions and constructors. Use new operator in constructor to allocate memory space required.

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8. Define a class string that could work as a user defined string type include constructors that will enable us to create an .un-initialized string. String s1; ./ string with length 0 And also to initialize an object with string constant at the time of creation like String s2("well done"); . Include a function that adds two strings to make a third string.
9. Create a class float that contains 2 float data member. Over load all the 4 arithmetic operators so that do operate on the objects of float.
10. Create a class MAT of size m*o. Define all possible matrix operation for MAT type objects.
11. Create a base class called shape use this class to store two double type values that could be used to compute the area of fig. Derive the specific class called TRIANGLE and RECTANGLE from the data shape. Add to base class, a member function get - data () to initialize base class data members and another member and another member function display – area() to compute and display the area of the fig. Make display – area () as a virtual function and redefine function in the derived classes to suit their requirements,Using these 3 classes design a program that will accept dimension of RECTANGLE orTRIANGLE interactivity and display the area.Remember the 2 values given as input will be treated as length of 2 sides in the case ofrectangle and as base and height in the case of triangles and used as follows:

$$\text{Area of rectangle} = x*y$$

$$\text{Area of triangle} = 1/2 *x*y$$

Upon successful completion of this subject students should be able to:

1. Apply basic & advance programming principles using C++ language.
2. Apply basic C++ program structure in software development.

Course Code: MCA028A

Course Name: Object Oriented Analysis & Design Lab

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective: To acquaint the students with the basics of a design language .UML is introduced as a modeling language which help the students to provide a complete understanding of how to Architect and design a S/W System.

MCA Syllabus at JECRC University

1. Introduction: OOAD and UML
2. What is Object Oriented Architectural Design?
3. What is Visual Modelling?
4. What is Unified Modeling Language (UML)?
5. UML Concepts
6. UML Diagrams:-Class Diagram. Object Diagrams. Interaction Diagrams Sequence Diagrams Collaboration Diagrams Behavioral Modeling Use case Diagrams Activity Diagrams Advanced Behavioral Modeling, State Chart Diagrams Architectural Modeling Component Diagrams Deployment Diagrams
7. UML Softwares Visio, StarUML, DiaArgoUMLUmbrello White Star UML BOUML

Upon successful completion of this subject students should be able to:

1. Implement the object oriented software development process, including object-oriented methodologies and work flows.
2. Designs based on design principles, patterns, and heuristics.
3. Implement Domain modeling, System-level testing of Object-oriented programs.
4. To design different UML diagrams through various tools available.

Course Code: MCA 029A

Course Name: Seminar-III

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0	0	4

A seminar will be on any technical topic.

Course Code: BMC117A

Course Name: Business Communication Skills Lab

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective:

- To learn the art of public speaking and facing interviews.

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- To build up the learners confidence in oral and interpersonal communication by reinforcing the basics of pronunciation specially focusing on interviews / corporate meetings / international business travels.
- To know the techniques of seminars and paper presentation.
- To explain the importance of oral communication to business.

1. Introduction of Phonetics
2. Pronunciation Exercise
3. Describing the Pictures or images and cartoon using MSWord
4. Developing outline, key expression and situation
5. Jumbled words/sentences
6. Group Discussion
7. Job inter view
8. Seminar Presentation
9. Resume Writing Practicing

Suggested Readings and Packages

1. Advanced Manual for Communication Laboratories and Technical Report Writing, D.Sudha Rani, Pearson, (New Delhi)
2. A Course in Phonetics and Spoken English, J. Sethi& P.V. Dhamija, PHI Learning Pvt.Ltd. (New Delhi)
3. English Language Laboratories: A Comprehensive Manual, NiraKonar, PHI Learning Pvt .Ltd. (New Delhi)
4. Communication Skills for Engineers and Scientists, Sangeeta Sharma and Binod Mishra, PHI Learning Pvt. Ltd.(New Delhi).
5. Oxford English Learning Package.(With CDs: Headway Series)

Upon successful completion of this subject students should be able to:

1. Understand communication processes and practices in professional and academic contexts.
2. Develop Reading, Listening and Speaking Skills.

SEMESTER -IV

Course Code: MCA030A

Course Name: Computer Graphics & Multimedia

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

MCA Syllabus at JECRC University

Objective: To be able to define the process of designing “multi-media” from concept to execution. To be able to utilize skills, technology, and formal concepts to effectively and creatively solve a wide range of graphic design problems which are solved in the context of various multimedia environments.

Unit-I

Computer Graphics: A Survey of Computer graphics, Overview of Graphics System: Video Display Devices, Raster-Scan Systems, Input Devices, Hard-Copy Devices, Graphics Software, and Introduction to OpenGL. Graphics Output Primitives: Point and Lines, Algorithms for line, circle & ellipse generation, Filled-Area Primitives. Attributes of Graphics Primitives: Point, line, curve attributes, fill area attributes, fill methods for areas with irregular boundaries, Antialiasing.

Geometric Transformations (both 2-D & 3-D): Basic Geometric Transformations, Matrix Representation and Homogeneous Coordinates, Composite Transformations, Inverse Transformations.

Unit-II

Two Dimensional Viewing: Viewing pipeline, Clipping Window, Normalization & Viewport coordinate Transformations, Clipping Algorithms: Point clipping, Line clipping and Polygon clipping. Three Dimensional Viewing: 3-dimensional Viewing Concepts, Viewing pipeline, Projection Transformations (Orthogonal, Oblique parallel, Perspective).

Three Dimensional Object Representations: Curved Surfaces, Quadratic Surfaces, Spline Representations, Bezier Spline Curves and Surfaces, B-Spline Curves and Surfaces, Visible Surface Detection Methods: Classification of Visible-Surface Detection Algorithms, Back-Face Detection, Depth-Buffer method.

Unit-III Illumination Models: Basic Illumination Models, Displaying light Intensities, Halftone Patterns and Dithering techniques, Polygon-Rendering Methods (Gouroud Shading, Phong Shading), Ray-Tracing Methods (Basic Ray-Tracing Algorithm, Ray-Surface Intersection Calculations). Computer Animation, Hierarchical Modeling (introductory idea only).

Unit-IV

Multimedia Fundamentals: Introduction, Multimedia & Hypermedia, WWW, Multimedia software tools, Multimedia Authoring and Tools, Graphics and Image Data Representation, Color Models in images & video, Fundamental Concepts in Video, Basics of digital Audio.

Unit V

Multimedia Data Compression: Lossless Compression Algorithms (Basics of Information Theory, Run length coding, variable length coding, lossless image compression), Lossy Compression Algorithms (distortion measure, quantization, Discrete Cosine transform), Basic

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Image Compression standard-JPEG, Basic Video Compression standard-MPEG (MPEG-1&2).

Text Books:

1. Donald **Hearn** & M. Pauline **Baker**, “Computer Graphics with OpenGL”, Third Edition, 2004, Pearson Education, Inc. New Delhi.
2. Ze-NianLiand Mark S. **Drew**, “Fundamentals of Multimedia”, First Edition, 2004, PHI Learning Pvt. Ltd., New Delhi.

Upon completion of the subject, students will be able to:

1. Demonstrate an understanding of contemporary graphics hardware
2. Differentiate multimedia and non-multimedia
3. Differentiate text, image, video & audio
4. Understand Multimedia Data Compression along with Compression Algorithms and Basic Image Compression standard

Course Code: MCA031A

Course Name: Programming in C#

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Unit-I

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The .NET Framework: Understand the motivation behind the .NET platform, Common Language Infrastructure (CLI). Know the role of the Common Type System (CTS), the Common Language Specification (CLS) and the Common Language Runtime (CLR), Understand the assembly, metadata, namespace, type distinction, Contrast single-file and multi-file assemblies, Know the role of the Common Intermediate Language (CIL), Platform independent .NET(Mono / Portable .NET distributions).

Unit-II

Evolution of C# Language: Language Fundamentals, Reference and value Types, primitive types the Nullable and enum types, Classes and objects, Defining classes Creating objects, Using static members, Garbage Collector, Overloading Methods, Various Constructors. Encapsulating data, access modifiers, properties, indexers arrays and read only fields. Handling errors and throwing exceptions The Root object class. Inheritance and polymorphism specialization, abstract classes, nesting of classes. String and Date Time classes

UNIT - III

Event handling paradigm: Delegates and events. Anonymous delegates and lambda expression FUNC and Action delegates.

Generics Collections: Interfaces, overriding interface implementation. Explicit interface implementation. Collection, IEnumerable, IEnumerator, IList, IComparer and their Generic equivalent. Working with generic List, Stack, Dictionary and Queue.

UNIT - IV

Programming Window Forms Applications: The notifies - subscribers paradigm for handling events. .NET framework for handling GUI events. Introduction to WPF and building an WPF application

UNIT - V

Introducing LINQ:A quick introduction. LINQ and C#. Defining and executing a Query. Implicitly typed local variables. Anonymous Types, Extension Methods and Lambda Expressions. Putting LINQ to work. LINQ to SQL Fundamentals of ADO.NET Updating retrieving and deleting data using LINQ to SQL.

Text Books

1. Jesse Liberty and Donald Xie , “Programming C# 3.0”, O’REILLY.
2. Paul J. Deitel, Harvey Deitel, “C# 2008 for Programmers”, Pearson, 3rd Ed., 2010.
3. Joseph Albahari and Ben Albhari, “C# 3.0/4.0 in NUTSHELL”, O’REILLY.
4. Stephen C. Perry, Atul Kahate, Stephen Walther, Joseph Mayo, “Essential of .net and Related Technologies with a focus on C#, XML, ASP.net and ADO.net”, Pearson, 2nd Ed. 2009.
5. Jon Skeet, “C# in Depth ”, O’REILLY

Upon successful completion of this course, students will be able to:

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1. Design, document, code and test small C# console and GUI applications.
2. Design, document, code and unit test class libraries as part of a larger project.

Course Code: MCA032A

Course Name: Compiler Design

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0	0	4

MCA Syllabus at JECRC University

Objective: This course aims to teach students the principals involved in compiler design. It will cover all the basic components of a compiler but not the advanced material on optimizations and machine code generation.

UNIT-I

Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools - Lexical Analysis -Role of Lexical Analyzer – Input Buffering – Specification of Tokens.

UNIT-II SYNTAX ANALYSIS

Role of the parser –Writing Grammars –Context-Free Grammars – Top Down parsing - Recursive Descent Parsing - Predictive Parsing – Bottom-up parsing - Shift Reduce Parsing – Operator Precedent Parsing - LR Parsers - SLR Parser - Canonical LR Parser - LALR Parser.

UNIT-III INTERMEDIATE CODE GENERATION

Intermediate languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – Procedure calls.

UNIT-IV CODE GENERATION

Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next-use Information – A simple Code generator – DAG representation of Basic Blocks – Peephole Optimization.

UNIT-V CODE OPTIMIZATION AND RUN TIME ENVIRONMENTS

Introduction– Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing.

By the end of the subject, students should be able to:

1. Acquire knowledge in different phases and passes of Compiler, and specifying different types of tokens by lexical analyzer
2. Parser and its types i.e. Top-down and Bottom-up parsers.
3. Syntax directed translation, synthesized and inherited attributes.
4. Techniques for code optimization.
5. Different techniques of symbol table organization.
6. Code generation and its limitations.

Course Code: MCA033A

Course Name: Software Project Management

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	0		3

Unit- I

MCA Syllabus at JECRC University

INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT

Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

Unit- II

PROJECT EVALUATION

Strategic Assessment – Technical Assessment – Cost Benefit Analysis –Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

Unit- III

SELECTION OF APROPRIATE PROJECT APPROACH

Software Process and Process Models, Waterfall Model, Spiral model, Prototype model,, Incremental Delivery, RAD model, Selecting most appropriate model.

Unit- IV

PROJECT PLANNING &ACTIVITY PLANNING

Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.

Unit- V

MANAGING PEOPLE AND ORGANIZING TEAMS , SOFTWARE QUALITY

Introduction – Understanding Behavior – Organizational Behavior: A Background –Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation– The Old man – Hackman Job Characteristics Model – Working In Groups – Becoming A Team –Decision Making – Leadership – Organizational Structures – Stress –Health And Safety, Software quality, Process Capability models. Product and Process Metrics.

Text Book

1. Bob Hughes, Mikecoterell, “Software Project Management”, Third Edition/ Fifth Edition, TataMcGraw Hill, 2004.

Upon completion of the subject, students will be able to:

1. Appreciate the importance of software project management;
2. Apply project management techniques for information systems development;
3. Apply the management skills to monitor and control a software project;

Course Code: MCA034A

Course Name: UNIX Lab

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

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Objective: To provide appropriate knowledge required to administer computer systems and networks. To know about the working of various network protocols. To help learn practical aspects of various system configurations in UNIX variants. Use of a shell script in various applications. A representative list is given in what follows: Write a shell script that presents a multiple choice question, gets the user's answer, and reports back whether it is right or wrong. Finally it shall display the score.

1. Write shell script which simulates the important DOS commands with various switches.
2. Write a shell script that receives a file name and informs whether it exists or not. If it exists, then it shall give the details of its access permission, its size etc.
3. Write a shell script that accepts a matrix and finds and prints the row and column totals Modify the calendar so that it knows about weekend: On Friday, tomorrow include Saturday, Sunday and Monday, Modify calendar to handle leap years. Calendar should know about our college holidays. How would you arrange it.
4. Write a shell script which will accept input and then check if the input is a directory file and is readable and writeable. If so then all ordinary files under the directory should be listed out one by one and for each ordinary file that is writeable, the user should be asked if the file is to be deleted or not. If yes, then the deletion should be done else next files processed. At the end of execution of the script, should display the following messages:
 - i. Ordinary files deleted from the directory.
 - ii. Ordinary files remaining in the directory.
5. Write a shell script that accepts the name of a text file and finds
 - i. No. of sentences ii. No. of words iii. No. of words having more than five characters. iv. No. of words that start with a vowel. v. No. of articles in the text file.
 - ii. Write a program using proper system calls to exchange data between you program and a specified file.
 - iii. Write a Program that passes some amount of data from the client to the server using message Queues files
 - iv. Write a program that enables you to run two or more shells on a single terminal.

After completing this course students should be able to:

1. Describe and use the UNIX operating system
2. Describe and use the fundamental UNIX system tools and utilities
3. Describe and write shell scripts in order to perform basic shell programming

Course Code: MCA035A

Course Name: Computer Graphics & Multimedia Lab

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective: An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs and an ability to function effectively on teams to accomplish a common goal.

Topics

1. Introduction to OpenGL Programming.
2. Implementing line drawing algorithms.
3. Implementing circle drawing algorithms.
4. Implementing ellipse drawing algorithms.
5. Implementing Line Clipping Algorithms.
6. Implementing Polygon Clipping Algorithms.
7. Implementing 2-d Transformations.
8. Implementing 3-d Transformations.
9. Implementing scan fill, boundary fill algorithms.
10. Implementing seed fill, flood fill algorithm.
11. Writing program on B-Splines, Bezier Curves
12. Writing program on Mandelbrot set & Julia set.
13. Writing program on Sierpinski gasket, Koch curve.
14. Writing program on Fractal trees & forest.
15. Writing program on wire frame model & terrain generation.
16. Implementing Ray tracing algorithm.
17. Writing program on Animation & Morphing techniques.

Upon completion of the subject, students will be able to:

1. Implement different graphical transformations and transitions of various shapes & patterns.
2. Implement Animation & Morphing techniques.

Course Code: MCA036A

Course Name: Programming in C# Lab

L	T/P	Pr	C
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MCA Syllabus at JECRC University

(Hr.)	(Hr.)	(Hr.)	
0	0	2	2

1. Write a Program in C# to Check whether a number is Palindrome or not.
2. Write a Program in C# to demonstrate Command line arguments processing.
3. Write a Program in C# to find the roots of Quadratic Equation.
4. Write a Program in C# to demonstrate boxing and unBoxing.
5. Write a Program in C# to implement Stack operations.
6. Write a program to demonstrate Operator overloading.
7. Write a Program in C# to find the second largest element in a single dimensional array.
8. Write a Program in C# to multiply two matrices using Rectangular arrays.
9. Find the sum of all the elements present in a jagged array of 3 inner arrays.
10. Write a program to reverse a given string using C#.
11. Using Try, Catch and Finally blocks write a program in C# to demonstrate error handling.
12. Design a simple calculator using Switch Statement in C#.
13. Demonstrate Use of Virtual and override key words in C# with a simple program
14. Implement linked lists in C# using the existing collections name space.
15. Write a program to demonstrate abstract class and abstract methods in C#.
16. Write a program in C# to build a class which implements an interface which already exists.
17. Write a program to illustrate the use of different properties in C#.
18. Demonstrate arrays of interface types with a C# program.
19. Program to display the addition, subtraction, multiplication and division of two number using console applications.
20. Program to display the first 10 natural numbers and their sum using console application.

After completing this course students should be able to:

1. Write programs that use fundamental C# programming tools
2. Use advanced OOP tools when designing C# program

Course Code: MCA037A

Course Name: Professional Skills-I

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0	0	4

SEMESTER –V

Course Code: MCA038A

MCA Syllabus at JECRC University

Course Name: Advance Java Programming

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Objective: An ability to communicate effectively with a range of audiences. An ability to analyze the local and global impact of computing on individuals, organizations and society. Recognition of the need for and an ability to engage in continuing professional development.

Unit I Core JAVA

Java Programming Language, Data Types and Operations, Structured Programming, Selection Statements, Loops, Methods, Method, Arrays, Object-Oriented Programming: Classes and Objects, Constructors, Implementing & Designing Classes, Use of Keywords: static, final, this, Class Abstraction and Encapsulation. Strings and Text I/O, Inheritance and Polymorphism, use of super keyword, Overriding vs. Overloading,

Unit II

Java Programming Object: The Cosmic Superclass, Abstract Classes and Interfaces, Packages, Applet As Java Applications Applets specific methods & Related HTML references Creating an Applet Displaying it using Web Browser with appletviewer.exe Advantages and Disadvantages of Applet Vs Applications

Unit III

Multithreading concepts, Thread Life cycle, creating multithreaded application, Thread priorities

Thread synchronization Abstract Windows Toolkit Components and Graphics Containers, Frames and Panels Layout Managers Border layout, Flow layout Grid layout, Card layout AWT all components.

Unit IV

Event delegation Model Event source and handler Event categories, Listeners, Anonymous classes Swing Libraries Model view Controller design pattern Different layout, menus dialog boxes, text input Java Input Output Java IO package Byte/Character Stream Buffered reader / writer File reader / writer Print writer File Sequential / Random.

Unit V

JDBC Java database connectivity, Types of JDBC drivers Writing first JDBC applications Types of statement objects (Statement, PreparedStatement and CallableStatement) Types of resultset, ResultSetMetadata Inserting and updating records JDBC and AWT Connection pooling RMI Introduction & Architecture of RMI Java rmi classes and interfaces Writing simple RMI application Parameter passing in remote methods (marshalling and unmarshalling) Introduction to CORBA Java Beans :Java Beans introduction, design pattern

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Writing simple bean Beans persistence and introspection EJB Architecture Container classes, Interfaces EJB types- Session, Entity, Message Driven.

Text Books:

1. Programming with Java A Primer, E.Balaguruswamy Tata McGraw Hill Companies
2. Java Programming John P. Flynt Thomson 2nd
3. Java Programming Language Ken Arnold Pearson
4. The complete reference JAVA2, Herbert schildt. TMH

On completion of this course students will be able to:

1. Understand the principles of programming, in particular the role of abstractions in representing and manipulating data and processes, and how a particular programming language can be used to express such abstractions in a form that can be executed on a machine
Understand the key principles of the Object Oriented Programming paradigm including Encapsulation, Polymorphism and Inheritance
2. Design, write and test programs written in Java, employing Graphical User Interface, in response to a set of user requirements
3. Write Java applications for handling collections of data using container objects provided by the Java 2 Collections Framework, in particular Array and Array List

Course Code: MCA039A

Course Name: Operations Research

MCA Syllabus at JECRC University

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	0		3

Objective: Students will get an introduction to use quantities methods and techniques for effective decisions making; Students will get introduction about model formulation and applications that are used in solving business decision problems.

UNIT-I

Introduction: Definition and scope of operations research (OR), OR model, solving the OR model, art of modeling, phases of OR study. Linear Programming: Two variable Linear Programming model and Graphical method of solution, Simplex method, Dual Simplex method, special cases of Linear Programming, duality, sensitivity analysis.

UNIT-II

Transportation Problems: Types of transportation problems, mathematical models, transportation algorithms, Assignment: Allocation and assignment problems and models, processing of job through machines

UNIT-III

Network Techniques: Shortest path model, minimum spanning Tree Problem, Max-Flow problem and Min-cost problem. Project Management: Phases of project management, guidelines for network construction, CPM and PERT.

UNIT-IV

Theory of Games: Rectangular games, Minimax theorem, graphical solution of $2 \times n$ or $m \times 2$ games, game with mixed strategies, reduction to linear programming model. Quality Systems: Elements of Queuing model, generalized poisson queuing model, single server models.

UNIT-V

Inventory Control: Models of inventory, operation of inventory system, quantity discount. Replacement: Replacement models: Equipments that deteriorate with time, equipments that fail with time

Text Books:

1. Wayne L. Winston, "Operations Research" Thomson Learning, 2003.
2. Hamdy H. Taha, "Operations Research-An Introduction" Pearson Education, 2003.
3. R. Panneer Seevam, "Operations Research" PHI Learning, 2008.
4. V.K.Khanna, "Total Quality Management" New Age International, 2008.

Learning Outcomes:

MCA Syllabus at JECRC University

1. After completion of this syllabus student will be able to understand the characteristics of different types of decision-making environments and the appropriate decision making approaches and tools to be used in each type.
2. After completion of this syllabus student will be able to build and solve Transportation Models and Assignment Models.

MCA Syllabus at JECRC University

Course Name: Programming in ASP.Net

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0	0	4

Objective:-To make students Develop dynamic web applications, create and consume web services appropriate data sources and data bindings in ASP.NET web applications

Unit-I

An overview of .NET including the Common Language Interface, the Common Type System, the Common Language Runtime, and .NET Framework and class libraries. Language and platform neutrality.

Unit-II

An introduction to Web Forms and a comparison to familiar models such as Windows Forms. The ASP.NET execution model. Server-side controls, events, state-management, configuration, authentication and authorization, navigation, master pages, themes and skins, static and dynamic components, data access and data binding including the use of ADO.NET, security.

Unit-III

Introduction to creation of web services using ASP.NET and consuming web services in both Windows Forms and Web apps.

Unit-IV

Server-side and client-side code-behind.

Unit-V

Current topics such as AJAX, LINQ, MVC, HTML5, and CSS3.

Text Book

1. ASP.NET 4.5 Web Programming with C# 2012 by Mary Delamater and Anne Boehm, published by Murach, 2013.

Learning Outcomes:

1. Web applications development using ASP.NET framework is the main outcome of this course.

Course Code: MCA041A

MCA Syllabus at JECRC University

Course Name: Software Testing and Quality Assurance

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	0	0	3

Objective:

1. To apply the testing strategies and methodologies in their projects
2. To understand test management strategies and tools for testing
3. A keen awareness on the open problems in software testing and maintenance

UNIT-I TESTING BASICS

Testing as an engineering activity – Role of process in software quality – Testing as a process – Basic definitions – Software testing principles – The tester’s role in a software development organization – Origins of defects – Defect classes – The defect repository and test design – Defect examples – Developer / Tester support for developing a defect repository.

UNIT-II TEST CASE DESIGN

Introduction to testing design strategies – The smarter tester – Test case design strategies – Using black box approach to test case design – Random testing – Equivalence class partitioning – Boundary value analysis – Other black box test design approaches – Black box testing and COTS – Using white box approach to test design – Test adequacy criteria – Coverage and control flow graphs –Covering code logic – Paths – Their role in white box based test design –Additional white box test design approaches – Evaluating test adequacy criteria.

UNIT-III LEVELS OF TESTING

The need for levels of testing – Unit test – Unit test planning – Designing the unit tests – The class as a testable unit – The test harness – Running the unit tests and recording results – Integration tests – Designing integration tests – Integration test planning – System test – The different types – Regression testing – Alpha,beta and acceptance tests.

UNIT-IV TEST MANAGEMENT

Basic concepts – Testing, debugging goals, policies – Test planning – Test plan components – Test plan attachments – Locating test items – Reporting test results – The role of three groups in test planning and policy development – Process and the engineering disciplines – Introducing the test specialist – Skills needed by a test specialist – Building a testing group.

CONTROLLING AND MONITORING

Defining terms – Measurements and milestones for controlling and monitoring – Status meetings – Reports and control issues – Criteria for test completion – SCM – Types of reviews – Developing a review program – Components of review plans – Reporting review results.

UNIT-V SOFTWARE QUALITY ASSURANCE

MCA Syllabus at JECRC University

Quality Concepts , Quality , Quality Control , Quality Assurance , Cost of Quality , The Quality Movement ,Software Quality Assurance , Background Issues , SQA Activities ,Software Reviews , Cost Impact of Software Defects , Defect Amplification and Removal , Formal Technical Reviews , The Review Meeting , Review Reporting and Record Keeping , Review Guidelines , Formal Approaches to SQA , Statistical Software Quality Assurance , Software Reliability , Measures of Reliability and Availability, Software Safety , Mistake-Proofing for Software , The ISO 9000 Quality Standards , The ISO Approach to Quality Assurance Systems The ISO 9001 Standard ,The SQA Plan ,

Text Books

1. SrinivasanDesikan, Gopaldaswamy Ramesh, “*Software Testing: Principles and Practices*”, Pearson 2012
2. Aditya P. Mathur, “*Foundations of Software Testing*”, Pearson, 2008

References:

1. Paul Ammann, Jeff Offutt, “*Introduction to Software Testing*”, Cambridge University Press, 2008
2. Paul C. Jorgensen, “*Software Testing: A Craftsman's Approach*”, Auerbach Publications, 2008

Upon completion of this subject, the student will be able to:

1. The students learn testing and how apply the testing strategies and methodologies in their projects
2. Use concepts of test management strategies and tools for testing
3. A keen awareness on the open problems in software testing and maintenance.

Course Code: MCA042A

MCA Syllabus at JECRC University

Course Name: Programming in JAVA Lab

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective: This module aims to introduce the students to some concepts of advanced programming and practice on reusing components. It focuses on Graphical User Interface (GUI), multithreading, networking, and database manipulation. A selected programming language is used such as Java. By completing this module, the students should be able to write sophisticated Java applications.

Topics

1. Introduction, Compiling & executing a java program.
2. Program with data types & variables.
3. Program with decision control structures: if, nested if etc.
4. Program with loop control structures: do, while, for etc.
5. Program with classes and objects.
6. Implementing data abstraction & data hiding.
7. Implementing inheritance.
8. Implementing and polymorphism.
9. Implementing packages.
10. Implementing generics.
11. Program with modern features of java.
12. Implementing interfaces and inner classes
13. Implementing wrapper classes
14. Implementing generics.
15. Implementing cloning.
16. Implementing Reflections
17. Working with files.
18. Assignments on Java concepts such as Interfaces, Packages, Exception Handling, Applet, multithreading, Abstract Windows Toolkit, Java Input Output, Networking, JDBC, RMI ,Java Beans can be included.

After completion of Lab Course students will be able to:

1. Design, write and test programs written in Java

Course Code: MCA043A

MCA Syllabus at JECRC University

Course Name: Programming in ASP.Net Lab

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
0	0	2	2

Objective: An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs and an ability to function effectively on teams to accomplish a common goal.

1. Write a program to display the following feedback form.
2. The different options for the list box must be ASP-XML, DotNET, JavaPro and UNIX, C, C++. When the Submit Form button is clicked after entering the data, a message as seen in the last line.
3. Write a program to display three images in a line. When any one of the images is clicked, it must be displayed below. On clicking the displayed image it must be cleared.
4. Write a simple ASP.NET program to display the following Web Controls:
 - i. A button with text “clicks me”. The button control must be in the center of the form.
 - ii. A label with a text hello
 - iii. A checkbox.
5. Write a program to display “Welcome To Radiant” in the form when the “click” button is clicked. The form title must be ASP.NET.
6. Write a program containing the following controls:
 - i. A ListBox
 - ii. A Button
 - iii. An Image
 - iv. A Label
7. The listbox is used to list items available in a store. When the user clicks on an item in the listbox, its image is displayed in the image control. When the user clicks the button, the cost of the selected item is in the control

After completion of Lab Course students will be able to:

1. Design, write and test programs written in ASP.NET
2. Develop Web applications with ASP.NET framework

Course Code: MCA044A

MCA Syllabus at JECRC University

Course Name: Professional Skills -II

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	0	0	3

Course Code: MCA045A

Course Name: Minor Project

L (Hr.)	T/P (Hr.)		Pr (Hr.)	C
	0		4	4

Course Code: MCA046A

MCA Syllabus at JECRC University

Course Name: Software Testing Lab

L (Hr.)	T/P (Hr.)		Pr (Hr.)	C
	0		2	2

Objective: To make student accustom with various automated tools used for Software Design and Development, Testing, Project Management etc.

1. Use of diagramming tools for system analysis Preparing Data Flow Diagrams & Entity Relationship Diagrams.
2. Use of Tools To design User Interfaces Report generation (Using VB /Oracle Developer)
3. MS – project Its use in project scheduling
4. Use of any Automated Testing Tools like Selenium/Load Runner/Win Runner etc.
5. Win Runner
 - a. Record Context Sensitive
 - b. Record Analog
 - c. Database check point
 - d. Bit map Check Point
 - e. Synchronization point
6. S/W Configuration Management Tools
 - a. Source Code Control System (SCCS)
 - b. Make in UNIX Note: Student has to check there own developed software through win runner.
7. Use of Test Management tools: Open Source tools like; TET(Test Environment Toolkit), Test manager.
8. Use of Functional Testing Tool: Selenium/Watir/Solex/Webrecorder.
9. Use of Load Testing Tools: Jmeter/FunkLoad.
10. Use of Test Management Tools: HP Quality Centre/QA Complete/Automated Test Designer (ATD).
11. Use of any tools: Apache JMeter, LoadRunner, WebLOAD, Appvance, NeoLoad, /LoadUI/WAPT/Loadster/LoadImpact/Rational Performance Tester/Testing Anywhe

Domain-I

Course Code: MCA047A

Course Name: Cloud Computing

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	1		4

Objectives: Get a clear understanding of Cloud Computing fundamentals and its importance to various organizations. Master the concepts of IaaS, PaaS, SaaS, Public and Private clouds. Get hands-on experience in Cloud Programming.

Unit-I

Cloud Computing Fundamental: Cloud Computing definition, private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds, role of virtualization in enabling the cloud; Business Agility: Benefits and challenges to Cloud architecture. Application availability, performance, security and disaster recovery; next generation Cloud Applications.

Unit-II

Cloud Applications: Technologies and the processes required when deploying web services; deploying a web service from inside and outside a cloud architecture, advantages and disadvantages

Unit-III

Cloud Services Management: Reliability, availability and security of services deployed from the cloud. Performance and scalability of services, tools and technologies used to manage cloud services deployment; Cloud Economics : Cloud Computing infrastructures available for implementing cloud based services.

Unit-IV

Economics of choosing a Cloud platform for an organization, based on application requirements, economic constraints and business needs (e.g Amazon, Microsoft and Google, Salesforce.com, Ubuntu and Redhat) Application Development: Service creation environments to develop cloud based applications. Development environments for service development; Amazon, Azure, Google App.

Unit V

Best Practice Cloud IT Model : Analysis of Case Studies when deciding to adopt cloud computing architecture. How to decide if the cloud is right for your requirements. Cloud based service, applications and development platform deployment so as to improve the total cost of ownership (TCO)

MCA Syllabus at JECRC University

Text Books:

1. GautamShroff, Enterprise Cloud Computing Technology Architecture Applications
2. Toby Velte, Anthony Velte, Robert Elsenpeter, Cloud Computing, A Practical Approach

At the end of course student will be able to:

1. Understand the systems, protocols and mechanisms to support cloud computing
2. Develop applications for cloud computing
3. Understand the hardware necessary for cloud computing
4. Design and implement a novel cloud computing application.

MCA Syllabus at JECRC University

Course Code: MCA048A

Course Name: Distributed Systems

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0		4

Objective: The student will be able to know the following

1. Understanding the major tools and techniques that allow programmers to effectively program the parts of the code that require substantial communication and synchronization; Studying the core ideas behind modern coordination paradigms and concurrent data structures;
2. Introduce a variety of methodologies and approaches for reasoning about concurrent programs;
3. Realizing not only the basic principles but also the best practice engineering techniques of concurrent computing;

UNIT I

Characterization of Distributed Systems: Introduction, Examples of distributed Systems, Issues in Distributed Operating Systems, Resource sharing and the Web Challenges. System Models: Architectural models, Fundamental Models Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks, Causal ordering of messages, global state, termination detection. Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non-token based algorithms, performance metric for distributed mutual exclusion algorithms.

UNIT II

Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms. Agreement Protocols: Introduction, System models, classification of Agreement Problem-Interactive consistency Problem, Applications of Agreement algorithms.

UNIT III

Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study. Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control

UNIT IV

Distributed Transactions: Introduction, Flat and nested distributed transactions, Atomic commit protocols, concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Distributed shared memory – Design and Implementation issues, consistency models, CORBA Case Study: CORBA RMI, CORBA services.

UNIT V

MCA Syllabus at JECRC University

File service components, design issues, interfaces, implementation techniques, Sun Network File System – architecture and implementation, other distributed file systems – AFS, CODA. Name services – SNS name service model.

Learning Outcomes

1. The students will be able to know the following.
2. Identifying techniques to formally prove correctness of multiprocessor programs;
3. Presenting techniques to formally study the progress properties of concurrent algorithms;
4. Analyzing the performance of multiprocessor algorithms;
5. Identifying limitations and impossibility results which express where the effort should not be put in solving a task;

Text Books

1. "Advanced Concepts in Operating Systems", by MukeshSinghal&Niranjan G Shivaratri, Tata McGraw Hill(2001).
2. "Distributed System: Concepts and Design", by Coulouris, Dollimore, Kindberg , Pearson Education (2006)

MCA Syllabus at JECRC University

Course Code: MCA049A

Course Name: Mobile Computing

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0	0	4

Unit-I

Overview of Mobile Computing and its applications; Radio Communication; Mobile Computing Architecture; Mobile System Networks; Data Dissemination; Mobility Management; Introduction to Cellular network: components, Architecture, Call set-up, Frequency Reuse and Co-channel cell, Cell Design, Interference, Channel assignment, Hand Off;

Unit-II

Cellular Network Standards; Digital cellular communication; Multiple Access Techniques: FDMA, TDMA, CDMA; GSM: System Architecture, Mobile services & features, Protocols, Radio interface, Handover, GSM Channels, Localization and calling, User validation; General Packet Radio Service;

Unit-III

Introduction to CDMA based systems; Spread spectrum in CDMA systems; coding methods in CDMA; IS-95;

Unit-IV

Wireless LAN: Wireless LAN (WiFi) Architecture and protocol layers; WAP Architecture; Bluetooth Architecture: Layers, Security in Bluetooth;
Mobile Ad-hoc and Sensor Networks: Introduction, MANET, Routing in MANET's Wireless Sensor Networks, Applications;

Unit-V

Mobile Devices: Mobile Agent, Application Server, Gateways, Portals, Service Discovery, Device Management, Mobile File Systems; Mobile IP: Architecture, Packet delivery and Hand over Management, Location Management, Registration, Tunnelling and Encapsulation, Route optimization, DHCP. Mobile Transport Layer: Conventional TCP/IP transport protocols, Indirect TCP, Snooping TCP, Mobile TCP

Text Books:

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education, 2004.
2. Raj Kamal, "Mobile Computing", Oxford Higher Education, 2008.

MCA Syllabus at JECRC University

Upon completion of the subject, students will be able to:

1. Understands the process to be followed in the software development life cycle
2. Find practical solutions to the problems
3. Solve specific problems alone or in teams
4. Manage a project from beginning to end
5. Work independently as well as in teams
6. Define, formulate and analyse a problem

MCA Syllabus at JECRC University

Course Code: MCA050A

Course Name: Human Computer Interaction

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0	0	4

OBJECTIVE:-At the end of the course, the student should be able to:

1. know what the user-centered design cycle is and how to practice this approach to design your own website or other interactive software systems
2. critique existing website and other interactive software using guidelines from human factor theories
3. analyze one after another the main features of a GUI: the use of colors, organization and layout of content, filling the interface with useful and relevant information, and communication techniques; and to critique designs in order to provide better solutions

Unit-I

Introduction The human, The computer, The interaction, Paradigms, Usability of Interactive Systems, Guidelines, Principles, and Theories

Unit-II

Design Process- Interaction design basics, HCI in the software process, Design rules, Implementation support, Evaluation techniques, Universal design, User support

Unit-III

Models and Theories0 Cognitive models, Socio-organizational issues and stakeholder requirements, Communication and collaboration models, Task analysis, Dialogue notations and design, Models of the system, Modeling rich interaction

Unit-IV

Interaction Styles- Direct Manipulation and Virtual Environments, Menu Selection, Form Filling and Dialog Boxes, Command and Natural Languages, Interaction Devices, Collaboration and Social Media Participation

Unit-V

Design Issues- Quality of Service, Balancing Function and Fashion, User Documentation and Online Help, Information Search, Information Visualization Module6: Outside the Box- Group ware, Ubiquitous computing and augmented realities, Hypertext, multimedia, and the world wide web

Text Books:

1. "Human Computer Interaction" by Alan Dix, Janet Finlay , ISBN :9788131717035, Pearson Education (2004)

MCA Syllabus at JECRC University

2. “Designing the User Interface - Strategies for Effective Human Computer Interaction”, by Ben Shneiderman ISBN : 9788131732557, Pearson Education (2010).
3. Usability Engineering: Scenario-Based Development of Human-Computer Interaction , by Rosson, M. and Carroll, J. (2002)

Upon completion of the subject, students will be able to:

1. Explain the human components functions regarding interaction with computer
2. Explain Computer components functions regarding interaction with human
3. Demonstrate Understanding of Interaction between the human and computer components.
4. Use Paradigms, implement Interaction design basics, Use HCI in the software process
5. Apply Design rules, Produce Implementation supports, Use Evaluation techniques

MCA Syllabus at JECRC University

Course Code: MCA051A

Course Name: Artificial Intelligence & Expert Systems

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0		4

Objectives: An ability to communicate effectively with a range of audiences. An ability to analyze the local and global impact of computing on individuals, organizations and society. Recognition of the need for and an ability to engage in continuing professional development.

Unit-I

Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems, AI techniques-search knowledge, abstraction. Problem solving, State space search: Production systems. Search space control: Depth first, breadth first search, heuristic search - Hill climbing, best first search, branch and bound. Minimax search: Alpha-Beta cut offs.

Unit-II

Knowledge Representation Predicate Logic: Skolemizing queries, Unification. Modus ponens. Resolution, dependency directed backtracking. Rule Based Systems: Forward reasoning: Conflict resolution. Backward reasoning: Use of no backtrack. Structured Knowledge Representations: Semantic Net: slots, exceptions and defaults Frames.

Unit-III

Handling uncertainty, Probabilistic reasoning. Use of certainty factors, Fuzzy logic.

Unit IV

Learning: Concept of learning, learning automation, genetic algorithm, learning by induction, neural netsback propagation.

Unit V

Expert Systems: Need and justification for expert systems.Knowledge acquisition. Case studies: MYCIN, RI.

Text Books

1. Nilsson, N.J., "Principles of AP", Narosa Publishing House, 1990.
2. Patterson, D. W., "Introduction to AI and Expert Systems", Prentice Hall of India, 1992.
3. Peter Jackson, "Introduction to Expert Systems", Addison Wesley Publishing Company, M.A., 1992.

MCA Syllabus at JECRC University

After completing this course students should be able to:

1. Understand the history, development and various applications of artificial intelligence
2. Learn the knowledge representation and reasoning techniques in rule-based systems, case-based systems, and model-based systems
3. Appreciate how uncertainty is being tackled in the knowledge representation and reasoning process
4. Master the skills and techniques in machine learning, such as decision tree induction, artificial neural networks, and genetic algorithm;
5. Apply and integrate various artificial intelligence techniques in intelligent system development as well as understand the importance of ExpertSystems.

MCA Syllabus at JECRC University

Course Code: MCA052A

Course Name: Theory of Computation

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0	0	4

UNIT I

Introduction to formal proof – Additional forms of proof – Inductive proofs – Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions.

UNIT II

REGULAR EXPRESSIONS AND LANGUAGES Regular Expression – FA and Regular Expressions – Proving languages not to be regular – Closure properties of regular languages – Equivalence and minimization of Automata.

UNIT III

CONTEXT-FREE GRAMMARS AND LANGUAGES Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages – Definition of the Pushdown automata – Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG – Deterministic Pushdown Automata.

UNIT IV

PROPERTIES OF CONTEXT-FREE LANGUAGES Normal forms for CFG – Pumping Lemma for CFL – Closure Properties of CFL – Turing Machines – Programming Techniques for TM.

UNIT V

UNDECIDABILITY A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing Machine – Post's Correspondence Problem – The classes P and NP.

Text Books:

1. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", second Edition, Pearson Education, 2007.
2. H.R. Lewis and C.H. Papadimitriou, "Elements of the theory of Computation", Second Edition, Pearson Education, 2003.

At successful completion of the course, students should able to:

1. Have a good knowledge of formal computation and its relationship to languages.
2. Classify languages and their constructs.
3. Understand the basic concepts of complexity theory.
4. Prove the basic results of the Theory of Computation.

MCA Syllabus at JECRC University

Course Code: MCA057A

Course Name: Data Mining & Warehousing

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0	0	4

Objective: To be able to understand the concepts, strategies, and methodologies related to the design and construction of data mining able to comprehend several data preprocessing methods to able to utilize data warehouses and OLAP for data mining and knowledge discovery activities.

Unit-I

Introduction of data warehousing- The evolution of Data warehousing (The Historical Context), the data warehousing- a brief History, need of data warehouse, characteristics of data warehouse, Data marts. Introduction of Data mining: evolution of database technology, definition, Relational data bases, Data warehouse, transactional databases, Advanced database applications and advanced database system, Functionalities of Data mining, classification of Data mining.

Unit-II

Data warehouse and OLAP technology for Data mining: Data warehouse, Operational database system, Data warehouse architecture, data warehouse schemas with examples. Data Warehouse Implementation: Efficient computation of Data cubes, indexing OLAP Data, Development of Database technology: Discovery Driven Exploration of Data cube, From Online Analytical Processing to Online Analytical Mining.

Unit-III

Data Preparation: Pre-process data cleaning, data integration, data transformation, data reduction Data mining primitives: Task Relevant Data, The Kind of Knowledge to be mined, back ground Knowledge: Concept Hierarchies, Architecture of Data mining System.

Unit-IV

Concept Description: Characterization and comparison .Data generalization and Summarization based Characterization, Analysis of attribute Relevance, and Methods of attribute Relevance Analysis. Mining Association rules in large Databases: Market Basket Analysis, Basic concept of Association rule mining, Association rule mining: A road Map.

Unit-V

Apriori Algorithm: Finding Frequent Item sets using Candidate Generation, Multidimensional Association rule, mining multidimensional association rule using static Discretization of Quantitative attributes, mining Quantitative association rules, Mining Distance Based Association Rules. Application of Data warehouse and Data mining in government: National Data warehouse, other areas for data warehouse and data mining. Case studies: Data warehouse in ministry of commerce, Data warehouses in World Bank.

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Text Book:

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Introduction to Data Mining. Pearson (2005), India.
2. Jiawei Han and Micheline Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann, 3rd edition

After completing this course students should be able to:

1. Do Conceptual, Logical, and Physical design of Data Warehouses OLAP applications and OLAP deployment
2. Have a good knowledge of the fundamental concepts that provide the foundation of data mining
3. Describe different techniques of Data Mining

Domain-II

Course Code: MCA053A

Course Name: Information security & E- Governance

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0	0	4

Objectives: Support in implementation of security monitoring and evaluation mechanisms to ensure compliance to security policies, procedures • Good practices and standards in information security Approach for managing information security Identification of information security risk categories in the organization

Unit-I

Introduction: Definition, Security as a concept, functions and subject area. Security domains, problems associated with computer system security – A Scenario. Reasons and argets for attack. Forms of attack and remedies. Security Concepts Security concepts, goals, and services. Role of Cryptography In Information Security. Cryptanalysis.

Unit-II

Authentication System Key management.

CryptographicAuthentication.AuthenticationSystems: Kerberos, Public Key Infrastructure. Remote Authentication dial in user services, Human Authentication, Proxies of humans.Security Process Management and Standards

Unit-III

E-GOVERNANCE Basics of E-Governance; why E-Governance; Issues in E-Governance Applications and Digital Divide. Evolution of EGovernance and its scope and content. Present Global trends of growth in E-Governance. E-Governance Models Models of Digital Governance:

- Broadcasting Model
- Critical Flow Model
- Comparative Analysis Model
- Interactive Service Model
- E-Governance maturity model
- Mobilisation and Lobbying model

Towards good governance through E-governance

Unit-IV

E-Governance Infrastructure, Stages in Evaluation and Strategies for Success

E-Readiness Data System Infrastructural preparedness Legal Infrastructural preparedness Human Infrastructural preparedness Institutional Infrastructural preparedness Technological Infrastructural preparedness Leadership and Strategic Planning

MCA Syllabus at JECRC University

Unit V

Case Studies

Challenges In E-Governance Comparative Study of India & any other developing country in terms of implementation of E-Governance; National E-Governance Plan Of Indian Government; Various Agencies Involved and websites In Indian EGovernance; E-Governance Products and Services in India; Case Study-Indian passport portal/ Indian Railways/ Online filing of Income Tax.

Text Books:

1. Stuart Jacobs 'Engineering Information Security' IEEE Press Series on Information and Communication Network Security, IEEE Press,2011.
2. C.S.R. Prabhu ,E-Governance: Concepts And Case Studies, PHI ,2011.

Upon completion of this subject, the student will be able to:

1. Define Information security, Threats & Countermeasures of Information Security
2. Use of cryptography in Information Security
3. Understand the basic concepts of E-Governance
4. Critically analyse the different models of E-Governance & use of technology to facilitate effective governance in India

MCA Syllabus at JECRC University

Course Code: MCA054A

Course Name: Advance Computer Architecture

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0	0	4

UNIT-I

INSTRUCTION LEVEL PARALLELISM ILP – Concepts and challenges – Hardware and software approaches – Dynamic scheduling – Speculation - Compiler techniques for exposing ILP – Branch prediction.

UNIT-II

MULTIPLE ISSUE PROCESSORS VLIW & EPIC – Advanced compiler support – Hardware support for exposing parallelism– Hardware versus software speculation mechanisms – IA 64 and Itanium processors –Limits on ILP.

UNIT-III

MULTIPROCESSORS AND THREAD LEVEL PARALLELISM Symmetric and distributed shared memory architectures – Performance issues –Synchronization – Models of memory consistency – Introduction to Multithreading.

UNIT-IV

MEMORY AND I/O Cache performance – Reducing cache miss penalty and miss rate – Reducing hit time Main memory and performance – Memory technology. Types of storage devices –Buses – RAID – Reliability, availability and dependability – I/O performance measures designing an I/O system.

UNIT-V

MULTI-CORE ARCHITECTURES Software and hardware multithreading – SMT and CMP architectures – Design issues –Case studies – Intel Multi-core architecture – SUN CMP architecture – heterogenous multi-core processors – case study: IBM Cell Processor.

Text Books:

1. Kai Hwang and Zhi.Wei Xu, “Scalable Parallel Computing”, Tata McGraw Hill, NewDelhi, 2003.
2. David E. Culler, Jaswinder Pal Singh, “Parallel computing architecture :Ahardware/software approach” , Morgan Kaufmann /Elsevier Publishers, 1999.

Upon completion of the subject, students will be able to

1. Know the fundamental aspects of computer architecture design and analysis
2. Understand design, pipelining, superscalar, out-of-order execution, caches (memory hierarchies), virtual memory, storage systems, and simulation techniques
3. Know about computer performance, instruction set architecture design and implementation

MCA Syllabus at JECRC University

Course Code: MCA055A

Course Name: High Speed Network

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0	0	4

Objectives: Students will get an introduction about ATM and Frame relay. Students will be provided with an up-to-date survey of developments in High Speed Networks. Enable the students to know techniques involved to support real-time traffic and congestion control. Students will be provided with different levels of quality of service (Q.S) to different applications.

Unit-I

The Motivation for Internetworking; Need for Speed and Quality of Service; History of Networking and Internet; Advanced TCP/IP and ATM Networks; Internet Services; Internet Architecture; Interconnection through IP Routers; Standards; TCP Services; TCP format and connection management; Encapsulation in IP; UDP Services, Format and Encapsulation in IP; IP Services; Header format and addressing; Fragmentation and reassembly; IPv4 Vs. IPv6.

Unit-II

Congestion Control and Quality of Service: Data traffic; Network performance; Effects of Congestion; Congestion Control; Congestion control in TCP and Frame Relay; Link-Level Flow and Error Control; TCP flow control.

Unit-III

Quality of Service: Flow Characteristics, Flow Classes; Techniques to improve QoS; Traffic Engineering; Integrated Services; Differentiated Services; QoS in Frame Relay and ATM; Protocols for QoS Support: Resource Reservation-RSVP; Multiprotocol Label Switching; Real-Time Transport Protocol.

Unit-IV

High Speed Networks: Packet Switching Networks; Frame Relay Networks; Asynchronous Transfer Mode (ATM); ATM protocol Architecture; ATM logical connections; ATM cells; ATM Service categories; ATM Adaptation Layer.

Unit-V

Optical Networks: SONET networks; SONET architecture; High-Speed LANs: The Emergence of High-Speed LANs; Fast Ethernet; Gigabit Ethernet; Wireless LANs: IEEE 802.11, Bluetooth; Connecting LANs: Devices, Backbone networks, Virtual LANs; Wireless WANs: Cellular Telephony; Generations; Cellular Technologies in different generations.

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Text Books:

1. William Stallings, “High-Speed Networks and Internets, Performance and Quality of Service”, Pearson Education;
2. Douglas E. Comer, “Internetworking with TCP/IP Volume – I, Principles, Protocols, and Architectures”, Fourth Edition, Pearson Education.

By the end of the subject, students should be able to:

1. Describe and interpret the basics of high speed networking technologies.
2. Define the various high-speed networking technologies and their design issues.
3. Apply the concept learnt in this course to optimize and troubleshoot high-speed network.
4. Demonstrate the knowledge of network planning and optimization

MCA Syllabus at JECRC University

Course Code: MCA056A

Course Name: Enterprise Resource Planning

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0	0	4

UNIT-I

ERP AND TECHNOLOGY

Introduction – Related Technologies – Business Intelligence – E-Commerce and E-Business – Business Process Reengineering – Data Warehousing – Data Mining –OLAP – Product life Cycle management – SCM – CRM

UNIT-II

ERP Implementation Challenges – Strategies – Life Cycle – Pre-implementation Tasks – Requirements Definition – Methodologies – Package selection – Project Teams –Process Definitions – Vendors and Consultants – Data Migration – Project management– Post Implementation Activities.

UNIT-III

ERP IN ACTION & BUSINESS MODULES Operation and Maintenance – Performance – Maximizing the ERP System – Business Modules – Finance – Manufacturing – Human Resources – Plant maintenance –Materials Management – Quality management – Marketing Sales, Distribution and service.

UNIT-IV

ERP MARKET Marketplace – Dynamics – SAP AG – Oracle – PeopleSoft – JD Edwards – QAD Inc –SSA Global – Lawson Software – Epicor – Intutive.

UNIT-V

Enterprise Application Integration – ERP and E-Business – ERP II – Total quality management – Future Directions – Trends in ERP.

Text Books:

1. Alexis Leon, “ERP DEMYSTIFIED”, Tata McGraw Hill, Second Edition, 2008.
2. Mary Sumner, “Enterprise Resource Planning”, Pearson Education, 2007.

Upon completion of the subject, students will be able to:

1. Examine systematically the planning mechanisms in an enterprise, and identify all components in an ERP system and the relationships among the components;
2. Understand production planning in an ERP system, and systematically develop plans for an enterprise;
3. Use methods to determine the correct purchasing quantity and right time to buy an item, and apply these methods to material management;

Course Code: MCA057A

Course Name: Data Mining & Warehousing

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0	0	4

Objective: To be able to understand the concepts, strategies, and methodologies related to the design and construction of data mining able to comprehend several data preprocessing methods to able to utilize data warehouses and OLAP for data mining and knowledge discovery activities. To be able to determine an appropriate mining strategy for given large dataset and to be able to obtain knowledge of current data mining applications.

Unit-I

Data Warehousing: Introduction, Definition, Multidimensional data transformation, OLAP operations, Ware house schema, Ware house Server, Other features.

Unit-II

Data Mining: Introduction, Definition, KDD vs. DM, DBMS vs. DM, DM Techniques, Issues and Challenges in DM, DM Applications. Association Rules: A Prior Algorithm, Partition, Pincer search, Incremental, Border, FP-tree growth algorithms, Generalized association rule.

Unit-III

Classification: Parametric and non-parametric technology: Bayesian classification, two class and generalized class classification, classification error, Decision boundary, Discriminate functions, Non-parametric methods for classification.

Unit-IV

Clustering: Hierarchical and non-hierarchical techniques, K-MEDOID Algorithm, Partitioning, Clara, Clarans. Advanced Hierarchical algorithms Decision Trees: Decision tree induction, Tree pruning, Extracting classification rules from decision trees, Decision tree construction algorithms, Decision tree construction with presorting.

Unit-V

Other Techniques for Data mining: Introduction, Learning, Neural Networks, Data mining using neural networks, Genetic algorithms. Web Mining: Web mining, Text mining, Content mining, Web structure mining.

Text Books:

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Introduction to Data Mining. Pearson (2005), India.
2. Jiawei Han and Micheline Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann, 3rd edition

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After completing this course students should be able to:

1. Do Conceptual, Logical, and Physical design of Data Warehouses OLAP applications and OLAP deployment
2. Have a good knowledge of the fundamental concepts that provide the foundation of data mining
3. Describe different techniques of Data Mining

MCA Syllabus at JECRC University

Course Code: MCA058A

Course Name: Wireless Adhoc Network

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0	0	4

Objectives: To demonstrate the knowledge and ability to:

1. Covers fundamental principles of ADHOC Networks.
2. To develop a comprehensive understanding of AdHoc network protocols .
3. To understand current and emerging trends in Wireless Networks.

Unit-I

Introduction– Issues in Ad-Hoc Wireless Networks. MAC Protocols – Issues, Classifications of MAC protocols, Multi channel MAC & Power control MAC protocol.

Unit-II

AD-HOC NETWORK ROUTING & TCP: Classifications of routing protocols – Hierarchical and Power aware. Multicast routing – Classifications, Tree based, Mesh based. Ad Hoc Transport Layer Issues. TCP Over Ad Hoc – Feedback based, TCP with explicit link.

Unit-III

WSN ROUTING, LOCALIZATION: Issues in WSN routing – OLSR, AODV. Localization – Indoor and Sensor Network Localization.

Unit-IV

Basic probability, randomized rounding; max-cut, max-sat by randomized rounding;

Unit-V

MESH NETWORKS :Necessity for Mesh Networks – MAC enhancements – IEEE 802.11s Architecture – Opportunistic routing – Self configuration and Auto configuration – Capacity Models – Fairness – Heterogeneous Mesh Networks – Vehicular Mesh Networks

Text Books:

1. C.SivaRamMurthyandB.Smanoj,“AdHocWirelessNetworksarchitecturesandProtocols”,PearsonEducation, 2004.
2. FengZhaoandLeonidasGuibas,“WirelessSensorNetworks”,MorganKaufmanPublishers , 2004.
3. C.K.Toth,“AdHocMobileWirelessNetworks”,PearsonEducation,2002.
4. ThomasKragandSebastinBuettrich,“WirelessMeshNetworking”,O’ReillyPublisher,2007.

After completing this course students should be able to:

1. This will help the student to design his own wireless network
2. Students will be able to evaluate the existing network and improve its quality of service

MCA Syllabus at JECRC University

Course Code: MCA051A

Course Name: Artificial Intelligence & Expert Systems

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
4	0		4

Objectives: An ability to communicate effectively with a range of audiences. An ability to analyze the local and global impact of computing on individuals, organizations and society. Recognition of the need for and an ability to engage in continuing professional development.

Unit-I

Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems, AI techniques-search knowledge, abstraction. Problem solving, State space search: Production systems. Search space control: Depth first, breadth first search, heuristic search - Hill climbing, best first search, branch and bound. Minimax search: Alpha-Beta cut offs.

Unit-II

Knowledge Representation Predicate Logic: Skolemizing queries, Unification. Modus ponens. Resolution, dependency directed backtracking. Rule Based Systems: Forward reasoning: Conflict resolution. Backward reasoning: Use of no backtrack. Structured Knowledge Representations: Semantic Net: slots, exceptions and defaults Frames.

Unit-III

Handling uncertainty, Probabilistic reasoning. Use of certainty factors, Fuzzy logic.

Unit-IV

Learning: Concept of learning, learning automation, genetic algorithm, learning by induction, neural netsback propagation.

Unit-V

Expert Systems: Need and justification for expert systems.Knowledge acquisition. Case studies: MYCIN, RI.

Text Books

1. Nilsson, N.J., "Principles of AP", Narosa Publishing House, 1990.
2. Patterson, D. W., "Introduction to AI and Expert Systems", Prentice Hall of India, 1992.
3. Peter Jackson, "Introduction to Expert Systems", Addison Wesley Publishing Company, M.A., 1992.

MCA Syllabus at JECRC University

After completing this course students should be able to:

1. Understand the history, development and various applications of artificial intelligence
2. Learn the knowledge representation and reasoning techniques in rule-based systems, case-based systems, and model-based systems
3. Appreciate how uncertainty is being tackled in the knowledge representation and reasoning process
4. Master the skills and techniques in machine learning, such as decision tree induction, artificial neural networks, and genetic algorithm;
5. Apply and integrate various artificial intelligence techniques in intelligent system development as well as understand the importance of ExpertSystems.

MCA Syllabus at JECRC University

List of Open Electives

Course Code: MCA062A

Course Name: Microsoft Windows Application Development

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	0		3

Unit - I

Introduction to Object oriented Programming, Working with C#, Creating Your First C# Program, Dissection the First C# Program You created, Quick Overview of the Visual C# Edition IDE ,Declaring Variables and Assigning Values Duration ,Branching with the if Decision Statement and the Conditional Operator , Operators Expressions and Statements , For Iterations, Creating Arrays of Values, Creating and Calling Simple Overloaded ,Helper Methods, While Iterations and Reading Data from a Text File, Working with Strings , Working with Date Time, Understanding and Creating Classes , Working with Classes and Inheritance in the Net Framework Class.

Unit - II

Understanding Namespaces and Adding References to Assemblies, understanding Scope and utilizing Accessibility Modifiers , Enumerations and the switch Decision Statement , Gracefully Handling Exceptions, Working with Collections , Filtering and Managing Data in Collections using LINQ , Concluding Thoughts , Understanding Event Driven Programming , Getting Started with the Grid App Template, Introduction to XAML, Familiarizing Ourselves with the Grid Template , Modifying the Grid App Template with Branding Element , Data Binding and the Sample Data .

Unit - III

Understanding How Data Binding Works At Design Time, Data Binding to the Recipe Data Source , Understanding Change Notification , Working with JSON Data, Working With Async Methods in the Windows Runtime , Working with the Grid View , Modifying Data Templates , Hands on (Creating your first Windows 8 application), Implementing Type Converters , Responding To Device Orientation Changes , Accommodating the Snapped State , Enabling Semantic Zooming , Implementing the Search Contract , Implementing an App Bar and Flyout , Enabling Your App to Take Photos , Lifetime Management Saving and Restoring State Adding a Settings Command and Settings Flyout , Saving User Preferences .

Unit - IV

Implementing User Preferences, Enabling Secondary Tiles , Incorporating Push Notifications , Incorporating Scheduled Toasts , Detecting Trial Versions , Simulating App Purchases , Simulating Product Purchases , Working with Databases (SQLite), Working with APIs (REST with XML/JSON) , Where to Go From Here, Writing your First Windows Phone App

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, Basics of Layout and Events , Styling the App, Localizing the App , Understanding Compilation and Deployment , Overview of the Windows Phone Emulator .

Unit - V

Overview of the data-bound App and Pivot App Project Templates , Setting up the SoundBoard App , Improving the View Model and Sample Data ,Styling Tiles in the LongListSelector , Binding to Real Data at Runtime , Playing a Sound when a ListItem is Selected , Working with the Application Bar , Recording an Audio Wav File , Working with Databases , Working with APIs (REST with XML/JSON) , Animating the Reel Grid with a Storyboard , Working with the Geolocator and Geoposition Classes, Navigating and Passing Data to the SearchResults Page , Understanding Async and Awaitable Tasks ,Working with the Lock Screen to Display an Image, Creating a Background Agent for Scheduled Tasks

MCA Syllabus at JECRC University

Course Code: MCA063A

Course Name: Android Application Development

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	0	0	3

Unit – I

Introduction: About Android, Smartphone future, Preparing the environment: Installing SDK, Crating Android Emulator, Installing Eclipse, Installing Android Development Tools, Choosing which Android version to use, Android Architecture: Android Stack, Android applications structure, Creating a project, Working with the Android Manifest.xml, Using the log system, Activities.

Unit - II

UI architecture: Application context , Intents, Activity life cycle , Supporting multiple screen sizes, User Interface widgets: Text controls, Button controls, Toggle buttons , Images, Notification and Toast: Parameters on Intents , Pending intents , Status bar notifications, Toast notifications

Unit - III

Menus: Localization , Options menu , Context menu, Dialogs: Alert dialog, Custom dialog, Dialog as Activity, Lists: Using string arrays, Creating lists, Custom Lists

Unit - IV

Location and Maps: Google maps, Using GPS to find current location, Working with data storage: Shared preferences, Preferences activity , Files access , SQLite database, Animation: View animation, Drawable animation

Unit - V

Contents providers: Content provider introduction, Query providers, Network Communication: Web Services, HTTP client, XML and JASON, Services: Service life cycle, foreground service, Publishing App: Preparing for publishing, Signing and preparing the graphics, Publishing to the Android Market.

Text Books

1. Android application development for dummies, Donn Felker with Joshua Dobbs, Wiley Publication.

MCA Syllabus at JECRC University

Course Code: MCA064A

Course Name: iOS Application Development

L (Hr.)	T/P (Hr.)	Pr (Hr.)	C
3	0	0	3

Unit - I

Introduction: The Mobile App Paradigm, Introduction to Xcode, Main characteristics of mobile apps, Differences between mobile apps and desktop apps, How iOS is tailored to a mobile platform, iOS main components and services, Model view-controller design paradigm: The Mobile App Paradigm.

Unit - II

Introduction to objective C: Coordinate Space, Obj-C vs. C++ vs. C# ,Objects , Dynamic Typing and Binding , Classes , Foundation Basics: collections, enumeration , Memory Management Basics, Protocols. View Hierarchy, Transparency, Memory Management, Coordinate Space, Custom Views: Creating a subclass of UIView, Drawing with Core Graphics.

Unit - III

Controllers: View Controller Initialization, View Life Cycle, Controllers of Controllers. Handling Gestures: Recognizing and Handling Gestures: pinch, pan, zoom, swipe, and tap Content Display:UIImageView, UIWebView, UIScrollView, UITableView and UITableViewController.

Unit - IV

Persistence Storage: Property Lists and their limitations , Archiving Objects ,Storing on the filesystem , SQLite ,Core Data Framework ,Using @property to access information,Xcode Generated Code for @property access ,Querying data ,Displaying Core Data data in Table Views ,Fetch Request , CoreDataTableViewController

Unit – V

Blocks and Multi-threading: What is a block ,Block Syntax , Context and Scope ,Memory Management in Blocks ,Declaring variables to hold blocks , Shorthand in block definitions,Usages of Blocks,Grand Central Dispatch API ,Creating and Releasing Queues ,Putting blocks in queues ,Getting the current or main queue , Advance Service:Textual content: UITextView , Keyboard control , Alerts & Timers ,Core Media: audio, still photos and video, Core Motion: accelerometer and gyro in apps , Uploading to the App store

Text Books

1. Beginning iOS 5 Application Development by Wei-Meng Lee, Wrox publication