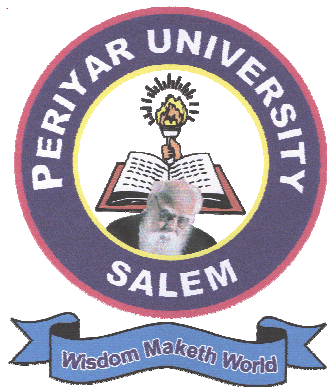# PERIYAR   UNIVERSITY
SALEM – 636 011

MASTER OF COMPUTER APPLICATIONS (M.C.A)
(Under Choice Based Credit System)

REGULATIONS AND SYLLABUS

(for University Department)
(For the candidates admitted from the academic year 2008-2009 onwards)

1. OBJECTIVE OF THE PROGRAMME

With the advent of globalization, the demand for software engineers/programmers has increased manifold. The students can smoothly land themselves in software industries on successful completion of this three year M. C. A Programme.

2. ELIGIBILITY FOR ADMISSION

Candidates who have secured 55% of marks or above in any one of the following or equivalent, are eligible to apply:
  (i) Bachelor's Degree in any subject with Mathematics at +2 level

OR

  (ii) Bachelor's Degree in any subject with Mathematics/Statistics as one of the subjects.

3. DURATION OF THE PROGRAMME AND MEDIUM

The programme shall be of three years duration spread over six semesters under choice based credit system. The Maximum duration to complete the course shall be two academic years after normal completion of the programme. The medium of instruction/study is English.

4. DISTRIBUTION OF CREDITS

The **minimum** credit requirement for full time three year Master of Computer Applications programme shall be 140 credits. The break-up of credits is as follows:

    Core Courses: 104
    Elective Courses: 28
    Supportive Courses: 08

A course on Human Rights will be offered during the II semester and it is non-credit compulsory course.

5. COURSE OF STUDY

The course of study for the degree shall be in Master of Computer Applications with internal assessment according to the syllabus prescribed from time to time.

    Total Marks   :   4300
    For each theory course: 100 Marks (S.A: 25 + E.E:75)
    For each practical course: 100 Marks (S.A: 40 + E.E:60)
    For Each Industrial training :   50 Marks
    (Joint viva-voice by internal and external examiners)

Dissertation and Viva-voce   :200 Marks
(S.A: 50 + Evaluation of the report by external 50 +Joint viva by internal external examiners 100)

6. STRUCTURE / SCHME OF EXAMINATIONS OF THE PROGRAMME

Courses	Number of Credits	Hours Per Week	Examination Duration (hrs)	Marks		
				S. A	E.E	Total
Semester-I						
Course-08PCB01 Digital Principles and Computer Organization	4	4	3	25	75	100
Course-08PCB02 Object Oriented Programming in C++	4	4	3	25	75	100
Course-08PCB03 Data Structures and Algorithm Analysis in C++	4	4	3	25	75	100
Course-08PCB04 Mathematical foundations for Computer Science	4	4	3	25	75	100
Supportive Course-1	4	4	3	25	75	100
Course-08PCBP01 Object oriented programming with C++ -Lab	2	4	3	40	60	100
Course-08PCBP02 Data structures - Lab	2	4	3	40	60	100
Course-08PCBP03 MS OFFICE - Lab	1	2	3	40	60	100
Semester-II						
Course-08 PCB05 Data Base Management Systems	4	4	3	25	75	100
Course-08 PCB06 Microprocessors	4	4	3	25	75	100

Course-08 PCB07 System Analysis and Design	4	4	3	25	75	100
Supportive Course– 2	4	4	3	25	75	100
Human Rights						100
Course-08PCBP04 Assembly language Programming - Lab	2	4	3	40	60	100
Course-08PCBP05 Relational Data Base Management System - Lab	2	4	3	40	60	100
Course-08PCBP06 Tally- Lab	1	2	3	40	60	100
Course-08PCBP07 Industrial Training –I	2					50
Semester-III						
Course-08 PCB08 Operating Systems	4	4	3	25	75	100
Course-08 PCB09 Computer Networks	4	4	3	25	75	100
Course-08PCB10 Visual Programming	4	4	3	25	75	100
Elective Course -I	4	4	3	25	75	100
Elective Course-II	4	4	3	25	75	100
Course-08 PCBP08 Visual Programming-Lab	2	4	3	40	60	100
Course–08 PCBP09 Operating systems - Lab	2	4	3	40	60	100
Course-08 PCBP10 Mini Project-I	1	2	3	40	60	100
Semester-IV						
Course-08 PCB11 .Net Programming	4	4	3	25	75	100
Course-08PCB12 Web Technology	4	4	3	25	75	100
Course-08 PCB13	4	4	3	25	75	100

Programming in Java						
Elective Course – III	4	4	3	25	75	100
Elective Course -IV	4	4	3	25	75	100
Course-08PCBP11 .Net Programming-Lab	2	4	3	40	60	100
Course-08 PCBP12 Java Programming-Lab	2	4	3	40	60	100
Course-08PCBP13 Web Technology-Lab	1	2	3	40	60	100
Course-08 PCBP14 Industrial Training-II	2					50
Semester-V						
Course-08 PCB14 Enterprise Resource Planning	4	4	3	25	75	100
Course-08PCB15 C# Programming	4	4	3	25	75	100
Elective Course -V	4	4	3	25	75	100
Elective Course -VI	4	4	3	25	75	100
Elective Course -VII	4	4	3	25	75	100
Course-08 PCBP15 C#-Lab	2	4	3	40	60	100
Course-08 PCBP16 Mini Project-II using open Source Softwares	1	4	3	40	60	100
Course-08 PCBP17 Animation Softwares-Lab	2	2	3	40	60	100
Semester-VI						
Course-08 PCBP18 Dissertation and Viva-Voce	15	-	-	50	50 100*	200

	Core						104
Total no. of Supportive Credits Elective							08 28
Grand Total							140
Total Marks							4300

*Joint via-voce: **Course Teacher: 50 Marks**
                       External Examiner: 50 Marks
SA – Sessional Assessments   EE – External Examinations
Core Course Code   : 08PCB- -
Elective Course Code: 08 PCBZ- -

List of Electives

Elective Course -I
Course 08 PCBZ01   - Client / Server Architecture
Course 08 PCBZ02   - Software Engineering
Course 08 PCBZ03   - System Software
Course 08 PCBZ04   - Embedded Computing

Elective Course -II
Course 08 PCBZ05   - Object Oriented Analysis and Design
Course 08 PCBZ06   - Compiler Design
Course 08 PCBZ07   - Design and Analysis of Algorithms
Course 08 PCBZ08   - Software Metrics

Elective Course -III
Course 08 PCBZ09   - Real Time Systems Development
Course 08 PCBZ10   - Component Technology
Course 08 PCBZ11   - High Performance Computing
Course 08 PCBZ12   - Software Testing

Elective Course -IV
Course 08 PCBZ13   - Web Services
Course 08 PCBZ14   - Data Mining
Course 08 PCBZ15   - Parallel Processing
Course 08 PCBZ16   - E – Commerce

Elective Course -V

Course 08 PCBZ17	- Virtual Reality
Course 08 PCBZ18	- Software Project Management
Course 08 PCBZ19	- Network Programming
Course 08 PCBZ20	- Network Security and Cryptography

Elective Course -VI

Course 08 PCBZ21	- Management Information System
Course 08 PCBZ22	- Mobile Computing
Course 08 PCBZ23	- Real Time operating systems
Course 08 PCBZ24	- WAP and XML

Elective Course -VII

Course 08 PCBZ25	- Soft Computing
Course 08 PCBZ26	- Digital Image Processing
Course 08 PCBZ27	- Multimedia Database Management System
Course 08 PCBZ28	- J2EE and J2ME

SA – Sessional Assessments   EE – External Examinations
CoreCourse Code   : 06PCB- -
Elective Course Code: 06 PCBZ-

7. EXAMINATIONS

THEORY

EVALUATION OF **INTERNAL ASSESSMENT**

Test	:	10 Marks
(Best one out of Two Tests	:	5 Marks
Model Examination	:	5 Marks)
Seminar	:	05 Marks
Assignment	:	05 Marks
Attendance	:	05 Marks

Total	:	25 Marks

The Passing minimum shall be 50% out of 25 marks (13 marks)

EVALUATION OF **EXTERNAL EXAMINATIONS**

QUESTION PAPER PATTERN

Time duration: 3 Hours   Max. Marks : 75

PART- A: 5x5 = 25
Answer all the questions
Either or type for each unit
PART- B: 5x10 = 50
Answer all the questions
Either or type for each unit

The Passing minimum shall be 50% out of 75 marks (38 marks)

PRACTICAL \ MINIPROJECT

EVALUATION OF **INTERNAL ASSESSMENT**
   Test 1   :   20 Marks
   Test 2   :   20 Marks
   (Best one out of Two Tests)
   Test 3   :   20 Marks

   Total   :   40 Marks

The Passing minimum shall be 50% out of 40 marks (20 Marks)

EVALUATION OF **EXTERNAL EXAMINATIONS**

Time duration: 3 Hours   Max. Marks : 60

8. QUESTION PAPER PATTERN
   (i) One compulsory question from the given list of objectives   : 30
      Marks
   (ii) One Either/OR type question from the given list of objectives : 30
   Marks

   Distribution of the Marks

   (i). **Practical**/Mini project
                   ➤   Record Note Book   10
                   ➤   Problem Understanding   10
                   ➤   Implementation   20

> Debugging and Modification   10
> For correct output and viva   10

(ii). **Industrial Training**

> Report   75%
> Viva-Voce   25%

(iii). **Dissertation**
> Evaluation of the Report(External)   50 Marks
> Viva – Voce (Joint)   100 Marks

9. REGULATIONS FOR DISSERTATION WORK

> Students should attach themselves with a well reputed Industry/Company/Institutions to do their five months dissertation work.
> The Candidate should submit the filled in format as given in Annexure–I to the department for approval during the I week of January during the even semester
> The review of the dissertation will be carried out periodically
> The student should submit three copies of their dissertation work.
> A sample format is enclosed in Annexure– II to prepare the dissertation
> Format for the title page and certificate are enclosed in Annexure– III.
> The students may use OHP/Power Point presentation during their dissertation Viva-Voce examinations.

10. PASSING MINIMUM
The candidate shall be declared to have passed in the theory/practical/Dissertation examination if the candidate secures
(i) 50% marks in the EE and
(ii) 50% in EE and SA put together

11. CLASSIFICATION OF SUCCESSFUL CANDIDATES
Candidates who obtain 75% of the marks in the aggregate shall be deemed to have passed the examination in First Class with Distinction provided they pass all the examinations prescribed for the programme at the first appearance. Candidates who secure not less than 60% of the aggregate marks in the examination shall be declared to have passed the examination in First Class. All other successful candidates shall be declared to have passed in Second Class.

Candidates who pass all the examinations prescribed for the programme in first instance and within a period of three academic years from the year of admission are only eligible for University Ranking.

12. COMMENCEMENT OF THIS REGULATION

These regulations shall take effect form the academic year 2008-09, i.e., for students who are admitted to the first year of the course during the academic year 2008-09 and thereafter.

13. TRANSITORY PROVISION

Candidates who were admitted to the PG course of study before 2008-09 shall be permitted to appear for the examinations under those regulations for a period of three years i.e., up to and inclusive of the examination of April/May 2009. Thereafter, they will be permitted to appear for the examination only under the regulations then in force.

ANNEXURE – I

PERIYAR UNIVERSITY, SALEM-11

Name   of the Department   :

Programme   :

Name of the Student   :

Register Number   :

Title of the Dissertation   :

Address of Organisation/Institution :

Name of the External Guide   :

Designation   :

Place:

Date:

<div align="right">Signature of External Guide</div>

<div align="center">(with seal)</div>

Name of the Internal Guide   :

Qualifications   :

Teaching Experience   :

Place   :

Date   :

<div align="right">Signature of Internal Guide</div>

Head of the Department

<div align="center">[Approved or not Approved]</div>

<div align="center">[University Use]</div>

<div align="center">**ANNEXURE II**</div>

<div align="center">BONAFIDE CERTIFICATE
COMPANY ATTENDACE CERTIFICATE
ACKNOWLDGEMENT
CONTENTS</div>

SYNOPSIS   Page No.

Chapter
1.   INTRODUCTION
        1.1   ORGANIZATION PROFILE
        1.2   SYSTEM CONFIGURATION
              1.2.1 HARDWARE CONFIGURATION
              1.2.2 SOFTWARE CONFIGURATION
2.   SYSTEM STUDY
            2.1 EXISTING SYSTEM
                  2.1.1 DEMERITS

            2.2 PROPSOED SYSTEM
                  2.2.1 SYSTEM STUDY
                  2.2.2 FEATURES/ADVANTAGES

3.   SYSTEM DESIGN AND DEVELOPMETN

      3.1 FILE DESIGN
      3.2 INPUT DESIGN
      3.3 OUTPUT DESIGN
      3.4 CODE DESIGN
      3.5 DATABASE DESIGN
      3.6 SYSTEM DEVELOPMENT

4.   TESTING AND IMPLEMENTATION

      CONCLUSION
      BIBLIOGRAPHY'

APPENDICES
A. DATA FLOW DISGRAM
B. TABLE STRUCTURE
C. SAMPLE INPUT
D. SAMPLE OUTPUT/REPORT

ANNEXURE III

A. Format of the title page

TITLE OF THE DISSERTATION

A Dissertation submitted in partial fulfillment of

The requirements for the degree of

Master of Computer Applications

To the

Periyar University, Salem – 11

By

Name of the Student followed by initial

University Registration Number

Department of Computer Science
PERIYAR UNIVERSITY
SALEM-636 011

MONTH – YEAR

B. Format of the Certificate:

Name and Address of the Internal Guide   Place
                                                         Date

CERTIFICATE

     This is to certify that the dissertation entitled ………………………………………………… submitted in partial fulfillment of the requirements of the degree of Master of Computer Applications to the Periyar University, Salem is a record of bonafide work carried out by ……………… under my supervision and guidance.

[Name of the internal Guide]

Head of the Department

Date of Viva-voice:

Internal Examiner   External
Examiner

Course-08 PCB01
DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION   4 Credits

Unit-I
Number Systems: Decimal, Binary, Octal, Hexadecimal-Conversion from one another-Binary Addition, Subtraction, Multiplication and Division. Codes-BCD Weighted -Excess-Gray -Error Detection Codes. Basic Logic Gates-Boolean laws and theorems-Sum of products -product of sums-Karnaugh map simplification methods-don't care conditions.

Unit-II
 Data processing circuits-Multiplexers-Demultiplexers-Decoders-Encoders-Arithmetic Building Blocks: Half and Full Adder: Subtractor, adder -TTL circuits-CMOS circuit. Flip-Flops: RS, Clocked RS, D-Edge-Triggered D, JK, Master/slave flip-flop-clocks and timers-counters, Asynchronous counters, Synchronous counters-MOD3, MOD5, Shift counters.

Unit-III

Central Processing Unit: Introduction –General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Data Transfer and Manipulation – Program Control - Reduced Instruction Set Computer (RISC).

Unit-IV

Input-Output Organization: Peripheral Devices – Input-Output Interface Asynchronous Data Transfer – Modes of Transfer – Priority Interrupt – Direct Memory Access (DMA) – Input-Output Processor (IOP) –Serial Communication.

Unit-V

Memory Organization: Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory – Memory Management Hardware. Control Unit:- Control Memory- Address Sequencing, Conditional Branching Mapping of Instruction Subroutines – Design of Control Unit , Microprogram Sequencer, Problems.

TEXT BOOKS
1. Albert Paul Malvino, Donals P.Leach, "Digital principles and Applications", McGraw Hill Fifth Edition, 2004.
   Chapters: 2(1,2), 3(1,2,5,6,8), 5,6(1,2,9), 4 (1to 6), 6(7,8), 7(1,2,4),8(1,2,4,5),   10(1,3,7), 13(10).
2. M. Morris Mano, Computer System Architecture", Prentice-Hall India Third Edition, 2005. Chapters 7(1, 2, 4), 8, 11, 12.

REFERENCE BOOKS
1. Thomas C.Bartee ,Digital Computer Fundamentals, Tata McGraw Hill, 1996.
2. M.Morris Mano, Digital Logic and Computer Design Prentice -Hall of India,

Course 08 PCB02
OBJECT ORIENTED PROGRAMMING IN C++   4 Credits

Unit-I

C++ programming Basics: Statements – Arrays – Pointers – functions – structures – unions – Enumerations and User defined types – preprocessor directives.

Unit-II

Characteristics of Object Oriented Programming languages – Classes and objects – friend functions – Inline functions – constructors and Destructors – Static class members – Scope resolution operator – Nested classes - Passing objects to functions – Returning objects – Object assignment – References – Dynamic Allocation operators.

Unit-III

Function overloading – Default function argument – Operator overloading: Creating a member operator function – operator overloading using a friend function – overloading new and delete – overloading the comma operator.

Unit-IV

Inheritance – Type of Inheritance - Virtual base classes – pointers to derived classes – Virtual functions – Polymorphism - formatted I/O – I/O manipulators - Creating your own extractors & Inserters--File Handling-File I/O Basics – Binary I/O – Random access – Templates and Exception Handling.

Unit-V

Formatted I/O – I/O Manipulators – File Handling – File I/O Basics – Binary I/O – Random access – Checking the I/O status – customized I/O and files. Templates and Exception handling: class templates – function templates – member function templates – template arguments – exception handling.

TEXT BOOK:

1. Herbert Schildt–C++ Complete Reference, Osborne McGraw Hill, II Edition, 1995. Chapters 1-21.

REFERENCES:

1. Robert Lafore – Object Oriented Programming in Microsoft C++, Galgotia publication, 1993.
2. E. Balagurusamy, Object Oriented Programming with C++, PHI, 2003.
3. O.M.P. Bhave, S. A. Patekar, Object Oriented Programming with C++, Pearson Education, Singapore Pvt Ltd., 2004.

Course 08 PCB03
DATA STRUCTURES AND ALGORITHM ANALYSIS IN C++   4 Credits

Unit-I

Lists, Stacks, and Queues: Abstract Data Types (ADTs) – The List ADT – Simple Array Implementation of Lists – Linked Lists - Programming Details – Common Errors – Doubly and Circularly Linked Lists – Sorted Listed Lists, Inheritance, and Virtual Functions – Examples – Cursor Implementation of Linked Lists – The Stack ADT: Stack Model – Implementation of Stacks – Applications – The Queue ADT: Queue Model – Array Implementation of Queues – Applications of Queues.

Unit-II

Trees: Preliminaries: Implementation of Trees – Tree Traversals with an Application - Binary Trees: Implementation – Expression Trees – The Search Tree ADT – Binary Search Trees: Make – Empty – Find - Find

_Min and Find_Max – Insert – Remove – Average- Case Analysis – AVL Trees: Single Rotation – Double Rotation – Splay Trees: A simple idea (That Does Not Work) – Splaying – Tree Traversals (Revisited) – B-Trees.

Unit-III
Hashing: General Idea – Hash Function – Open Hashing (Separate Chaining) – Closed Hashing (Open Addressing): Linear Probing – Quadratic Probing – Double Hashing – Rehashing – Extendible Hashing. Priority Queues (Heaps): Model – Simple Implementations – Binary Heap: Structure Property – Heap Order Property – Basic Heap Operations – Other Heap Operations – Applications of Priority Queues: The Selection Problem – Event Simulation – d-Heaps – Leftist Heaps: Leftist Heap Property – Leftist Heap Operations – Skew Heaps – Binomial Queues: Binomial Queue Structure – Binomial Queue Operations – Implementation of Binomial Queues.

Unit-IV
Sorting: Preliminaries – Insertion Sort: The Algorithm – Analysis of Insertion Sort – A Lower Bound for Simple Sorting Algorithms – Shell sort: Worst-Case Analysis of Shell sort – Heap sort – Merge sort: Analysis of Merge sort – Quick sort: Picking the Pivot – Partitioning Strategy – Small Files – Actual Quick sort Routines – Analysis of Quick sort – A linear-Expected-Time Algorithm for Selection – Sorting Large Objects – A General Lower Bound for Sorting: Decision Trees – Bucket Sort – External sorting: why we need new Algorithms – Model for External Sorting – The Simple Algorithm – Multiway Merge – Poly phase Merge – Replacement Selection.

Unit-V
Graph Algorithms: Definitions: Representation of Graphs – Topological Sort – Shortest- Path Algorithms: Unweighted Shirtest Paths – Dijkstra's Algorithm – Graphs with Negative Edge Costs – Acyclic Graphs - All-pairs Shortest Path – Network Flow Problems: A simple Maximum-Flow Algorithm – Minimum Spanning Tree – Prim's Algorithm – Kruskal's Algorithm – Applications of Depth-First Search: Undirected Graphs – Biconnectivity – Euler Circuits – Directed Graphs – Finding Strong Components – Introduction to NP-Completeness: Easy vs. Hard – The class NP – NP-Complete Problems.

Text Book:
1. Mark Allen Weiss "Data Structures and Algorithm Analysis in C++" (Internal Student Edition AWL). Chapters: 3, 4, 5, 6, 7, 9

Reference Books:
1. A.V. Aho, J.E. Hopcroft, J.D. Ullman, The Design and Analysis of Computer algorithms, Addison –Wesley Publishing company, 1974.
2. Horowitz & Sahani, Fundamentals of Data Structures in Pascal, Galgotia Book Source, 1982.
3. A.V. Aho, J.E. Hopcroft, J.D. Ullman, Data structures and Algorithms, Addison – Wesley Publishing Company, 1987.

Course 08 PCB04
MATHEMATICAL FOUNDATIONS FOR COMPUTER SCIENCE   **4** Credits

Unit-I   Mathematical Logic

Connectives – Negation – Conjunction – Disjunction – Statement formulas and Truth tables: Well-formed formulas – Tautologies – Equivalence of formulas - Duality law – Normal Forms: Disjunction Normal Form – Conjunctive Normal Form – Principal Disjunctive Normal Form – Principal conjunctive Normal Form.

Unit-II   Theory of inference

Validity using truth table – The Predicate Calculus – Predicates, Statement function, variables and Quantifiers – Inference Theory of predicate calculus: Valid formulae and Equivalence.

Unit-III Relations and functions

Relation and Ordering – Relation – Properties of Binary relation in a ser – Functions – Definition and Introduction – Composition of functions – Inverse functions – Binary and n-array operations – Hashing functions – Natural Numbers – Peano Axioms and Mathematical induction - Cardinality.

Unit-IV Lattice and Boolean algebra

Lattices and Partially Ordered Sets – Definition and Example – Some Properties of Lattices – Lattices of Algebra system – Sub lattices – Direct Product and Homomorphism – Boolean Algebra – Definition and Example – Sub Algebra – Direct Product and Homomorphism – Boolean function – Boolean forms and Free Boolean Algebra – Values of Boolean Expression and Boolean Function.

Unit-V Languages and finite state machines

Grammars and Languages: Discussion of Grammars – Formal Definition of Language – Finite State Machines – Introductory Sequential Circuit – Equivalence – of Finite State Machines – Finite State Acceptors and Regular Grammars.

Text Book:

1. J.P.Trembley and R.Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, New Delhi, 1997.

Sections: 1.4.1,1.5.1, 1.5.2, 1.6.1, 3.3.1 -3.3.2, 2.3.1, 2.3.2, 2.4.1-2.4.4, 2.4.6, 2.5.1, 2.5.2, 4.1.1, 4.1.4, 4.2.1, 4.2.2, 4.3.1, 6.1.1, 4.6.1, 4.6.2.

Reference Books:

1. James C.Abbott, Sets, Lattices and Boolean algebra, Allyn and Bacon, inc. Boston. 1969.
2. J.E.Hopcropt and J.D.Ullman, Formal Languages and Their Relations to Automata, Addison – Wesley Pub. Comp. Reading Mass, 1969.

3. H.G.Flegg, Boolean algebra and Its Applications, John Wiley and Sons Inc.New York, 1974.

Course 08 PCBP01
OBJECT ORIENTED PROGRAMMING WITH C++ - LAB   2 Credits

Implement the following:

1. Function Overloading
2. Functions with default arguments
3. Constructors and Destructors
4. Passing objects to functions by value and by reference
5. Friend functions
6. Inline functions
7. Operator Overloading
8. Inheritance
9. Pointers to objects
10.   This pointer
11.   Virtual functions
12.   Formatted I/O
13.   Files (Formatted and Unformatted)
14.   Templates and Exception Handling

Course 08 PCBP02
DATA STRUCTURES LAB   **2 Credits**

Implement the following:
1. Array Creation and Operations.
2. Stack Operation.
3. Queue Operation.
4. Recursion.
5. Infix to Postfix Conversion.
6. Infix to Prefix Conversion.
7. Polynomial Addition Using Singly Linked List.
8. Doubly Linked List.
9. Tree Traversal Depth first search.
10.   Graphs-Shortest Path
11.   Linear Search.
12.   Binary Search.
13.   Shell sort.
14.   Quick sort.
15.   Heap sort.
16.   Merge sort.

Course 08 PCBP03
MS-OFFICE- Lab   1 Credit

MS –Word
  1. Create a document and apply alignment and edit properties.
  2. Create a table and apply its various properties.
  3. Develop "Mail merge".

MS – Excel
  1. Create an Excel sheet uses the following operations
                   1. Cell formatting.
                   2. Row/ Column formatting.
  2. Create Chart applications.
  3. Create an excel books that consists of various excel sheets.
                   1. A work sheet should consist of tables &text.
                   2. A work sheet should consist of charts.
  4. Create a Table of values & how apply mathematical functions

MS- Power point
  1. Create Slides with different layout & apply different backgrounds.
  2. Create slide with links and change the order of slides.
  3. Create a slide with custom animation.
  4. Create slides with action button and reverse using for the animation how.

MS- Access
  1. Create a new database with various tables
  2. Create different tables and assign relationships between them.
  3. Create tables and develop action & cross tab queries
  4. Create forms in column & tables style

Course 08 PCB05
DATABASE MANAGEMENT SYSTEMS   4 Credits

Unit-I

Introduction to Database Systems: Overview – Data Models – Database System Architecture – History of Database Systems. Diagram – Weak Entity Sets – Extended E-R Features – Design of an E-R Database Schema – Reduction of E-R Schema to Tables. Entity-Relationship Model: Basic Concepts – Constraints – Keys – Design Issues – Entity Relationship.

Unit-II

Relational Model: Structure of Relational Databases – Relational Algebra – Extended Relational Algebra Operations – Modification of Database – Views – Tuple Relational Calculus – Domain Relational Calculus. SQL: Basic Structure – Set Operations – Aggregate Functions – Null Values – Nested Sub queries –Modification of the database – Joined Relations– Embedded SQL – Dynamic SQL –Query-by-Example, Quel.

Unit-III

Integrity and Security: Domain Constraints – Referential Integrity – Assertions – Triggers – Security and Authorization – Authorization in SQL – Encryption and authentication. Relational Database Design: First Normal Form – Second Normal Form – Boyce-Codd Normal Form – Third Normal Form – Fourth Normal Form.

Unit-IV

Storage and File Structures: Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary Storage – Storage Access – File Organization – Organization of Records in Files – Data-Dictionary Storage. Indexing and Hashing: Basic Concepts – Ordered Indices – B^+-Tree Index Files – B-Tree Index Files – Static Hashing – Dynamic Hashing Index Definition in SQL – Multiple-Key Access.

Unit-V

Transactions: Transaction concept – Transaction State – Implementation of Atomicity and Durability – Concurrent Executions – Serializability – Recoverability – Implementation of Isolation – Transaction Definition in SQL – Testing for Serializability Concurrency Control: Lock-Based

Protocols – Timestamp-Based protocols – Validation-Based Protocols – Multiple Granularity – Deadlock Handling. Recovery System: Failure Classification – Storage Structure – Recovery and Atomicity – Log-Based Recovery – Shadow Paging – Recovery with concurrent Transactions – Buffer Management – Failure with Loss of Non - volatile Storage.

TEXT BOOK

1. A.Silberschatz, N.F. Korth, S. Sudarshan, "Database System Concepts",
   4th Edition – McGraw Hill Higher Education, International Edition 2002.
   Chapters: 1 to 7, 11, 12, 15 to 17

REFERENCE BOOKS

1. Fred R McFadden, Jeffery A Hoffer, Mary B. Prescott, "Modern Database Management", Fifth Edition, Addison Wesley, 2000.
2. R. Elmasri and S.B. Navathe Benjamin Cummings, "Fundaments of Database Systems", Redwood City, 1994.
3. B.C. Desai, "An Introduction to Database Systems", Galgotia Publication, New Delhi, 1995.

Course 08 PCB06
MICROPROCESSORS **4 Credits**

Unit-I
Introduction: Microprocessor system concepts, Microprocessor evolution, Areas of application. Microprocessor architecture and operation: Basic Microprocessor Architecture, Registers, Arithmetic and logic section, control section, Interface section, The 8085 Microprocessor, Architecture, timing and sequencing, state transition sequence, Memory and I/O synchronization. The wait state.

Unit-II
Programming the 8085: Instruction set, Programming Techniques, counter and time delay programs, stacks and subroutines, code conversion and BCD arithmetic programs. Memory Interfacings: Review of memory types and characteristics, compatibility between memory and microprocessor unit system bus, Address space, Partitioning of the Address space, Dynamic RAM Interfacing.

Unit-III
D/A and A/D conversion: variable - register network binary ladder-D/A converter-D/A accuracy and resolution A/D converter (simultaneous Conversion)-A/D conversion (counter method)-continuous A/D conversion-A/D techniques-Dual slope A/D Conversion-A/D accuracy and resolution.
Interfacing Peripherals: Review of data transfer techniques, I/O ports, programmable I/O ports, the 8155h-8255a programmable peripheral interface, 8085 interrupt structure, and 8259a programmable interrupt controller, 8254 programmable interval timer, DMA controller. Serial mode of data transfer, 8251a USART, standard interfaces, interfacing keyboard, interfacing displays, 8279 programmable keyboard display interfaces.

Unit-IV
The 8086 Processor – Software aspects Evolution of Microprocessors – 8086 architecture – Addressing modes. Instruction set and assembler directives – Assembly language programming – Interrupts and interrupt service routines.

Unit-V

The Pentium and Pentium Pro Microprocessors : Introduction – Introduction to the Pentium Microprocessor – Special Pentium Registers – Pentium Memory Management – New Pentium Instructions – Introduction to the Pentium Pro Microprocessor – Special Pentium Pro Features.

TEXT BOOK:

1. Gaonkar, "Microprocessor architecture, programming and applications", Wiley Eastern Ltd, 1987. (Chapter 3-5, 6-10, 13-15, 17)
2. Barry B.Brey, "The Intel Microprocessors, 8086/8088, 80186/80188. 80286,80386, 80486, Pentium, Pentium Processor, Pentium II, Pentium III, Pentium IV, Architecture, Programming & Interfacing", Sixth Edition, Pearson Education, 2002. (Chapters 2, 3, 8, 17)

REFERENCE BOOKS:

1. Kenneth L short, "Microprocessor and programming logic", PHI, 1988.
2. Ajith pal, "microprocessors, principles and applications", Tata McGraw Hill, 1990.
3. A.K. Ray & K.M. Bhurcandi, "Advanced Microprocessors and peripherals-Architectures, Programming and Interfacing", Tata McGraw Hill, 2002 reprint.
4. Yu-Cheng, Glenn A. Gibson, "Microcomputer systems: The 8086/8088 Family architecture, Programming and Design", PHI 2003.
5. Peter Abel, "IBM PC Assembly language and programming", Prentice Hall of India Pvt, Ltd.
6. Barry B. Brey & C.R. Sarma , "The Intel Microprocessors – Architecture, Programming, and Interfacing", Pearson Education Pte. Ltd., 2005.
7. U.S. Shah, "Microprocessor and Microcontrollers", Tech-Max Publications, 2005

Course 08 PCB07
SYSTEM ANALYSIS AND DESIGN   **4 Credits**

Unit-I
System Concepts and the Information Systems Environment: Introduction – The systems concept – Characteristics of a system – Elements of a system – Types of Systems – The system Development Life Cycle: Considerations for candidate systems – The role of the systems Analyst: Historical Perspective – The multifaceted role of the analyst – The Analyst/user Interface – Rising positions in system Development.

Unit-II
Systems planning and the Initial investigation: Determined the user's information Requirement. Case scenario problem – Definition and Project Initiation. Background Analysis.   Fact – Finding.   Fact Analysis, Determination of Feasibility. Information Gathering: Information Gathering tool – On site observation.

Unit-III
The tools of structured analysis: The Data flow diagram – Data dictionary – Decision tree and structured English – Decision table – Pros and Cons of Each tool – Feasibility Study: System Performance definition - Feasibility study – Cost/Benefit analysis.

Unit-IV
The process and stages of systems design – The process of Design – Design Methodologies – Major Development Activities – Audit considerations – Input – Output and Forms Design: Input Design. File organization.

Unit-V
System Testing and Quality Assurance: Introduction – System testing. The nature of test data – The test plan – Quality Assurance – Role of the Data

Processing Auditor Implementation: Conversion – Post implementation Review – Software maintenance: – Security, Disaster/recovery and ethics in system development: System security – Ethics in system development.

TEXT BOOK:
1. Elias M. Awad, 'System Analysis & Design' II Edition –Galgotia Publication, 2003. Chapters: 1,2,3,4,5,6,7,8,9,10,11,12,13,16.

REFERENCE BOOKS:
1. James A. Senn, 'Analysis and Design of Information System', MGH, 1989.
2. Lee, 'Introducing Systems Analysis & Design', VOL. I & II Galgotia NCC.

COURSE 08 PCBP04

ASSEMBLY LANGUAGE PROGRAMMING LAB   **2 Credits**

Implement the following:

1. Study of Assembler (Turbo) and Assembles directives.
2. Study of INT 21H Functions for input and output.
3. 8-bit and 16-bit Addition
4. 8-bit and 16-bit Subtraction
5. 8-bit and 16-bit Multiplication
6. Packing of BCD digits.
7. Unpacking of BCD digits.
8. Conversion from BCD to ASCII.
9. Conversion from ASCII to BCD.
10. Delay loop implementation.
11. Arranging numbers in ascending order.
12. Arranging numbers in descending order.
13. MACROS – Examples.
14. Implementation of String Functions.
15. Displaying the contents of the memory locations.

Course 08 PCBP05
RELATIONAL DATABASE MANAGEMENT SYSTEMS – LAB   2 Credits

Implement the following:
1. Simple Queries using DDL, DML, base Tables.
2. Simple Queries using DDL, DML base Views.
3. Column Reports Creation.
4. PL/SQL Procedures Creation.
5. Database Triggers Creation.
6. Reports Creation.
7. Built-in Functions Creation.
8. Simple programs in Visual Basic program.
9. Simple Calculator program Creation.
10.   Simple program using menu Design.
11.   Simple program using Timer Control.
12.   Student Information System.
13.   Payroll Processing System.
14.   Banking Information System.
15.   Inventory System.

Course 08 PCB P06
TALLY- Lab   1 Credit

1. Create a Single Ledger using display and alter commends
2. Create a Multiple Ledger using display and alter commends
3. Create Single group using display and alter commends
4. Create a multiple groups using using display and alter commends
5. Create a voucher types like contra, credit & debit notes, purchase, sales, receipt and delivery notes.
6. Create a single stock group.
7. Create a multiple stock groups
8. Create balance sheet for various items
9. Create profit and loss account for various aspects
10.   Prepare various types of vouchers like accounting, inventory, and import transaction

Course-08PCBP07   Industrial Training-I

2 Credits

The Students are expected to submit a report after undergoing industrial training programme for about 15 days during summer vocation by selecting the industry themselves. The report may contain the following:

1. Profile of the organization
2. Training modules
3. Observations

SEMESTER III
Course-08PCB08
OPERATING SYSTEMS **4 Credits**

Unit-I
Introduction: operating system structure-operating-system operations-process management-memory management-storage management-production and security.
Process management: process-concept: process scheduling-operation on process-inter process communication. Process scheduling: scheduling criteria-scheduling algorithms-multiple-processor scheduling-thread scheduling.

Unit-II
Process coordination: synchronization: the critical section problem-Peterson's solution- synchronization hardware-semaphores. Deadlocks: deadlock characterization-methods for handling deadlocks-deadlock prevention-deadlock avoidance-deadlock detection-recovery from deadlock. Memory management: strategies: swapping-contiguous memory allocation paging structure of the page table-segmentation. Virtual memory management: demand paging-copy on-write-page replacement-allocation of frames-thrashing memory-mapped files.

Unit-III
Storage management: file system: file concept-access methods-directory structure-file sharing-protection-file-system implementation. Secondary-storage structure: overviews of mass storage structure-disk structure - disk attachment-disk scheduling. I/O systems -I/O hardware-application I/O interface–kernel I/O subsystem-transforming I/O request to hardware operations.

Unit-IV
The Kernel and Shell – Files - User names – Logging in – Logging out – Commands – Communication with other users – Files – Input and Output. Files: Directory hierarchy – Files systems – Manipulating and protecting files – File contents – Printing files – File archives and file compression. Process and Devices: Processes and Devices: Processes – Environment – Program control – Quotes and escapes – Devices – back quotes.

Unit-V

Introduction to shells: Shell syntax – Arithmetic – Making decisions – Loops – Searching for files – Formatted output – Passing information to scripts – Simple arithmetic – Pattern Matching –Entering and leaving the Shell - Scripts with options – Symbolic links – Setting up terminals - Sending and Trapping signals – Functions – Aliases –exec and eval mechanism – Sending data across networks –Make files – Safe programming . Regular expression and filters: Filters – Character-to Character transformation –Selecting line by content –Stream editor – Splitting a file according to context – Awk: Introduction –Invoking awk – Naming the fields – Formatted output – Patterns – Variables – Arguments to awk scripts – Arrays –Field and record separators – Functions.

TEXT BOOKS

1. Abraham silberschatz, Peter Baer Galvin, Greg Game"" Operating system Principles" Seventh Edition, Willy Asia Student Edition, 2006
   UNIT 1-3 Chapters: 1,3,5,6,7,8,9,10,11,12,13.
2. Mike Joy, Stepen Jarvis, M. Luck, "Introducing UNIX and Linux", Palgrave Macmillan, U.S.A
   UNIT 4, 5 Chapters: 2.1, 2.2, 4.1 to 4.6, 5, 6, 7, 8, 9, 10, 11

REFERENCE BOOKS:

1. Charles Crowley, Operating System a Design Oriented Approach, Tata McGraw Hill Publishing Company limited 2005

2. H. M. Deitel, Operating System, Second edition, Pearson Education, 2003

3. John Goerzen, Linux Programming Bible, Wiley-Dream tech India (P) Ltd, 2004

4. Richard L. Peterson, The complete Reference "Linux", Fifth Edition, Tata McGraw-Hill Edition, 2005

Course-08PCB09
COMPUTER NETWORKS   4 Credits

Unit- **I**
Introduction – Network Hardware – Network Software – Reference models: OSI Reference model – TCP/IP Reference model – Network Standardization
Physical Layer: Transmission media –- Wireless transmission – Communication Satellites - PSTN.
 (Chapters: 1.2, 1.3, 1.4, 1.6, 2.2 to 2.5)

Unit- **II**
Data Link layer: Design issues – Error Detection and Correction – Elementary Protocol – Sliding Window Protocol – Protocol verification.
MAC sub layer: Channel Allocation problem – Multiple Access Protocols.
(Chapters: 3.1 to 3.5, 4.1, 4.2)

Unit- **III**
Network Layer: Design Issues – Routing algorithms – Quality of Service – Internetworking.
(Chapters: 5.1, 5.2, 5.4, 5.5)

Unit-**IV**
Transport Layer: Transport Service – Elements of Transport Protocol – Internet Transport Protocols: UDP – TCP.
(Chapters: 6.1, 6.2, 6.4, 6.5)

Unit- **V**
Application Layer: DNS – Electronic mail. Network Security: Cryptography – Communication Security – Authentication Protocols –E-mail Security.
(Chapters: 7.1, 7.2, 8.1, 8.6, to 8.8)

Text Book
1.   Andrew S Tanenbaum, "Computer Networks", Fourth Edition, PHI Private Limited, 2005.

Reference Books:
1.   Uyless Black, Computer Networks, Second Edition, PHI, 2005

2.   B.A. Forouzan, "Data Communication and Networking", Third Edition, Tata McGraw Hill, 2004.

08 PCB10
VISUAL PROGRAMMING **4 Credits**

Unit- I
Windows Programming: Basic- Windows and Messages -An Introduction to GDI-Scroll bars- Keystroke Messages-Character Messages-Keyboard Messages -The Mouse: Mouse Basics-Client-Area Mouse Messages-Non Client-Area Mouse Messages-Capturing the Mouse- Dialog Boxes: Modal Dialog Boxes-Modeless Dialog Boxes.

Unit-II
Visual Basic: introduction – Forms – Common form properties- scale properties – color properties – Events – Toolbox – Creating control – the name property – command buttons: properties – events- Image controls-Textboxes – labels – message box- grid- Data types – variables – picture box – rich text box- functions and procedures- control arrays – list and combo boxes – Flex grid control.

Unit- III
Common dialog boxes - Microsoft windows common controls- Menus- MDI forms – Mouse event procedures- Basic File Handling: File commands – Sequential files – random access files – Binary files – Sharing files- File system controls and file system objects- Overview of COM/OLE – Methods and events for data control.

Unit-IV
Windows Programming Foundations - Concepts and Tools for Windows Applications. Procedure-Oriented Windows Applications - The Microsoft Foundation Class Library: Fundamentals - Windows Applications Using the MFC. Visual C++ Basics- An Introduction to Visual C++ - Building a Basic Application - Understanding Visual C++ Resources.

Unit-V
Visual C++ and Database Management. ADO (Active Data Objects) versus ODBC (Open Database Connectivity)- Database Building Overview-Building a Database Application Using ODBC. Building a Database Application Using DAO - Creating an ActiveX Control.

Text Books:
 1.   Charles Petzold, "Programming Windows", Microsoft Press, Fifth

Edition. (Unit – I Ch.1,3,5,6,7,9,11)

2. Gary Cornell, "Visual Basic 6 from the ground up", TMH, 2005 (Unit II Ch.3, 4,5,6,9,11,14,17,18,19,20,22)

3. Pappas, Chris; Murray, William, "Visual C++ 6: The Complete Reference", First Edition,1999, (Unit – IV, Part- IV)

4. Mueller, John, "Visual C++ 6 from the Ground Up", TMH, 2nd Edition,1999(Unit – IV Ch.1,2,3 Unit – V Ch. 4,5,6,7,10)

REFERENCE BOOKS:
1. Steven Holzner , "Visual C++ 6", BPB publications, 2002.
2. Yashavant P.Kanetkar, "Visual C++ programming", BPB Publications, 2002
3. James Allert, "Visual C++ Programming", Cengage Learning, India edition, 2009.
4. Diane Zak, "Visual Basic 2008", Cengage Learning, India Edition, 2008

08PCBP08
VISUAL PROGRAMMING LAB   **2 Credits**

VISUAL BASIC
Implement the following:
1. Design a calculator.
2. Preparation of student mark list
3. Railway Reservation system
4. Bank management system.
5. Hospital management system.
6. Handling Events
7. Creation of Active X controls
8. Simple Animations

Visual C++
Implement the following:
1. Writing code for keyboard and mouse events.
2. Creating Dialog based applications
3. Crating SDI applications
4. Creating MDI applications
5. Creating applications using common dialog controls.
6. Simple data base application.
7. Graphics and animation.

Course – 08PCBP09
OPERATING SYSTEMS LAB   **2 Credits**

Operating System Concepts:

1.   Implementation of Process Creation
2.   Implementation of Message Communication
3.   Implementation of Round Robin Scheduling algorithm
4.   Implementation of FCFS scheduling algorithm
5.   Implementation of Shared Memory Client/ Server techniques
6.   Implementation of Priority Scheduling algorithm
7.   Implementation of Segmentation concept
8.   Implementation of Paging algorithm
9.   Implementation of File System concept
10.   Implementation of Semaphore (Producer _Consumer Process)

SHELL SCRIPT

1.   Implementation of File status test command.
2.   Implementation of Student Grading Process
3.   Implementation of Menu driven Program
4.   Implement the Menu driven shell program to perform the following lists.
                 i. Enter the sentence in file.
                ii. Search a whole word in an existing file.
               iii. Quit.
5.   Develop 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.

Course – 08PCBP10
Mini Project – I   **1**
Credit

The students are expected to submit a mini project by collecting information within the University Departments/Sections or nearby organizations to design applications. The project report may contain the following:

1. Introduction
2. Data Collection
3. System development
4. Implementation
5. Conclusion

Course 08PCB11
. NET PROGRAMMING   **Credits 4**

Unit-I
Introduction to .NET – VB and VB.NET differences- Datatypes- Variables-
Operators- Arrays- Conditional Logic

Unit-II
Procedures- Dialog Boxes- File IO and System Objects- Error Handling-
Namespaces- Classes and Objects

Unit-III
Introduction to Data Access in .NET-   ADO.NET – Data Access in Visual
Studio.NET – Windows Forms: Controls – Specific Controls
Unit-IV

ASP.NET Application Fundamentals – Page Rendering Model- Custom
Rendered Controls – Composite Controls – Control Potpourri

Unit-V
Web Parts- Configuration – Logging in- Data binding – Web Site
Navigation- Session State – Diagnostics and Debugging – ASP.NET Web
Services – AJAX.

Text books:

1. Bill Evjen, Jason Beres, et al**., "Visual Basic. NET Programming
   Bible**", Wiley India (P) Ltd. New Delhi, 2006.
   Chapters: 1,2,5,6,7,8,9,10,12,13,14,21,22,23,26,27

2. George Shepherd **,"Microsoft ASP.NET Step by Step "** , Prentice
   Hall of India Pvt. Ltd. 2008 .
   Chapters: 2,3,4,5,6,7,9,10,11,12,14,17,20,22

Reference Books

1. Thearon Willis , Jonathan Crossland, Richars Blair, "**Beginning VB .NET 2003**", Wiley Dreamtech Publishers , 2004.
2. David Chappell , **"Understanding .NET"**, Pearson Education, 2002.
3. David.S.Platt, **"Introducing Microsoft .Net"**, PHI, 2003.
4. G.Andrw Duthie **,"Microsoft ASP .NET Programming with Microsoft Visual C# .NET step by step"**, PHI , 2003.

Course 08PCB12
Web Technology **4 Credits**

Unit-I
Basics of HTML - HTML tags Head tag sections - Body Sections - Paragaraph end lines - Lists - Images- Links - Texts - Tables - forms - Objects and Plugins.

Unit-II
XML basics- XML - Cascading Style sheets - CSS basics - Style Definitions - Text - Padding - Margins and Borders - Color and Backgrounds - Tables - Elements positioning.

Unit-III
Java Script and DHTML - JavaScript basis- Determining Documents Object models used for Javascript- Incorporating Javascript in your document - Basic Java script syntax- Data types and variables - Calculations and Operators - Control structure - Labels - Built in functions - user defined functions – objects- Event handling.

Unit-IV
The Document Object Model (DOM) - History of DOM - understanding the Document object model - DOM node properties and methods - Traversing a document node - changing a nodes Built in Javascipt objects - Accessing an element by the ID - Dynamic HTML.

Unit-V
Server side scripting :- PHP programming – External PHP – Flow control – PHP Short Function Reference – DOM Document – PHP examples – Web 2.0 features – Ajax- The role of XML in Ajax – Ajax with PHP – Ajax with CSS – Ajax with Databases- Integration with web services – Setting up with open source.

Text books:

1. Steven M. Schafer , "HTML , CSS ,Javascript,Perl,Python and PHP - Web standards Programmer's Reference" , Wiley dreamtech Ltd - 2005. (For Unit I –IV Chapters 1-22)

2.   Guy W. Lecky –Thompson, "Web Programming" , Cengage Learning, 2008

(For Unit V, Chapters 6, 9, 10)

Reference books

1.   Mitch conrad, kay Ether , Michal D.Thomas,"XML problem Design – solution",Wiley India private Ltd ; New Delhi- 2006".
2.   Steve Suehring ,"JavaScript step by step" Prentice-Hall of India Private Limited, 2008
3.   Burdman, "Collaborative Web Development", Addison Wesley.

4.   Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech Publication.

Course-08PCB13
Programming in Java   **4**
Credits

Unit-I

Java Fundamentals- Data types – Operators – Control Statements- Classes and objects

Unit-II

Methods and Classes - Inheritance – Packages – Interfaces – Exceptional Handling

Unit-III

Collections- File and Streams – Networking –Event Handling – AWT: Windows, Controls, Layout Managers and Menus –Swing -JDBC

Unit-IV

Java Servlets: Design – Life Cycle- cookies – Session tracking- Java Server Pages: Overview –Implicit Objects –Scripting –Standard Actions-Directives.

Unit-V

Remote Method Invocation: Remote Interface – Naming Class – RMI Security Manager Class – RMI Exceptions – Creating RMI Client and Server Classes – IIOP.

Text Books

1. Herbert Schildt, The Complete Reference – Java 2, Seventh Edition,2006
   Chapters: 1-10,17,19,20,22-24, 29,31

2. Deitel & Deitel , Java How to Program , Pearson Education ,Seventh Edition ,2008.Chapters : 18,20,24,25

Course 08PCBP11
.NET PROGRAMMING LAB   **2 Credits**

A. Implement the following using VB.NET

1. Creating and using Variables, Arrays , Structure and Procedures
2. Using Decision Structures
        a. Checking User Input
        b. Confirming Application Close
3. Implementing Structured Exception Handling
4. Creating Menus , Status Bars and Toolbars
5. Accessing Data with ADO.NET
     a. Create and open a connection to a database.
     b. Create, read, update, and delete records in a database.

B. Implement the following using ASP.NET

1. Simple Web site
2. Accessing Data with ADO.NET
        a. Create and open a connection to a database.
        b. Create, read, update, and delete records in a database.
        c. Use SqlDataSource to populate a DropDownList and GridView

Course-08PCBP12   Java Programming Lab   2 Credits

Use JAVA Programming Language to implement the following:
1. Concept and Functions of inheritance
2. Concept of Package
3. To handle mouse events.
4. To create applets incorporating the following features:
   a. Create a color palette with matrix of buttons
   b. Set background and foreground of the control text area by selecting a color from color palette.
   c. In order to select Foreground or background use check box control as radio buttons
   d. To set background images
5. To simulate the functions of simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result.
6. To develop chat application with datagram sockets and datagram packets.
7. Use Servlets:
   a. To invoke servlets from HTML forms
   b. To invoke servlets from Applets
8. Simple client/server application.
09. JDBC to interact with database.
10. To Create multiple chat applications using TCP packets.

08PCBP13

WEB TECHNOLOGY LAB   **1 Credit**

1. Develop static pages of an online Book store which includes
Home page and Registration and user Login page
2. Create a home page using XML and JavaScript.
3. Create a web page using XML for creation of DTD which specifies a particular set of rules.
4. Create a Stylesheet in CSS and display the document in Web Browser.
5. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.
6. Write a JavaScriptProgram, embedded in an HTML web page, to play a simple game.
7. Implement Client Side form validation using JavaScript
8. Create a web page to handle events and objects using JavaScript.
9. Create a Stylesheet in XSL and display the document in Web Browser.
10. Create a web page to display the history of the web pages visited by the user
using DOM.

08PCBP13
Industrial Training - II   **2 Credits**
      The Students are expected to submit a report along with computerization of minimum of two modules after taking industrial training programme during summer vocation. The necessary information should be collected during the training programme for computerization. The report should contain the following:

1. Introduction
2. Training modules
3. Implementation as per the requirement of organization.
4. Screen Shots

SEMESTER-V
COURSE 08PCB14
ENTERPRISE RESOURCE PLANNING   **4** Credits

Unit-I
Introduction: Definition – Functional modules – Evolution of ERP systems – Characteristics – Process Integration – Benefits of ERP application – Technology in ERP systems – Implementation costs – Implementation challenges – Facts about Implementations – ERP Implementation in India – ERP Market and Vendors : ERP Market – Vendors – Service oriented on Architecture – ERP Package feature – ERP Packages.

Unit- II
Extended ERP Services : Definition – SCM and ERP – ERP and BI – ERP and E-Commerce – Business Process – Re-engineering and ERP : Definition of ERP – Enterprise Redesign Principles - BPR Vs Total Quality – BPR and change management – Implementation approaches – Implementation methodology – Role of IT in BPR – BPR and ERP systems – BPR Success / Failure factors – BPR Implementation cases.

Unit-III
Planning for ERP: Planning for Implementation – Organizational Requirements –Economic and strategic justification – Analyzing Project scope and Broad implementation approach – Determining resources – Top management commitment – Realizing the commitment – Matching with right ERP systems – Creating a budget – Selecting the right ERP package – Organization preparation – Implementation of ERP: Design – Approaches –Lifecycle –Examples.

Unit- IV
Managing ERP Projects: Risk/Failure factors – Examples of ERP failure – Implementation risks – Management and Complexity of ERP Projects – Training users –Evaluating ERP projects. Going Live and Post implementation: Preparing to GO Live – Strategies for migration to new ERP systems – GO Live performance surprises – Managing after GO Live – Maintenance of ERP systems.

Unit-V
Expanding ERP boundaries: Service oriented architecture – Enterprise Application Integration – Application service provider model.

Case studies: Manufacturing Industries – Service Industries – Governmental Organizations

Text Book
1. Ashim Raj Singla, "Enterprise Resource Planning", Cengage Learning India Pvt Ltd, New Delhi 2008.
   Chapters: 1 to 9.

Reference Book
1. Leon Alexis, "Enterprise Resource Planning", Tata McGraw Hill, New Delhi, 1999.

Course: 08 PCB15
C# PROGRAMMING   **4 Credits**

Unit- I
Introduction to Computing and Programming – Programming Methodologies – Evolution of C# and .NET – Need for C# - First C# Program – Types of Applications Developed with C# - Elements of C# program – Compiling, Building, Running, Debugging and Creating an Application – Data Types and Expressions – Memory Locations for Data – Types Classes and Objects – Predefined Data types – Integral Data types – Floating-point types – Decimal types – Boolean Variables – Declaring Strings – Making Data Constant – Assignment Statements – Order of Operations – Formatting output.

Unit- II
Methods and Behaviours – Anatomy of Method – Calling Class Methods – Predefined Methods – Writing Your own Class Methods – The Object Concept - Your own Instance Methods – Calling Instance Methods – Types of Parameters – Making Decisions – Boolean, Conditional expressions – If..else Selection, Switch Selection Statements – Ternary Operator – Order of Operations.

Unit-III
Repeating Instructions – use a Loop – using the While statement – using the For statement Loop – Using the Foreach statement – using the Do … while structure – Nested Loops – Recursive Calls – unconditional transfer of control – deciding which loop to use - Arrays and Collections – array Basic, Declaration, Access, Class – arrays as Method Parameters – arrays in Classes – two-dimensional arrays – multidimensional arrays – Array List class, String Class and other Collection classes.

Unit- IV
Introduction to Windows Programming – contrasting Windows and Console Applications – Graphical User Interfaces – Elements of Good design – using C# and visual studio to create Window-based applications – Windows Forms – controls – Programming Based on Events – Delegates – Event Handling in C# - List Box, Combo Box, Menu Strip, Check Box, Radio Button and Tab Control Objects.

Unit-V

Working with Files – System I/O Name space – file and directory classes – file streams – Binary reader and writer classes – Database access using ADO .NET – Database Access - ADO .NET – data source configuration tools – Web-based Applications – ASP.NET – Web Forms page – Controls – Web Forms server controls – Validation, Custom and Composite controls – Web services – Smart device Applications.

Text Book
1. Barbara Doyle, "Programming in C#", Course Technology, Cengage Learning , 2008.   (Chapter: 1,2,3,4,5,6,7,8,9,12,13,14)

Reference Books
1. E. Balagurusamy, "Programming in C#", Tata McGraw-Hill, 2004
2. J. Liberty, "Programming C#", 2nd edition, O'Reilly, 2002.
3. Herbert Schildt, "The Complete Reference: C#", Tata McGraw-Hill, 2004.

Course 08 PCBP15
C# Lab   **2   Credits**

1. Program using Program Control
2. Program using Exception
3. Program using Classes and Constructor
4. Program using Interface
5. Program using String and Arrays
6. Program using Files in C#
7. Program using Windows Concepts
8. Program using ADO.NET
9. Program using COM objects
10.   Program using ActiveX Control

08PCBP17
Animation Softwares   Lab   **2**
Credit

Photoshop
- To design the text with image and adding the special effects on the respected text and image.
- To develop the any natural picture

Premiere
- To design the text with image and adding the special effects on the respected text and image.
- To develop the any new model of picture

Illustrator
- To design the text with image and adding the special effects on the respected text and image.
- To develop the dancing text and image.

Flash
- To design the text with image and adding the special effects on the respected text and image.
- To develop the any natural picture

Director
- To design the text with image and adding the special effects on the respected text and image.
- To develop the animation of alphabet with relevant picture
- To develop the any natural picture

Dream weaver
- To design the text with image and adding the special effects on the respected text and image.
- To be develop the any picture

Maya
- To Create a Clip for a Character of the human Skeleton Components.
- To develop the Rendering (The Real World) animations.
- To develop the Maya Dynamics.

Course 08 PCBP17
Mini Project-II using open Source Softwares   **1 Credits**

      The students are expected to submit a mini project by using any kind of open source software to develop applications. The report may contain the following:

1. Introduction
2. System development
3. Implementation
4. Screen shots
5. Conclusion

SEMESTER-VI

COURSE 08PCBP18
Dissertation and Viva Voce   **15 Credits**

      The students are expected to do their dissertation for one full semester by attaching themselves with a well reputed organization/research institution. The report should be submitted as per the format provided in Annexure II.

Elective Course –I

Course: 08 PCBZ01
CLIENT /SERVER ARCHITECTURE   4
Credits

Unit-I

Basic concepts of client /server: Characteristics. File servers –Data base servers - transaction servers – groupware servers – object servers – web servers – fat servers or fat clients – 2-tier – client/server building blocks - Operating system services: Base services –extended services – server scalability- client anatomy.

Unit-II

NOS middleware - peer-to-peer communication –Remote Procedure Calls –MOM middleware – SQL database servers: Server architecture – stored procedures – triggers – rules.

Unit-III

Online transaction processing – Decision support systems – OLTP vs. DSS – Data warehouses: elements – hierarchies – replication vs. direct access – replication mechanism — client/server transaction processing: transaction models – TP monitors.

Unit-IV

Groupware: Components – Distributed objects: components and distributed objects. CORBA: components - object management architecture (IORB) – services – business objects.

Unit-V

Client/server distributed system management-components - management application – Network management – OSI management framework - the desktop management interface - X/OPEN management standards – client/server application development tools - client /server application design.

TEXT BOOK
1. Robert Orafli, Dan Harkey and Jeri Edwards, "Client/Server Survival guide", 3rd Edition Wiley India Edition, 2007.
Chapters: 2,3,5,7,8,10,12,15,16,19,21,22,30,31,32.

REFERENCE BOOKS
1. Dawna Travis Dewire, "Client /Server Computing", Tata Mc Graw Hill 2003.
2. Robert Orafli, Dan Harkey and John Wiley, "The Essential client/server Survival guide", 2nd Edition
   Galgotia Publication, 2005

Course-08PCBZ02
SOFTWARE ENGINEERING

4 Credits

Unit-I
Introduction to Software Engineering – The Evolving Role of Software – Software – Software Myths – The Software Process: – A Generic View of Process – Software Engineering a layered technology – A Process Framework – Process Models: -Prescriptive Models – The Waterfall Models- Incremental Process Models, Evolutionary Process Models- The Unified Process.

Unit-II
Requirements Engineering: - Requirements Engineering Tasks – Initiating the Requirements Engineering Process – Eliciting Requirements – Building the Analysis Model – Negotiating and Validating Requirements- Building the Analysis Model:- Requirements Analysis – Analysis Modeling Approaches – Data Modeling Concepts – Object Oriented Analysis – Scenario based Modeling - Flow oriented Modeling – Class Based Modeling – Creating a Behavioral Model.

Unit-III
Design Engineering: – Design Concepts – The Design Model – Pattern-Based Software Design – Creating An Architectural Design – Software Architecture – Architectural Styles and Patterns – Architectural design – Mapping Data Flow into a Software Architecture- Modeling Component level Design – What is a Component – Designing Class-Based Components – Designing Conventional Components.

Unit-IV
Testing Strategies: - A Strategic approach to Software Testing – Test Strategies for Conventional Software – Test Strategies for Object oriented Software – Validation Testing – System Testing - Testing Tactics:- Software Testing Fundamentals – White Box Testing: – Basis Path Testing – Control Structure Testing-Black box Testing :- Object oriented Testing Methods – Testing Patterns.

Unit-V
Web Engineering :- Web Engineering Layers – The Web Engineering Process – Quality Management :- Quality Concepts – Software Quality Assurance – Software Reviews – Formal Technical Reviews –

Reengineering - Software Reengineering – Reverse Engineering – The Economics of Reengineering.

Text Book:

1. Roger S. Pressman, "Software Engineering a Practioner's Approach", Sixth Edition, McGraw-Hill Higher Education, 2006

Chapters and Sections: 1.1, 1.2, 1.5, 2.1, 2.2, 3.1, 3.2, 3.3, 3.4, 3.6, 7.2, 7.3, 7.4, 7.6, 7.7, 7.8, 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 9.3, 9.4, 9.5, 10.1, 10.3, 10.6, 11.1, 11.2, 11.5, 9.3, 9.4, 9.5, 10.1, 10.3, 10.6, 11.1, 11.2, 11.5, 13.1, 13.3, 13.4, 13.5, 13.6, 14.1, 14.3, 14.4, 14.5, 14.6, 14.7, 14.11, 16.2, 16.3, 26.1, 26.2, 26.3, 26.4, 31.2, 31.3, 31.6.

Reference Books:

1. Ian Somerville, "Software Engineering", Seventh Edition, Pearson Education, 2005.
2. Richard Fairly, "Software Engineering Concepts", TMGH, 2004.
3. Rajib Mall, "Fundamentals of Software Engineering", PHI, Second Edition, 2000.
4. Carlo Ghezzi, Mehdi Jazayeri, Dino Mndrioli, "Fundamentals of Software
Engineering ", Second Edition, PHI/Pearson Education Asia, 2000

Course-08PCBZ03
SYSTEM SOFTWARE   **4 Credits**

Unit-I
System software and machine architecture – The Simplified Instructional
Computer (SIC) - Machine architecture - Data and instruction formats -
addressing modes - instruction sets - I/O and programming.

Unit-II
Basic assembler functions - A simple SIC assembler – Assembler algorithm
and data structures - Machine dependent assembler features - Instruction
formats and addressing modes – Program relocation - Machine
independent assembler features - Literals – Symbol-defining statements –
Expressions - One pass assemblers and Multi pass assemblers .

Unit-III
Basic loader functions - Design of an Absolute Loader – A Simple
Bootstrap Loader - Machine dependent loader features - Relocation –
Program Linking – Algorithm and Data Structures for Linking Loader -
Machine-independent loader features - Automatic Library Search – Loader
Options - Loader design options - Linkage Editors – Dynamic Linking –
Bootstrap Loaders

Unit-IV
Basic macro processor functions - Macro Definition and Expansion – Macro
Processor Algorithm and data structures - Machine-independent macro
processor features - Concatenation of Macro Parameters – Generation of
Unique Labels – Conditional Macro Expansion – Keyword Macro
Parameters-Macro within Macro.

Unit-V
Text editors - Overview of the Editing Process - User Interface – Editor
Structure. - Interactive debugging systems - Debugging functions and
capabilities – Relationship with other parts of the system – User-Interface
Criteria.

TEXT BOOK

1.   Leland L. Beck, "System Software – An Introduction to Systems

Programming", Pearson Education Asia, 2005.

REFERENCE BOOKS

1.   D. M. Dhamdhere, "Systems Programming and Operating Systems", Second
       Revised Edition, Tata McGraw-Hill, 1999.
2.   John J. Donovan "Systems Programming", Tata McGraw-Hill Edition, 1972.

08PCBZ04
EMBEDDED COMPUTING   **4 Credits**

Unit-I
An Introduction to Embedded Processing :
Embedded Computing, Distinguishing Between Embedded and General-Purpose Computing – Characterizing Embedded Computing – Embedded Market Structure.

An Overview of VLIW and ILP:
Semantics and Parallelism – Design Philosophies – Role of the Compiler – VLIW in the Embedded and DSP Domains – Historical Perspective and Further Reading.

Unit-II
An Overview of ISA Design:
Overview – Basic VLIW Design Principles – Designing a VLIW ISA for Embedded Systems – Instruction-set Encoding – VLIW Encoding – Encoding and Instruction-set Extensions.
Architectural Structures in ISA Design:
The Datapath - Registers and Clusters – Memory Architecture – Branch Architecture – Speculation and Predication – System Operations.

Unit-III
Microarchitecture Design:
Register File Design – Pipeline Design – CLIW Fetch, Sequencing, and Decoding – The Datapath – Memory Architecture – The Control Unit – Control Registers – Power Considerations.

System Design and Simulation:
System-on-a-Chip (SoC) – Procesor Cores and SoC – Overview of Simulation - Simulating a VLIW Architecture – System Simulation – Validation and Verification.

Unit-IV
Embedded Compiling and Tool chains:

Introduction – Embedded Cross-Development Toolchains – Structure of an ILP Compiler – Code Layout – Embedded-Specific Tradeoffs for Compilers – DSP-Specific Compiler Optimizations.

Compiling for VLIWs and ILP:
Profiling – Scheduling – Register Allocation – Speculation and Predication – Instruction Selection.

Unit-V
The Run-time System:
Exceptions, Interrupts, and Traps – Application Binary Interface Considerations – Code Compression – Embedded Operating Systems – Multiprocessing and Multithreading.

Application Areas:
Digital Printing and Imaging – Telecom Applications – Other Application Areas : Digital Video – Automotive – Hard Disk Drives – Networking and Network Processors.

TEXT BOOK

1. Joseph A. Fisher, Paolo Faraboschi, Cliff Young, Embedded Computing : AVLIW Approach to Architecture, Compilers, and Tools, Morgan Kaugmann Publishers An imprint of Elsevier, Elsevier Inc, 2005.

REFERENCE BOOKS

1. Wayne Wolf, Computers as Components: Principles of Embedded Computing System Design, Morgan Kaufman Publishers, 2001.
2. Jane.W.S. Liu Real-Time systems, Pearson Education Asia, 2000
3. C. M. Krishna and K. G. Shin , Real-Time Systems, ,McGraw-Hill, 1997
4. Frank Vahid and Tony Givargi, Embedded System Design: A Unified Hardware/Software Introduction, John Wiley & Sons, 2000.

Elective Course -II

Course 08PCBZ05
   OBJECT ORIENTED ANALYSIS AND DESIGN

4 Credits

Unit-I
The Object Model: The evolution of the object model – Elements of the object model –Applying object model. Classes and Objects: The nature of an object – Relationships among objects.

Unit-II
Classes and objects: The nature of the class – Relationship among classes – The Int**ENTERPRISE RESOURCE PLANNING**lay of Classes and Objects – On building quality classes and objects. Classification: The importance of proper classification – Identifying proper classes and objects – Key abstraction mechanism.

Unit-III
 Introduction to UML- Development Process- The Class Diagram: Essentials and Advanced Concepts- Sequence Diagrams- Object Diagrams

Unit-IV
Package Diagrams-Deployment Diagrams- Use Cases- State Machine Diagram

Unit-V
Activity Diagram- Communication diagram-Component Diagram-Collaborations-Interaction Diagram –Timing Diagram

Text Books :
1.   Grady Booch, " Object Oriented Analysis And Design", Addison Wesley, 1994.   Chapters:2-4
2.   Martin Fowler, Kendall Scott, "UML Distilled", Addison Wesley, 3rd Edition, 2007   Chapters:1-12,14-17

Reference Books:

1. James Rumbaugh, Ivar Jacobson, Grady Booch, " The Unified Modeling Language Reference Manual ", Addison Wesley, 1999.
2. Erich Gamma, "Design Patterns", Addison Wesley.
3. James Rumbough et al, "Object Oriented Modeling and Design", 1991.
4. Ivar Jacobson, "Object Oriented Software Engineering; A Use Case Driven Approach", Addison Wesley, 1994.
5. Eriksson, "UML Tool Kit", Addison Wesley.

Course 08PCBZ06
COMPILER DESIGN   **4 Credits**

Unit-I

Introduction to compilers: Compilers and Translators – Structure of a Compiler – Lexical Analysis – Syntax Analysis – Intermediate code generation – Optimization – Code generation – Book keeping – Error handling – Compiler Writing tools – Lexical Analysis: The role of the Lexical analysis – A simple approach to the design of lexical analyzers – Regular expressions – Implementation of a lexical analyzer.

Unit-II

Basic Parsing techniques: Derivations and parse trees – Parsers – shift reduce parsing – Operator Precedence Parsing – Top down parsing – Predictive parsing – Automatic construction of efficient parsers: LR parsers – The Canonical collection of LR (0) items – Constructing SLR parsing tables – Constructing canonical LR parsing tables – Constructing LALR parsing tables – Using ambiguous grammars – An automatic parser generator – Implementation of LR parsing tables – Constructing LALR set of items.

Unit-III

Syntax- Directed translation: Syntax-directed translation schemes – Implementation of syntax-directed translators – Intermediate code – Postfix notation – Three address code, quadruples, and triples- Postfix translations.

Unit-IV

Symbol tables: The contents of a symbol table – Data structures for symbol tables – Representing scope information – 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 simple code generator – Peephole optimization.

Text Book:

1. Alferd V.Aho and Jeffrey D.Ullman, "Principles of Compiler Design", Narosa Publishing House, 2002.
   Chapters: 1.1, 1.3, 1.4, 1.5 to 1.11, 3.2,3.3, 3.8, 4.2,5,6,7.1 to 7.4, 7.6, 7.10, 9,11,12.1 to 12.3, 15.1, 15.2,15.4, 15.7.

Reference Books:
1. Alferd V. Aho, Ravi Sethi, Jeffery D.Ullman, "Compilers", Narosa Publishing House, 2002.
2. Jean-Paul Tremblay and Paul G. Soreson, "Compilers Writing", McGraw Hill International Editions, 2000.

Course: 08 PCBZ07
DESIGN AND ANALYSIS OF ALGORITHMS   **4   Credits**

Unit-I

Introduction – Notion of Algorithm - Fundamentals of algorithmic problem solving – Important problem types – Fundamentals of the analysis of algorithm efficiency – analysis frame work –   Mathematical analysis of non-recursive Algorithms – Non-recursive solution to the   Matrix Multiplication - Mathematical analysis of recursive algorithms – Recursive solution to the Tower of Hanoi Puzzle.

Unit-II

Divide and conquer Technique   – Multiplication of large integers – Strassen's matrix   multiplication – Closest pair and Convex Hull Problems - Greedy method – Prim's algorithm – Kruskal's algorithm – Dijkstra's algorithm.

Unit-III

Computing a binomial coefficient – Warshall's and Floyd' Algorithm – Application of Warshall's Algorithm to the digraph – Flyd's Algorithm for the all pairs shortest paths Problem - The Knapsack problem and Memory function.

Unit-IV

Backtracking – N-Queens problem – Hamiltonian circuit problem – Subset sum problem – Branch and bound – Assignment problem – Knapsack problem –   Traveling salesman problem.

Unit-V

P & NP problems – NP-complete problems – Approximation algorithms for NP-hard problems – Traveling salesman problem – Knapsack problem.

Text Book

1.   Anany Levitin "Introduction to the Design and Analysis of Algorithms" Pearson Education 2008. (Chapters 1.1-1.3, 2.1, 2.3, 2.4, 4.5, 4.6, 8.2, 8.4, 9.1-9.3, 11.3, 12.1,12.2, 12.3)

Reference Books

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, "Introduction to   algorithms", Prentice Hall 1990.
2. S.K. Basu, "Design methods and Analysis of Algorithms", Prentice Hall , 2005.

Course 08PCBZ08
SOFTWARE METRICS   **4 Credits**

Unit-I
Fundamentals of Measurement and Experimentation-I: Measurement, - Basics of measurement- Goal based frame work for software measurement

Unit-II
Fundamentals of Measurement and Experimentation –II : Empirical investigation- Software metrics data collection- Analyzing software measurement data.

Unit-III
Measuring internal product attributes: size, length, reuse, functionality and its complexity- structure- measuring external product attributes

Unit-IV
Software reliability: measurement and prediction-Resource measurement: productivity, teams and tools

Unit-V
Measurement and Management: Planning a measurement program- Measurement in practice: Success criteria- Measurement in the small and large- Metric tools

Text Book:
1.   Norman E. Fenton, Shari Lawrence Pfleeger ,"**Software Metrics – a Rigorous and practical approach**", Second edition ,International Student Edition, 2004, hapters-1-11,13,14

 Reference Books:

1.   Robert B. Grady," **Practical software metrics for project management and process improvement** ", PTR Prentice Hall Edition,1992.

2.   B. A. Kitchenham **,"Software metrics: measurement for software process improvement "**, NCC Backwell Publication , 1996.

3. C. Ravindranath **,"Software metrics: a guide to planning, analysis, and application",** Auerbach Publications, first edition , 2003

Elective Course -III

Course 08PCBZ09
REAL TIME SYSTEMS DEVELOPMENT   **4 Credits**

Unit-I
Introduction: World of Real-Time Systems – What are Real Time Systems-history-Computer Hardware for Monitoring and control –Process and State Based systems model-cyclic executives-standard OS and concurrency architectures – Systems objects and object-oriented structures

Unit-II
Requirements and Design Specifications: Survey and classification of notations-data flow diagrams- Tabular languages- State Machines – Systems of State Machines:- Communicating Real-time state Machine-Statecharts

Unit-III
Declarative Specifications: Regular Specifications and Extensions-Traditional Logics- Real Time Logic- Deterministic Scheduling :-Assumptions and Candidate Algorithms- Basic RM and EDF results-Relaxing the assumptions-Process interactions

Unit-IV
Execution Time Prediction: Approaches and Issues –Measurement of Software by software –Program Analysis with Timing Schema- Prediction by Optimization-
System Interferences and Architectural complexities .

Unit-V
Timer Applications- Properties of Real and Ideal clocks- clock servers-clock synchronization- Real time language features- Ada and software fault tolerance
-Java and Real time extensions- CSP and Occam-Esterel concepts- Real time Euclid System- Operating systems- Case study: Air Traffic Control system

Text Book:

1. Real Time Systems and Software, Alan C. Shaw, John Wiley & Sons Pvt. LTD,2002

Reference Book:

1. Real-Time Systems Development, Rob Williams**,** Butterworth-Heinemann 2005

Course 08PCBZ10
COMPONENT TECHNOLOGY   4 Credits

Unit-I
Object and Component wiring standard-Where it Came from-Form
Procedure to objects-The fine print-On the Wire-the rise of XML.

Unit-II
CORBA,CCM,OMA And MDA-Object Request Broker-Common object
service specifications-CORBA Component model-CORBA component
implementations-CORBA facilities-Application object-CORBA, UML, XML
and MDA.

Unit-III
COM-COM object recuse-interface and polymorphism-COM object creation
and the com library-Initializing objects, persistince,structured storage,
monikern, from COM to distributed COM – DCOM- Component
architecture:-The roles of an architecture-Conceptualization-beyond
objects-Definition of key terms-A tiered component architecture-component
and middleware.

Unit-IV
Component framework-contributors of contextual component frameworks-
Foundation and roots- Component framework versus connection-
Component framework versus meta-programming-Component framework
versus aspect-oriented programming.

Unit-V
Component development-The methodology-Component oriented
programming-The environment selecting target framework-The tools-
selecting programming Languages-Component distribution and
acquisition-Component assembly.

Text Book:
 1.   Clemens Skyperski, Dominish Gruntz,Stephan Murer,"Component
 software
       beyond object oriented programming",Pearson Education 2007.
       Chapters 12,13,15,20-24.

Reference Books:

1. Thomas J. Mowbray, William A.Rug, Inside CORBA, Distributed object standards and application, Addison Wesley, 1999.
2. Randy Abernethy, Randy Morin, Jesus Chahin, COM/DCOM Unleashed, Techmedia,1999.
3. Robert Orfali, Dan Harvey,Jeri Edwaras, The essential Distributed objects survival guide, John Wiley & sons,Inc 1996.

08PCBZ11
HIGH PERFORMANCE COMPUTING   **4 Credits**

Unit-I

Grid Computing : Introduction : The Data Centre, the Grid and the Distributed/High Performance Computing – Cluster Computing and Grid Computing – Metacomputing – the Precursor of Grid Computing – Scientific, Business and e-Governance Grids – Web Services and Grid Computing – Business Computing and the Grid - a Potential Win-win Situation – e-Governance and the Grid.

Technologies and Architectures for Grid Computing: Clustering and Grid Computing – Issues in Data Grids – Key Functional Requirements in Grid Computing – Standards for Grid Computing – Recent Technological Trends in Large Data Grids.

 Unit-II

World Wide Grid Computing Activities, Organizations and Projects: Standards Organizations – Organizations Developing Grid Computing Tool Kits, Framework, and Middleware – Grid Projects and Organizations Building and Using Grid Based Solutions. Commercial Organizations Building and Using Grid Based Solutions.

The Grid and the Databases: Issues in Database Integration with the Grid – The Requirements of a Grid-enabled Database – Storage Request Broker (SRB) – The Architecture of OGSA-DAI for offering Grid Database Services.

 Unit-III

Cluster Computing: Introduction – Approaches to Parallel Computing – Achieve Low Cost Parallel Computing through Clusters – Definition and Architecture of a Cluster – Functionality of a Cluster – Categories of Clusters.

Cluster Middleware: An Introduction – Levels and Layers of Single System Image (SSI) – Cluster Middleware Design Objectives – Resource Management and Scheduling – Cluster Programming Environment and Tools.

Early Cluster Architectures and High Throughput Computing Clusters: Early Cluster Architectures – High Throughput Computing Clusters – Condor.

Unit-IV

Cluster Technology for High Availability: Highly Available Clusters – High Availability Parallel Computing – Mission Critical Applications – Types of Failures and Errors – Cluster Architectures and Configurations for High Availability – Faults and Error Detection – Failure Recovery – Failover/Recovery Clusters.

Performance Models and Simulation: Performance Measures and Metrics – Profit Effectiveness of Parallel Computing through Clusters.

Process Scheduling: Job Management System (JMS) - Resource Management System (RMS) – Queues, Hosts, Resources, Jobs and Policies – Policies for Resource Utilization – Scheduling Policies.

Unit-V

Load Sharing and Load Balancing: Load Sharing and Load Balancing – Strategies for Load Balancing – Modelling Parameters – Recent Work.

Distributed Shared Memory: Issues in DSM – Write Synchronization for Data Consistency – Double Faulting – Application/Type Specific Consistency – Issues in Network Performance in DSM.

Case Studies of Cluster Systems: Beowulf, COMPaS, PARAM Padma

TEXT BOOKS

1. C.S.R. Prabhu, "Grid and Cluster Computing", Prentice Hall of India Pvt. Ltd., New Delhi, 2008. (Unit-I: Chapter 1, 2 Unit-II: Chapter 3, 7 Unit-III: Chapter 8, 9, 10 Unit-IV: Chapter 13, 14, 15 Unit-V: Chapter 16, 17).

REFERENCE BOOKS

1. Joshy Joseph & Craig Fellenstein, "Grid Computing", PHI, PTR-2003.
2. Ahmar Abbas, "Grid Computing: A Practical Guide to technology and Applications", Charles River media – 2003.

3. Harry F. Jordan, Gita Alaghband , "Parallel Processing" ,Prentice Hall of India Pvt. Ltd., New Delhi, 2008.
4. Sasi Kumar, Dinesh Shikhare, P. Ravi Prakash, "Introduction to Parallel processing" Prentice Hall of India , New Delhi, 2006.
5. George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", Pearson Education, 3rd Edition, 2002.
6. Sape Mullender, Distributed Systems, Addison Wesley, 2nd Edition, 1993.
7. Albert Fleishman, Distributes Systems- Software Design and Implementation, Springer-Verlag, 1994.
8. M.L.Liu, Distributed Computing Principles and Applications, Pearson Education, 2004.

Course: 08 PCBZ12
SOFTWARE TESTING   **4 Credits**

Unit –I:
Tackling the testing maze: Introduction – Sample application – The incremental testing approaches. **Test Outline:** Introduction – Sample application – The outline approaches – Evaluating the outline – Schedule estimation.

Unit –II:
Building a software testing environment: Creating an environment supporting of software testing – Minimizing risk – Writing a policy of software testing - Economic of testing – Testing an organizational issues – Management support for software testing – Building a structured approach to software testing – Developing a test strategy.

Building a software testing process: Software testing guidelines – workbench concepts – Customizing the software testing process – Process preparation checklist.

Unit – III:
Overview of the software testing process: Advantages of software testing process – The cost of computer testing – Seven steps software testing process – Workbench Skills.

Using tables and spreadsheets: Introduction – Sample application – Documenting test cases – State machines – Test case table with multiple inputs – Decision tables – Applications with complex data – Managing tests.

Unit – IV:
Testing software system security: Overview – Where vulnerabilities occur – Functional vulnerabilities – Vulnerable areas – Accidental versus intentional losses – Do Procedures – Output – guidelines.

Unit – V:
Testing objects – oriented software: Introduction – Comparing object-Oriented and Procedural software – System testing example – Unit testing of classes. **Testing web applications:** Sample application – functional and usability issues – Security testing – Database testing.

Text Books:
1. Louise Tamres, "Introducing software testing", Pearson education 2007.
   (Chapters 1, 2 – Unit – I, Chapters 4, 5 - Unit – III, Chapters 6, 7 - Unit – V)
2. William Perry, "Effecting methods for software testing", Wiley-India and sons,

2006. (Chapters 2, 3 – Unit – II, Chapter 6 - Unit – III, Chapter 20 – Unit – IV)

Reference Books:

1. Bovis Beizer, "Software testing Techniques", Dreamtech Press 2003.
2. Ilene Burnstein, "Practical software testing- A Process oriented approach",
   Springer-Verlay 2004.
3. Boris Beizer, "Black Box Testing", John Wiley and Sons 1995.
4. Elfriede Dustin, "Effective software is testing", Pearson Education 2003.

Elective Course -IV

Course: 08 PCBZ13
WEB SERVICES   **4 Credits**

Unit–I

Web services – web services and their approach to distributed computing – Web services technology – Web services architecture .

Unit–II

Basic Web services Technology – A Minimalist infrastructure for web services – SOAP – Simple Object Access Protocol – WSDL Web Services Description Language – UDDI: Universal Description Discovery and Integration – Web services at work – Interactions between the specifications – Related Standards.

Unit – III

Creating and Using web services :- Understanding XML based web services – SOAP and web services – Additional needs for web services - creating a web service – Declaring a web service – Creating the web service class – Advertising a web service – Securing a web service – Exploring authentication options .

Unit – IV

Using a web service - Locating a web service – Understanding WSDL files – Creating a proxy class – MakeServices.bat – How the proxy code Works

Unit – V

Service Coordination Protocols – An Introduction to coordination protocols – Infrastructure for coordination protocols –WS- coordination – WS-Transaction – Rosetta Net – Other standards Related to coordination protocols .

Text Books

1.   Alonso Casati , Kuno ,Machiraju, "Web services Concepts Architectures and
       Applications- Springer International Edition- 2009.
       For Units 1, 2 and 5 Chapters 5, 6 and 7.

2.   G. Andrew Duthie, Microsoft ASP .NET Programming with Microsoft VISUAL C# . NET step by step , PHI private Limited, New Delhi – 2006. For Units 3 and 4 Chapter 11

Reference Books

1. Joe Wigglesworth and Paula McMillan, "Java Programming : Advanced Topics" Thomson Learning Inc -2007.
2. Ramesh Nagappan , Robert Skoczylas and Rima Patel Sriganesh, " Developing Java Web Services", Wiley Publishing Inc., 2004.
3. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.
4. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers,2005.
5. Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson Education, 2002.

Course: 08 PCBZ14
DATAMINING   **4 Credits**

Unit-I

Introduction – Data mining – Data mining functionalities – kinds of patterns can be mined – classification – Data mining task primitives-major issues. Data pre-processing – Data cleaning – Data Integration and Transformation – Data Reduction – Discretization and concept hierarchy generation

Unit-II

Data warehouse – A multidimensional data model – Data warehouse architecture – Data warehouse implementation – From data warehouse to data mining-Efficient methods for data Cube computation.

Unit-III

Mining Frequent Patterns, Associations and Correlations: Basic Concepts-Efficient and scalable Frequent Itemset Mining Methods-Mining Various kinds of association rules-from association Mining to correlation analysis-constraint-based Association Mining. Classification and prediction – Issues regarding classification and prediction – classification by decision tree induction- Bayesian classification- Rule based classification.

Unit-IV

Cluster Analysis – Types of Data in cluster analysis- A categorization of Major clustering methods - Partitioning methods- Hierarchical methods – Density – based methods -Grid based methods -Model based clustering methods – outlier analysis.

Unit-V

Mining Data Streams-Mining Time-Series Data-Mining Sequence patterns in Transactional Data Bases-Multimedia Data Mining-Text Mining-Mining the world wide web.

Text Book

1. Jiwei Han, Michelien Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann Publishers an Imprint of Elsevier, 2006.
   Chapters: 1,2,3, 4.1, 5, 6.1- 6.6, 7.1-7.8, 7.11,8.1-8.3, 10.3-10.5

Reference Books

1. Arun K.Pujari, "Data Mining Techniques", Universities Press (India) Limited, 2001.
2. George M. Marakas, Modern Data warehousing, Mining and Visualization: core concepts, Printice Hall, First Edition, 2002.
3. John Wang, Encyclopedia of Data warehousing and Mining, Idea Group Publishing, 2005.

Course: 08 PCBZ15
PARALLEL PROCESSING   **4 Credits**

Unit-I

Parallel Machines and Computations – The Evoluation of parallel Architectures – Interconnection Networks – Application of Architectural Parallelism – Getting Started in SIMD and MIMD Programming – Parallelism in Algorithms – Conclusion – Bibliographic Notes – Parameters Characterizing Algorithm Parallelism – Prefix Problem – Parallel Prefix Algorithms – Characterizing Algorithm Behaviour for Large Problem Size – Programming Parallel Prefix – Speedup and Efficiency of Parallel Algorithms –
The Performance Perspective.

Unit-II

Vector And Matrix Algorithms – A Vector Architecture – Single Instruction Multiple Data – An SIMD Instruction Set – The Prime Memory System – Use of the PE Index to Solve Layout Problems – SIMD Language Constructs – Fortran 90 – Pipelined SIMD Vectors Computers – Vector Architecture Summary.

Unit-III

Shared Memory and Message-Passing Architectures – Overview of Shared Memory Multiprocessor Programming – Shared Memory Programming Alternatives and Scope – A Shared Memory Multiprocessor Programming Language – Pipelined MIMD-Multithreading – Distributing Data and Operations Among Processor Memory Pairs – Programming With Message Passing – Characterization of Communication – The Message Passing Interface, MPI – Hardware Managed Communication-Distributed Cache .

Unit-IV

Discovering Parallel Operations in (Sequential) Code – Variables With Complex Names – Sample Compiler Techniques – Data Flow Principles – Data Flow Architectures – Systolic Arrays – Parallel Processor.

Unit-V

The Parallel I/O Problem – Hardware for Parallel and I/O – Parallel Access Disk Arrays-RAID – Parallel Formatted I/O in Shared Memory Multiprocessors – Collective I/O in Multiprocessors-MPI-IO – MPI-IO Examples.

Text book:
1.   Harry F.Jordan, Gita Alaghband , "Parallel Processing" ,Prentice Hall of India -   2008.   Chapters 1,2,3, 4,5,6,7,9,11

Reference Books
1.   Sasi kumar,Dinesh Shikhare,P.Ravi Prakash, "Introduction to Parallel processing" Prentice Hall of India , New Delhi-2006.
2.   Raja raman ,"Elements of Parallel Processing" Prentice Hall of India, New Delhi-2006.

Course: 08 PCBZ16
E-COMMERCE   **4 Credits**

Unit-I

E-Commerce in the Beginning: What is E-Commerce? – Advantages and Limitations of E-Commerce – The Role of Strategy in E-Commerce – Value Chains in E-Commerce – Integrating E-Commerce – Managerial Implications – The Internet and the World Wide Web: The Internet Today – In the Beginning – Unique Benefits of the internet – Searching Online - Bulletin Board Systems (BBSs) and Pay Services –Some Web Fundamentals – The Language of the Internet – Managerial Implications.

Unit-II

Launching a Business on the Internet: The Lifecycle Approach – The Business Planning and Strategizing Phase – Hardware, software, Security, and the Setup Phase – The Design Phase – The Marketing Phase – The Fulfillment Phase – The Maintenance and Enhancement Phase – Designing Web Sites: What does a Web Site Do – The Lifecycle of Site Building – How to Build a Web Site – Web Navigation Design – Design Criteria – Hiring a Web Designer – Website Evaluation and Usability Testing: Anatomy of a Site – What's the Big Fuss Over Cookies –Makes a Web Site Usable – Web Site Content and Traffic Management.

Unit-III

Payment Systems: From Barter to Money – Requirements for Internet-based Payments – Electronic Payment Media – Issues and Implications – E-Security: Security in Cyberspace – Designing for Security – how Much risk Can You Afford – The Virus: Computer Enemy Number One – Security Protection and Recovery – How to Secure Your System.

Unit-IV

Marketing on the Internet: The Pros and Cons of Online Shopping – Internet Marketing Techniques – The E-Cycle of Internet Marketing – Marketing Your Presence – Attracting Customers to Your Site – Tracking Customers – Customer Service – managing Implications – Web-Based Business-to-Business E-Commerce: B2B E-Commerce – B2B Models – B2B Tools-EDI – Beyond B2B: A2Z – Management Implications.

Unit-V

Intranets and Extranets: Intranets: The Basics – The Technical Infrastructure – Planning an Intranet – E-Mail and the Intranet – Extranets – Management Implications – Legal and Ethical Issues, Legal Issues - Ethical Issues- Management Implications.

Text Books
1. Elias M.Awad, "Electronic Commerce, PHI, 2006. (Chapters:1,2,3,5,6,8,9,11,12,13, 14,15)

Reference Books
1. Kamalesh K.Bajaj, Debjani Neg, "E-Commerce the Cutting Edge of Business", TMH, 2000.
2. S. Jaiswal, "Doing Business on the Internet E-Commerce", Galgotia, 2002.

Course: 08 PCBZ17
VIRTUAL REALITY   **4 Credits**

Unit-I
Virtual Reality and Virtual Environments: Introduction – Computer graphics – Real-time computer graphics – Flight simulation – Virtually environments. **The Historical Development of VR:** Introduction – Scientific landmarks.
3D Computer Graphics: Introduction – The virtual world space – Positioning the virtual observer – The perspective projection – Human vision – Stereo perspective projection – 3D clipping – Colour theory – Simple 3D modeling – Illumination models – Reflection models – Shading algorithms – Radiosity – Hiddeny-surface removal – Realism – Stereographic image.
(Chapters: 1, 2, 3)

Unit-II
Geometric Modelling: Introduction – From 2D to 3D – 3D space curves – 3D boundary representation. **Geometrical Transformations:** Introduction – Frames of reference – Modelling transformations – Instances – Picking – Flying – Scaling the VE – Collision detection.
(Chapters: 4, 5)

Unit-III
A Generic VR System:
Introduction – The virtual environment – The computer environment – VR technology – Modes of interaction – VR systems. **Animating the Virtual Environment:** Introduction – The dynamics of numbers – The animation of objects – Shape and object inbetweening – Free-from deformation – Particle systems.
(Chapters: 6, 7)

Unit-IV
Physical Simulation: Introduction – Objects falling in a gravitational field – Rotating wheels – Elastic collisions – Projectiles – Simple pendulums – Springs – Flight dynamics of an aircraft. **Human Factors:** Introduction – The eye – The ear – The somatic senses – Equilibrium.
(Chapters: 8, 9)

Unit-V

Virtual Reality Hardware: Introduction – Sensor hardware – Head-coupled displays – Acoustic hardware – Integrated VR systems. **Virtual Reality Software:** Introduction – Modelling virtual worlds – Physical simulation – VR toolkits. **Virtual Reality Applications:** Introduction – Engineering – Entertainment – Science – Training.
(Chapters: 10, 11, 12)

Text Book
1. John Vince, "Virtual Reality Systems", Pearson Education Ltd., ACM Press, 1995.

Reference Books:

1. Nathaniel I. Durlach and Anne S. Mavor, "Virtual Reality: Scientific and Technological Challenges", Committee on Virtual Reality Research and Development, National Research Council, National Academy Press, 1995.
2. Newquist HP, Gerald Marks, "Virtual Reality/Book and 3-D Glasses", Scholstic; Book and Access edition, 1995.
3. Joey W. Hill, "Virtual Reality", Ellora's Cave Taboo, 2005.

Course 08PCBZ18
SOFTWARE PROJECT MANAGEMENT   **4 Credits**

Unit-I

Introduction to Software Projects – An Overview of Project Planning – Project Management and Evaluation .

Unit-II

Selection of an appropriate Project approach – Software effort Estimation - Activity Planning :- Project Schedules – Sequencing and Scheduling Projects – Network
Planning Model – forward and backward pass-Identifying the Critical path-Activity float-
Shortening Project Duration – Identifying Critical Activities-precedence networks.

Unit-III

Risk Management – Resource Allocation – Monitoring and Control

Unit-IV

Managing People and Organizing Teams – Software Quality -Planning for Small Projects.

Unit-V

Case Study – PRINCE Project Management, BS 6079:1996

Text Book:

1.   Mike Cotterell, Bob Hughes , "**Software Project Management"**,
      Inclination/Thomas Computer Press, 4th Edition, 2004
      Chapters : 1-13

Reference Book:

1.   Darrel Ince, H.Sharp and M.Woodman**," Introduction to Software Project Management and Quality Assurance"**, Tata McGraw Hill, 1995.

Course: 08PCBZ19
NETWORK PROGRAMMING   **4 Credits**

Unit-I

Introduction :UNIX Architecture - Logging In – Files and Directories – Input and Output – Programs and Processes – Error handling – User Identification – Signals – Time values – System Calls and Library functions – Standards and Implementation : UNIX Standardization – Implementations – Limits –Process Environment: main() – Process termination – Command line arguments – Environment list and variables. Process Control: Identifiers –fork () , vfork(), exit(), wait().
Chapters: 1, 2.2, 2.3, 2.5, 7.2 to 7.5, 7.9, 8.2 to 8.8

Unit-II

exec functions – Changing User IDs and Group IDs – System function – Process accounting – User identification – Process times. Process relationships: Terminal logins – Network logins – Process groups – Sessions – Controlling terminals – tcgetpgrp (), tcsetpgrp () – Job control – Shell execution of programs – Orphaned process groups. Daemon Processes: Characteristics –Coding rules.
Chapters: 8.10, 8.11, 8.13 to 8.16, 9.2 to 9.10, 13.2, 13.3

Unit-III

Socket Introduction: Socket address structure – Byte ordering and manipulation functions – Address conversions functions. Elementary TCP sockets: Introduction – socket, connect, bind, listen, accept, close functions – Concurrent server – Server host crashes, rebooting and shut down. I/O multiplexing: I/O models – select () – shutdown () – poll ().
Chapters: 3.1 to 3.8, 4.1 to 4.6, 4.8, 5.14 to 5.16, 6.2, 6.3, 6.6, 6.10

Unit-IV

Socket options: getsocket () and setsocket () – Generic socket options – IP socket options (IPv4 and IPv6) – ICMP socket options – TCP socket options. Elementary UDP sockets: recvfrom and sendto functions – Lost datagrams – Verifying received response – Server not Running – connect () with UDP – Lack of flow control – Determining out going interface – TCP and UDP echo server using select () – DNS – gethostbyname() – gethostbyaddr () – getservbyname() and getservbyport ().
Chapters: 7.1 to 7.2, 7.2, 7.5 to 7.9, 8.2, 8.7 to 8.9, 8.111, 8.13 to 8.15, 11.2 to 11.5

Unit-V

IPv4 and IPv6 interoperability – Routing sockets – Key management sockets : Reading and Writing – SADB – SA – Maintaining SAs – Broadcasting : Address – Unicast Vs Broadcast – Multicasting : Multicast Vs Broadcast – Multicasting on LAN – Multicasting on WAN – Threads: Creation and Termination – Raw sockets : Creation – Input – Output – ping program – trace route program.
Chapters: 12, 18, 19.2 to 19.5, 20.2, 20.3, 21.2 to 21.4, 26.2, 28.2 to 28.6

Text Books:
1. W. Richard Stevens, Stephen A. Rago, "Advanced Programming in the UNIX Environment", Second Edition, Pearson Education, New Delhi, 2007.
   For Units I and II
2. W.R.Stevens, B.Fenner, A.M.Rudoof, "UNIX Network Programming" Volume I, Third Edition, PHI Private Ltd, New Delhi, 2005.
   For Units III to V

Reference Books:
1. Sumitabha Das, "Your UNIX the ultimate Guide", Tata McGraw Hill, 2002.
2. Ashok Arora, S. Bansal, "UNIX and C Programming" First edition, Firewall media, 2005.

Course: 08PCBZ 20
NETWORK SECURITY AND CRYPTOGRAPHY   4 Credits

Unit-I
Overview: Services, Mechanisms, and Attacks – The OSI Security Architecture – A Model for Network Security – Classical Encryption Techniques: Symmetric Cipher Model – Substitution Techniques – Transposition Techniques – Rotor Machines – Steganography.

Unit-II
Block Ciphers and the Data Encryption Standard Simplified DES – Block Cipher Principles – The Data Encryption Standard – The Strength of DES – Differential and Linear Cryptanalysis – Block Cipher Design Principles – Block Cipher Modes of Operation.

Unit-III
Advanced Encryption Standard: Evaluation criteria for AES – The AES Cipher – Contemporary Symmetric Ciphers: Triple DES – Blowfish – RC5 – Characteristics of Advanced Symmetric Block Ciphers – RC4 Stream Cipher.

Unit-IV
Confidentiality Using Symmetric Encryption: Placement of Encryption Function – Traffic Confidentiality – Key Distribution – Random Number Generation – Public – Key Cryptography and RSA: Principles of Public-key Cryptosystems – The RSA Algorithm.

Unit-V
Key Management – Diffie-Hellman Key Exchange – Authentication Requirements – Authentication Functions – Digital Signatures and Authentication Protocols: Digital Signatures – Authentication Protocols – Digital Signature Standard.

Text Book:
1.   William Stallings, "Cryptography and Network Security – Principles and   Practices",   Pearson Education / PHI, 3rd Edition, 2005. (Chapters: 1.1 – 1.3, 2.1 – 2.5, 3.1 – 3.8, 5.1,   5.2, 6.1 – 6.5, 7.1 – 7.4, 9.1, 9.2, 10.1, 10.2, 11.1, 11.2, 13.1 – 13.3)

Reference Books:

1. C. P. Pfleeger, S. L. Pfleeger, "Security in Computing", Pearson, 3rd Edition, 2003.
2. Bruce Schneier, Niel Ferguson, "Practical Cryptography", Wiley, 2003.

Elective Course VI

Course: 08 PCBZ21
MANAGEMENT INFORMATION SYSTEM   **4 Credits**

Unit-I

Foundations of Information systems in Business – Foundations concepts: - Information Systems Technologies – What You need to know – System Concepts: A Foundation – Components of an Information System – Information System Resources – Information System Activities – Business Applications - Development and Management – The Fundamental Roles of IS Applications in Business – eBusiness in Business – Types of Information Systems – Managerial Challenges of Information Technology.

Unit-II

Data Resource Management – Managing data Resources - Foundation Data Concepts– Types of Databases – Data Warehouses and Data mining – The Database Management Approach - Implementing Data Resource Management – Database Management – Database Structures - Accessing Database –Database Development.

Unit-III

Introduction to eBusiness Systems – Functional Business Systems - Marketing Systems –Manufacturing Systems – Human Resource Systems –Accounting Systems –Financial management Systems – Electronic Commerce Systems - Fundamentals – Introduction to e – Commerce – The Scope of eCommerce – Essential ecommerce Processes –Electronic Payment Processes – eCommerce Applications and Issues – Web Store Requirements.

Unit-IV

Decision Support in Business – Decision Structure – Security and Ethical Challenges –Computer Crime – Privacy Issues – Other Challenges –Health Issues – Security Management of Information Technology – Internet worked Security Defense– Other Security Measures.

Unit-V

Developing and Implementing Application Systems, Quality assurance and evaluation of Information Systems. Organization and management of the Information Resource function.

Text Books
1. Murdick, R.G.Ross J.E & Vlaggtt, J.R. "Information Systems for Modern Management", 3 rd Edition, Prentice Hall India, 1987.
(Chapter : 1,3,5,7,11,)
2. James A.O'Brien ," Management Information Systems", Sixth Edition,Tata McGraw Hill Edition,2004.
(Chapters: 18,19,20,21).

Reference Books
1. Aktas "Structured analysis and Design of Information System," Prentice Hall International (Paperback Edition).
2. Soargue and Watson, "Decision Support System", 2nd Edn., Prientice Hall International, 1989.
3. David, "Applied Decision Support", Prientice Hall International,1988.
4. Kanter, J, " Management Information System", 3rd Edn, Printice Hall India, 1984.

Course 08PCBZ22
MOBILE COMPUTING   **4 Credits**

Unit-I

Introduction – Applications – History of wireless communication – A Simplified reference model - Wireless transmission – Frequencies for radio transmission – Regulations – Signals –Antennas - Signal propagation: Path loss of radio signals - Additional signal propagation effects - Multi-path propagation – Multiplexing - Modulation

Chapters: 1, 2.1 to 2.6

Unit-II
Spread spectrum – Direct sequence spread spectrum – Frequency hopping spread spectrum – Cellular systems. Medium access control: Hidden and exposed terminals – Near and far terminals – SDMA, FDMA, TDMA, Fixed TDM, Classical Aloha, slotted Aloha, Carrier sense multiple access – Reservation TDMA – Multiple access with collision avoidance – Polling – CDMA – Spread Aloha multiple access.
Chapters: 3.1 to 3.3, 3.4.1 to 3.4.4, 3.4.7 to 3.4.9, 3.5.1

Unit-III
Comparison of S/T/F/CDMA.GSM: Mobile services – System architecture – Radio interface – Protocols – Localization and calling – Handover – Security – New Data services. UMTS and IMT-2000 - Satellite Systems: Applications – Basics – Routing – Localization – Handover.
Chapters: 3.6, 4.1.1 to 4.1.8, 4.4, 5.2 to 5.6

Unit-IV
Wireless LAN: Infra red vs. radio transmission – Infrastructure and ad-hoc network – IEEE 802.11 – System architecture – Protocol architecture – Physics layer – Medium access control layer – MAC management – Blue tooth. Mobile network layer: Mobile IP: Goals, assumptions and requirements – entities and terminology – packet delivery – Agent discovery – Registration – Tunneling and encapsulation Recent technologies
Chapters: 7.1 to 7.3.5, 7.5, 8.1.1 to 8.1.6

Unit-V
Mobile ad-hoc networks - World Wide Web – WAP: Architecture – wireless datagram Protocol, Wireless transport layer security, Wireless transaction protocol, Wireless session protocol, Wireless application environment,

Wireless markup language, WML script – Mobile computing applications using J2ME.
Chapters: 8.3, 10.2, 10.3.1 to 10.3.8

Text Book:

1.   Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education, 2009.

References Books:

1.   Rifaat A. Dayen "Mobile Data & Wireless LAN Technologies", Prentice Hall,   1997.
2.   Steve Mann and Scoot Schibli, "The Wireless Application Protocol", John Wiley & inc., 2000.
3.   Steve Mann, "Programming Applications with the Wireless Application   Protocol", John   iley & Sons, Inc., 2000.

Course 08PCBZ23
REAL TIME OPERATING SYSTEMS   **4 Credits**

Unit-**I: Introduction**

Real Time Systems- Embedded Systems- Pervasive Computing-Information access Devices- Smart Cards- Embedded Controllers-Hardware Fundamentals.

Unit-**II: RTOS**

Real Time Operating Systems- Memory Management- Processes, Threads, Interrupts, Events- User Interface.

Unit-III**: REAL TIME UML**

Requirement Analysis- Object Identification Strategies- Object Behavior-Real Time Design Patterns.

Unit-**IV: SOFTWARE DEVELOPMENT**

Concurrency- Exceptions- Tools- Debugging Techniques- Optimization-Case Studies.

Unit-**V: CONNECTIVITY**

Wireless Connectivity- Blue tooth- Other Short Range Protocols- wireless application Environment-Service Discovery- Middleware.

REFERENCES:
1. R. J. A. Buhr, D. L. Bailey, "An introduction to Real Time Systems", Prentice-Hall International, 1999.
2. B. P. Douglass, "Real time UML",2nd edition, Addison-Wesley, 2000.
3. D. E. Simon, "An Embedded Software Primer", Addison-Wesley, 1999.
4. J. Schiller, "Mobile Communications", Addison-Wesley, 2000.
5. V. Hansmann, L.Merk, M.S.Nicklous, T. Stober, "PreVASIVE Computing Handbook", Springer, 2001.

Course 08PCBZ24
WAP AND XML   **4 Credits**

Unit-I

Overview of WAP-WAP and the wireless world-WAP application architecture-WAP Internal Structure-Setting up WAP - Available software products-Development toolkit.

Unit-II

What a WAP Gateway-Functionality of a WAP Gateway-the Web model vs the WAP model –positioning of a WAP Gateway.

Unit-III

Basic WML-Text formatting-Navigating-Advanced display features-Interacting with user-WML script-variables & Literals, Operators, Control constructs, Functions-Using standard Libraries.

Unit-IV

Multiple device types using XML and XSLT- Using XML to define data-Transforming XML into other formats - XSLT.

Unit-V

Interacting with the Mobile Phone - fundamentals of the WTA Architecture-WTA Interfaces-WTA state model-WTA Applications Scenarios-Voice XML-Voice Markup Language.

Text Book:

1. Professional WAP, Charles Archart, Nirmal Chidambaram & co,Wrox press Ltd, Fourth Edition,2002   - Chapter: 1,2,3,4,5,6,9,10,17,18

Reference Books:

1. Dharma Prakash Agrawal, Qing An Zeng, "Introduction to Wireless and

   Mobile systems ,Cengage Learning, New Delhi -2008.

2. William Stallings, Wireless Communication and Networks, Pearson Education, 2003.

3. Singhal, WAP-Wireless Application Protocol, Pearson Education, 2003.

4. David Hunter & Co., Beginning XML ,Third Edition –Wrox Phublishers-2006

Elective Course -VII

Course 08PCBZ25
SOFT COMPUTING   **4 Credits**

Unit-I: Fundamentals of Neural Networks
Basic Concepts of Neural Network-Model of an Artificial Neuron-Neural Network Architectures-characteristics of Neural Networks-Learning Methods-Taxonomy-History of Neural Network-Early Neural Network Architectures.

Unit-II: Backpropagation Networks
Architecture of Backpropagation Network-Backpropagation Learing-Illustratrations-applications-Effect of Tuning Parameters of the Backpropagation Neural Network-Selection of various parameters in Backpropagation Neural Network-Variations of Standard Backpropagation algorithms.

Unit-III: Adaptive Resonance Theory (ART)
Introduction- ART1- ART2-Applications

Unit-IV: Fuzzy Sets and Systems
Fuzzy Sets-Fuzzy Relations-Fuzzy Logic-Fuzzy Rule based system-Defuzzification Methods-Applications.

Unit-V: Fuzzy Backpropagation Networks
LR-Type Fuzzy Numbers-Fuzzy Neuron-Fuzzy Backpropagation Architecture- Learning in Fuzzy Backpropagation-inference in Fuzzy Backpropagation-Applications.

TEXT BOOK:
1. Rajasekaran. S and Vijayalakshmi Pai, Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI, 2008 (Chapters: 2.1, 2.3-2.9, 3.1-3.7, 5.1-5.4, 6.3, 6.5, 7.3-7.6, 12.1-12.6)

REFERENCE BOOKS:
1. Fakhreddine O. Karray, Clarence De Silva, Soft Computing and Intelligent Systems Design, Pearson, 2009.
2. Sivanandam. S. N and Deepa S. N, Principles of Soft Computing, Wiley India, 2008

Course 08PCBZ26
DIGITAL IMAGE PROCESSING   **4 Credits**

Unit-I
DIGITAL IMAGE FUNDAMENTALS
Image formation, Image transforms – Fourier transforms, Walsh, Hadamard, Discrete cosine, and Hotelling transforms.

Unit-II
IMAGE ENHANCEMENT & RESTORATION
Histogram modification techniques - Image smoothening - Image Sharpening - Image Restoration - Degradation Model – Noise models - Spatial filtering – Frequency domain filtering.

Unit-III
IMAGE COMPRESSION & SEGMENTATION
Compression Models - Elements of information theory - Error free Compression -Image segmentation –Detection of discontinuities - Edge linking and boundary detection - Thresholding – Region based segmentation - Morphology.

Unit-IV
REPRESENTATION AND DESCRIPTION
Representation schemes- Boundary descriptors- Regional descriptors - Relational Descriptors

Unit-V
OBJECT RECOGNITION AND INTENTERPRISE RESOURCE PLANNINGRETATION
Patterns and pattern classes - Decision-Theoretic methods - Structural methods.

TEXT BOOK:

1. Gonzalez.R.C & Woods. R.E., Digital Image Processing, 2nd Edition, Pearson Education, 2002. (Chapters: 1, 2, 3, 4, 5, 8, 9, 10, 11 and 12).
2. Anil Jain.K, Fundamentals of Digital image Processing, Prentice Hall of India, 1989.
   (Chapters: 5, 7, 8 and 11).

REFERENCE BOOKS:

1. Sid Ahmed, Image Processing, McGraw Hill, New York, 1995.
2. Milan Sonka, Vaclav Hlavac and Roger Boyle, "Image processing Analysis and Machine vision", Second Edition, Thomson Brooks/Cole, 1999.
3. Chanda & Majumdar, Digital Image Processing and Analysis, Prentice Hall, 3rd Edition.

Course 08PCBZ27
MULTIMEDIA DATABASE MANAGEMENT SYSTEM   4 Credits

Unit-I
Introduction-What is Multimedia-Early Hypertext and Collaborative Research-Multimedia and Personalized computing-Emerging applications-Multimedia Systems: The challenges-Distributed Multimedia Systems-Role of standards-Framework for Multimedia systems

Unit-II
Types of Multimedia Information- Multimedia Database Applications-Multimedia Objects- Multimedia Database Management Systems-Multimedia Storage and Retrieval

Unit-III
Metadata for Multimedia: Metadata Classification- Metadata for Text, Speech, Images, Video –Multimedia data access – Access to Text, Speech, Images, Video data.

Unit-IV
Object Oriented Modeling –Temporal models-spatial Models- Multimedia Authoring- Querying Multimedia Databases- Multimedia communication: Retrieval Schedule Generation- Multimedia Server-client Interaction-Network support for multimedia communication

Unit-V
Multimedia Database Management Systems-Multimedia specific properties of an MMDBMS- Data Modeling in MMDBMS-MMDBMS -architecture: Distributed MMDBMS Architecture-Implementation consideration- MMDBMS implementation.

Text Books:

1.   B. Prabhakaran , **Multimedia Database Management Systems** , Springer
          International Edition, 2007, Chapters :1-8

2.   Ralf Steinmetz and Klara Nahrsredt, **Multimedia Applications**, Springer
          International Edition,2007. Chapter: 2
Reference Books:

1. Nigel Chapman and Jenny Chapman, "**Digital Multimedia** ", Wiley India Edition,2006.
2. Prabhat K. Andleigh and Kiran Thakrar, **"Multimedia Systems Design "**, Prentice Hall of India,2005.

3. Multimedia Systems, John F.Koegel Buford, Pearson Education,2003

Course-08PCBZ28   **J2EE   and J2ME**   **4 Credits**

UNIT I:
Understanding Java and the J2EE Platform : Introduction – Application Components of J2EE – Model-View-Controller – J2EE APIs. Java Mail: Protocols – Components – Java Mail API . Java Messaging Service: Introduction – Models – Components – Reliable Messaging - Message-Driven EJB. Java Transactions: Introduction – Local and Distributed Transactions – Consistency – Isolation – Durability – Transaction Models – Transaction Standards - Java Transaction API.

UNIT II:
EJB Architecture and Design: Introduction – Component Model – The Enterprise JavaBean – EJB Container Functionality – Integrating with CORBA . Session Beans and Business Logic – Stateless and Stateful Beans – Entity Beans – Message-Driven Beans.

UNIT III:
J2ME overview – Java 2 Micro Edition and the world of Java – Inside J2ME - J2ME and wireless devices – other Java platforms for small computing devices – Wireless technology – Radio Data Networks – Mobile Radio Networks – messaging –smart cards - J2ME Architecture and development environment - J2ME architecture – small computing device requirements – Run-time environment – MIDlet programming – Java language for J2ME - J2ME software development kits – Hello world J2ME style – Multiple MIDlets in a MIDlet suite - J2ME wireless toolkit - J2ME best practices and patterns – the reality of working in a J2ME world – best practice

UNIT IV:
Commands, items and event processing - J2ME user interfaces – display class – the palm OS emulator – command class – item class – exception handling - High level display: Screens – screen class – alert class – form class – item class – list class – text box class – ticker class – Low-level display: Canvas – The Canvas – User Interactions - Graphics – Clipping regions – animation - Record Management system – Record storage – writing and reading records – record enumeration – sorting records – searching records – record listener.

UNIT V:
Java Database Connectivity: Introduction – JDBC program – Savepoints – JDBC-ODBC Bridge DBProcessor. Web services – basics – J2EE mutli-

ties web services architecture – client tier implementation – web tier implementation – Enterprise JavaBeans tier implementation – Enterprise Information systems tier implementation – inside WSDL - J2ME MIDlets and web services – Remote method invocation concept – SOAP basics – WSDL and SOAP – WSDL and HTTP Binding.

Text Books:
1. James McGovern et al., Fahim Adatia, Yakov Fain, "J2EE1.4 Bible",Wiley – dreamtech India Pvt. Ltd., 2003. (Chapters 1,8, 9 , 10 14, 15, 16, 17 ,18)
2. James Keogh, "J2ME: The Complete Reference", TMH, New Delhi, 2008.
   (Chapters: 1,2,3,4,5,6,7,8,9,11,14)

Reference Books:

1. Jim Keogh, "The Complete Reference – J2EE", Tata McGraw-Hill Edition 2002.
2. Herbert Schildt, "The Complete Reference – JAVA 2", Fourth Edition, 2001.
3. Deitel H.M. & Deitel P.J, "Java How to Program", Prentice-Hall of India, Fifth Edition, 2003.
4. Stephen Asbury, Scott R.Weiner "Enterprise JavaBeans – Developing component based Distributed Applications", Pearson Education, 1999.chapters(17,21,10)
5. Sing Li, Jonathan Knudsen, "Beginning J2ME: From novice to professions", Third edition, kindle edition, 2009
6. Jonathan Knudsen, "Wireless Java: Developing with J2ME" Second edition, Kindle edition, 2003.