

# HAJEE KARUTHA ROWTHER HOWDIA COLLEGE

(An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai.)  
(Re-Accredited at "A" Grade, by NAAC, Bangalore)

UTHAMAPALAYAM - 625533.



## DEPARTMENT OF INFORMATION TECHNOLOGY

### MASTER OF SCIENCE – COMPUTER SCIENCE

### SYLLABUS

(Effect from the Academic Year 2017 – 2018 Onwards)

#### **PROGRAMME SPECIFIC OUTCOMES**

- PSO1.** Develop a software product, debug the code, test the code, and deliver the product, maintenance activity for the software product
- PSO2.** Run a personal computer, and install an operating system and drivers for the hardware used in the system
- PSO3.** Enhance the quality of the image; produce 2D and 3D view of an image
- PSO4.** Configure a personal computer on any network like LAN, MAN, WAN
- PSO5.** Save the cost and time of a company by using latest technologies like cloud computing, mobile computing, grid computing, and expert systems according to the needs of the company

**HAJEE KARUTHA ROWTHER HOWDIA COLLEGE (AUTONOMOUS)**  
**M.Sc., Computer Science(2017-2018 onwards)**

Semester	Course Category	Course Code	Title of the Course	Hour	Credits	Int	Ext	Total
<b>I</b>	Core	17PCSC11	Mathematical Foundations	6	4	25	75	100
	Core	17PCSC12	Data Structures and Algorithms	6	4	25	75	100
	Elective	17PCSE11	Computer Organization	6	4	25	75	100
		17PCSE12	Neural Networks					
	Core	17PCSC1P	Advanced C Programming – Lab	6	4	40	60	100
	Core	17PCSC1Q	Programming in C++ and Data Structures – Lab	6	4	40	60	100
<b>Total</b>				<b>30</b>	<b>20</b>	<b>155</b>	<b>345</b>	<b>500</b>
<b>II</b>	Core	17PCSC21	Advanced Java Programming	5	4	25	75	100
	Core	17PCSC22	Database Management Systems	5	4	25	75	100
	Core	17PCSC23	Operating Systems	5	4	25	75	100
	Elective	17PCSE21	Data Communications And Networks	5	4	25	75	100
		17PCSE22	Data Mining And Warehousing					
	Core	17PCSC2P	Advanced Java Programming – Lab	5	4	40	60	100
	Core	17PCSC2Q	Relational Database Management systems – Lab	5	4	40	60	100
<b>Total</b>				<b>30</b>	<b>24</b>	<b>180</b>	<b>420</b>	<b>600</b>
<b>III</b>	Core	17PCSC31	Mobile Computing	5	4	25	75	100
	Core	17PCSC32	Compiler Design	5	4	25	75	100
	Elective	17PCSE31	Cloud Computing	4	4	25	75	100
		17PCSE32	Security In Computing					
	Core	17PCSC3P	Dot Net Programming –Lab	5	4	40	60	100
	Core	17PCSC3Q	Android Programming –Lab	5	4	40	60	100
	NME	17PCSN21	Computer Fundamentals And Applications	6	5	25	75	100
<b>Total</b>				<b>30</b>	<b>25</b>	<b>180</b>	<b>420</b>	<b>600</b>
<b>IV</b>	Core	17PCSC41	Software Project Management	5	4	25	75	100
	Elective	17PCSE41	Computer Graphics And Multimedia	5	4	25	75	100
		17PCSE42	Digital Image Processing					
	Core	17PCSC4P	Project Work	20	13	40	60	100
<b>Total</b>				<b>30</b>	<b>21</b>	<b>90</b>	<b>210</b>	<b>300</b>
<b>TOTAL</b>				<b>90</b>	<b>90</b>	<b>605</b>	<b>1395</b>	<b>2000</b>

**Year : First**

**Semester : I**

**Hours : 6**

**MATHEMATICAL FOUNDATIONS**

**Credits : 4**

**Course code:17PCSC11**

**Course Category : CORE**

**COURSE OUTCOME:**

On successful completion of this subject the students should have: - Understanding the concepts of discrete mathematics - Learning applications of discrete structures in Computer Science.

**UNIT I**

**Logic:** Propositions – Logical Operators – Truth Tables – Normal Forms – Laws of Logic – Proofs in Propositional Calculus (Theory of Inference).

**UNIT II**

**Graph Theory:** Basic Concepts – Matrix Representation of Graphs – Shortest Path Problem – Directed Trees – Binary Trees.

**UNIT III**

**Formal Languages:** Four Class of Grammars (Phrase Structure, Context Sensitive, Context Free, Regular) Context Free Language – Generation Trees.

**Finite Automata:** Representation of FA – Acceptability of a String by FA – Non Deterministic FA (NFA) – Acceptability of String by NFA. Equivalence of FA and NFA – Procedure for Finding FA –NFA.

**UNIT IV**

**Algebraic Structures:** Groups – Subgroups – Homomorphism – Cosets – Lagrange's Theorem – Normal Subgroups – Semi Groups – Monoids – Homomorphism of Semi Group and Monoids – Sub Semigroups and Submonoids

**UNIT V**

**Lattices And Boolean algebra:** Lattices – Properties – New Lattices – Modular and Distribution Lattices. **Boolean algebra:** Boolean Polynomials – Switching Circuits.

**Text Book:**

1. **“Discrete Mathematics”** – M.K. Venkatraman, N. Sridharan, N. Chandrasekaran. The National Publishing Company.

**Year : First**

**Semester : I**

**Hours :6**

**DATA STRUCTURES AND ALGORITHMS**

**Credits : 4**

**Course code:17PCSC12**

**Course Category : Core**

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**COURSE OUTCOME:**

On successful completion of this subject the students should have writing programming.Ability on data structures dealing with Stacks, Queues, List, Searching and Sorting algorithms etc.

**UNIT I**

**Introduction:** Overview – Definition – Concept of Data Structure – Overview – Implementation – Arrays – Definition – One Dimensional Array – Multidimensional Array – Pointer Array. **Linked List:** Definition – Singly Linked List – Double Linked List – Circular Linked List – Circular Double Linked List – Application – Memory Representation.

**UNIT II**

**Stack:** Definition – Representation – Operations – Applications. **Queues:** Definition – Representation – Various Queue Structures – Applications. **Trees:** Definition – Representation – Operation – Types.

**UNIT III**

**Divide and Conquer:** General Method – Binary Search – Finding the Maximum and Minimum – Merge Sort – Quick Sort – Selection – Strassen's Matrix Multiplication.

**UNIT IV**

**Greedy Method:** General Method –Optimal Storage on Tapes – Knapsack Problem – Job Sequencing with Deadlines – Optimal Merge Patterns – Minimum Spanning Trees – Single Source Shortest Paths.

**UNIT V**

**Dynamic Programming:** General Method – Multistage Graphs – All Pair Shortest Path – Optimal Binary Search Trees – 0/1 Knapsack – Reliability Design – Traveling Salesperson Problem – Flow Shop Scheduling.

**Text Book:**

- 1.“**Classic Data Structures**” , D. Samantha, PHI, 2008.
- 2.“**Fundamentals of Computer Algorithms**”, Ellis Horowitz, Sartaj Sahni, Galgotia Publications, 2005.

**Reference:**

- 1.“**Fundamentals of Data Structures**” , Ellis Horowitz, Sartaj Sahni, Galgotia Publications, 2005.

Year : First

Semester : I

Hours : 6

**COMPUTER ORGANIZATION**

Credits : 4

Course code: 17PCSE11

Course Category : ELECTIVE

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**COURSE OUTCOME:**

On successful completion of this subject the students should have Knowledge on Digital circuits, interfacing of various components

**UNIT I**

**Basic Structure of Computers:** Computer Types – Functional Units – Basic Operational Concepts – Bus Structures – Software – Performance – Historical Perspective.

**Machine Instructions and Programs:** Memory Locations and Addresses – Memory Operation – Addressing Modes – Assembly Language – Basic Input/output Operations – Stacks and Queues - Additional Instructions – CISC and RISC Architecture.

**UNIT II**

**Input/ Output Organization:** Accessing I/O Devices – Interrupts – Interrupt Hardware – Enabling and Disabling Interrupts – Handling Multiple devices – Controlling Device Requests - Exception - Processor Examples – DMA – Buses – Interface Circuits – Standard I/O Interfaces.

**UNIT III**

**The Memory System:** Basic Concepts – Semiconductor RAM Memories – Read-Only Memories – Speed, Size and Cost – Cache Memories – Virtual Memories – Secondary Storage.

**UNIT IV**

**Arithmetic:** Addition and Subtraction of Signed Number – Design of Fast Adders – Multiplication of Positive Numbers – Signed Operand Multiplication Fast Multiplication – Integer Division – Floating Point Numbers and Operations.

**Basic Processing Unit:** Fundamental Concepts – Execution of a Complete Instruction – Multiple Bus Organization – Hardwired Control – Micro programmed Control.

**UNIT V**

**Processor Families:** The ARM Family – The Intel IA-32 Family – The Intel IA-64 Family – A Stack Processor.

**Pipelining:** Basic Concepts - Data Hazards – Instruction Hazards – Influence on Instruction Sets – Data path and Control Consideration - UltraSPARC II Examples.

**Text Book:**

1. “**Computer Organization**”, Carl Hamacher, Zvonko Vranesic, Safwat Zak, 5<sup>th</sup> Edition, TMH 2002.

**References:**

1. “**Computer Organization and Architecture Designing for Performance**”, W.Stalling, Prentice Hall of India, 2002.
2. “**Computer Architecture and Organization**”, J.P.Hayes, McGraw Hill, 1998.

**Year : First**

**Semester : I**

**Hours : 6**

**NEURAL NETWORKS**

**Credits : 4**

**Course code:17PCSE12**

**Course Category : Elective**

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**COURSE OUTCOME:**

To understanding objective functions in neural networks.

**UNIT I**

**Introduction to Neural Networks:** Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Characteristics of ANN, McCulloch–Pitts Model, Historical Developments, Potential Applications of ANN.

**UNIT II**

**Essentials of Artificial Neural Networks:** Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN – Connectivity, Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules.

**UNIT III**

**Single Layer Feed Forward Networks:** Introduction, Perceptron Models: Discrete, Continuous and Multi – Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Limitations of the Perceptron Model.

**UNIT IV**

**Multi – Layer Feed Forward Networks:** Credit Assignment Problem, Generalized Delta Rule, Derivation of Back propagation (BP) Training, Summary of Back propagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

**UNIT V**

**Associative Memories:** Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory, Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function. Architecture of Hopfield Network: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis. Neural network applications: Process identification, control, fault diagnosis.

**Text Books:**

1. Laurene Fausett, “**Fundamentals of Neural Networks**” , Pearson Education, 2004..
2. Simon Haykin, “**Neural Networks– A comprehensive foundation**”, Pearson Education, 2003.
3. S.N.Sivanandam, S.Sumathi, S. N. Deepa “**Introduction to Neural Networks using MATLAB 6.0**”, TATA Mc Graw Hill, 2006.
4. S. Rajasekharan and G. A. Vijayalakshmi pai, “**Neural Networks, Fuzzy Logic, Genetic Algorithms: Synthesis and Applications**”, PHI Publication, 2004.
5. Timothy J. Ross, “**Fuzzy Logic With Engineering Applications**”, Tata McGraw–Hill Inc. 2000

**Year : First**

**Semester : I**

**Hours : 6**

**ADVANCED C PROGRAMMING LAB**

**Credits : 4**

**Course code:17PCSC1P**

**Course Category : CORE**

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**COURSE OUTCOME:**

On successful completion of this subject the students have the programming ability in C Language

1. The basic salary is input through the keyboard. The dearness allowance is 40% of basic salary, and house rent allowance is 20% of basic salary. Write program to calculate the gross salary.
2. Write program to obtain the sum of the first and last digit of a given number
3. Any integer is input through the keyboard. Write a program to determine whether it is an odd number or even number.
4. Given the length and breadth of a rectangle, write a program to find whether the area of the rectangle is greater than its perimeter.
5. If the ages of three persons are input through the keyboard, write a program to determine the youngest and oldest of the three.
6. Write program to find the greatest of the three numbers entered through the keyboard using conditional operators
7. Two numbers are entered through the keyboard. Write a program to find the value of one number raised to the power of another.
8. Write a program to print all prime numbers from 1 to 300.(using nested loops, break and continue)
9. Write a menu driven program which has following options:
  - a. Factorial of a number.
  - b. Prime or not.
  - c. Perfect number or not
  - d. Armstrong number or not.

- 10 . Write a function to calculate the factorial value of any integer entered through the Keyboard.
11. Write a program using function to swap two numbers using pointers.
12. Write down the macro definition for the following:
  - a. To convert a uppercase alphabet to lowercase
  - b. To find arithmetic mean of two numbers
13. Write a program for to find the largest and smallest numbers from an m x n matrices.
14. Write a program for performing to add and multiply two matrices.
15. Write a program to sort a set of names stored in an array in alphabetical order.
16. Write a program to delete all vowels from a sentence. Assume that the sentence is not more than 80 characters long
17. Write a program to display pay slip for an employee
18. Write a program to display any five student's mark details using array of structure.
19. Write a program to count chars, spaces, tabs, and newlines in a file.
20. Write a program takes the contents of a file and copies them into another file, character by character.



**Year : First**

**Semester : I**

**Hours : 6**

**C++ AND DATA STRUCTURES  
PROGRAMMING LAB**

**Credits :4**

**Course code: 17PCSC1Q**

**Course Category : CORE**

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**COURSE OUTCOME:**

On successful completion of this subject the students have the programming ability in C & C++ Language

1. To find minimum objects using friend two numbers between two class objects using friend function.
2. To overload Binary + operator which adds two complex numbers.
3. To process students mark list using multiple inheritance.
4. Process employee details using hierarchical inheritance.
5. To process family details using hybrid inheritance
6. To sort number using Merge sort.
7. To sort number using quick sort.
8. To sort number using Heap sort.
9. To search a element using linear search using C++.
10. To perform stack operations using pointer.
11. To perform queue operations using pointer.
12. To manipulate singly linked list.
13. To manipulate doubly linked list.
14. To implement binary search using C++.
15. To perform tree traversals.

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**Year : First**

**Semester : II**

**Hours : 5**

**ADVANCED JAVA PROGRAMMING**

**Credits : 4**

**Course code: 17PCSC21**

**Course Category : Core**

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**COURSE OUTCOME:**

To understand the concepts of object-oriented, event driven programming paradigms and develop skills in using these paradigms using Java.

**UNIT I**

**Swing and MVC Design Patterns:** Design Pattern, MVC Pattern, MVC Analysis of Swing Buttons.

**Layout Management:** Border Layout, Grid Layout, Grid bag Layout, Group Layout, Using No Layout managers, Custom layout Managers.

**Text Input:** Text Fields, Password Fields, Text Areas, Scroll Pane, Label and Labeling Components. Choice Components: Check Boxes, Radio Buttons, Borders, Combo Boxes,

**Sliders Menus:** Menu Building, Icons in Menu Items, Check box and Radio Buttons in Menu Items, Pop-up Menus, Keyboard Mnemonics and Accelerators, Enabling and Design menu Items, Toolbars, Tooltips.

**Dialog Boxes:** Option Dialogs, Creating Dialogs, Data Exchange, File Choosers, Color Choosers Components Organizers: Split Panes, Tabbed Panes, Desktop Panes and Internal Frames, Cascading and Tiling.

**Advance Swing Components:** List, Trees, Tables, Progress Bars.

**UNIT II**

**Networking:**Internet Addressing, InetAddress, Factory Methods, Instance Methods, TCP /IP Client Sockets, URL, URL Connection, TCP/IP Server Sockets, Datagrams.

**JavaDatabase Connectivity (JDBC):**Merging Data from Multiple Tables: Joining, Manipulating Databases with JDBC, Prepared Statements, Transaction Processing.

**UNIT III**

**Servlets:**Servlet Overview and Architecture,Interface Servlet and the Servlet Life Cycle, HandlingHTTP get Requests, Handling HTTP post Requests, Redirecting Requests to Other Resources, Session Tracking, Cookies, Session Tracking with HttpSession.

**JavaServerPages(JSP):**Introduction, JavaServer Pages Overview, A First JavaServer Page Example, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries.

**UNIT IV**

**Remote Method Invocation:**Defining the Remote Interface, Implementing the Remote Interface, Compiling and Executing the Server and the Client.

**Common Object Request Broker Architecture (CORBA):** Technical/Architectural Overview, CORBA Basics, CORBA services

**UNIT V**

***Introduction Smart Phone Application Development:*** Introduction to android platform, Creating application template, adding activity, intent, services to application, using Google map API

**Text Book:**

1. **“Advanced Java 2 Platform How To Program”** by H. M.Deitel, P. J. Deitel, S. E. Santry – Prentice Hall
2. Steven Holzner, **“Java 2 Pagramming–AWT, Swing, XML and Java Beans Black Book”**, Dreamtech

**Reference Book:**

1. **“Beginning Java™ EE 6 Platform with GlassFish 3 From Novice to Professional”**  
by Antonio Goncalves – Apress publication.
  2. Cay Horstmann and Grazy Cornell, **“Core Java Volume I–Fundamentals”** , 8<sup>th</sup> Edition.
  3. Cay Horstmann and Grazy Cornell, **“Core Java Volume II–Advance Features”** , 8<sup>th</sup> Edition
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**Year : First**

**Semester : II**

**Hours : 5**

**DATABASE MANAGEMENT SYSTEMS**

**Credits : 4**

**Course code: 17PCSC22**

**Course Category :Core**

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**COURSE OUTCOME:**

To inculcate knowledge on DBMS concepts and Programming with Oracle

**UNIT I**

Introduction to Database Management Systems – Database Architecture and Design – Data models – Entity Relationship Modeling

**UNIT II**

Relational Database Management Systems – Relational Data Integrity and Database Constraints – Data Normalization – Relational algebra – Relational Calculus

**UNIT III**

Secondary Storage Devices – Files, File Organization and file Structures – Indexing and Hashing

**UNIT IV**

Database Security – Transaction Management and concurrency Control – Backup and Recovery

**UNIT V**

Client/Server Databases – Distributed Databases – Hierarchical and Network Databases – Object oriented and Object Relational Databases

**Text book:**

1. **“Essentials of Database Management Systems”** , Alexis Leon Mathews Leon, Vijay Nicole Imprints Pvt .Ltd, 2006

**Reference:**

1. **“Database System Concepts”** – 5<sup>th</sup> Edition – Abraham Silberschatz, Henry F. Korth, S.Sundran ,TMH, 2006

**Year : First**

**Semester : II**

**Hours : 5**

**OPERATING SYSTEMS**

**Credits : 4**

**Course code: 17PCSC23**

**Course Category : Core**

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**COURSE OUTCOME:**

To provide fundamental concepts of all managements in an operating system.

**Unit I**

Operating Systems Objectives and Functions – OS and User/ Computer Interface, OS as a Resource Manager. Evaluation of OS – Serial Processing, Simple Batch Systems, Multi Programming Batch Systems, Time Sharing Systems , Real Time Systems.

**Unit II**

Process – Description, Process Control – Processes and Threads, Concurrency – Principles of Concurrency, Mutual Exclusion – Software Support, Dekkar’s Algorithm – Mutual Exclusion – Hardware Support, Mutual Messages. Deadlock – Deadlock Prevention, Deadlock Detection, Deadlock Avoidance.

**Unit III**

Memory Management – Memory Management Requirements – Fixed Partitioning, Placement Algorithm, Relocation in a Paging System, Simple Segmentation. Virtual Memory – Paging – Address Translation in a Paging System, Segmentation – Organization, Address Translation in a Segmentation System, Combined Paging and Segmentation, Virtual Memory – OS Software – Fetch Policy, Placement Policy and Replacement Policy, Page Buffering Resident Set Management.

**Unit IV**

Scheduling – Types of Scheduling, Scheduling Algorithms, Scheduling Criteria, FIFO, Round Robin, Shortest Process Next, Shortest Remaining Time, Highest Response Ration and Feedback Scheduling Performance Comparison.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.

**Unit V**

File Management – Files, File Management Systems, File System Architecture, Functions of File Management, File Directories – File Sharing – Secondary Storage Management, File Allocation.

**Text Books:**

1. William Stallings, :”Operating Systems”,2<sup>nd</sup> edition, Maxvell McMillan, International editions, 1997.
2. Charles Crowley, “ Operating Systems: A Design Oriented Approach”, IRWIN Publications Chicagao, 1997.

**Reference:**

1. Operating systems – Concept based approach by D.M.Dhamdhere, TMH 2<sup>nd</sup> edition.

**Year : First**

**Semester : II**

**Hours : 5**

**DATA COMMUNICATIONS AND  
NETWORKS**

**Credits : 4**

**Course code: 17PCSE21**

**Course Category :ELECTIVE**

**COURSE OUTCOME:**

The main Objectives is to understand the state-of-the-art in network protocols, architectures, and applications.

**UNIT I**

**Introduction:** A Brief History – Applications – Computer Networks – Categories of Networks – Standard and Standards Organization – Network Architecture – Open systems and OSI Model – TCP/IP Architecture.

**Communication Media and Data Transmission:** Fourier Analysis – Analog and Digital Data Transmission – Modulation and Demodulation – Transmission Media – Wireless Communications – Data Transmission Basics – Transmission Mode – Interfacing – Multiplexing.

**Data Link Control and Protocol Concepts:** Flow Control – Error Control – Asynchronous Protocols – Synchronous Protocol – High level Data Link Control (HDLC)

**UNIT II**

**Local Area Networks:** Types of Networks and Topology – LAN Transmission Equipment – LAN Installation and performance. **Ethernet:** IEEE Standard 802.3– Fibre Distributed Data Interface(FDDI) .

**Distributed Queue Dual Bus (DQDB):** IEEE Standard 802.6 – LAN Operating Systems and Protocols – Ethernet Technologies

**Wide Area Networks:** WAN Transmission Methods – WAN Carrier Types – WAN Transmission Equipments – WAN Design and Multicast Consideration – WAN Protocols.

**UNIT III**

**Integrated Services and Routing Protocols:** Integrating Services – ISDN Topology – ISDN Protocols – Broadband ISDN – Asynchronous Transfer Mode (ATM) – Principal Characteristics of ATM – Frame Relay – Comparison of ISDN, ATM and Frame Relay

**Wireless LANs:** WLAN Applications – Wireless LAN Requirements – Planning for Wireless LANs – Wireless LAN Architecture – IEEE 802.11 Protocol Layer – IEEE 802.11 Physical Layer – Designing the Wireless LAN Layout – WAP Service

**UNIT IV**

**OSI Internetworking:** Principles of Internetworking – Routing Principles – Internetwork Protocols (IP) – Shortcomings of IPv4 – IP Next Generation.

**TCP Reliable Transport Service:** Transport Protocols – The Service TCP Provides to Applications – End-to-End Service and Datagram – Transmission Control Protocol – User Datagram Protocol

**UNIT V**

**Network Applications:** Client – Server Model – Domain Name System (DNS) – Telnet – File Transfer and Remote File access – Electronic Mail – World Wide Web (WWW)

**Network Management:** Goal of Network Management – Network Management Standards – Network Management Model – Infrastructure for Network Management – Simple Network Management Protocol(SNMP).

**Text Book:**

1. **“Data Communications and Computer Networks”** – 2<sup>nd</sup> Edition Brijendra Singh, PHI,2006

**Reference:**

1. **“Computer Network”**, Andrew S. Tanenbaum, 4<sup>th</sup> Ed, Prentice Hall of India, 2006
2. **“Data Communications and Computer Networks”** – Prakash C. Gupat, Prentice Hall of India, 2005.
3. **“Data and Computer Communications”** , William Stallings, PHI, 2007.
4. **“Data Communication and Networking”** – Behrouz A. Forouzan, TMH, 2005.
5. **“Data Communications and Computer Networks”** , Brijendra Singh, PHI, 2006.
6. **“Data Communications and Networks”** , Achyut S. Godbole, Tata McGraw Hill 2005.

**Year : First**

**Semester : II**

**Hours : 5**

**DATA MINING AND WAREHOUSING**

**Credits : 4**

**Course code: 17PCSE22**

**Course Category : Core**

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**COURSE OUTCOME:**

Students will be enabled to understand and implement classical models and algorithms in *data warehousing* and *data mining*

**UNIT I**

***Data warehousing components:*** Introduction – Overall Architecture – Data warehouse database – Sourcing, Acquisition, Cleanup and Transformation tools – Metadata. ***Access Tools:*** Accessing and Visualizing Information – Tool Taxonomy – Query and Reporting tools – Application – OLAP tools – Data mining tools – Data Marts – Data Warehouse Administration and Management – Impact of the Web – Approaches to using the Web.

**UNIT II**

Data Mining – The Mining Analogy – Measuring Data Mining Effectiveness – (Accuracy – Speed–Cost Embedding – Data Mining into a Business Process) – Data Mining Methodology.

**UNIT III**

Classical Techniques – Statistics, Neighbourhoods and Clustering. Next Generation Techniques – Trees, Network rules – When to use Data Mining.

**UNIT IV**

The Business Value – Customer Profitability, Customer Acquisition, Cross Selling, customer Retention – Customer Segmentation.

**UNIT V**

Business Intelligence and Information Mining – Text Mining and Knowledge Management – Text Mining Technologies – Text Mining Products – Conclusion.

**Text book:**

1. Alex Berson, Stephen Smith & Kurt Thearling, “ **Building Data Mining Application for CRM** “, Tata McGraw Hill Edition, 2000.



**Year : First**

**Semester : II**

**Hours : 5**

**ADVANCE JAVA PROGRAMMING LAB**

**Credits : 4**

**Course code: 17PCSC2P**

**Course Category :Core**

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**COURSE OUTCOME:**

To build software development skills using java programming for real world applications. To implement frontend and backend of an application .To implement classical problems using java programming.

1. Program for multiplying two matrices
2. Program for finding area and circumference of a circle using class and object.
3. 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.
4. 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 interface reference.
5. Program to prepare an EB–Bill using the package concept
6. Program to handle the following Exceptions
  - i) DivideByZeroException
  - ii) ArrayIndexOutOfBoundsException
  - iii) NumberFormatException
  - iv) NullPointerException
  - v) User defined exceptions
7. Program for arranging the given names in alphabetical order and display the number of names in palindrome.
8. Menu driven program using Vector utility class
9. Program for handling multiple threads.
10. Program for displaying contents of a given file, copying contents between files and updating an existing file.
11. Program using ServerSocket and Socket classes
12. Program using DatagramSocket and DatagramPacket classes
13. Applet programs for displaying geometrical object on a window and passing parameters to an apple
14. Program for implementing simple calculator using Swing controls
15. Simple Servlet program to display the factorial of a given number using HttpServlet class.

**Year : First**

**Semester : II**

**Hours : 5**

**RELATIONAL DATABASE  
MANAGEMENT SYSTEMS LAB**

**Credits : 4**

**Course code: 17PCSC2Q**

**Course Category : Core**

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**COURSE OUTCOME:**

To inculcate knowledge on DBMS concepts and Programming with Oracle

**1.SQL – Data Definition Language**

- Table Creation with Constraints Table Alteration (Add Column, Modify size and data type, Drop Column)
- Drop Table

**2.SQL – Data Manipulation Language**

- Data Insertion
- Data Updation
- Data Deletion
- Ordering Tuples
- Tuple Variable
- Build-in Function
- Set Operations Join Operations Nested Subqueries Views

**3. PL/SQL Procedure**

- Reverse the string.
- Delete any record and count it.
- Student Mark Sheet Preparation
- Pay Roll preparation.
- Excess record stored in separate files.
- Split a table in to two tables.
- Joining two tables in to one table.
- Find factorial number using recursive function.
- Find Fibonacci series using recursive function

**4. SQL Forms**

- Student Mark System
- Pay Roll Preparation
- Income Tax Calculation
- Train Reservation System

**Year : Second**

**Semester : III**

**Hours : 5**

**MOBILE COMPUTING**

**Credits : 4**

**Course code: 17PCSC31**

**Course Category : Core**

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**COURSE OUTCOME:**

To understand how to work with various mobile application development framework

**UNIT I**

Mobile Computing – Developing mobile computing Applications – Security in Mobile Computing – Architecture for Mobile Computing – Three tier Architecture – Mobile computing through internet – Satellite Communication Systems.

**UNIT II**

Emerging Technologies – Introduction – Bluetooth – Wireless broadband (WIMAX) – Mobile IP – Wireless Application Protocol: Introduction – WAP – WAP Applications, Environment, User Agent – MMS

**UNIT III**

Introducing the Android Software development platform – Understanding JAVA SE and the DALVIK virtual machine – Leveraging Android XML Using ur Android Application Resources – Launching ur Applications – Screen layout design – Views and layouts – Android view Hierarchies – Defining Screen layout : Using XML

**UNIT IV**

**UI Design:** Buttons, Menus and dialogue – Using common UI elements – Using Menus in Android – Adding dialogs

**UNIT V**

**The iPhone SDK:** The SDK – The iPhone framework – iPhone limitations – Deploying and distributing your application – UI Application and UI Application delegate – UI view and UI view controller – The UI view class and the UI view controller class: controls – :Part I – Buttons, UI switch, UI slider, UI Text field.

**Text Book:**

1. Asoke K. Talukder and Roopa R Yavagal (2005), **“Mobile Computing Technology”**, Applications and service creation, Tata McGraw – Hill Publishing Company Limited.  
Walloce– Jackson(2012): **“Android Apps for Absolute Beginner’s A pre”**
2. James A. Brannan(2010), **“iPhone SDK Programming, A. Beginner’s Guide”** Marchihill.

**Reference:**

1. **“Programming Mobile devices: An Introduction for Parctitioner’s”**, Willey 2007, T. Mikonen,
2. Hashimi, S. Komatineni, D. Maclean **“Pro Android”** A press 2010

**Year : Second**

**Semester : III**

**Hours : 5**

**COMPILER DESIGN**

**Credits : 4**

**Course code: 17PCSC32**

**Course Category : Core**

### **COURSE OUTCOME:**

After you complete this course, you should be able to: describe the theory and practice of compilation, in particular, the lexical analysis, parsing and code generation and optimization phases of compilation, and design a compiler for a concise programming language.

### **UNIT I**

**Introduction to Compilers:** Compilers and Translators – Lexical Analysis – Syntax – Analysis – Intermediate Code Generation– Optimization – Code Generation – Error Handling – Compiler Writing Tools.

**Finite Automata and Lexical Analysis:** The Role of The Lexical Analyzer – The Design of the Lexical Analyzers – Regular Expressions – Finite Automata – From Regular Expressions to Finite Automata – Minimizing The Number of States of a DFA – A Language for Specifying Lexical Analyzers – Implementation of a Lexical Analyzer.

### **UNIT II**

**The Syntactic Specification of Programming Languages:** Context – Free Grammars – Derivations and Parse Trees – Capabilities of Context – Free Grammars.

**Basic parsing Techniques:** Parses– Shift – Reduce Parsing – Operator – Precedence Parsing – Top – Down Parsing – Predictive Parsers.

**Automatic construction of efficient parsers:** LR Parsers – The Canonical Collection of LR (0) Items – Constructing SLR Parsing Tables – Constructing LALR Parsing Tables.

### **UNIT III**

**Syntax– Directed translation:** Syntax Directed Translation Schemes – Implementation of Syntax – Directed Translators –Intermediate Code – Postfix Notation – Parse Trees and Syntax Trees – Three Address Code, Quadruples, And Triples –Translation of Assignment Statements – Boolean Expressions – Statements that Alter the Flow of Control – Postfix Translations – Translation with a Top – Down Parser.

### **UNIT IV**

**Symbol Tables:** The Contents of a Symbol Table – Data Structures for the Symbol Tables – Representing Scope – Information

**Runtime Storage Administration:** Implementation of a Simple Stack Allocation Scheme – Implementation of Block – Structured Languages – Storage Allocation of FORTRAN – Storage Allocation in Block – Structured Languages.

**Error detection and Recovery:** Errors – Lexical – Phase Errors – Syntactic Phase Errors – Semantic Errors

## **UNIT V**

***Introduction to Code Optimization:*** The Principal Sources of Optimization – Loop Optimization – The DAG Representation of Basic Blocks

***Code Generation:*** Object Programs – Problems in Code Generation – A Machine Model – A Simple Code Generator – Register Allocation and Assignment – Code Generation from DAG's – Peephole Optimization.

### **Text Book:**

1. **“Principles of compiler design”** by Alfred V. Aho Jeffrey D. Ullman, Narosa Publishing house, 1989.

### **Reference books:**

1. **“Compile Construction principles and Practice”**, by Dhamdhere D.M, 1981. Macmillan India.
2. **“Compiler Design”** , by Reinhard Wilhelm ,Director Mauser ,1995, Addison Wesley.

**Year : Second**

**Semester : III**

**Hours : 4**

**CLOUD COMPUTING**

**Credits : 4**

**Course code: 17PCSE31**

**Course Category : ELECTIVE**

**COURSE OUTCOME:**

Course covers a series of current cloud computing technologies, including technologies for Infrastructure as a Service, Platform as a Service, Software as a Service, and Physical Systems as a Service

**UNIT I**

Cloud Computing Overview – What is Cloud Computing? – Cloud Components – Applications – Storage – Database Services – Intranets and The Cloud Components – Hypervisor Applications – First Movers in the Cloud. When you can use Cloud Computing – Scenarios – Benefits: Scalability, Simplicity, Knowledgeable Vendors – More Internal Resources, Security, Limitations – Sensitive Information – Application Development – Security Concerns – Privacy Concern with A Third Party – Security Level of Third Party – Security Level of Third Party – Security Benefits, Regularity Issues

**UNIT II**

Cloud Computing With the Titans – Google – EMC – Neap – Microsoft – Amazon – Sales force – IBM – Partnership – Cloud computing Service – Infrastructure as a Service – Platform as a Service – Software As a Service – Software Plus Services – How Those Applications Help – Operational Benefits, Economic Benefits – Tips For Evaluating SAAS – Staffing Benefits – Deleting Data Center – Thomson Reuters – Their Cloud Use – Using the Cloud – Cloud Computing and Web 2.0 – Applications and the Cloud

**UNIT III**

Cloud Computing Technology – Hardware and Infrastructure – Clients , Security, Network , Services. Accessing. The cloud – Platforms – Web Applications – Web Apps – Web Browsers – Cloud Storage Providers

**UNIT IV**

Standards – Application, Client, Infrastructure ,Service, Software as a Service – Overview – Driving Forces – Company Offerings – Industries. Software Plus Services – Overview – Mobile Device Integration – Providers – Microsoft Online

**UNIT V**

Local Clouds and thin Clients – Virtualization – Server Solutions – Thin Clients – Migrating to the Cloud – Cloud Services for Individuals – Cloud Services Aimed at the Mid – Marked – Enterprise Class Cloud Offerings – Migration

**Text Book:**

1. **“Cloud Computing A Practical Approach”** – Anthony T. Velte, Toby . J .Velte  
Robert Elsenpter TATA McGraw –Hill, New Delhi –2010  
Unit I to V                      Chapters 1,2 3,4,5,6,7,8,9,10 & 12,13

**Reference:**

1. **“Cloud Computing: Web –Based Applications That Change the Way you Work and Collaborate Online Miller”** – 2008, Pearson.
2. **“Cloud Computing”**, JohnW.Ritting House and James F Ramsome, CRC Press ,2012.

**Year : Second**

**Semester : III**

**Hours : 4**

**SECURITY IN COMPUTING**

**Credits : 4**

**Course code: 17PCSE32**

**Course Category : ELECTIVE**

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**COURSE OUTCOME:**

Confidentially, integrity, availability and nonrepudiation.

**UNIT I**

Security Problem in Computing – The Meaning of “Secure”– Attacks – The Meaning of Computer Security – Computer Criminals – Methods of Defense – What’s Next Elementary Cryptography: Terminology and Background – Substitutions Ciphers – Transpositions (Permutations) – Making “Good” Encryption Algorithms – The Data Encryption Standard (DES) – The AES Encryption Algorithm – Public Key Encryption – The Uses of Encryption

**UNIT II**

**Program Security:** Secure Programs – Non Malicious Program Errors – Viruses and Other Malicious Code – Targeted Malicious Code – Control Against Program Threats

**UNIT III**

Protection in General – Purpose Operating System: Protected Objects and Methods of protection – Memory and Address Protection – Control of Access to General Objects – File Protection Mechanisms – User Authentication Designing Trusted Operating Systems: Trusted System – Security policies – Models of Security – Trusted Operating System Design

**UNIT IV**

**Database Security:** Introduction to Database – Security Requirements – Reliability and Integrity – Sensitive Data – Inference – Multi Level Database – Proposals for Multilevel Security

**UNIT V**

**Security In Networks:** Network Concepts – Threats in Networks – Network Security Controls –Firewall – Intrusion Reduction Systems – Secure E-Mail

**Text Books:**

1. “Security In Computing” , 3<sup>rd</sup> Edition, Charles P. Pfleeger Shari Lawrence Pfleeger, PHI, 2005

**Reference:**

1. “Cryptography and Network Security” – Behrouz A. Forouzan, The McGraw Hill, 2008
2. “Cryptography and Networks Security” – William Stallings PHI, 2008

**Year : Second**

**Semester : III**

**Hours : 5**

**DOT NET PROGRAMMING LAB**

**Credits : 4**

**Course code: 17PCSC3P**

**Course Category : CORE**

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**COURSE OUTCOME:**

Students will gain the ability to implement the algorithms in *C#.net*, *VB.net* and *ASP.net*. Pre-requisite.

**ASP.NET:**

- Webforms in ASP.NET
- Validation
- ADO.NET
- ASP.NET Data controls
- Working with XML data
- Web Services

**VB.NET**

- Validation
- Arrays and Structure
- Procedures
- Decision Structures
- Exception Handling
- open a connection to a database using ADO.NET

**C#.NET:**

- Polymorphism
- Abstraction and Encapsulation
- Properties
- Delegates and Events



**Year : Second**

**Semester : III**

**Hours : 5**

**ANDROID PROGRAMMING LAB**

**Credits : 4**

**Course code: 17PCSC3Q**

**Course Category : CORE**

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**COURSE OUTCOME:**

To understand how to work with various mobile application development framework

1. To create a java android to build a simple android application.
2. To create a java android program to demonstrate activity life cycle.
3. To create a java android to change the background of your activity.
4. To create a java android to perform all operations using calculators.
5. To create a java android to change the image displayed on the screen.
6. To create a java android to demonstrate the use of scroll view.
7. To create a java android to demonstrate the menu application.
8. To create a java android to demonstrate list view activity.
9. To create a java android to demonstrate the countdown timer application.
10. To create a java android to demonstrate a simple to do list application
11. To create a java android to demonstrate radio group application.
12. To create a java android to create multiple activities within an application.
13. To create a java android to animate bitmap.
14. Java Android Program to Demonstrate Action Button by Implementing on  
Click Listener
15. Java Android Program to Demonstrate Alert Dialog Box

**Year : Second**

**Semester : III**

**Hours : 6**

**COMPUTER FUNDAMENTALS AND  
APPLICATIONS**

**Credits : 5**

**Course code: 17PCSN21**

**Course Category : NME**

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**COURSE OUTCOME:**

This course comprehends 2D and 3D object generations and transformations; with add on exposure to OpenGL programming. Also, provides an idea of multimedia authoring and presentations.

**UNIT I**

**Knowing computer:** Introduction to Computer– Basic Applications of Computer – Components of Computer System – Central Processing Unit (CPU) – VDU – Keyboard and Mouse – Other Input/Output Devices – Computer Memory – Concepts of Hardware and Software – Concept of Computing – Data and Information – Applications of IECT – Connecting Keyboard – Mouse– Monitor and Printer to CPU and Checking Power Supply.

**UNIT II**

**Operating Computer using GUI Based Operating System:** Introduction to Operating System – Basics of Popular Operating Systems – The User Interface – Using Mouse – Using Right Button of the Mouse and Moving Icons on the screen – Use of Common Icons – Status Bar – Using Menu and Menu Selection – Running an Application – Viewing of File – Folders and Directories – Creating and Renaming of Files and Folders – Opening and Closing of Different Windows – Using help – Creating Short Cuts – Basics of O.S Setup – Common Utilities

**UNIT III**

**Understanding Word Processing:** Word Processing Basics – Opening and Closing of Documents – Text Creation and Manipulation – Formatting of Text – Table Handling – Spell Check, Language Setting and Thesaurus – Printing of Word Document.

**Using Spread Sheet:** Basics of Spreadsheet – Manipulation of Cells – Formulas and Functions – Editing of Spread Sheet – Printing of Spread Sheet.

**Making Small Presentation:** Basics of Presentation Software – Creating Presentation – Preparation and Presentation of Slides – Slide Show – Taking Printouts of Presentation Handouts.

## UNIT IV

***Introduction to Internet– WWW and Web Browsers:*** Basic of Computer Networks – LAN – WAN – Concept of Internet – Applications of Internet – Connecting to Internet – ISP – Knowing the Internet – Basics of Internet Connectivity Related Troubleshooting – World Wide Web – Web Browsing Software's – Search Engines – Understanding URL – Domain Name – IP Address – Using E-Governance Website

***Communications and collaboration:*** Basics of Electronic Mail – Getting an Email Account – Sending and Receiving Emails – Accessing Sent Emails – Using Emails – Document Collaboration – Instant Messaging – Netiquettes.

## UNIT V

***Financial Literacy for Banking Scheme and Applications:*** Need of Saving – Why Save in a Bank – Banking Products – ATM Card – Banking Instruments – Cheque – Demand Draft (DD) – Banking Services Delivery Channels – Know Your Customer (KYC) – Opening of Bank Account and Documents Required – Types of Bank Accounts, Bank's Services Including Remittances, Loan – Mobile Banking – Overdraft – Pension – Pradhan Mantri Jan Dhan Yojana (PMJDY) – Password Security and ATM Withdrawal – Insurance – Social Security Schemes – Atal Pension Yojana (APY) – Pradhan Mantri Suraksha Bima Yojana (PMSBY) – Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY) – Pradhan Mantri Mudra Yojana (PMMY).

### References:

1. **“Information Technology The breaking Wave”** Dennis P.Curtin, Kim Foley, Kunal Sen, Cathileen Morin. – TMH edition.
2. **Computers today** –Basantra Galgotia Publications.
3. **Computers & Commonsense** –Roger and Hunt.
4. **Fundamentals of Computer** – 2<sup>nd</sup> edition –V.Rajaraman –PHI, 1998

**Year : Second**

**Semester : IV**

**Hours : 5**

**SOFTWARE PROJECT  
MANAGEMENT**

**Credits : 4**

**Course code: 17PCSC41**

**Course Category : CORE**

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**COURSE OUTCOME:**

To successful development of the project procedures of initiation, planning, execution, regulation and closure and guidance of projects.

**UNIT I**

**Introduction:** Importance of Software Project Management – Project – Software Project Vs Other types of Project – Contract Management and Technical Project Management – Activities covered by Software Project Management – Plans Methods and Methodologies – Categorizing Software Projects – Setting Objectives – Stake holders – Business Case – Requirement specification –Management Control .Step Wise: An Overview of Project Planning: Introduction – Ten Steps.

**Programme management and project evaluation:** Introduction – Programme management – Managing the Allocation of Resources within Programmes – Strategic Programme Management – Creating a Programme – Aids to Programme Management – Benefits Management – Evaluation of Individual Project – Technical Assessment – Cost Benefit Analysis – Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

**UNIT II**

**Selection of an appropriate project approach:** Introduction – Choosing Technologies – Technical Plan Contents List– Choice List– Choice of Process Models – Structure Vs Speed of Delivery – The Waterfall Model – The V-Process Model – The Spiral Model – Software Prototyping – Other ways of Categorizing Prototypes – Incremental Delivery – Dynamic Systems Development Method – Extreme Programming – Managing Iterative Processes – Selecting the Most Appropriate Process Model.

**Software Cost Estimation:** Introduction – Where are Estimates done – Problems With over and Under Estimates – Basis for Software Estimating – Software Effort Estimation Techniques – Expert Judgment – Estimating by Analogy – Albrecht Function Point Analysis Function Points Mark II – COSMIC Full Function Points – A Procedure Code Oriented Approach – COCOMO: A Parametric Model.

**UNIT III**

**Activity Planning:** An Introduction – Objectives of Activity Planning – When to Plan – Project Schedules – Project & Activities – Sequencing and Scheduling Activities – Network Planning Models – Formulating a Network Model – Adding the Time Dimension – The Forward Pass – The Backward Pass – Identifying the Critical Path – Activity Float – Shortening the Project Duration – Identifying Critical Activities – Activity on Arrow Network.

**Risk Management:** Introduction – Risk – Categories of Risk – A framework for dealing with this– Risk Identification – Risk Assessment – Risk Planning – Risk Management – Evaluating Risk to the Schedule – Applying the PERT Technique– Monte Carlo Simulation – Critical Chain Concepts.

**Resource Allocation:** Introduction – The nature of Resources – Identifying Resource Requirements – Scheduling Resources – Creating Critical Paths – Counting the Cost – Being Specific – Publishing the Resource Schedule – Cost Schedule – The Scheduling Sequence.

#### **UNIT IV**

**Monitoring and Control:** Introduction – Creating the Framework – Collecting the Data – Visualizing Process – Cost Monitoring – Earned Value Analysis – Prioritizing Monitoring – Getting the Project Back to Target – Change control.

**Managing Contracts:** Introduction – ISO 12207 Approach to the Acquisition and Supply of software – The Supply Process – Type of Contract – Stages in Contract Placement – Typical Terms of a Contract – Contract Management – Acceptance.

#### **UNIT V**

**Managing People And Organizing Teams:** Introduction – Understanding Behavior – Organizational Behavior: A Background – Selecting the Right Person for the Job – Instruction in the Best Methods – Motivation –The Oldham – Hackman Job Characteristics Model – Working in Groups– Working in Groups – Becoming a Team – Decision Making – Leadership – Organizational Structures – Dispersed and Virtual Team – The Influence of Culture – Stress – Health & Safety.

**Software Quality:** Introduction – The Place of Software Quality in Project Planning Importance of Software Quality – Defining Software Quality – ISO 9126 – Practical Quality Measures – Product Vs Process Software Quality Management – External – Technologies to Help Enhance Software Quality – Quality Plans

#### **Text Book:**

1. “**Software Project Management**” , Bob Hughes and Mike Cotterell, Tata Mc Grawhill ,4<sup>th</sup> Edition, 2006.

#### **Reference Book:**

1. “**Software Project Management**”, A Concise study, S.A.Kelkar, PHI, 2005.

**Year : Second**

**Semester : IV**

**Hours : 5**

**COMPUTER GRAPHICS AND  
MULTIMEDIA**

**Credits : 4**

**Course code: 17PCSE41**

**Course Category : ELECTIVE**

**COURSE OUTCOME:**

This course comprehends 2D and 3D object generations and transformations; with add on exposure to OpenGL programming. Also, provides an idea of multimedia authoring and presentations.

**UNIT I**

**Computer Graphic Applications:** Introduction – Applications – Graphic Devices: Introduction – Display Systems – Hardware Components. Graphical User Interface: Introduction – Types of GUI – Designing a GUI – Principles for good GUI Design – User Interface Engineering – GUI Examples – Creating Graphical Interfaces – Scan Conversion: Line Drawing Algorithms – DDA Algorithm – Bresenham's Line Drawing Algorithm – General Bresenham's Algorithm – Bresenham's Circle Generation Algorithm Polygon Filling

**UNIT II**

**Windows and Clipping:** Windows & Viewports – Window to Viewport Mapping – Clipping – Sutherland Cohen Subdivision Line Clipping Algorithm – Midpoint Subdivision Algorithm.

**2D Transformation:** Introduction Representations of Points in Matrix form – Representation of 2D points in any Matrix form – Transformation of points – Transformation – 2D Rotation – Reflection – Scaling – Shearing

**UNIT III**

**3D Transformation:** Introduction – Representation of points – Representation of 3D object in Matrix form – 3D Translation – 3D Rotation – 3D Reflection – 3D Scaling – 3D Shearing. 3D Perspective Geometry: 3D Viewing – Introduction – Terms related to Projection – Orthographic Projection – Axonometric Projection – Oblique projection. **Hidden Surfaces:** Hidden Surface and Lines – Back face Detection – Back face Removal – Z Buffer Algorithm – A Buffer Algorithm.

**UNIT IV**

**Multimedia:** An Overview – Introduction – Presentation and Production – Characteristics of Multimedia Presentation – Hardware and Software Requirements – Uses of Multimedia – **Visual Display Systems:** Introduction – Cathode Ray Tube – Video Adapter Card – Video Adapter Cable – Liquid Crystal Display – Plasma Display Panel. **Text:** Introduction – Types – Unicode Standard – Font – Insertion of text – Text Compression – File formats. **Image:** Introduction Standards – Color Management Systems – File formats.

## **UNIT V**

**Audio:** Introduction – Nature – Fundamental Characteristics of sound – Elements of audio systems – MIDI – Sound card – Audio File formats and CODECs.

**Video:** Introduction Analog Video Camera – Transmission of video signals – Video signal formats – Television broadcasting standards – Digital Video – Digital Video Standards –

**Video File formats & CODECs. Compression:** Introduction – CODECs – Types – Lossless Compression Techniques – Lossy Compression Techniques – JPEG Image Coding Standard – MPEG Standards Overview.

### **Text Book:**

1. **“Computer Graphics”** , ISRD Group, Tata Mc Graw Hill, 2006
2. **“Principles of Multimedia”** , Ranjan Parekh, Tata Mc Graw Hill 2006

### **Reference:**

1. **“Computer Graphics, Multimedia and Animation”**, Malay K. Pakhira, PHI, 2008
2. **“Computer Graphics”** , Donold Hearn, Pauline Basker, PHI, 2007
3. **“Multimedia Making it work”** , Tay Vaughan, TMH, 2007

**Year :Second**

**Semester : IV**

**Hours : 5**

**DIGITAL IMAGE PROCESSING**

**Credits : 4**

**Course code: 17PCSE43**

**Course Category : ELECTIVE**

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### **COURSE OUTCOME:**

This course is the use of computer algorithms to perform image processing on digital images

#### **UNIT I**

**Introduction:** What is Digital image processing – the origin of DIP –Examples of fields that use DIP – Fundamentals steps in DIP – Components of an image processing system.

**Digital Image Fundamentals:** Elements of Visual perception – Light and the electromagnetic spectrum – Image sensing and acquisition – Image sampling and Quantization – Some Basic relationship between Pixels – Linear & Nonlinear operations.

#### **UNIT II**

**Image Enhancement in the spatial domain:** Background – some basic Gray level Transformations – Histogram Processing – Enhancement using Arithmetic/Logic operations Basics of spatial filtering – Smoothing spatial filters – Sharpening spatial filters –Combining spatial enhancement methods.

#### **UNIT III**

**Image Restoration:** A model of the Image Degradation /Restoration Process – Noise models – Restoration is the process of noise only – Spatial Filtering – Periodic Noise reduction by frequency domain filtering – Linear, Portion – Invariant Degradations – Estimating the degradation function – Inverse filtering – Minimum mean square Error Filtering – Constrained least squares filtering – Geometric mean filter – Geometric Transformations.

#### **UNIT IV**

**Image Compression:** Fundamentals – Image compression models – Elements of Information Theory – Error Free compression – Lossy compression – Image compression standards.

#### **UNIT V**

**Image Segmentation:** Detection and Discontinuities – Edge Linking and Boundary deduction – Threshold – Region – Based segmentation by Morphological watersheds – The use of motion in segmentation.

#### **Reference Books:**

1. Rafael C. Gonzalez, Richard E. Woods, “**Digital Image Processing**”, 2<sup>nd</sup> Edition, PHI/Pearson Education.
2. B. Chanda, D. Dutta Majumder, “**Digital Image Processing and Analysis**”, PHI, 2003.
3. Nick Efford, “**Digital Image Processing a practical introducing using Java**”, Pearson Education, 2004.



**Year :Second**

**CORE PAPER**

**Semester : IV**

**Hours : 20**

**17PCSC4P – PROJECT WORK**

**Credits 13**

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**COURSE OUTCOME:**

The objective of the project is to enable the students to work in a project of latest topic / research area / industrial applications.

- Each project student will have an internal guide.
- During the semester the students are expected to do literature survey, formulate the problem and form a methodology of arriving at the solution of the problem.
- Also during the semester, the students are expected to complete the project and submit a full-fledged report comprising of the complete system developed along with implementation and test results.
- The departmental committee shall examine the students for 40 marks and the evaluation is based on continuous internal assessment comprising of three reviews.
- After three reviews internal 40 marks (is based on seminar (20 marks), demo (10 marks) and internal viva-voce (10 marks)) will be given by the guide with the consultation of the departmental committee.
- At end of the semester, a viva-voce examination will be conducted for 60 marks

(For external examiner).