MASTER OF COMPUTER APPLICATIONS

SYLLABUS – 2017

Under
CHOICE BASED CREDIT SYSTEM

Since 1951

PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

JAMAL MOHAMED COLLEGE (AUTONOMOUS)

College with Potential for Excellence

Re-accredited (3rd Cycle) with 'A' Grade by NAAC

TIRUCHIRAPPALLI – 620 020

SEM	COURSE CODE	COURSE	COURSE TITLE	HRS/ WEEK	CREDIT	CIA MARKS	SE MARKS	TOTAL MARKS
I	17MCA1C1	Core I	Programming in C	4	3	25	75	100
	17MCA1C2	Core II	Mathematical Foundations	4	3	25	75	100
	17MCA1C3	Core III	Computer Organization and Architecture	4	3	25	75	100
	17MCA1C4	Core IV	Computer Graphics	4	3	25	75	100
	17MCA1C5	Core V	Data Structures and Algorithms	4	3	25	75	100
	17MCA1C6P	Core VI	C Programming Lab	4	3	20	80	100
	17MCA1C7P	Core VII	Animation Lab	4	3	20	80	100
		Skill Based Course - I	Communication Skills *	2	-	-	-	-
	TOTAL			30	21	280	420	700
II	17MCA2C8	Core VIII	Object Oriented Programming with C++	4	3	25	75	100
	17MCA2C9	Core IX	Numerical and Statistical Methods	4	3	25	75	100
	17MCA2C10	Core X	Principles of Operating Systems	4	3	25	75	100
	17MCA2C11	Core XI	Database Systems	4	3	25	75	100
	17MCA2C12	Core XII	Enterprise Resource Planning	4	3	25	75	100
	17MCA2C13P	Core XIII	Object Oriented Programming Lab	4	3	20	80	100
	17MCA2C14P	Core XIV	Shell Programming Lab	4	3	20	80	100
	17MCA2S1	Skill Based Course - I	Communication Skills *	2	3	100	-	100
	17MCA2PW1		Summer Project Work – I	-	2	40	60	100
	TOTAL			30	26	420	480	900
III	17MCA3C15	Core XV	Programming in Java	4	3	25	75	100
	17MCA3C16	Core XVI	Optimization Techniques	4	3	25	75	100
	17MCA3C17	Core XVII	Computer Networks	4	3	25	75	100
	17MCA3C18	Core XVIII	Accounting and Financial Management	4	3	25	75	100
	17MCA3CE1A./B/C	Core Based Elective – I #		4	4	25	75	100
	17MCA3C19P	Core XIX	Java Programming Lab	4	3	20	80	100
	17MCA3C20P	Core XX	RDBMS Lab	4	3	20	80	100
		Skill Based Course – II	Quantitative Aptitude *	2	-	-	-	-
	17MCA3EC1	Extra Credit Course – 1	Programming Smart Devices	-	4***		100	100
	TOTAL			30	22	280	420	700
IV	17MCA4C21	Core XXI	.Net Technology	4	3	25	75	100
	17MCA4C22	Core XXII	Computer Simulation and Modeling	4	3	25	75	100
	17MCA4C23	Core XXIII	Microprocessors, interfacing and Applications	4	3	25	75	100
	17MCA4C24	Core XXIV	Artificial Intelligence and Expert Systems	4	3	25	75	100
	17MCA4CE2 A/B/C	Core Based Elective– II #		4	4	25	75	100
	17MCA4C25P	Core XXV	Web Technology Lab	4	3	20	80	100
	17MCA4C26P	Core XXVI	.Net Lab	4	3	20	80	100
	17MCA4S2	Skill Based Course – II	Quantitative Aptitude *	2	3	100	-	100
	17MCA4PW2		Summer Project Work – II	-	2	40	60	100
	17MCA4EC2	Extra Credit Course – 2	Network Security		4***		100	100
	TOTAL			30	27	420	480	900
V	17MCA5C27	Core XXVII	Distributed Technology	4	3	25	75	100
	17MCA5C28	Core XXVIII	Principles of Compiler Design	4	3	25	75	100
	17MCA5C29	Core XXIX	Organizational Dynamics	4	3	25	75	100
	17MCA5CE3 A/B/C	Core Based Elective– III #		4	4	25	75	100
	17MCA5CE4 A/B/C	Core Based Elective– IV#		4	4	25	75	100
	17MCA5C30P	Core XXX	Distributed Technology Lab	4	3	20	80	100
	17MCA5C31P	Core XXXI	Mini Project Lab	4	3	20	80	100
	17MCA5S3	Skill Based Course - III	Comprehensive Study **	2	1	100	-	100
	17MCA5EC3	Extra Credit Course -III	Cyber Security		4***		100	100
	TOTAL			30	24	380	420	800
VI	17MCA6PW		Industrial Experience and Project Work	30	20	80	120	200
	TOTAL			30	20	80	120	200
	GRAND TOTAL			180	140	1875	2325	4200

*   Fully Internal – Examination at the end of the year

**   Paper fully Internal

*** Not considered for Grand Total and CGPA

\#   Core Based Electives

CORE BASED ELECTIVES

SEMESTER	COURSE CODE	COURSE TITLE
III	17MCA3CE1A	Multimedia Systems and Design
	17MCA3CE1B	Human Computer Interaction
	17MCA3CE1C	Mobile Communication
IV	17MCA4CE2A	Software Engineering
	17MCA4CE2B	Software Project Management
	17MCA4CE2C	Soft Computing
V	17MCA5CE3A	Principles of E-Commerce
	17MCA5CE3B	Data Warehousing and Data Mining
	17MCA5CE3C	Big Data Analytics
	17MCA5CE4A	Parallel Processing
	17MCA5CE4B	Grid Computing
	17MCA5CE4C	Cloud Computing

PROGRAMMING IN C

Course Code : 17MCA1C1	**Maximum Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 3	**External Marks : 75**

Objective:

To understand the basic concepts of programming language and to develop programming skills in C Language

UNIT I 12 hours

The C Character Set – Constants, Variables and Keywords – Types of C Constants – Integer, Real and Character – Rules for Constructing Constants and Variables – Form of a C Program – Types of C Instructions – Type Declaration, Arithmetic and Control Instructions – Operators – Hierarchy of Operations – Data Types – Storage Classes in C – Decision Control Structure – The *if* Statement – The *if-else* Statement – Nested *if-elses* – Forms of *if* – Use of Logical Operators – # The Conditional Operators #.

UNIT II 12 hours

The Loop Control Structure – The *while* loop – The *for* loop – The *do-while* loop – The *break* and *continue* Statements – The Case Control Structure – Decision Using *switch* – The *goto* keyword – Functions – Use of Functions – Passing Values between Functions – Scope Rule of Functions – # Library Functions # – Advanced Features of Functions – Return Type of Function – Call by Value and Call by Reference – Recursion.

UNIT III 12 hours

Pointers – Arrays – One Dimensional Arrays – Array Declaration – Array Initialization – Passing Array Elements to Function – Two Dimensional Arrays – Three Dimensional Arrays – Pointers and Arrays – Array of Pointers – Strings – Pointers and Strings – #Standard Library String Functions#.

UNIT IV 12 hours

The C Preprocessor – Features of C Preprocessor – Macro Expansion – File Inclusion – Conditional Compilation – #if and #elif Directives – Miscellaneous Directives – The Build Process – Structures – Why Use Structures – Array of Structures – Additional Features of Structures – Uses of Structures – # Unions #.

UNIT V 12 hours

Console Input / Output – Types of I/O – Console I/O Functions – File Input / Output – Data Organization – File Operations – File Opening Modes – Record I/O in Files – Text Files and Binary Files – More Issues in Input / Output – Using *argc* and *argv* – Detecting Errors in Reading / Writing – Operations on Bits – Bit Operations – Shift Operator – # Bitwise AND, OR, XOR operators #.

 # … # Self Study Portion

Text Book

Yashavant P. Kanetkar, *Let Us C*, BPB Publications, New Delhi, Thirteenth Edition, 2014.

UNIT I:	Chapters 1, 2, 3 and 7
UNIT II:	Chapters 4, 5 and 6
UNIT III:	Chapters 6, 9 and 10
UNIT IV:	Chapters 8, 11 and 16
UNIT V:	Chapters 12, 13, 14 and 15

Book for Reference

E. Balagurusamy, *Programming in ANSI C*, Tata McGraw Hill Education Private Ltd., Fifth

Edition, 2011.

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SEMESTER - I : CORE - II
MATHEMATICAL FOUNDATIONS

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Course Code : 17MCA1C2	**Maximum Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 3	**External Marks : 75**

Objective:
To impart basic features of Logic, Set Theory and ideas of Lattices and Boolean Algebra and to introduce Graph Theory.

UNIT I   **12 hours**
Mathematical logic: Introduction, Connectives, Normal Forms, Theory of inference for the statements Calculus.

UNIT II   **12 hours**
Sets, Relations & Functions: Sets, Property of binary relations, equivalence, compatibility, partial ordering relations, Hasse diagram, functions, inverse functions, compositions of functions

UNIT III   **12 hours**
Introduction to Lattice - Lattices as Partially Ordered Sets – Some Properties of Lattices – Lattices as Algebraic System – Some Special Lattices.

UNIT IV   **12 hours**
Graph Theory :- Introduction – Path and Circuits – Trees and Fundamental Circuits.

UNIT V   **12 hours**
 Cut sets and properties of a Cut-set , fundamental Circuits and Cut Vertices, Matrix Representation of Graphs.

Text Books:
1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, Reprint, 2006.
UNIT I: Chapter 1 - 1.1, 1.2 (except 1.2.7, 1.2.10, 1.2.12 – 1.2.15), 1.3 (except 1.3.5 – 1.3.6), 1.4 (except 1.4.4).
UNIT II: Chapter 2 [2.1 (except 2.1.5 – 2.1.8), 2.3 (except 2.3.6), 2.4.1 – 2.4.3.
UNIT III: Chapter 4 [4.1 (except 4.1.4)]
2. Narsingh Deo, Graph Theory with Applications to Engineering and Computer Sciences, PHI, Twelfth Reprint, 1997.
UNIT IV: Chapter 1 (expect 1.6), Chapter 2 (2.1, 2.2, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9),
Chapter 3 (expect 3.4 and 3.6).
UNIT V: Chapter 4 (expect 4.6 to 4.8), Chapter 7 (expect 7.5)

Books for Reference:
1. T.Veerajan, Discrete Mathematics with Graph Theory and Combinatory, Tata McGraw Hill Private Limited, 2011.
2. J K Sharma, Discrete Mathematics, 2nd ed., Macmillan, 2005
3. Kenneth H.Rosen, Discrete Mathematics and its Applications, Pearson, Sixth Edition 2007
4. Seymour Lipschutz and Marc Lipson, Discrete Mathematics, Third Edition 2009.
5. Kolman, Busy & Ross "Discrete Mathematical Structures", *6th Edition,* 2008 ,.
6. K.D Joshi, "Foundations of Discrete Mathematics", Wiley Eastern Limited.1989

Course Code : 17MCA1C3	**Maximum Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 3	**External Marks : 75**

Objective:

To understand the principles of digital computer logic circuits and their design. To understand the working of a central processing unit architecture of a computer

UNIT I **12 hours**

Number Systems – Decimal, Binary, Octal and Hexadecimal Systems – Conversion from one system to another – Binary Addition, Subtraction, Multiplication and Division – Binary Codes – 8421, 2421, Excess-3, Gray, BCD – #Alphanumeric Codes# – Error Detection Codes.

UNIT II **12 hours**

Basic Logic Gates – Universal Logic – Boolean Laws and Theorems – Boolean Expressions – Sum of Products – Product of Sums – Simplification of Boolean Expressions – Karnaugh Map Method (up to 4 Variables) – Implementation of Boolean Expressions using Gate Networks.

UNIT III **12 hours**

Combinational Circuits – Multiplexers – Demultiplexers – Decoders – Encoders – Arithmetic Building Blocks – Half and Full Adders – Half and Full Subtractors – Parallel adder – 2's Complement Adder – Subtractor – #BCD Adder#.

UNIT IV **12 hours**

Sequential Circuits – Flip Flops – RS, Clocked RS, D, JK, T and Master-Slave Flip Flops – Shift Register – Counters – Asynchronous, MOD-n and Synchronous Counters – BCD Counter – Ring Counter.

UNIT V **12 hours**

Central Processing Unit: General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – #Data Transfer and Manipulation# – Program Control – Reduced Instruction Set Computer – CISC characteristics – RISC Characteristics.

 # .... # self-study portion.

Text Books:

1. Donald P. Leach, Albert Paul Malvino and Goutam Saha, *Digital Principles and Applications*, Tata McGraw Hill, Sixth Edition, Third Reprint, 2007.
   UNIT I : Chapter-5 Section (5.1-5.8)
   UNIT II : Chapter-2 Section (2.1-2.2), Chapter-3 Section (3.1, 3.2, 3.5, 3.7)
   UNIT III: Chapter-4 Section (4.1-4.3, 4.6), Chapter-6 Section (6.7, 6.8)
2. Thomas C. Bartee, *Digital Computer Fundamentals*, Tata McGraw-Hill, Sixth Edition, Twenty Fifth Reprint, 2006.
   UNIT III : Chapter-5 Section (5.1, 5.3, 5.10, 5.11)
   UNIT IV : Chapter-4 Section (4.1-4.9)
3. Morris Mano M, *Computer System Architecture*, Prentice Hall of India, Third Edition, 2008.
   UNIT I: Chapter-3 Section (3.5-3.6)
   UNIT V: Chapter-8 Section (8.2-8.8)

Book for Reference:

Morris Mano. M, *Digital Logic and Computer Design*, Prentice Hall of India, 2008.

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SEMESTER - I : CORE - IV
COMPUTER GRAPHICS

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Course Code : 17MCA1C4   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks   :   25**
Credit   : 3   **External Marks   :   75**

Objective:

     To present concepts on basic graphical techniques, raster graphics, two dimensional and three dimensional graphics.

UNIT I   **12 hours**
     Overview of Computer Graphics System: Video Display Devices – Raster Scan Systems – Random – Scan Systems - Graphics Monitors and Workstations – #Input Devices# – Hardcopy Devices – Graphics Software.

UNIT II   **12 hours**
     Output Primitives: Line Drawing   Algorithms – Loading the Frame Buffer – Line Function – Circle – Generating Algorithms. **Attributes of Output Primitives:** Line Attributes – Curve Attributes – Color and Grayscale levels – Area fill Attributes – Character Attributes# – Bundled Attributes – Inquiry Functions.

UNIT III   **12 hours**
2D Geometric Transformations: Basic Transformation – Matrix Representations – Composite Transformations – Window to View port Co-Ordinate Transformations. **Clipping:** Point Clipping – Line Clipping – Cohen-Sutherland Line Clipping – Liang Barsky Line Clipping – Polygon Clipping – Sutherland – Hodgman Polygon Clipping – Curve Clipping – Text Clipping.

UNIT IV   **12 hours**
Graphical User Interfaces and Interactive Input Methods: The User Dialogue – Input of Graphical Data – Input Functions – Interactive Picture Construction Techniques. **Three Dimensional Concepts:** 3D-Display Methods – #Three Dimensional Graphics Packages#

UNIT V   **12 hours**
     3D Geometric and Modeling Transformations: Translation – Scaling – Rotation – Other Transformations.   **Visible Surface Detection Methods:** Classification of Visible Surface Detection Algorithm – Backface Detection – #Depth-Buffer Method# – A-Buffer Method – Scan-Line Method – Applications of Computer Graphics.

 # .... # self-study Portion.

Text Book:

Donald Hearn M. Pauline Baker, Computer Graphics, Second Edition, Prentice Hall of India, New Delhi, 2005

 Book for Reference:

 William M. Newman, Robert F. Sproull, Principles of Interactive Computer Graphics, Second Edition, Tata McGraw Hill, 26th Reprint, 2011.

DATA STRUCTURES AND ALGORITHMS

Course Code : 17MCA1C5	**Maximum Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 3	**External Marks : 75**

Objective :
To give a detailed knowledge on Data structures and to give an exposure in the development of algorithms related to data structures.

UNIT I   **12 hours**
Lists, Stacks and Queues: Abstract Data Types (ADTs) - The Stack ADT - The Queue ADT

UNIT II   **12 hours**
Trees: Introduction - Binary Trees - Representing Binary Trees in Memory - Traversing Binary Trees - Traversal Algorithms using Stacks - Header Nodes: Threads. Binary Search Trees - Searching and Inserting in Binary Search Trees - Deleting in a Binary Search Tree - AVL Search Trees - Insertion in an AVL Search Tree - Deletion in an Search Tree - m-way Search Trees - Searching Insertion and Deletion in an m-way Search Tree - B Trees - Searching Insertion and Deletion in B Trees - Heap: Heapsort. Path Lengths: Huffman's Algorithm - General Trees.

UNIT III   **12hours**
Divide and Conquer: The General Method – Defective Chessboard – Binary Search – Finding the Maximum and Minimum – Merge Sort – Quick Sort – Selection - Strassen's Matrix Multiplication.
UNIT IV   **12 hours**
The Greedy Method: General Method - Container Loading - Knapsack Problem - Tree Vertex Splitting – Job Sequencing With Deadlines - Minimum Cost Spanning Trees - Optimal Storage On Tapes – Optimal Merge Patterns - Single Source Shortest Paths.

UNIT V   **12 hours**
Dynamic Programming: The General Method – Multistage Graphs – All-Pairs Shortest Paths – Single-Source Shortest Paths - Optimal Binary Search Trees - String Editing - 0/1 Knapsack - Reliability Design - The Traveling Salesperson Problem - Flow Shop Scheduling.
Backtracking: The General Method – The 8-Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycles – Knapsack Problem

Text Books
1. Mark Allen Weiss, "*Data Structures an Algorithm Analysis in C",* Pearson publishing Company
    Limited, Second Edition, Reprint, Eleventh Impression 2009.
        UNIT I   Chapter 3
2. Seymour Lipschutz *Data Structures* (Schaum's Outlines), Tata McGraw-Hill Publishing Company
    limited, Fourth Reprint, 2006.
        UNIT II   Chapter 7
3. Ellis Horowitz, Satraj Sahni and Sanguthevar Rajasekaran, *Fundamentals of Computer
    Algorithms*, Universities Press, Second Edition, Reprint 2009.
        UNIT III   Chapter 3 (3.1 – 3.8) **UNIT IV** Chapter 4   U**NIT V** Chapter 5 and 7

Book for Reference
Seymour Lipschutz, *Data Structures,* Schaum's Outlines, Tata McGraw Hill Publishing
Company Limited, Fourth Reprint, 2006.

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SEMESTER - I : CORE - VI
C PROGRAMMING LAB

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Course Code : 17MCA1C6P	**Maximum Marks : 100**
Hours/Week : 4	**Internal Marks : 20**
Credit : 3	**External Marks : 80**

1.   a) Program to convert Fahrenheit degrees into Centigrade degrees.
       b) Program to find sum of digits of a given number.
       c) Program to determine area of circle and volume of a cube.

2.   a) Program to find whether the given number is odd or even (if … else)
       b) Program to find the smallest of three given numbers (nested if-elses)
       c) Program to find the greatest of three given numbers (conditional operators)

3.   a) Program to find the factorial value of any given number (while loop)
       b) Program to calculate the sum of odd numbers between 1 and 100 (do-while loop)

4.   a) Program to print all prime numbers from 1 to 100 (nested while, break)
       b) Program to find total and average for the given 10 values. (for loop)

5.   Menu driven Program which has the following options (using switch):

       1. Leap year or not
       2. Prime or not
       3. Armstrong number or not
       4. Exit

6.   a) Program to calculate the area of a triangle for the given lengths of the
           sides. (Function)
       b) Generate first 20 terms of a Fibonacci sequence (Recursion)

7.   a) Program to add and multiply two given matrices (arrays)
       b) Program to find the largest and smallest number in an mxn matrix. (arrays)

8.   a) Program to swap two given numbers (pointers)
       b) Program to sort a set of names stored in an array in alphabetical order.

9.   a) Program to find arithmetic mean of two numbers (Macros)
       b) Program to convert a uppercase alphabet to lowercase (Macros)

10.   Program to display five students mark details (Array of structures)

11.   a) Program to count the characters, spaces, tabs, and newlines in a file.
       b) Program to copy the contents of a file into another file, character by character.

12.   Program to prepare pay slip of an employee (using files)

Course Code : 17MCA1C7P   **Maximum Marks   : 100**
Hours/Week : 4   **Internal Marks   :   20**
Credit   : 3   **External Marks   :   80**

Exercise 1: Use different tools and types of tweens to create a simple animation. (bouncing ball, bud blooming (morphing) into a flower)

Exercise 2: Draw two Scenes for any Animation of your choice

Exercise 3: Create a webpage

Exercise 4: Create a slide show

Exercise 5: Create an Animated Birth day Card

Exercise 6: Create an interactive Photo Album

Exercise 7: Create an animated advertisement

Exercise 8: Create a simple story with a moral

Exercise 9: Redesign any existing scenery giving it different effects. (water fall, smoky night, rainbow colour, or fire effect)

Exercise 10: Design a Brochure for a College.

Exercise 11: Design an Invitation for an event.

Exercise 12: Design an advertisement for a Car Company.

Exercise 13: Design a Business card for a company.

Exercise 14: Create a colour photo from black and white photo.

Exercise 15: Create a Photo album

Exercise 16: Create a collage.

Course Code : 17MCA2C8	**Maximum Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 3	**External Marks : 75**

Objective :

   To impart Object Oriented Programming skills using C++

UNIT I   **12 hours**

   What is Object Oriented Programming? – C++ Console I/O – C++ Comments – Some Differences between C and C++ – Introducing Function Overloading – Constructor and Destructor Functions – Constructors Take Parameters – Introducing Inheritance – # Object Pointers # – Inline Functions – Automatic inlining.

UNIT II   **12 hours**

   Assigning Objects – Passing Object to Functions – Returning Object from Functions - An Introduction to Friend Functions – Arrays of Objects – Using Pointers to Objects – Using New & Delete – More about new & delete – References – Passing References to Objects – Returning References – # Independent References and Restrictions #.

UNIT III   **12 hours**

   Overloading Constructor Functions – Creating and Using a Copy Constructor – Using Default Arguments – Overloading and Ambiguity – # Finding the Address of an Overload Function # – The Basics of Operator Overloading – Overloading Binary Operators –Overloading the Relational and Logical Operators – Overloading a Unary Operator – Using Friend Operator Functions – A Closer Look at the Assignment Operator – Overloading the [ ] Subscript Operator.

UNIT IV   **12 hours**

   Base Class Access Control – Using Protected Members – Constructors, Destructors and Inheritance – Multiple Inheritance – Virtual Base Classes – Some C++ I/O Basics – Formatted I/O – Using width(), precision() and fill() – Using I/O Manipulators – # Creating your own Inserters – Creating Extractors #.

UNIT V   **12 hours**

   Creating your own Manipulators – File I/O Basics – Unformatted, Binary I/O – More Unformatted I/O Functions – Random Access – Checking the I/O Status – Customized I/O and Files – # Pointers to Derived Classes # – Introduction to Virtual Functions – More about Virtual Functions – Applying Polymorphism – Templates and Exception Handling

 # .... # self-study portion.

Text Book:

Herbert Schildt, *Teach Yourself C++*, TMH, Third Edition, 22nd Reprint, 2011.

   UNIT I : Chapters 1 and 2
   UNIT II : Chapters 3 and 4
   UNIT III: Chapters 5 and 6
   UNIT IV : Chapters 7 and 8
   UNIT V : Chapters 9, 10 and 11

Books for Reference:

1. Robert Lafore, *Object - Oriented Programming in Turbo C++*, Galgotia, Reprinted, 2002.
2. E. Balagurusamy, *Object Oriented Programming with C++*, TMH, Fourth Edition, 2nd Reprint, 2008.

SEMESTER - II : CORE - IX
NUMERICAL AND STATISTICAL METHODS

Course Code : 17MCA2C9   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks   : 25**
Credit   : 3   **External Marks : 75**

Objective:

To provide the basic concepts used in Numerical and Statistical methods for solving problems.

UNIT I   **12 hours**

Error – Types of Errors-Solution of Algebraic and Transcendental Equations-Bisection – False Position – Newton Raphson – Iteration – Simultaneous Linear Algebraic Equations – Gauss Elimination – ill Conditioned Equations – #Gauss-Jordon Method# – Gauss Seidel Methods.

UNIT II   **12 hours**

Interpolation – Difference Table – Newton's Forward and Backward Differences – Lagrange's Interpolation – Numerical Integration – Trapezoidal and Simpson's Rule Differential Equations – Euler Method –#Runge#-Kutta Methods.

UNIT III   **12 hours**

Sample Space – Events - Probability – Probability Axioms – Addition and Multiplication Law of Probabilities – Conditional Probability – Independent Events – #Baye's Theorem# – Random Variables (One dimensional only) – Distribution Functions.

UNIT IV   **12 hours**

Mathematical Expectations – Moment Generating Functions – Discrete Distributions – Binomial – Poisson – Continuous Distributions – #Normal Distributions#.

UNIT V   **12 hours**

Sampling – Types of Sampling – Testing of Hypothesis – Test of Significance of Small Samples – Test Based on Single Mean, Difference of Means – Chi-Square Test – Test of Goodness of Fit.

 # .... # self-study portion.

Text Books:

1. S. Sastry, *Introductory Methods of Numerical Analysis*, Third Edition, 2008. [**UNIT I, II**]
   UNIT I: Chapter 1: 1.4 only, Chapter 2: [2.2, 2.4, 2.5], Chapter 6: [6.3.2, 6.3.7, 6.4] **UNIT II:** Chapter 3: [3.3.1, 3.3.2, 3.6, 3.9.1], Chapter 5: [5.4.1, 5.4.2], Chapter 7: [7.4, 7.5]
2. S.C Gupta and V.K Kapoor, *Fundamentals of Mathematical Statistics,* Sultan Chand and sons, 1999.
   UNIT III, IV & V
   UNIT III : Chapter 3:[3.8.1, 3.8.2, 3.8.3, 3.8.4, 3.8.5, 3.9:3.9.1, 3.10, 3.12],
        Chapter 4: 4.2 only, Chapter 5: [5.1, 5.2, 5.3, 5.4:5.4.1, 5.4.2,5.4.3],
   UNIT IV : Chapter 6:[6.1, 6.2, 6.4, 6.5, 6.6], Chapter 7:7.1 only, Chapter 8:[8.4, 8.5],
        Chapter 9:9.2 only.
   UNIT V : Chapter 14:[14.1, 14.2, 14.4], Chapter 15:[15.6.2,15.6.3], Chapter 16:[16.3.1, 16.3.2, 16.6.1]

Book for Reference:

M.K. Jain, S.R.K. Iyengar and R.K. Jain, *Numerical Methods for Science and Engineering Computations,* New Age International(P) Limited Publishers, Third Edition, Seventh Reprint, 1999.

SEMESTER - II : CORE - X
PRINCIPLES OF OPERATING SYSTEMS

Course Code : 17MCA2C10   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks   :   25**
Credit   : 3   **External Marks   :   75**

Objective :
    To present fundamental aspects of various managements in an operating system

UNIT I   **12 hours**
    Operating Systems Objectives and Functions – Operating System and User / Computer Interface, Operating System as a Resource Manager: Evolution of Operating Systems – #Serial Processing#, Sample Batch Systems, Multi Programmed Batch Systems, Time Sharing Systems.

UNIT II   **12 hours**
    Process Description, Process Control – Processes and Threads, Concurrency – Principles of Concurrency, Mutual Exclusion – Deadlock Prevention, Deadlock Detection, Deadlock Avoidance. Memory Management – #Memory Management Requirements# – Fixed Partitioning, Placement algorithm, Relocation in a Paging System – Sample Segmentation.

UNIT III   **12 hours**
    Virtual Memory – Paging – Address Translation in a Paging System, Segmentation – Organization, Address Translation in a Segmentation System – Combined Paging and Segmentation – #Virtual Memory# – Operating System Software – Fetch Policy, Placement Policy and Replacement Policy.

UNIT IV   **12 hours**
Scheduling – Types of Scheduling, Scheduling Algorithms, Scheduling Criteria, FIFO, Round Robin, Shortest Process Next, Shortest Remaining Time, Feedback Scheduling – Fairshare Scheduling.
.
UNIT V   **12 hours**
    I/O Management and disk scheduling – Organization of the I/O function – the Evaluation of the I/O Function, Logical Structure of the I/O Function, I/O Buffering, Disk I/O – Disk Scheduling Algorithms, Disk Cache. File Management – Files, File Management Systems, Secondary Storage Management – #File Allocation#.

 # .... # self-study portion.

Text Books:
1.William Stallings, *Operating Systems*, Second Edition, Maxwell McMillan, International Editions, 1997.
2. Charles Crowley, *Operating Systems – A Design Oriented Approach*, IRWIN Publication, 1998.

Books for Reference:
1. Ann McIver McHoes and Ida M. Flynn, Understanding Operating Systems, Sixth Edition, Course Technology, Cengage Learning, 2011
2**.** Ann McHoes, Ida M. Flynn**,**Understanding Operating Systems, Seventh Edition**,** Cengage Learning, 2013.
3. Deital H.M. "An Introduction to Operating Systems", Addison Wesley Publishing , 1998
4. Silberchatz A., Peterson J.L., Galvan P. "Operating System Concepts", Third Edition, Addison Wesley Publishing Co., 1992.

DATABASE SYSTEMS

Course Code : 17MCA2C11 **Maximum Marks : 100**

Hours/Week : 4 **Internal Marks : 25**

Credit   : 3 **External Marks : 75**

Objective:

To impart knowledge about relational database and distributed database.

UNIT I **12 hours**

Introduction: Database System Applications – Database Systems Versus File Systems – Views of Data – Data Models – Database Languages-Database Users and Administrators. ER Model: Basic Concepts – Constraints-Keys – #ER Diagram# – Weak Entity Sets.

UNIT II **12 hours**

Relational Model: Structure-Relational Algebra-Tuple   Relational Calculus- Domain Relational Calculus. Relational Databases: SQL- Basic Structure-Set Operations-Aggregate Functions-Nested Subqueries - Views-Modification of Database-Joined Relations- Data definition language - #Query By Example#.

UNIT III **12 hours**

Relational Database Design: Pitfalls in Relational Database Design. Functional Dependencies: Basic Definitions- Trivial and Nontrivial Dependencies-Closure of a set of Dependencies – Non-loss Decomposition - First, Second and Third Normal Forms-Boyce/Codd Normal Form- Multivalued Dependencies and Fourth Normal Form-#Join Dependencies#.

UNIT IV **12 hours**

Transactions: Concepts – State – Concurrent Executions – Serializability – Testing for Seriazability. Concurrency Control: Lock-Based Protocols-Timestamp Based Protocols – Validation Based Protocols. Recovery System: Failure Classification – Storage Structure – Recovery.

UNIT V **12 hours**

Database System Architectures: Centralized and C/S Architectures-Server System Architectures-Distributed Systems. Distributed Database: Homogeneous and Heterogeneous Database-Distributed Data Storage-Distributed Transactions-Commit Protocols – Concurrency Control in Distributed Database - #Heterogeneous Distributed System#.

#...... # self-study portion.

Text Books:

1. Abraham Silberschatz, Henry F. Korth, S. Suderson, *Database System Concepts*,
   McGraw-Hill International Edition, Fourth Edition, 2002.
   UNIT I : Chapter 1 (1.1 to 1.6) Chapter 2 (2.1 to 2.3, 2.5, 2.6)
   UNIT II : Chapter 3 (3.1, 3.2, 3.6, 3.7) Chapter 4 (4.1 to 4.4, 4.6, 4.7, 4.9,
        4.10, 4.11) Chapter 5 (5.1)
   UNIT III : Chapter 7(7.2)
   UNIT IV : Chapter 15 (15.1, 15.2, 15.4, 15.5, 15.9) Chapter 16 (16.1
        to16.3) Chapter 17(17.1 to 17.4)
   UNIT V : Chapter 18(18.1, 18.2, 18.4) Chapter 19 (19.1 to 19.5, 19.8)
2. C.J Date, An *Introduction to Database System*, Seventh Edition Pearson Education Asia, 1999
   UNIT III: Chapter (10.2 to 10.4) Chapter (11.2, 11.3, 11.5), Chapter (12.2, 12.3)

Books for Reference

1. Ramez Elmasri, Shamkant B. Navathe, Fundamentals of Database Systems, Addison Wesley, Third Edition, 2000.
2. Thomas Connolly and Carolyn Begg, Database Systems, Fourth Edition, Pearson Education 2009

ENTERPRISE RESOURCE PLANNING

Course Code : 17MCA2C12 **Maximum Marks : 100**

Hours/Week : 4 **Internal Marks   : 25**

Credit   : 3 **External Marks : 75**

Objective:

In this course students shall learn various components of an application software that help computerize functioning of an enterprise such as sales, materials, production, financial , customer relationship AND supply chain modules.

UNIT I **12 hours**

A Foundation for Understanding Enterprise Resource Planning systems – Re- engineering and Enterprise Resource Planning Systems – Planning ,Design ,and Implementation of Enterprise Resource Planning Systems – ERP Systems: Sales and Marketing – ERP Systems: Accounting and finance ERP Systems :Production and Materials Management ERP Systems: Human Resources

UNIT II **12 hours**

Managing an ERP Project – Supply chain Management and the marketplace – Rules of the game – Winning as a team.

UNIT III **12 hours**

Solutions: Supply chains as Systems - Modeling the Supply Chain – Supply Chain Software - **Operations** – Meeting Demand – Maintaining Supply – Measuring Performance

UNIT IV **12 hours**

Forecasting Demand – Scheduling Supply – Improving performance – Mastering Demand – Designing the Chain – Maximizing Performance

UNIT V **12 hours**

Planning: Essentials of Customer relationship management – Designing CRM application – Various modules of CRM application - Advantages of CRM

Text books:

1. **Sumner Mary**, Enterprise Resource Planning, First edition, Pearson education, 2006 (ISBN 81-317-0240-5) (**Unit 1**: Chapters 1 to 7; **Unit 2:** Chapters 8, 9 (continued on text book number TWO)
2. **Taylor David A**., Supply Chains (A managers guide), Pearson education, 2004 (ISBN 81-297-0334-3) (**Unit 2:** Chapters 1, 2, 3; **Unit 3:** Chapters 4, 5, 6, 7, 8, 9; **Unit 4:** Chapters 10, 11, 12, 13)
3. **Tiwana**, Essential guide to knowledge management : The e-business and CRM applications, Pearson education (ISBN 81-780-8326-4) **(Unit 5)**

Books for Reference

1. Leon, Enterprise Resource Planning, Tata Mc Graw Hill, 2013
2. **ALTEKAR Rahul V**., Enterprise wide resource planning (Theory and practice), Prentice Hall of India, 2005 (ISBN 81-203-2633-4)
3. **GargVinod K &Venkitakrishnan N.K**, Enterprise resource planning, Second edition, Prentice Hall of India, 2006 (ISBN 81-203-2254-1).
4. **Handfield R. B & Nichols. Ernest L**., Introduction to supply chain management, Prentice Hall of India, 2006 (ISBN 81-203-2753-5)

Course Code : 17MCA2C13P	**Maximum Marks : 100**
Hours/Week : 4	**Internal Marks : 20**
Credit : 3	**External Marks : 80**

1. a) Program to find maximum of two given numbers (Inline function).
   b) Program to read and display the employee data such as employee number, employee name and basic salary (Class and Objects).

2. a) Program to add two complex numbers (Overloaded constructors).
   b) Program to insert and delete an element in a stack (Constructor and Destructor).

3. a) Program to add two given times in hour and minutes format (Passing objects to functions)
   b) Program to find average of three given numbers. (Friend function)

4. a) Program to illustrate the use of Arrays of objects.
   b) Program to implement the concept of Object Pointers.

4. a) Program to find the maximum of three integer and float numbers (Function Overloading).
   b) Program to illustrate the Copy Constructors.

5. Program to illustrate the overloading of
   a) Unary Operator
   b) Binary Operator
   c) Relational and Logical Operators

6. a) Program to implement the Single Inheritance.
   b) Program to implement the Multiple Inheritance.

7. a) Program to illustrate the dynamic binding of member functions of a class for employee data.
   b) Program to implement the concept of virtual base class for student data.

8. a) Program to calculate the total value and grand total for the given five product names, number of items and their costs (width( ) and precision( )).
   b) Program to illustrate the use of creating your own manipulators.

9. a) Program to create, write and read student data using file.
   b) Program to count the number of vowels present in a file.

10. Program to read an array of class object of personal information such as name, age, sex, height and weight from the keyboard and to store them on a specified file using read( ) and write( ) member functions. The same file is opened for reading and displaying the contents of the file on the screen.

1). Write a Shell program, which accepts the name of a file from the standard
   input and performs the following tests on it:
   - (i)   File existence
   - (ii) File readable
   - (iii) File writeable
   - (iv) Both readable and writeable

2). Write a Shell program using 3 arguments to take the pattern as well as input and
   output file names. If the pattern is found display "Pattern found", else display "Error
   message". Also check if right number of arguments is entered.

3). Write a Shell program, which accepts the name of the file from the
   standard input and then performs the following tests on it:
   - (i) Enter the 5 names in a file
   - (ii) Sort the names in existing file
   - (iii) List unsorted and sorted file
   - (iv) Quit

4). Write a menu driven Shell program to copy, edit, rename, and delete a file.

5). Write a menu driven Shell program to perform the following tasks
   - (i)   Enter the sentence in file
   - (ii) Search a given whole word in an existing file
   - (iii) Quit

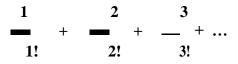6(a). Write a Shell program to prepare the electricity bill based on the following
      rules.

For first 100 units	-	Rs. 1.00 / unit
For next 100 units	-	Rs. 2.00 / unit
Above 200 units	-	Rs. 3.00 / unit

6(b). Write a Shell program to prepare the electricity bill based on the
      following
      conditions. (Illustrates bc utility)

For first 100 units	-	Rs. 0.75 / unit
For next 100 units	-	Rs. 1.50 / unit
Above 200 units	-	Rs. 3.00 / unit

7).   Write a Shell script to sum up the following series.

$$\frac{1}{1!} + \frac{2}{2!} + \frac{3}{3!} + \dots$$

8(a).   Write a Shell script to display the result "PASS" or "FAIL" using the
        information given below:
        Student Name, Student Register Number, Mark1, Mark2, Mark3, Mark4.
        The minimum pass for each subject is 50.

8(b).   Write a Shell script to display the result of a student in neat format using the
        information given below:

        Student Name, Student Register Number, Mark1, Mark2, Mark3, Mark4.
        The minimum pass for each subject is 50.

9).   Write a menu driven Shell script for converting all the capital letters in a file
       to small case letters and vice versa.

10).   Write a Shell script for a file contains records with each record containing
       name of city, name of state and name of country. How would you sort this
       file with country as the primary sort key and state as the secondary sort key.

11).   Merge the contents of three given files, sort them and display the sorted
       output on the screen page by page.

       Display the list of last 20 files present in the current directory. Also store this

       list in a file name -profile.

12).   Enhance the cp command to copy files. Display the necessary error message
       if error occurs.

13).   Write a Shell script to check the user is eligible for vote or not. (One must
       attain 18 years for voting. Ignore month differences.)

14).   Write a Shell script to do the following on the files of the current directory
       based on file extensions.

       ☐ Move all the C language files in to the subdirectory –C (under the root directory of
         the current user)
       ☐ Move all the Shell scripts in to the subdirectory –shell
       ☐ Move all the Text files in to the subdirectory –text
       ☐ Move all the Java files in to the subdirectory –java

15).   Write a Shell script to check whether a given string is Palindrome or not.
       (Palindrome: The given string and its reverse are same).

Course Code : 17MCA2S1   **Maximum Marks : 100**
Hours/Week : 2 + 2   **Internal Marks   : 100**
Credit   : 3

Course is Fully Internal; Examination is at the end of Semester II

Objective :

        To Empower the students with sufficient ability, usage of vocabulary and styles of usage of English language.

UNIT I

Listening Comprehension

        Global as well as local comprehension based on the listening to audio cassettes;
        A communicative interaction is to be set up in the class room.
        Testing accuracy of comprehension by asking 'yes' or 'no' questions. Meaning
        of words the students find difficult, is to be given.
    Pronunciation and intonation of words and sentences

Materials used:

        1). Sweet and Salty – A Folk Tale, 2) The Magic Vessels – A Folk Tale, 3) The Crows and Serpent – A Karadi Tale, 4) The Monkey and Crocodile – A Karadi Tale, 5) Keep up your English – Cassette 3, 8) Tiger's Eye – Cassette 1, 9) Tiger's Eye- Cassette 2, 10) Tiger's Eye- Cassette 3.

UNIT II

Video Viewing:

        Introducing students to foreign accent
            Interaction based on certain important aspects of the clipping used
            Discussion of the theme and moral aspects in an interactive way

Materials used:

    1) The King and I, 2) Beethovan's 2nd 3) Titanic, 4) The Sound of Music, 5) Mrs. Doubtfire

UNIT III

Grammar and Reading Comprehension:

Test book used: "Strengthen Your English" (Second Edition) by Bhaskaran and Horsburgh
        Rules on usage are to be explained clearly
        Examples apart from the ones in the text are to be given
        Students are made to answer the exercise following the rules on usage
        The Comprehension questions following the reading passage are to be answered
        To improve the usage of rules pertaining to the topic, a guided composition exercise is
        to be done.

UNIT IV

Speech Practice and Presentation Skills:

□ Speech Preparation: Writing out the speech / Presentation materials with coherence and cohesion

Delivery and speech presentation:

□ Installing confidence and getting ride of stage fear by asking students speak in front of the class

□ Adhering to the policy of " Fluency first ands accuracy gradually"

□ Building up learner confidence through encouragement and appreciation.

UNIT V

Interview Skills:

(a) Preparation   -   Introducing yourself
                                 -        Traits employers look for in applicants
                                 -        Self Inventory (Experience – Skills -
                                                    Qualities)
                                 -        Your USP
                                 -        CV and Letter of Application
                                 -        First Impression

(b) Presentation   -   First Impression
                                 -        Role of Body Language
                                 -        Answering questions
                                 -        Certain Do's and Don'ts

(c) Post Presentation   -   Mock Interview and Assessment
                                 -        Guest Lecturers by HR personnel.

Group Dynamics / Discussion:

Interaction and communication in Group Discussion

Organisation principles in Group Discussion

Do's and Don'ts of Group discussion

Practical Sessions in Group Discussion

Books for Reference

1. Larry L. Barker, Communication, 3rd Edition, Prentice Hall, London, 1984.
2. Mohan, Krishna and Meera Banerji, Developing Communication Skills, Delhi - Macmillan, 1990.
3. Stanton, Nicky, Mastering Communication, Hampshire: Pal grave, 1982.
4. H.M. Prasad, Group Discussion and Interview, Tata McGraw Hill Publishing Company Limited, New Delhi, 2001.
5. Edgar Thorpe and Showick Thorpe, Winning at Interviews, Pearson Education, New Delhi, 2004.
6. Hemant Goswami, How to be successful in Interviews and get a job, Chandika Press Ltd, Chandigarh, 2001.
7. G. Ravindran, S.P. Benjamin Ilango, L. Arockiam, "Success Thru Soft Skills", IFCOT Publications, 2008.

Course Code : 17MCA2PW1   **Maximum Marks : 100**
Hours/ Week : -   **Internal Marks   :   20**
Credit   : 2   **External Marks   : 80**

Students carry out a Project Work during Summer Vacation at the end of Semester II

        System Study: 10 days

        Project Development: 3 weeks   18 days x 5 hours per day = 90 hours

        Report Preparation: 5 days

PROGRAMMING IN JAVA

Course Code : 17MCA3C15   **Maximum Marks   : 100**
Hours/Week : 4   **Internal Marks   : 25**
Credit   : 3   **External Marks   : 75**

Objective :
   To Impart sound knowledge in Object Oriented Programming skills in JAVA

UNIT I   **12 hours**
   An overview of Java – Java Buzzwords- Data Types, Variables and Arrays - Operators – Control Statements- Introducing Classes: Class Fundamentals – Declaring Objects – Introducing Methods – Constructors – The **this** keyword – Garbage Collection – Overloading Methods – Call by value, Call by reference – #Recursion# – Understanding static – final – Nested and Inner classes.

UNIT II   **12 hours**
   Inheritance: Inheritance Basics – Using super – Method overriding –Dynamic Method Dispatch- Using Abstract Classes - Final with Inheritance- Object class. Packages and Interfaces: Declaring Packages – #Access Protection# – Importing Packages – Defining, Implementing, Applying Interfaces - Exception Handling: Exception Types – try, catch – throw – throws – finally –multiple catch and nested try statements- Creating User-defined Exception classes.

UNIT III   **12 hours**
   Multithreaded Programming: The Java Thread Model – Creating a Thread –Creating Multiple Threads-Thread Priorities- Synchronization – #Inter-thread communication. String Handling# –The Collection Interfaces and Collection Classes: List,Set,Map,Enumeration and Iterator interfaces-ArrayList, LinkedList, Vector, Stack,Properties,HashTable, StringTokenizer, and Date classes.

UNIT IV   **12 hours**
   Files and IO Streams: File – The Byte Streams: InputStream,   Output Stream, FileInputStream,FileOutputStream, PipedInputStream and PrintStream – The Character Streams: Reader, Writer. FileReader and FileWriter – Serialization. Networking- Networking classes and interfaces: InetAddress class -#TCP/IP Client and Server sockets#–Datagrams – URL and URLConnection classes.

UNIT V   **12 hours**
   Introduction to Applet class- Applet Architecture- The HTML APPLET tag – Passing parameters to Applets – Event handling: The Delegation Event Model, Event Classes, Event Listener Interfaces - Working with Graphics, Color and Font classes - Understanding Layout managers- Swing Component classes: JApplet, JFrame and JDialog - Text Fields, Buttons, Combo boxes, List ,Tabbled and Scroll Panes.Understanding Layout managers.

 # .... # self-study portion.
Text Book:
Herbert Schildt, *The Complete Reference Java 2*, Fifth Edition, TMH Education Pvt. Ltd.2009.
UNIT I : Chapter 1 to 7
UNIT II : Chapter 8 to 10
UNIT III : Chapter 11,13, and 15, 16
UNIT IV : Chapter 17 and 18
UNIT V : Chapter 19 to 22, and 26
Book for Reference:
Herbert Schildt with Joe O' Neil, *Java – Programmer's Reference*, TMH, 2000.

SEMESTER - III : CORE - XVI
OPTIMIZATION TECHNIQUES

Course Code : 17MCA3C16   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks   : 25**
Credit   : 3   **External Marks   : 75**

Objective:

      To understand the basic concepts of operations research and to impart the knowledge on various operations research techniques and their applications.

UNIT I   **12 hours**

      Operations Research – Nature and Features of O.R.- Definitions of O.R. - Applications of O.R. - Linear Programming Problem - Mathematical Formulation of the Problem - Graphical Solution Method –Simplex Method – The Computational Procedure - Use of Artificial Variables - Big-M Method - # Two-Phase Method #.

UNIT II   **12 hours**

      Transportation Problem – # Linear Programming Formulation of the Transportation Problem # - Finding an Initial BFS – North-West Corner Rule – Matrix Minima Method – Vogel's Approximation Method – Test for Optimality - Assignment Problem – Mathematical Formulation of the problem - Hungarian Assignment Method.

UNIT III   **12 hours**

      Network Scheduling by PERT / CPM – Network: Basic Components – Logical Sequencing – Rules for Network Construction – Concurrent Activities – Critical Path Analysis – Probability Considerations in PERT – # Distinction between PERT and CPM #.

UNIT IV   **12 hours**

      Inventory Control – Types of Inventories – Reasons for Carrying Inventories – The Inventory Decisions – Objectives of Scientific Inventory Control – Costs Associated with Inventories – # Factors Affecting Inventory Control # – An Inventory Control Problem – The Concept of EOQ – Deterministic Inventory Problems with No Shortages – Deterministic Inventory Problems with Shortages.

UNIT V   **12 hours**

      Queueing Theory - Queueing System – Elements of a Queuing System – Operating Characteristics of a Queueing System – Classification of Queueing Models – Definition of Transient and Steady States – $(M/M/1):(\infty /FIFO)$ - $(M/M/1):(N/FIFO)$ - $(M/M/C):(\infty /FIFO)$ - # $(M/M/C):(N/FIFO)$ #.

Note : Stress to be on solving numerical problems only.

 # .... # self-study portion

Text Book :

Kanti Swarup, P.K. Gupta and Man Mohan, *Operations Research*, Sultan Chand & Sons Educational Publishers, New Delhi, Sixteenth Edition, Reprint 2013.

Books for Reference:

1. Hamdy A. Taha, *Operations Research : An Introduction*, Pearson Education, Eighth Edition 2008.
2. A. Ravindran, Don T. Phillips, James J. Solberg, *Operations Research Principles and Practice*, John Wiley & Sons, Second Edition, Third Reprint 2007.

COMPUTER NETWORKS

Course Code : 17MCA3C17	**Maximum Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 3	**External Marks : 75**

Objective:
        To provide an overall knowledge in computer communication networks concepts and its implementation details in the Internet.

UNIT – I   **12 hours**
Introduction - Uses of Computer Networks - Network Hardware: Personal Area Networks - Local Area Networks -Metropolitan Area Networks - Wide Area Networks – Internetworks. Network Software: Protocol Hierarchies - Design Issues for the Layers - Connection-Oriented Versus Connectionless Service - Service Primitives. Reference Models: The OSI Reference Model - The TCP/IP Reference Model. The Physical Layer: Guided Transmission Media. The Public Switched Telephone Network: Structure of the Telephone System – #Switching#.

UNIT – II   **12 hours**
The Data Link Layer: Data Link Layer Design Issues: Services Provided to the Network Layer – Framing - Error Control - Flow Control. Error Detection and Correction - Elementary Data Link Protocols - Sliding Window Protocols **- The Medium Access Control Sub-layer** Multiple Access Protocols: Carrier Sense Multiple Access Protocols - Collision-Free Protocols –#BLUETOOTH# - Data Link Layer Switching: Uses of Bridges - Learning Bridges - Spanning Tree Bridges - Repeaters, Hubs, Bridges, Switches, Routers, and Gateways

UNIT – III   **12 hours**
The Network Layer: Network Layer Design Issues - Routing Algorithms: The Optimality Principle - Shortest Path Algorithm - Distance Vector Routing - Link State Routing - Hierarchical Routing - Broadcast Routing - Congestion Control Algorithms - The Network Layer in the Internet - The IP Version 4 Protocol - #IP Addresses#

UNIT – IV   **12 hours**
The Transport Layer: The Transport Service: Services Provided to the Upper Layers - Transport Service Primitives - Berkeley Sockets - Elements of Transport Protocols - The Internet Transport Protocols: UDP - Introduction to UDP - #Remote Procedure Call# – TCP: Introduction to TCP - The TCP Service Model - The TCP Protocol - The TCP Segment Header

UNIT – V   **12 hours**
The Application Layer: DNS: The Domain Name System - The DNS Name Space – Domain Resource Records - Electronic Mail: Architecture and Services - The User Agent - **Network Security:** Cryptography - Introduction – Substitution & Transposition Ciphers – DES – RSA - Symmetric-Key Signatures - Public-Key Signatures - Communication Security: Firewalls - VPN - Authentication Protocols - Authentication Based on a Shared Secret Key - Establishing a Shared Key: #The Diffie-Hellman Key Exchange#.

 # ………..# self-study portion
Text Book:
Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, PHI, Fifth Edition, 2011
UNIT – I: Chapter1 (1.1, 1.2.1 – 1.2.5, 1.3.1 – 1.3.4, 1.4.1, 1.4.2
                Chapter2 2.2.1 – 2.2.5, 2.6.1, 2.6.5
UNIT – II: Chapter3 (3.1.1 – 3.1.4), 3.2.1, 3.2.2, (3.3.1 – 3.3.3), (3.4.1 – 3.4.3)
                Chapter4 (4.2.2. 4.2.3, (4.6.1 – 4.6.6), (4.8.1 – 4.8.4)
UNIT – III: Chapter5 (5.1, (5.2.1, 5.2.2, 5.2.4 – 5.2.7) , (5.3.1 – 5.3.5), 5.6.1, 5.6.2
UNIT – IV: Chapter6 (6.1.1 – 6.1.3), 6.2, 6.4.1, 6.4.2, (6.5.1 – 6.5.4)
UNIT – V: Chapter7 (7.1.1, 7.1.2, (7.2.1 – 7.2.2),
                Chapter8 (8.1.1 – 8.1.3), 8.2.1, 8.3.1, 8.4.1, 8.4.1, (8.6.1 – 8.6.3), 8.7.1, 8.7.2,
                        (8.9.1 – 8.9.3)
Books for References:
1. William Stallings, Data and Computer Communication, PHI, Eighth Edition, 2013
2. Behrouz A. Forouzan, Data Communication and Networking, Fourth Edition, Tata McGraw Hill, 2007

ACCOUNTING AND FINANCIAL MANAGEMENT

Course Code : 17MCA3C18   **Maximum Marks : 100**

Hours   : 4   **Internal Marks : 25**

Credits   : 3   **External Marks : 75**

Objective:

     To present the whole range of book keeping & accountancy and to give comprehensive coverage to management accounts.

UNIT I   **12 hours**

     Accounting Principles and Concepts – Double Entry Book Keeping – Income and Expenditure – Accounting Record and System – #Assets and Liabilities#

UNIT II   **12 hours**

     Journal – Ledger – #Trial Balance# – Trading, Manufacturing and Profit and Loss Account – Balance Sheet

UNIT III   **12 hours**

     Analysis and Interpretation of Financial Statements with Ratios

UNIT IV   **12 hours**

     Cost Accounting – Methods and Techniques of Cost Accounting – Classifications of Cost – Material Cost – Labour Cost – Overhead – Fixed and Variable Cost – Cost-Volume – Profit Analysis – #Marginal Costing and Decision Making#

UNIT V   **12 hours**

     Budgeting and Budgetary Control – Types of Budgets – Preparation of Various Functional Budgets – Preparations of Cash Budgets – Flexible Budgets – Advantages of Budgeting and Budgetary Control.

 # .... # self-study portion.

Text Books:
1. K.L. Nagarajan, N. Vinayakam, P.L. Mani, *Principles of Accountancy,* EURASIA Publishing House (PVT) Ltd., Revised Edition, 2002.
     UNIT I : Chapter-1
     UNIT II : Chapter-2, 4, 6
2. S.N. Maheswari, *Principles of Management Accounting*, Sultan Chand & Sons, 2001.
     UNIT III : Section-B Chapter-1, 2
     UNIT IV : Section-C Chapter-4
     UNIT V : Section-C Chapter-1

Books for Reference:
1. M.C. Shukla, T.S. Grewal, *Advanced Accounts*, S.Chand & Company Pvt., Ltd, Eleventh Edition, Reprinted, 1988.
2. M.Y. Khan and P.K. Jain, *Financial Management: Text, Problems and Cases*, Tata McGraw Hill, Fourth Edition, 2007.

SEMESTER - III : CORE BASED ELECTIVE-I
MULTIMEDIA SYSTEMS AND DESIGN

Course Code : 17MCA3CE1A	**Maximum Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 4	**External Marks : 75**

Objective:

To provide a sound knowledge in various concepts of Multimedia and its applications.

UNIT I   **12 hours**

Definitions – uses of Multimedia – Multimedia Hardware – Software – Authoring Tools – Stages of Multimedia Project – Text : Fonts & Faces – using Text in Multimedia – Font Editing and Design Tools – Hyper media – Hyper text

UNIT II   **12 hours**

Sound : The power of sound – Digital Audio – MIDI Sound – Multimedia Systems Sounds – Audio file formats – Animation : Power of motion – Principles of Animation – Animation by Computer – marking Animation that work.
Video : using video – How video works and is displayed – Shooting and Editing Tools.

UNIT III   **12 hours**

Video Technology : Raster Scanning principles – Sensors for TV Cameras – Color Fundamentals - Color Video – Digital Video and Image Compression : Evaluating a compression system- Video compression Techniques – JPEG and MPEG Compression standards.

UNIT IV   **12 hours**

Limitation of work station operating systems – Goals of Multimedia System Services – Some Views of the Multimedia System Services Architecture – Multimedia Communication Systems : Network Services – Network Protocols – Multimedia Conferencing : Tele conferencing Systems – Requirements for multimedia communication – Multimedia Conferencing Architectures.

UNIT V   **12 hours**

Multimedia and Internet: Internet – Client/Server technology – Communications protocol – Internet addressing – Internet functions – HTML and Web Authoring. Multimedia Development Team: Team approach – Assembling multimedia Production Team – Multimedia Development Process: Multimedia Project – Structured Multimedia Development –Casting multimedia Project.

 # .... # self-study portion.

Text Books:

1. Tay Vaughan , Multimedia Making it Work, Tata McGraw Hill Edition , Eighth Edition, 2011.
   UNIT I : Chapter 1,2,7
   UNIT II : Chapter 4, 5, 6
2. John F. Koegel Buferd, Multimedia Systems, Addison Wesley Longman. 3rd Edition, 2000.
   UNIT III : Chapter 5, 6
   UNIT IV : Chapter 8-8.2,9-9.1,9.2,13-13.3,13.4,15-15.1,15.2,15.4,
3. David Hillman, Multimedia Technology and Applications, Galgotia Publications Pvt., Ltd., 1998.
   UNIT V : Chapter 10, 11, 12

Book for Reference:

Fred T.Hofstetter, Multimedia Literacy, McGraw Hill, 1995.

Course Code : 17MCA3CE1B	**Maximum Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 4	**External Marks : 75**

Objective:

To impart knowledge related to the various concepts, methods of Human Computer Interaction techniques with design basics, design rules and evaluation   techniques.

UNIT I   **12 hours**
        The Interaction: Introduction – Models of interaction – Frameworks and HCI – Ergonomics – Interaction Styles – #Elements of WIMP interface# – Interactivity – The Context of the interaction - **Paradigm**: Introduction – Paradigms for interaction.

UNIT II   **12 hours**
Interaction Design basics: Introduction - Design – User focus – Scenarios – Navigation design – Screen design and layout – Interaction and prototyping - **HCI in the software process:** Introduction **–** The software lifecycle – Usability engineering – #Interactive design and prototyping# – Design rationale.

UNIT III   **12 hours**
Design rules: Introduction – Principles to support usability – Standards – Guidelines – Golden rules and heuristics – #HCI patterns# – **Implementation Support**: Introduction – Elements of windowing systems – Programming the application – Using toolkits – User interface management systems.

UNIT IV   **12 hours**
Evaluation techniques: What is evaluation – Goals of evaluation – Evaluation through expert analysis – Evaluation through user participation – Choosing an evaluation method - **Universal Design**: Introduction – Universal design principles – Multi-modal interaction – Designing for diversity.

UNIT V   **12 hours**
User Support: Introduction – Requirements of user support – Approaches to user support – Adaptive help system – #Designing user support systems#.

 # .... # self-study portion.

Text Book:

Alan Dix, *Human-Computer Interaction*, Pearson Education, Third Edition, 2004.

                        UNIT I : Chapter- Section (3.1-3.8),   Chapter-4 Section (4.1, 4.2)
                        UNIT II : Chapter- Section (5.1, 5.2, 5.4-5.8) Chapter-6 Section (6.1-6.5)
                        UNIT III: Chapter- Section(7.1-7.6) Chapter-8 Section (8.1-8.5)
                        UNIT IV: Chapter- Section (9.1-9.5) Chapter-10   Section (10.1-10.4)
                        UNIT V : Chapter-11 Section (11.1-11.5)

Book for Reference:

John M. Carroll, Human Computer Interaction in the new millennium, Pearson Education, 2007

MOBILE COMMUNICATION

Course Code : 17MCA3CE1C   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks : 25**
Credit   : 4   **External Marks : 75**

Objective:
     To impart and understand the important concepts of Mobile communications

UNIT I   **12 hours**
Introduction: Applications – History of wireless communication – Market for mobile communications –Open research topics – Simplified reference model Wireless transmission: Multiplexing – Cellular systems Medium Access Protocol: Comparison of S/T/F/CDMA

UNIT II   **12 hours**
Telecommunication systems: GSM Satellite systems: History – Applications – Basics – Routing – Localization – Handover

UNIT III   **12 hours**
Wireless LAN: Infra-red vs radio transmission – Infrastructure and ad-hoc network – System architecture – Protocol architecture – Historical HIPERLAN – Bluetooth User Scenarios – Architecture

UNIT IV   **12 hours**
Mobile network layer: Mobile IP – Dynamic host configuration protocol – Mobile ad-hoc networks

UNIT V   **12 hours**
Mobile transport layer: Traditional TCP – Classical TCP improvements – TCP over 2.5/3G wireless networks Support for mobility: Wireless application protocol Architecture – Wireless datagram protocol – Wireless application environment – Wireless markup language – WMLScript

Text Book:
Jochen Schiller, *Mobile Communications*, Pearson Education, Second Edition, 2011.
UNIT I : Chapter 1,2 & 3 (1.1 to 1.5, 2.5,2.8, 3.6)
UNIT II : Chapter 4 & 5 (4.1,5.1 to 5.6)
UNIT III : Chapter 7 (7.1, 7.2, 7.3.1, 7.3.2, 7.4.1, 7.5.1, 7.5.2)
UNIT IV : Chapter 8 (8.1, 8.2, 8.3)
UNIT V : Chapter 9 & 10 (9.1, 9.2, 9.3, 10.3.1, 10.3.2, 10.3.6, 10.3.7, 10.3.8)

Book for Reference
William C.Y. Lee *, Mobile Cellular Telecomunications,* Second Edition, McGraw Hill*, 1995.*

Course Code : 17MCA3C19P	**Maximum Marks : 100**
Hours/Week : 4	**Internal Marks : 20**
Credit : 3	**External Marks : 80**

1) Write Java Applications for the following:
   - (i) Mark List Preparation (if else)
   - (ii) Reverse and Sum of individual digits of a given number (while, do..while and for loops)
   - (iii) Arranging numbers in Ascending and Descending order (1D-Array)
   - (iv) Matrix Manipulation (Two Dimensional Arrays with switch statement)

2) Classes and Objects
   - (i) Write a Java program for finding the area and perimeter of a Rectangle (class)
   - (ii) Write a Java program for preparing neat Telephone bill. (Use suitable fields and conditions)

3) Inheritance
   - (i) Define a class Stack and implement the PUSH and POP operations and enhance the Stack class by automatically extending the size when the stack pointer reaches the maximum value.
   - (ii) Write a Program for Library Information System (Parameterized Constructor)

4) Interfaces and Packages
   - i) Define an interface named as Area and three implementing classes namely Circle, Rectangle and Triangle. Display the area of the circle, area of the rectangle and area of the triangle by invoking area() method through interface reference.
   - ii) Program to implement multiple inheritance.
   - iii)   Prepare an EB-Bill using the package concept.

5) Exception Handling
   - a) Write a Java Program to handle the following Exceptions
     - i) DivideByZeroException
     - ii) ArrayIndexOutOfBoundsException
     - iii) NumberFormatException
     - iv) NullPointerException
   - b) Program using user-defined Exception class

6) String and Utility classes
   i) Write a Program to test the methods in String and StringBuffer classes.
   ii) Write a Program for arranging the given names in Alphabetical order.
   iii)Menu driven program using Vector class
   iv) Menu driven program using LinkedList

7) Multi Threaded Programs
   a) Thread Class b) Runnable Interface c) Inter-thread communication

8) Files, I/O Streams and Networking
   i) Program for displaying contents of a given file, Copying contents between files and updating an existing file.
   ii) Program using ServerSocket and Socket classes.
   iii) Program using DatagramSocket and DatagramPacket classes

9) Applets
   i) Applet program for displaying geometrical object on a window.
   ii) Applet program for parameter passing (use HTML<param> tag)

10) Swing
   i) Bio-Data preparation using Swing classes and interfaces
   ii) Simple Calculator using Swing classes and interfaces

Course Code : 17MCA3C20P   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks   :   20**
Credit   : 3   **External Marks :   80**

I. Data Definition Languages

1. Create the following relations

        Customer (customer-Id (**Primary key**), customer-name, address)
        Account (account-number (**Primary key**), branch-name, balance)
        Loan (loan-number (**Primary key**), branch-name, amount)
        Branch (branch-name, branch-city, assets)
        Depositor (customer-name, account-number)
        Borrower (customer-name, loan-number)
        Supplier (supplier-number, part-number, color, quantity) **use candidate key**

2. Write DDL query to perform foreign key with on delete cascade - A foreign key with cascade delete means that if a record in the parent table is deleted, then the corresponding records in the child table will automatically be deleted.

3. Write DDL query to change the column and table name.

4. Alter with three options

        Add – add columns in the existing table
        Modify – modify the data type and size in the existing table
        Drop – delete column from existing table

II. Data Manipulation Languages

(1) Insert Operation

(2) Rename Operation

        Display the customer-name instead of customer-id

(3) Tuple Variables

        Using branch relation, Find the names of all branches that have assets greater than at least one branch located in a city (any city)

(4) String Operations

        Find the customer names whose names start with M.
        Find the customer names whose names end with R.
        Find the customer name whose names contain " mo" as a substring
        Find the customer name whose names exactly six character.
        Find the customer name whose names at least five character.

(5) Ordering of Tuples

        To list in alphabetic order all customers who have loan at a branch (ex: cantonment)
        To list customer names in descending order.

(6) Set Operation – (union, Intersect, minus)

        Find all customers having a loan, an account or both at the bank.
        Find all customers who have both a loan and account at the bank.
        Find all customers who have an account but no loan at the bank.
        Find all customers who have a loan but not an account at the bank.

(7) Aggregate functions – (average, minimum, maximum, total, and count)

        Find average account balance at a branch. (any branch name like cantonment branch)
        Find the minimum balance at a branch.

Find the maximum balance at a branch.
Find the total balance at a branch
Find the number of accounts in a branch.

(8) Aggregate functions with group by and having clause)

Find the average account balance at each branch.
Find branch names those branches where the total balance is more than Rs. 1, 00,000.
Find the branches those branches where the total accounts are more than 3.

(9) Nested sub-queries. Membership (in and notin)

Find all customers who have both a loan and account at the bank.
Find all customers who have an account but no loan at the bank.

Set Comparison (some, all)

Using branch relation, Find the names of all branches that have asset value greater than at least one branch located in a city (any city)
Find the names of all branches that have asset value greater than that of each branch located in a city (any city)

(10) Views

Create the view consisting of customer-names and branch-names who have either loan or an account at the branch.

(11) Deletion

Delete the tuples of all accounts with balances below the average at the bank (sub-query).
Delete all accounts tuples at every branch located in a city(any city)

(12) Updates

All balances are to be increased by 5 percent.

Update with case statements

All accounts with balances over 10000 receives 10 percent interest where as others receive 5 percent

(13) Join Operations

Inner join – Find the customer-names who have loan from a branch (KK nagar)
Left outer join – Show the relation, which loan not buy a single customer.
Right outer join – Show the relation, which customers bought loan, that loan details not
                in the loan relation

III. PL/SQL Procedure

1. Reverse the string.
2. Student Mark Sheet Preparation
3. Pay Roll preparation
4. Find factorial number using recursive function.
5. Find Fibonacci series using recursive function.

IV. SQL FORMS

1. Student Mark System
2. Pay Roll Preparation
3. Income Tax Calculation

PROGRAMMING SMART DEVICES

Course Code : 17MCA3EC1   **Maximum Marks : 100**

Hours/Week : -   **Internal Marks   : -**

Credit   : 4   **External Marks   : 100**

Objective :

To provide concepts to enable the students for creating applications for smart devices using Android

UNIT I

Introduction to Android: History of Android – Versions of Android – Android Architecture – App Architecture – Components – Intents – Mainfest – App Package - Activities - Services – Broadcast Receivers – Content Providers – Installing the Android SDK – Installing an Android Platform – Creating an Android Virtual Device – Starting the AVD – Introducing UC – Creating UC – Installing and Running UC – Preparing UC for Publishing – Migrating to Eclipse – Developing UC with Eclipse.

UNIT II

User Interface: Customizing the Window – Creating and Displaying Views – Monitoring Click Actions – Resolution Independent Assets – Locking Activity Orientation – Dynamic Orientation Locking – Manually Handling Rotation - Creating Pop-up Menu Actions – Customizing Options Menu – Customizing Back Button – #Emulating the Home Button# – Monitoring TextView Changes – Scrolling TextView Ticker – Animating a View – Creating – Drawables as Backgrounds – Creating Custom State Drawables – Applying – Masks to Image – Creating Dialogs that Persist – Implementing Situation – Specific Layouts – Customizing Keyboard Actions – Dismissing Soft Keyboard – Customizing AdapterView Empty View – Customizing ListView Rows – Making ListView Section Headers – Creating Compound Controls.

UNIT III

Interacting with Device Hardware and Media – Interacting Device Location – Mapping Locations – Annotating Maps – Capturing Images and Videos – Making a Custom Camera Overlay – Recording Audio – Adding Speech Recognition – Playing Back Audio/Video – Creating a Tit Monitor – Monitoring Compass Orientation.

UNIT IV

Persisting Data : Marking a Preference Screen – Persisting Simple Data – Reading and Writing Files – Using Files as Resources - Managing a Database – Querying a Database – Backing Up Data – Sharing your Database – Sharing your other Data.

UNIT V

Interacting with the Systems: Notifying from the Background – Creating Timed and Periodic Tasks – Scheduling a Periodic Task – Creating Sticky Operations – Running Persistent Background Operations – Launching Other Applications – Launching System Application – other Applications – Interacting with Contacts – Picking Device Media – Saving to the MediaStore Working with Libraries : Creating Java Library JARs – Using Java Library JARs – Creating Android Library Projects – Using Android Library Projects – Charting – Practical Push Messaging.

Text Book:

Dave Smith and Jeff Friesen, "Android Recipes: A Problem – Solution Approach", Rakmo Press Pvt., Ltd, New Delhi, 2011.

Web Reference:

http://developer.android.com/Android Developer's Guides

.NET TECHNOLOGY

Course Code : 17MCA4C21	**Maximum Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 3	**External Marks : 75**

Objective :
To understand the concepts of .NET Frame work and develop the applications using VB.NET and ASP.NET programming

UNIT I   **12 hours**
Introduction to .NET Framework: Evolution and Overview of .NET Framework-Features in VS.NET:The IDE Main Window, Class View Window, Object Browser, Code Window, Intellisense, Compiling and Debugging the Code, Developing simple applications through Visual Studio IDE- Variables, Constants and Expressions: Value Types and Reference Types, Boxing and Unboxing - Operators - Example Programs.

UNIT II   **12 hours**
Decision Making Statements: If Statements, Select..Case Statement, Looping Statements, Types of Methods-Arrays: One dimensional and Multidimensional Arrays, Jagged Arrays, Example Programs. User Interfacing Controls: The Textbox, Label, Button, RadioButton, CheckBox, GroupBox, List box, Checked List Box, Combo Box, Timer and Menu controls.

UNIT III   **12 hours**
Definition and Usage of Class-Constructors—Properties and Indexers-Virtual Methods-Abstract classes and Methods-Sealed Classes. Definition and Usage of Interfaces-#Interface Inheritance#-Namespaces-Components and Access Modifiers – Delegates-Events-Attributes and Reflection.

UNIT IV   **12 hours**
Exception Handling: Default and User-defined Exception handling Mechanisms, Backtracking and Custom Exception- I/O Streams : Introduction, Binary Data Files, Text Files, Data Files and FileInfo and DataInfo Classes-#Networking Basics#-Socket, TcpClient, TcpListener and NetworkStream Classes

UNIT V   **12 hours**
ADO.NET- Advantages, Managed Data Providers, Creation of a Data Table, Retrieving Data from Table, Table Updating, Disconnected Data Access through Dataset Object. ASP.NET: Advantages, ASP.NET Object Model, Server-side Controls- Calendar Control, AdRotator Control, #Validation and List Web Controls#.

 # .... # self-study portion.

Text Book:
C. Muthu Visual Basic.NET, Vijay Nicole Imprints Private Limited, 2007.

Books for Reference:
1. Evangelos Petroutsos , *Mastering Microsoft Visual Basic,* Wiley India Edition*, 2008.*
2. Steven Holzer, Visual Basic.Net Programming Black Book, Dream Tech Press, 2007.

COMPUTER SIMULATION AND MODELING

Course Code : 17MCA4C22   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks :   25**
Credit   : 3   **External Marks :   75**

Objective :

    To impart knowledge in real time modeling process and the simulation of any system using the real time mode.

UNIT I   **12 hours**

    Introduction to Simulation: When Simulation is the Appropriate Tool- When Simulation is not Appropriate- Advantages and Disadvantages of Simulation- Areas of Application- Systems and System Environment- Components of a System- Discrete and Continuous Systems- Model of a System- Types of Models- Discrete-Event System Simulation – #Steps in a simulation study#. Simulation Examples: Simulation of Queuing Systems, Simulation of Inventory Systems.

UNIT II   **12 hours**

    Simulation Software: History of Simulation Software- Selection of Simulation Software- Simulation in JAVA, Simulation in GPSS, Simulation in SSF- #Simulation software# – Experimentation and Statistical and analysis tools .

UNIT III   **12 hours**

Statistical Models in Simulation: Review of Terminology and Concepts- Useful Statistical Models- Discrete Distributions- Continuous Distributions- #Poisson process. Queuing models# - Characteristics of queuing systems.

UNIT IV   **12 hours**

    Random-Number Generation: Properties of Random Numbers-Generation of Pseudo-Random Numbers-Techniques for Generating Random Numbers-Linear congruential Method-Random number streams -Tests for random numbers-Frequency tests - Test for Autocorrelation. Random-Variate Generation: Inverse Transform Technique-Exponential Distribution-Uniform Distribution- #Weibull Distribution#.

UNIT V   **12 hours**

    Input Modeling: Data Collection - Identifying the Distribution with Data - parameter estimation- goodness of fit tests.Verification and Validation of Simulation Models: Model Building, Verification, and Validation-Verification of Simulation Models-Calibration and Validation of Models.
 # .... # self-study portion.

Text Book:

Jerry Banks, John S. Carson, II Barry L. Nelson., Discrete-Event System Simulation, Fourth Edition, PHI Edition, 2009.
    UNIT I : Chapter 1   Sections (1.1-1.11), Chapter 2   Sections (2.1, 2.2)
    UNIT II : Chapter 4   Sections (4.1, 4.2, 4.4-4.7)
    UNIT III : Chapter 5   Sections (5.1-5.5), Chapter 6   Sections (6.1)
    UNIT IV : Chapter 7   Sections (7.1, 7.2, 7.3.1, 7.3.3, 7.4), Chapter 8 Sections (8.1.1-8.1.3)
    UNIT V : Chapter 9   Sections (9.1-9.4), Chapter 10   Sections (10.1-10.3)

Book for Reference:

E.Winsberg, Science in the age of computer simulation, Chicago: University Press, 2010.

MICROPROCESSORS, INTERFACING AND APPLICATIONS

Course Code : 17MCA4C23   **Maximum Marks : 100**

Hours/Week : 4   **Internal Marks   : 25**

Credit   : 3   **External Marks   : 75**

Objective:

To understand the architecture and working principle of a microprocessor. To write simple assembly language programs, and to provide knowledge of interfacing devices and real time applications of microprocessors.

UNIT I   **12 hours**

Overview of Microcomputer Systems - Addresses – General Operation of a Computer - Intel 8086 Architecture – Internal Operation – Pin Configuration – Minimum & Maximum Modes - Machine Language Instructions – Addressing Modes – Instruction Formats – Instruction Execution Timing – The 8088.

UNIT II   **12 hours**

Assembler Language Programming – Assembler Instruction Format – Data Transfer Instructions – Arithmetic Instructions – Branch Instructions – Loop Instructions – Flag Manipulation Instructions – Logical Instructions – Shift and Rotate Instructions – String Instructions – REP Prefix

UNIT III   **12 hours**

Assembly Language Programs – Addition, Subtraction, Multiplication and   Division – Multibyte Addition and Subtraction – Complements – Shifting – Masking – Sum of a Series – Block Data Transfer – Finding the Smallest and the Biggest Number in an Array – Arranging a Series of Numbers in Descending and Ascending Order – Length of a String – Number of Occurrences of a Character in a String – Comparison of Two Strings

UNIT IV   **12 hours**

I/O Interfaces – Serial Communication Interface – Asynchronous Communication – Synchronous Communication – 8251 Programmable Communication Interface – Parallel Communication – 8255 Programmable Peripheral Interface – DMA Controller

UNIT V   **12 hours**

Microprocessor Applications – Delay Subroutines – Seven Segment Displays – Frequency Measurement – Temperature Measurement – Water Level Indicator & Controller – Traffic Lights Control.

Text Books:

1. Yu-cheng Liu and Glenn A. Gibson, Microcomputer Systems–The 8086/8088 Family–Architecture, Programming and Design, Prentice Hall of India, Second Edition, 2011
    UNIT-I   : Chapters 1 and 2
    UNIT-II   : Chapters 3 and 5
    UNIT-III   : Based on Chapters 3 and 5
    UNIT-IV   : Chapter 9

2. B. Ram, Fundamentals of Microprocessors and Microcontrollers, Dhanpat Rai Publications, Seventh Edition, 2011.
    UNIT-V   : Chapter 9

Book for Reference:

Douglas V. Hall, Microprocessors and Interfacing – Programming and Hardware, Tata McGraw Hill, Revised Second Edition, 2006.

ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS

Course Code : 17MCA4C24	**Maximum Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 3	**External Marks : 75**

Objective :

To provide the knowledge of problem solving using AI techniques, knowledge representations, expert system development process and tools.

UNIT I   **12 hours**

The AI problems – AI techniques – problems, problems space & search – Defining the problem as a state Search – Production systems – problem characteristics – heuristic search techniques – Generate & test – #Hill climbing# – Best first search. Problem reduction – constraint satisfaction – means – ends analysis.

UNIT II   **12 hours**

Game playing : Mini – max procedure – Adding Alpha – Beta cutoffs – Additional refinements – Searching AND/OR Graphs – Iterative deepening. Using Predicate Logic – Representing simple facts & logic – Representing instance & IS a Relationships – Computable functions & Predicates – Use of the predicate calculus in AI – Resolution – #natural deduction#.

UNIT III   **12 hours**

Representing knowledge using Rules – Procedural verses declarative knowledge logic programming – forward versus backward reasoning – Resolving within AND/OR Graphs matching – control knowledge – symbolic Reasoning under uncertainity – non – monotonic reasoning – Implementation Issues – Augmenting a problem solver - Implementation of depth first & breadth first search. Statistical reasoning – Bayee's theorem – Certainity factors & Rule based Systems – Bayesian Networks – #Dempstor# – Shafer theory – Fuzzy logic.

UNIT IV   **12 hours**

Expert Systems – Architectural Components – Explanation facilities – knowledge acquisition.

UNIT V   **12 hours**

Expert System Development process – Non – formal representation of knowledge – semantic Networks – Frames – Scripts – Production Systems –#Expert Systems tools#.

 # .... # self-study portion.

Text Books:

1. Elaine Rich & Kevin Kaight, *Artificial Intelligence,* Tata McGraw Hill, Second Edition, 1991.
    UNIT I : Chapter I : Sections 1.1, 1.3, Chapter II : Sections 2.1-2.3
         Chapter III : Sections 3.1-3.6
    UNIT II : Chapter XII: Sections 12.2-12.5, Chapter V : Sections5.1-5.5
    UNIT III : Chapter VI : Sections 6.1-6.5, Chapter VII : Sections 7.1,7.3-7.6
2. David W. Roltson, *Principles of Artificial Intelligence & Expert Systems Development,* McGraw Hill, 1988.
    UNIT IV : Chapter I : Sections 1.1, 1.6, Chapter VII : Sections 7.1-7.7
         Chapter IX : Sections 9.1-9.9
    UNIT V : Chapter VIII : Sections 8.1-8.8, Chapter IV : Sections 4.1-4.4
         Chapter X : Sections 10.1-10.7

Books for Reference:

1. Data W. Patterson, Introduction to Artificial Intelligence and Expert Systems, PHI, 2009.
2. Stuart Russell and Peter Norvig, Artificial Intelligence A Modern Approach, Second Edition, Pearson Education Series, 2003.
3. Keith Darlington, The essence of Expert Systems, Pearson First Impression, 2011.

SOFTWARE ENGINEERING

Course Code : 17MCA4CE2:A   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks : 25**
Credit   : 4   **External Marks : 75**

Objectives

To understand theories, methods, and technologies applied for professional software development.

UNIT I   **12 hours**

Introduction to software engineering: The Evolving Role of software – The changing nature of software – Software myths. A generic view of process: A Layered Technology – Process Models: The Waterfall model-Evolutionary Process Models. System Engineering: Computer –Based Systems – The System Engineering Hierarchy.

UNIT II   **12 hours**

Requirements engineering: Requirements engineering Tasks – Initiating The Requirement Engineering process – Eliciting Requirements – Building the analysis Model – Requirements analysis – Data Modeling Concepts – Flow Oriented Modeling – Class Based Modeling – Creating a Behavioral Model.

UNIT III   **12 hours**

Design Engineering: Design Process and Design Quality Design Concepts – The Design Model. Creating an Architectural Design: Software Architecture – Data Design-Architectural Design – Mapping Data Flow into Software Architecture. Performing User Interface Design: The Golden Rules – Interface Analysis and Design – Interface Analysis – Interface Design Steps – Design Evaluation.

UNIT IV   **12 hours**

Testing strategies: A strategic Approach to Software Testing –Test Strategies for conventional Software and Object Oriented Software – Validation Testing – System Testing – The art of Debugging. Testing Tactics: Software Testing Fundamentals – White Box Testing – Basic Path Testing – Control Structure Testing – Black Box Testing – Object Oriented Testing Methods.

UNIT V   **12 hours**

Project Management: The Management Spectrum – The People – The Product – The Process–The Project. Estimation: The Project Planning Process – Resources – Software Project Estimation – Decomposition Techniques – Empirical Estimation Models. Project Scheduling: Project Scheduling – Scheduling. Quality Management: Quality Concepts – Software Quality Assurance – Formal Technical Reviews.

Text Book
Roger S Pressman, *Software Engineering*, McGraw-Hill International Edition, Sixth Edition, 2006.

Book for Reference
Richard Fairley, *Software Engineering Concepts*, Tata McGraw-Hill Education Private Limited, 2008

SEMESTER - IV : CORE BASED ELECTIVE-II
SOFTWARE PROJECT MANAGEMENT

Course Code : 17MCA4CE2B   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks : 25**
Credit   : 4   **External Marks : 75**

Objective:
          To impart knowledge related to the various concepts, methods of Software Project Management   using management   process framework, management disciplines, and   risk Management techniques.

UNIT I   **12 hours**
          Introduction to Software Project Management :   What is a Project? - Software Projects versus Other Types of Project – Activities Covered by Software Project Management - Stakeholders - Project Success and Failure - What is Management? - Management Control. An overview of Project Planning : Introduction to stepwise Project Planning - Select the Project – Identify Project Scope and Objectives – Identity of Project Infrastructure - Analyze Project Characteristics - Identify Project Projects and Activities – Estimate Effort for each Activity - Identify Activity Risks - Allocate Resource – Review/Publicize plan - Execute Plan/Lower levels of Planning.

UNIT II   **12 hours**
           Project   Evaluation : Evaluation of   Individual Projects - Risk Evaluation - Strategic Programme Management – Selection of an Appropriate   Project Approach : Introduction – Choosing Methodologies and Technologies – Software Processes and Process   Models – Choice of Process models – The Waterfall model - Software Prototyping - Other ways of Categories Prototypes – Incremental   Delivery – Selecting   the Most Appropriate Process Model. Software Effort Estimation : Basis for software Estimating - Software Effort Estimation Techniques – Bottom-up Estimating – The Top-down Approach and Parametric Models - Albrecht Function Point Analysis – COCOMO II : A Parametric Productivity Model.

UNIT III   **12 hours**
           Activity Planning : Objectives - Project Schedules - Sequencing and Scheduling Activities - Network Planning Models - Formulating a Network Model – The Forward Pass – The Backward Pass – Identifying the Critical Path - Identifying Critical Activities – Activity0n-Arrow Networks.Risk Management : Risk – Categories of Risk - Risk Identification – Risk Assessment – Risk Planning – Risk Management - Applying the PERT Technique. Resource Allocation : The Nature of the Resources - Identifying Resource Requirements – Scheduling Resources – Creating Critical Paths - The Scheduling Sequence.

UINT IV   **12 hours**
           Monitoring   and Control : Creating the Framework – Collecting the Data – Visualizing Progress - Cost monitoring Earned Value Analysis – Prioritizing Monitoring - Change control. Managing Contracts : Types of Contract - Stages in Contract Placement – Typical Terms of Contract – Contract Management - Acceptance Managing People in Software Environments : Understanding the Behaviour - Organizational Behaviour: A Background - Selecting the Right Person for the Job – Instruction in the Best methods – Motivation - The Oldham-Hackman Job Characteristic Model.

UNIT V   **12 hours**
           Working   in Teams : Becoming a Team – Decision Making – Organization and Team Structures - Leadership – Coordination dependencies - Software Quality The importance of Software Quality - Defining Software Quality - ISO 9126 - Product versus Process Quality Management - Quality Management systems - Software Reliability -Quality Plans - Prince2 – An overview - Project Management Tools.

Text Book:
Bob Hughes , Mike Cotterell , Rajib Mall – Software Project Management, Fifth Edition , Mcgraw Hill Education Pvt Ltd-2014.
UNIT I   : Chapters – 1,3
UNIT II   : Chapters – 2,4,5
UNIT III : Chapters – 6,7,8
UNIT IV   : Chapters – 9,10, 11
UNIT V   : Chapters – 12,13
Books for Reference:
1. Walker Royce, Software Project Management, Pearson Education, 2012.
2. Joel Henry, Software Project Management, Pearson Education, 2009

SEMESTER - IV : CORE BASED ELECTIVE-II
SOFT COMPUTING

Course Code : 17MCA4CE2C   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks   :   25**
Credit   : 4   **External Marks :   75**

Objective:

To understand concepts of Neural Networks, Fuzzy logic and Genetic Algorithm.

UNIT I   12 hours

Neural Networks-1(Introduction & Architecture):
Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks. Various learning techniques; perception and convergence rule, Auto-associative and hetro-associative memory.

UNIT II   12 hours
Neural Networks-II (Back propagation networks):
Architecture: Perceptron model, solution, single layer artificial neural network, multilayer perception model; back propagation learning methods, effect of learning rule co-efficient ;back propagation algorithm, factors affecting back-propagation training, applications.

UNIT III   12 hours
Fuzzy Logic-I (Introduction):
Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations, Properties of fuzzy sets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion.

UNIT IV   12 hours
Fuzzy Logic –II (Fuzzy Membership, Rules):
Membership functions, interference in fuzzy logic, fuzzy if-then rules, Fuzzy implications and Fuzzy algorithms, Fuzzyfications & Defuzzificataions, Fuzzy Controller, Industrial applications.

UNIT V   12 hours
Genetic Algorithm (GA):
Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations, (encoding) Initialization and selection, Genetic operators, Mutation, Generational Cycle, applications.

Text Books:
1. S. Rajsekaran & G.A. Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithm:Synthesis and Applications" Prentice Hall of India.
2. N.P.Padhy,"Artificial Intelligence and Intelligent Systems" Oxford University Press.

Books for Reference
1. S.N. Sivanandam & S.N. Deepa, "Principles of Soft Computing", Wiley India (P), Ltd.,
2. I.S.R. Jang, C.T. Sun and E. Mizutani, "New Fuzzy and Soft Computing", PHI/Pearson Education.

Course Code : 17MCA4C25P　　　　　　　　　　　**Maximum Marks :　100**
Hours/Week : 4　　　　　　　　　　　　　　　　　**Internal Marks　:　　20**
Credit　　　: 3　　　　　　　　　　　　　　　　**External Marks　:　　80**

1. Write a JavaScript code block, which checks the contents entered in a form's text element. If the text entered is in the lower case, convert to upper case.

2. Write a JavaScript code block, which validates a username and password.

   a) If either the name or password field is not entered display an error message.

   b) The fields are entered do not match with default values display an error message.

   c) If the fields entered match then display the welcome message.

3. Write a JavaScript code to display the current date and time in a browser.

4. Write a PHP program that adds products that are selected from a web page to a shopping cart .

5. Write a PHP program to access the data stored in a mysql table

6. Write a PHP program interface to create a database and to insert a table into it.

7. Write a PHP program using classes to create a table

8. Write a PHP program to upload a file to the server

9. Write a PHP program to create a directory and to read contents from the directory

10. Write a shell program to find the details of an user session

11. Write a shell program to change the extension of a given file

12. Create a mysql table and execute queries to read, add remove and modify a record from that table

13. Write a PHP program to update and delete a table

14. Write a PHP program for Storing and Retrieving Information from files

Course Code : 17MCA4C26P   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks   :   20**
Credit   : 3   **External Marks :   80**

1. Placing Textboxes dealing with its properties.

2. Making use of placeholders, literals and controls.

3. Making use of list box, check box and radio button controls.

4. Setting up and using Adrotator control.

5. Making use required field validator and compare validator controls.

6. Using range validator, regular expression validator and validation summary.

7. Database connectivity through connected approach.

8. Data view with the help of grid view control.

9. Formatting data with a help of data list control.

10. Develop a project to update and delete few records using Disconnected Access.

11. Develop a project to view the records using GridView, DetailsView, FormView Controls.

12. Designing a ASP.Net client for web service.

QUANTITATIVE APTITUDE

Course Code : 17MCA4S2   **Maximum Marks : 100**

Hours/Week : 2 + 2   **Internal Marks : 100**

Credit : 3

Course is Fully Internal; Examination is at the end of Semester IV

Objective:

To revise and master the basic techniques of arithmetic operations so that these skills will augment to their professional capacity

UNIT I

Numbers, HCF, LCM, Decimal Fractions, Simplification, Square Roots, Cube Roots, averages, Problems in numbers and ages.

UNIT II

Surds, Indices, Percentages, Profit and Loss, Ratio and Proportion, Partnership, Chain Rule, Time and Work, Pipes and Distances.

UNIT III

Time and distance, Problems on Trains, Boats and Streams, Alligation, Simple Interest, Compound Interest, Logarithms, Area.

UNIT IV

Volume and Surface Area, Races and Games of Skill, Calendar, Clocks, Stocks and Shares Permutation and Combination, Probability.

UNIT V

True discount, Banker's Discount, Height and Distances, Odd man out and Series, Tabulation, Bar graphs, Pie charts, Line Graphs.

Text Book:

R.S. Aggarwal, *Quantitative Aptitude for Competitive Examinations*, Seventh Revised Edition, S.Chand and Co. Ltd, 2010.

         UNIT I   Chapter I : Sections 1-8

         UNIT II   Chapter I : Sections 9-16

         UNIT III   Chapter I : Sections 17-24

         UNIT IV   Chapter I : Sections 25-31

         UNIT V   Chapter I : Sections 32-35 , Sections 36-39

Book for Reference:

Barron's, *Guide for GMAT*, Galgotia Publications, 2005.

Course Code : 17MCA4PW2   **Maximum Marks : 100**
Hours/Week : -   **Internal Marks   :   20**
Credit   : 2   **External Marks   :   80**

Students carry out a Project Work during Summer Vacation at the end of Semester IV.

    System study   : 10 days

    Project development : 3 weeks 18days x 5 hours per day = 90 hours

    Report preparation : 5 days

SEMESTER - IV : EXTRA CREDIT COURSE - II
NETWORK SECURITY

Course Code : 17MCA4EC2	**Maximum Marks : 100**
Hours/Week : -	**Internal Marks : -**
Credit : 4	**External Marks : 100**

Objective:

To impart knowledge related to the various concepts, methods of Network Security using cryptography basics, program security, database security, and security in networks.

Unit I

Overview-Symmetric Ciphers: Classical Encryption Techniques

Unit II

Symmetric Ciphers: Block ciphers and the Data Encryption Standards Public-key Encryption and Hash Functions: Public-Key Cryptography and RSA

Unit III

Network Security Practices: Authentication applications-Electronic Mail Security

Unit IV

Network Security Practices: IP Security-Web Security

Unit V

System Security: Intruders-Malicious Software-Firewalls

Text Book

William Stallings, Cryptography and Network Security-Principles and Practices, Prentice-Hall, Third edition, 2003 **ISBN:** 8178089025

Books for References

1. By Joseph Migga Kizza, Guide to Computer Network Security, Springer 2015.

2. Johannes A. Buchaman, Introduction to cryptography, Springer-Verlag 2000.

3. AtulKahate, Cryptography and Network Security, Tata McGraw Hill. 2007

DISTRIBUTED TECHNOLOGY

Course Code : 17MCA5C27   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks   :   25**
Credit   : 3   **External Marks   :   75**
Objective:
　　　　To impart the basic concepts of Distributed Components(DCOM) and the methods of developing Distributed Applications using RMI,CORBA, Servlet, JSP and EJB with the support of JavaScript and XML.

UNIT I   **12 hours**
　　　　Distributed Component Architecture : Introduction- Methods of Distribution-Multi-tier Architecture-Component Concepts- Distributed Component Model : Evolution of DCOM, OLE, ActiveX, Microsoft DCOM, Error Handling in COM, COM interfaces- Marshalling.

UNIT II   **12 hours**
　　　　Java RMI : Introduction – Architecture of RMI – The RMI Package- Creation of RMI applications- Advantages and Disadvantages of RMI. CORBA : Object Management Architecture- #CORBA Architecture#-OMG CORBA IDL-CORBA Object Life Cycle-CORBA Services: Object Location Service, Messaging Service, Security Service, Transaction Service and Persistency Services.

UNIT III   **12 hours**
　　　　Servlets : Introduction – Advantages of Servlets – The Servlet Life Cycle – Servlet API – Handling HTTP GET Requests-#Handling HTTP POST Requests# –Cookies – Session Tracking – Multi-tier Applications using Database Connectivity- Servlet Chainig.

UNIT IV   **12 hours**
　　　　Introduction to Scripting Languages- JavaScript Elements: Identifiers, Expressions, Keywords, Operators, Statements and Functions – Objects in JavaScript: Window, Document, Forms Objects- Other Objects: Date, Math and String Objects. HTML <form> tag and elements. Java Server Pages: Introduction-Advantages- Components of JSP: Directives, Declaratives, Scriptlets, Expressions, Standard Actions and Custom Tags – JSP Sessions-JSP Implicit Objects.

UNIT V   **12 hours**
　　　　Enterprise Java Beans : Introduction to JavaBeans – Properties – EJB Architecture- Types of Enterprise Beans: Session Bean, Entity Bean and Message Driven Beans – #Life Cycle of Beans# – Callback Methods-Steps for developing Enterprise Beans-Creation of Deployment Descriptor.
 # .... # self-study portion
Text books:
1. G. Sudha Sadasivam, Distributed Component Architecture, Wiley India Pvt. Ltd, 2008.
　　UNIT I : Chapter 1 – 1.1, 1.3, 1.5 & 1.6, Chapter 6 - 6.1to 6.5, 6.8, 6.9 and 6.11
　　UNIT II: Chapter 2 – 2.1 to 2.5, Chapter10 – 10.1
　　UNIT V: Chapter 8- 8.1 to 8.5
2. N.P. Gopalan and J. Akilandeswari, Web Technology, PHI Learning Pvt. Ltd., 2011.
　　UNIT III : Chapter 5 Section 2-4 , Chapter 10 Section 1,2, 4 -12
　　UNIT IV : Chapter 11 : Section 1, 2, 4, 7, 8

Books for Reference:
1. Jim Keogh , J2EE – The complete Reference, Tata McGraw Hill Edition, 2002.
2. Richard Monson Haefel, Enterprise Java Beans, O 'Reilly Fourth Edition, 2004.

PRINCIPLES OF COMPILER DESIGN

Course Code : 17MCA5C28   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks   : 25**
Credit   : 3   **External Marks : 75**

Objective:
To understand the various phases of a compiler and to develop skills in designing a compiler.

UNIT I   **12 hours**
Introduction to Compilers: Compilers and Translators – The Structure of a Compiler – Lexical Analysis – Syntax Analysis – Intermediate Code Generation – Optimization – Code Generation. **Finite Automata and Lexical Analysis:** The Role of Lexical analyzer Regular Expressions – Finite Automata – From a regular expression to Finite Automata – Minimizing the Number of States of a DFA.

UNIT II   **12 hours**
The Syntactic Specification of Programming Languages: Context-free grammars – Derivations and parse trees**. Basic Parsing Techniques:** Parsers – Shift-reduce Parsing -Operator precedence parsing – Top-down Parsing – Predictive Parsers.

UNIT III   **12 hours**
Syntax Directed Translation: Syntax Directed Translation: Implementation of Syntax Directed Translation - Intermediate code – Postfix Notation – Parse Trees and Syntax Trees – Three-address Code, Quadruples and Triples – Boolean Expressions.

UNIT IV   **12 hours**
Symbol Table: The Contents of Symbol table – Data Structures for Symbol table – **Runtime storage Administration:** Implementation of a Simple Stack allocation scheme - Implementation of a Block Structured Languages. **Error Detection and Recovery:** Errors – Lexical-phase Errors - Syntactic-phase Errors – Semantic Errors.

UNIT V   **12 hours**
Introduction to Code Optimization: The Principal Sources of Optimization – Loop Optimization – The DAG Representation of Basic Blocks.
Code Generation: Problems in Code Generation – A Machine Model – A Simple Code Generator – Register allocation and Assignment – Peephole optimization.
Text Book
 Principles of Compiler Design, Alfred V.Aho and Jeffrey D.Ullman.
            Unit I: Chapter 1: (1.1, 1.3 – 1.8) Chapter 3: (3.1, 3.3 – 3.6)
            Unit II: Chapter 4: (4.1 – 4.2) and Chapter 5
            Unit III: Chapter 7: (7.1 – 7.6 and 7.8)
            Unit IV: Chapter 9: (9.1 – 9.2) Chapter 10: (10.1– 10.2) and Chapter 11
            Unit V: Chapter 12: (12.1 – 12.3) Chapter 15: (15.2– 15.5 and 15.7)
Books for Reference:
1. Santara Chattopadhyay, Compiler design, PHI, New Delhi, 1st Edition, 2009.
2. Kenneth C. Louden San Jose State University*,* Compiler Construction: Principles and Practice, 1st Edition.
3. Bal, H., Grune, D., Jacobs C., and Langendoen, K.: Modern Compiler Design. Wiley, First Edition 2000
4. Andrew W Appel,and aia Ginsburg, Modern Compiler Implementation in C, CAMBRDGE University press, First Indian Edition 2000.
5. David Galles, Modern Compiler Design, Pearson Edition, First Impression, 2007.

ORGANIZATIONAL DYNAMICS

Course Code : 17MCA5C29   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks   :   25**
Credit   : 3   **External Marks :   75**

Objective:
   To impart knowledge about fundamentals of organization behavior, Motivation, Individual and Interpersonal Behavior, Change, Stress and Counseling

UNIT I   **12 hours**
   Fundamentals of Organization Behavior: – Understanding Organization Behavior – Fundamental Concepts – Contingency Approach – Limitation of Organization Behavior – An Organization Behavior System – Model of Organization Behavior. Managing Communications: communications Fundamentals – #Upward and Downward Communication# – Other Form of Communication – Informal Communication

UNIT II   **12 hours**
   Social Systems and Organizational Culture: Understanding a Social System – Social Culture – Role – Status – Organizational Culture – Motivation: Model – Motivational Drives – Human Needs – Behavior Modification – #Goal Setting. Appraising: Organizational Behavior and performance Appraisal# – Economic Incentive Systems

UNIT III   **12 hours**
   Leadership – The Nature of Leadership – Behavior Approaches to Leadership Style – Contingency approaches to Leadership Style – Individual and Interpersonal Behavior: Nature of Employee Attitudes – Effects of Employee Attitudes – Studying Job Satisfaction. Interpersonal Behavior: Conflict in Organizations – #Power and Politics#.

UNIT IV   **12 hours**
   Organizations and Individuals: Rights to Privacy – Discipline – QWL –Individual Responsibilities. Informal and Formal Groups: Group Dynamics – #Nature of Informal Group# – Formal Group. Team and Team Building: Organizational Context for Teams – Teamwork – Team Building

UNIT V   **12 hours**
   Change and its Effects: Change at Work- Resistance to Change – Implementing Change Successfully – Understanding Organization Development. Stress and counseling: Employee Stress – #Employee Counseling – Type of counseling#.
 # .... # self-study portion.
Text Book:
John W Newstrom, "Organizational Behavior: Human Behavior at Work", 12th Edition,
Tata McGraw Hill Education Private Limited, 2007.
   UNIT I : Chapter 1, 2, 3
   UNIT II : Chapter 4, 5, 6
   UNIT III : Chapter 7, 9, 11 **UNIT**
   IV : Chapter 10, 12, 13 **UNIT V** :
   Chapter 14, 15
 Books for Reference:
1. Organizational Behavior, 12th Edition, Tata McGraw Hill Education Private Limited, 2011.
2. Stephen P. Robbins, *Organizational Behavior*, 13th Edition, PHI Pvt. Ltd, New Delhi, 2010.

SEMESTER – V : CORE BASED ELECTIVE III
PRINCIPLES OF E-COMMERCE

Course Code : 17MCA5CE3A   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks   :   25**
Credit   : 4   **External Marks :   75**

Objective:

To acquire the knowledge in Electronic Commerce, Electronic Payment systems, Security systems , Online Advertising and Marketing.

UNIT I   **12 hours**

Electronic Commerce Framework – Electronic Commerce and Media Convergence – The Anatomy of E-Commerce Applications – Electronic Commerce Consumer Applications – Electronic Commerce Organization Applications. The Network Infrastructure for Electronic Commerce : Components of the I-way – Network Access Equipment – #Global information Distribution Networks#.

UNIT II   **12 hours**

The   Internet as a Network Infrastructure : The Internet Terminology – NSFNET Architecture and components – #National Research and Education Network# – Internet Governance – An overview of Internet Applications. The Business of Internet Commercialization : Telco/Cable/On-Line companies – #National Independent ISPs# – Regional Level ISPs – Local-level ISPs – Internet Connectivity options.

UNIT III   **12 hours**

Electronic Commerce and the World Wide Web : Architectural Framework for Electronic Commerce – World Wide Web as the Architecture – Technology behind the Web – Security and the Web. Consumer-Oriented Electronic Commerce : Consumer-oriented applications – mercantile process model – mercantile models from the consumers perspective.

UNIT IV   **12 hours**

Electronic Payment Systems : Types of Electronic Payment Systems – Digital Token based Electronic Payment Systems – #Credit Card-Based Electronic Payment Systems# – Risk and Electronic Payment Systems – Designing Electronic Payment Systems. Inter Organizational Commerce and EDI : Electronic Data Interchange – EDI Applications in Business – EDI: Legal, Security and privacy issues.

UNIT V   **12 hours**

Advertising and the Marketing on the Internet : The New Age of Information Search and Retrieval – Electronic Commerce Catalogs – Information filtering – Consumer-Data Interface – Emerging Tools. On Demand Education and Digital Copyrights : Computer-based Education and Training – Technological Components of Education on Demand. Software Agents: Characteristics and Properties of Agents – #The technology behind Software Agents – Applets#, Browsers, and Software Agents.

 # .... # self-study portion.

Text Book:

Ravi Kalakota and Andrew Whinston, *Frontiers of Electronic Commerce*, Addison Wesley, 2000.

UNIT I   Chapter I   : Section : 1.1 - 1.5   , Chapter II   : Section : 2.2 – 2.5
UNIT II Chapter III   : Section : 3.1 – 3.7   , Chapter IV   : Section : 4.1 -4.4 , 4.7
UNIT III Chapter VI   : Section : 6.1 - 6.5   , Chapter VII : Section : 7.1 ,7.3
UNIT IV Chapter VIII : Section : 8.1 – 8.6 , Chapter IX   : Section : 9.1-9.3
UNIT V   Chapter XIII   : Section : 1.3 - 1.7   , Chapter XIV : Section 14.3-14.5 ,Chapter XV :Section :15.1-15.3,
        Chapter XVI   : Section 16.2-16.3,16.6

Books for Reference:

1. Damil Minoli & emma milothi mele commerceTechnology Handbook, Tata McGraw Hill, 1999.
2. K.Bajaj & D.Naj, E-Commerce, Tata McGraw Hill, 1999.

SEMESTER – V : CORE BASED ELECTIVE III
DATA WAREHOUSING AND DATA MINING

Course Code : 17MCA5CE3B   **Maximum Marks : 100**

Hours/Week : 4   **Internal Marks   : 25**

Credit   : 4   **External Marks   : 75**

Objective:

To impart knowledge related to the various concepts, methods and algorithms of data mining with data warehousing, data preprocessing, data mining algorithms with temporal and spatial data mining techniques.

UNIT I   **12 hours**

Introduction: Data mining-motivation, importance-DM Functionalities, Basic Data Mining Tasks, DM Vs KDD,DM Metrics, DM Applications, Social implications.

UNIT II   **12 hours**

Data Warehousing: Difference between Operational Database and Data warehouse-Multidimensional Data Model: From tables to data Cubes, Schemas, Measures-DW Architecture: Steps for design and construction of DW, 3-tier DW Architecture-DW Implementation: Efficient computation of DATA Cubes, #Efficient Processing of OLAP queries#, Metadata repository.

UNIT III   **12 hours**

Data Preprocessing: Data Mining Primitives, Languages: Data cleaning, Data Integration and Transformation, Data Reduction. Discretization and concept Hierarchy Generation. Task-relevant data, Background Knowledge, Presentation and Visualization of Discovered Patterns. Data Mining Query Language-#other languages for data mining#.

UNIT IV   **12 hours**

Data Mining Algorithms: Association Rule Mining: MBA Analysis, The Apriori Algorithm, Improving the efficiency of Apriori. Mining Multidimensional Association rules from RDBMS and DXV. Classification and Predication: Decision Tree, Bayesian Classification back propagation, Cluster Analysis: Partitioning Methods, Hierarchical Method, Grid-based methods, Outlier Analysis.

UNIT V   **12 hours**

Web, Temporal And Spatial Data Mining: Web content Mining, Web Structure Mining, Web usage mining. Spatial Mining: Spatial DM primitives, Generalization and Specialization, Spatial rules, spatial classification and clustering algorithms. Temporal Mining: Modeling Temporal Events, Times series, Pattern Detection, #Sequences#.

 # .... # self-study portion.

Text Books:

1. Jiawei Han & Micheline Kamber, *Data Mining: Concepts and Techniques,* Harcourt
   India Private Limited, First Indian Reprint, 2001.
2. Margaret H. Dunham, *Data Mining: Introductory and Advanced Topics*, Pearson Education,
   First Indian Reprint, 2003.
3. Arun K. Pujari, *Data Mining Techniques*, University Press (India) Limited, First Edition, 2001.
4. Efrem O. Mallach, *Decision Support and Data Warehouse Systems*, McGraw-Hill,
   International Edition, 2000.

Book for Reference:

IBM, *An Introduction to Building the Data Warehouse,* Prentice Hall of India, 2005.

BIG DATA ANALYTICS

Course Code : 17MCA5CE3C **Maximum Marks : 100**

Hours/Week : 4 **Internal Marks   : 25**

Credit   : 4 **External Marks   : 75**

Objective:

To impart knowledge in Fundamentals, Big Data Analytics, Operationalizing Big Data, Big Data Warehouses and Map Reduce Fundamentals

UNIT I **12 hours**

Fundamentals of Big Data : The Evolution of Data Management – Understanding the waves of Managing Data – Defining Big Data – Building a Successful Big Data Management Architecture – Examining Big Data Types : Defining Structured Data – Defining Unstructured Data – Looking at Real Time and Non Real Time Requirements - Digging into Big Data Technology Components : Exploring the Big Data Stack – Redundant Physical Infrastructure – Security Infrastructure – Operational Databases – organizing data Services and Tools – Analytical Data Warehouses – Big Data Analytics – Big Data Applications.

UNIT II **12 hours**

Defining Big Data Analytics : Using Big Data to get Results – Modifying Business Intelligence Products to Handle Big Data – Studying Big Data Analytics Examples – Big Data Analytics Solutions – Understanding Text Analytics and Big Data : Exploring Unstructured Data – Analysis and Extraction Techniques – Putting Results Together with Structured Data – Putting Big Data to use – Text Analytics Tools for Big Data – Customized Approaches for Analysis of Big Data : Building New Models and Approaches to Support Big Data - Understanding Different Approaches to Big Data Analysis - Characteristics of a Big Data Analysis Framework.

UNIT III **12 hours**

Operationalizing Big Data : Making Big Data a Part of Your Operational Process - Integrating Big Data - Incorporating big data into the diagnosis of diseases - Understanding Big Data Workflows - Workload in context to the business problem - Ensuring the Validity, Veracity, and Volatility of Big Data - Security and Governance for Big Data Environments : Security in Context with Big Data - Understanding Data Protection Options - The Data Governance Challenge - Putting the Right Organizational Structure in Place - Developing a Well-Governed and Secure Big Data Environment.

UNIT IV **12 hours**

Appliances and Big Data Warehouses : Integrating Big Data with the Traditional Data Warehouse - Big Data Analysis and the Data Warehouse - Changing the Role of the Data Warehouse - Changing Deployment Models in the Big Data Era - Examining the Future of Data Warehouses - Examining the Cloud and Big Data : Defining the Cloud in the Context of Big Data - Understanding Cloud Deployment and Delivery Models - The Cloud as an Imperative for Big Data - Making Use of the Cloud for Big Data - Providers in the Big Data Cloud Market.

UNIT V **12 hours**

MapReduce Fundamentals : Tracing the Origins of MapReduce - Understanding the map Function - Adding the reduce Function - Putting map and reduce Together - Optimizing MapReduce Tasks - Exploring the World of Hadoop : Explaining Hadoop - Understanding the Hadoop Distributed File System - HadoopMapReduce - The Hadoop Foundation and Ecosystem - Building a Big Data Foundation with the Hadoop Ecosystem - Managing Resources and Applications with Hadoop

YARN - Storing Big Data with HBase - Mining Big Data with Hive - Interacting with the Hadoop Ecosystem.

Text Book

"Big Data" by Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, Wiley Publications, 2014.

Book for Reference

"Big Data Imperatives : Enterprise Big Data Warehouse, BI Implementations and Analytics" by SoumendraMohanty, MadhuJagadeesh and HarshaSrivatsa, Apress Media, Springer Science + Business Media New York, 2013

PARALLEL PROCESSING

Course Code : 17MCA5CE4A	**Maximum Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 4	**External Marks : 75**

Objective:

To study the Parallel computer Architecture, theories of parallel computing, interconnection networks and applications of cost effective computer systems.

UNIT I   **12 hours**

Introduction to Parallel Processing – Evolution of Computer Systems – Parallelism in Uniprocessor Systems – Parallel Computer Structures – #Architectural Classification Schemes# – Parallel Processing Applications.

UNIT II   **12 hours**

Memory and Input-Output Subsystems – #Hierarchical Memory Structure# – Virtual Memory System – Memory Allocation and Management – Cache Memories and Management – Input-Output Subsystems.

UNIT III   **12 hours**

Principles of Pipelining and Vector Processing – Pipelining : An Overlapped Parallelism – Instruction and Arithmetic Pipelines – Principles of Designing Pipelined Processors – Vector Processing Requirements.

UNIT IV   **12 hours**

Vectorization and Optimization methods – Parallel Languages for Vector Processing – Design of Vectorizing Compiler – Optimization of Vector Functions – SIMD Array Processors – SIMD Interconnection Networks – #Associative Array Processing#.

UNIT V   **12 hours**

Multiprocessors Architecture and Programming – Functional Structures – Interconnection Networks   - Parallel Memory Organizations – Multiprocessor Operating Systems – Language Features to Exploit Parallelism – Multiprocessor Scheduling Strategies.

 # .... # self-study portion.

Text Book:

Kai Hwang and Faye A. Briggs,Computer Architecture and Parallel Processing,McGraw Hill India Edition, 2014.
[Chapters : 1, 2, 3, 4.5.1 – 4.5.3, 5.1, 5.2, 5.4, 6.3, 7.1, 7.2.1, 7.2.2, 7.2.3, 7.3.1, 7.3.3, 7.4, 7.5.1, 8.3]
UNIT I Chapter 1 Section 1.1 – 1.5   **UNIT II** Chapter 2 Sections 2.1 – 2.5
UNIT III Chapter 3 Sections 3.1 – 3.4 **UNIT IV** Chapter 4 Sections 4.5 , Chapter 5 Sections 5.1 ,5.2 , 5.4
UNIT V   Chapter 7 7.1 – 7.4, 7.5-7.5.1, Chapter 8 Sections 8.3

Books for Reference:

1. Introduction To Parallel Processing, By M. Sasikumar, Dinesh Shikhare, Ravi P.Prakash, Eastern Economy Edition, 2014
2. Computer Architecture and Parallel Processing, Kai Hwang and Baye
3. Parallel Computing, Theory and Practice, Michel J.Quinn, McGraw-Hill International Edn., Singapore 1994
4. Richard Kain, *Advanced Computer Architecture,* PHI, 1999.
5. V. Rajaraman and C. Siva Ram Murthy, *Parallel Computers*, *Architecture and Programming,* PHI, 2000.

Course Code : 17MCA5CE4B   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks   : 25**
Credit   : 4   **External Marks : 75**

Objective:

        To impart knowledge related to the various concepts, methods of Grid computing with grid benefits, components, and standards supporting grid computing techniques.

UNIT I   **12 hours**
Introduction: Grid Computing & Key Issues – #Applications# – Other Approaches – Grid Computing Standards – Pragmatic Course of Investigation.

UNIT II   **12 hours**
Grid Benefits & Status of Technology: Motivations – History of Computing, Communications and Grid Computing – Grid Computing Prime Time – #Suppliers and Vendors# – Economic Value – Challenges.

UNIT III   **12 hours**
        Components of Grid Computing Systems and Architectures: Basic Constituent Elements- A Functional View – A Physical View – Service View.

UNIT IV   **12 hours**
        Grid Computing Standards-OGSI: Standardization – Architectural Constructs – Practical View – OGSA/OGSI Service Elements and Layered Model – #More Detailed View#.
UNIT V   **12 hours**
        Standards Supporting Grid Computing-OGSA: Functionality Requirements – OGSA Service Taxonomy – Service Relationships – OGSA Services – #Security Considerations#.
 # .... # self-study portion.

Text Book:
Daniel Minoli, *A Networking Approach to Grid Computing*, Wiley Publication, 2004.

        UNIT I   Chapter I : Section 1.1 – 1.2 , 1.4 – 1.6
        UNIT II Chapter II : Section 2.1 –2..6
        UNIT III Chapter III : Section 3.1 – 3.4
        UNIT IV Chapter IV: Section 4.1 – 4.6
        UNIT V Chapter V : Section 5.1 – 5.6

Book for Reference:
 Ahmar Abbas, *Grid Computing – A Practical Guide to Technology and Applications,* Charles River Media Publication, 2004.

SEMESTER – V : CORE BASED ELECTIVE-IV
CLOUD COMPUTING

Course Code : 17MCA5CE4C   **Maximum Marks : 100**

Hours/Week : 4   **Internal Marks   : 25**

Credit   : 4   **External Marks : 75**

Objective:

To impart knowledge on Introduction to Cloud Computing, The Evolution of SaaS, The Anatomy of Cloud Infrastructure, Workflow Management Systems and Clouds.

UNIT I   **12 hours**

Introduction to Cloud Computing: Roots of Cloud Computing - Layers and Types of Cloud - Features of a cloud-Infrastructure Management-Infrastructure as a Service Providers-Platform as a Service Providers-Challenges and Risks. Broad Approaches to Migrating into the Cloud - Seven Step Model of Migration into a Cloud.

UNIT II   **12 hours**

The Evolution of SaaS-The Challenges of SaaS Paradigm- Approaching the SaaS Integration Enigma- New Integration Scenarios- The Integration Methodologies- SaaS Integration Products, Platforms and Services-B2Bi Services -. Background of Enterprise cloud computing paradigm- Issues for Enterprise Applications on the Cloud- Transition Challenges- Enterprise Cloud Technology and Market Evolution -Business drivers toward a marketplace for Enterprise cloud computing- The Cloud Supply Chain.

UNIT III   **12 hours**

The Anatomy of Cloud Infrastructure- Distributed Management of Virtual Infrastructures- Scheduling Techniques for Advance Reservation of Capacity- RVWS Design - Cluster as a Service: The Logical Design - Cloud Storage : from LANs TO WANs- Technologies for Data Security in Cloud Computing.

UNIT IV   **12 hours**

Workflow Management Systems and Clouds - Architecture of Workflow Management Systems - Utilizing Clouds for Workflow Execution- A Classification of Scientific Applications and Services in the Cloud-SAGA based Scientific Applications that Utilize Clouds. MapReduce Programming Model- Major MapReduce Implementations for the Cloud- MapReduce Impacts and Research Directions. A Model for Federated Cloud Computing - Traditional Approaches to SLO Management- Types of SLA -Life Cycle of SLA - SLA Management in Cloud- Automated Policy based Management.

UNIT V   **12 hours**

Grid and Cloud- HPC in the Cloud: Performance related Issues -Data Security in the Cloud- The Current State of Data Security in the Cloud- Homo Sapiens and Digital Information- Risk- Identity- The Cloud, Digital Identity and Data Security - Content Level Security :Pros and Cons- Legal Issues in Cloud Computing - Data Privacy and Security Issues- Cloud Contracting models- Case Studies : Aneka and CometCloud.

Text Book

Cloud Computing - Principles and Paradigms, by RajkumarBuyya, James Broberg, and AndrzejGoscinski. 2011 .

Book for References

Cloud Application Architectures,GeorgeReese,ISBN: 184047142,Shroff/O'Reilly,2009.

Course Code : 17MCA5C30P	**Maximum Marks : 100**
Hours/Week : 4	**Internal Marks : 20**
Credit : 3	**External Marks : 80**

1. a) Creation, insertion, deletion and modification of records in MS-Access database using Statement Interface
    b) Creation, insertion, deletion and modification of records in MS-Access database using Prepared Statement Interface

2. a) Simple chatting application using TCP
    b) Simple message passing application using UDP

3. Simple RMI application for downloading and uploading files on the server by using multiple clients

4. Simple RMI application for inserting and deleting records in any database from multiple clients

5. Simple Server side applications
    a) By extending GenericServlet class
    b) By extending HttpServlet class

6. a) Session Tracking in Servlets using
        i)   HttpSession class
        ii) Cookies
    b) Database manipulation using Servlet program.

7. a) JSP code for checking number of times a particular page is visited
    b) JSP code for using request and response objects

8. Application to display factorial of a given number using Stateless Session Bean

9. Application to display the result of a student using Stateful Session Bean

10. Simple banking application using Entity Bean.

MINI PROJECT LAB

Course Code : 17MCA5C31P   **Maximum Marks : 100**
Hours/Week : 4   **Internal Marks   :   20**
Credit   : 3   **External Marks :   80**

Students carry out a Mini Project during their practical hours.

COMPREHENSIVE STUDY

Course Code : 17MCA5S3   **Maximum Marks   : 100**
Hours/Week : 2   **Internal Marks   : 100**
Credit   : 1   **Course Fully Internal**

Objective:
To consolidate the understanding of the basics through frequent tests and interaction. Emphasis is on the concepts an fundamentals and the orientation is towards placement.

UNIT I :   C Debugging – Object Oriented Programming

UNIT II :   Operating Systems

UNIT III :   Data Structures – Algorithms

UNIT IV :   Database Concepts – Software Engineering

UNIT V :   Distributed Technologies - Networking

Books for Reference:

1. Robert Lafore, " Object Oriented programming in Microsoft C++", Galgotia Publications, New Delhi, 2000.
2. Andrew S. Tanenbaum, " Modern Operating Systems", Prentice Hall of India Private Ltd, New Delhi, 1997.
3. Ellis Horowitz and Sartaj Sahni, "Fundamentals of Computer Algorithms", Galgotia Publications, New Delhi, 1985.
4. Roger S. Pressman, "Software Engineering", McGraw Hill, International, 6th Edition, New York, 2008.
5. Andrew S. Tanenbaum, "Computer Networks", Prentice Hall of India, New Delhi, 1999.

SEMESTER - V : EXTRA CREDIT COURSE - III
CYBER SECURITY

Course Code : 17MCA5EC3   **Maximum Marks : 100**
Hours/Week : -   **Internal Marks   :   -**
Credit   : 4   **External Marks   : 100**

Objectives: To understand concepts of cyber crime, cyber security and computer forensics. To learn the tools and methods used in cyber crimes. To understand the organizational implications of cyber security and the ethical dimensions of cyber crimes.

UNIT I

Introduction to Cybercrime - Definition and Origin - Cybercrime and Information Security -Classifications of Cybercrimes - Cybercrime Era - Cyber offenses - How Criminals Plan the Attacks - Social Engineering - Cyberstalking - Cybercafe and Cybercrimes - Botnets: The Fuel for Cybercrime - Attack Vector - Cybercrime: Mobile and Wireless Devices – Proliferation - Trends in Mobility - Credit Card Frauds in Mobile and Wireless Computing Era - Security Challenges Posed by Mobile Devices - Registry Settings for Mobile Devices - Authentication Service Security - Attacks on Mobile/Cell Phones.

UNIT II

Tools and Methods Used in Cybercrime - Proxy Servers and Anonymizers – Phishing - Password – Cracking - Keyloggers and Spywares - Virus and Worms -Trojan Horses and Backdoors – Steganography DoS and DDoS Attacks - SQL Injection - Buffer Overflow - Attacks on Wireless Networks - Phishing and Identity Theft – Phishing - Identity Theft.

UNIT III

Cybercrimes and Cybersecurity: The Legal Perspectives - Cybercrime and the Legal Landscape around the World - Why Do We Need Cyberlaws: The Indian Context - The Indian IT Act - Challenges to Indian Law and Cybercrime Scenario in India - Consequences of Not Addressing the Weakness in Information Technology Act - Digital Signatures and the Indian IT Act - Amendments to the Indian IT Act - Cybercrime and Punishment - Cyberlaw, Technology and Students: Indian Scenario.

UNIT IV

Understanding Computer Forensics -Digital Forensics Science - The Need for Computer Forensics - Cyberforensics and Digital Evidence - Forensics Analysis of E-Mail - Digital Forensics Life Cycle - Chain of Custody Concept - Network Forensics - Approaching a Computer Forensics Investigation - Setting up a Computer Forensics Laboratory: Understanding the Requirements - Computer Forensics and Steganography - Relevance of the OSI 7 Layer Model to Computer Forensics - Forensics and Social Networking Sites: The Security/Privacy Threats - Computer Forensics from Compliance Perspective - Challenges in Computer Forensics - Special Tools and Techniques - Forensics Auditing – Antiforensics.

UNIT V

Cybersecurity: Organizational Implications - Cost of Cybercrimes and IPR Issues: Lessons for Organizations - Web Threats for Organizations: The Evils and Perils - Security and Privacy Implications from Cloud Computing - Social Media Marketing: Security Risks and Perils for Organizations - Social Computing and the Associated Challenges for Organizations - Protecting People's Privacy in the Organization - Organizational Guidelines for Internet Usage, Safe Computing Guidelines and Computer Usage Policy - Incident Handling: An Essential Component of Cybersecurity - Forensics Best Practices for Organizations - Cybercrime and Cyberterrorism: Social, Political, Ethical and Psychological Dimensions - Intellectual Property in the Cyberspace - The Ethical Dimension of Cybercrimes.

Text Book:
Nina Godbole and Sunit Belapure, Cyber Security: *Understanding Cyber Crimes,* Computer Forensics And Legal Perspectives, Wiley India, 2012.

Book for References
James Graham, Ryan Olson, Rick Howard, *Cyber Security Essentials,* CRC Press, 2010

Course Code : 17MCA6PW	**Maximum Marks : 200**
Hours/Week : 30	**Internal Marks : 80**
Credit : 20	**External Marks : 120**

Students carry out a Project in Software Development Companies throughout the Semester.

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