

M. Sc-Computer Science Syllabus under CBCS Pattern effect from 2012-2013 Onwards
Periyar University, Salem



M. Sc DEGREE
COMPUTER SCIENCE
REGULATIONS AND SYLLABUS
(Effective from the Academic year 2012-2013 and thereafter)

Regulations

Effective from the Academic year 2012 - 2013

1. OBJECTIVE OF THE COURSE

To Develop the Post Graduates in **Computer Science** with strong knowledge of theoretical computer science subjects who can be employed in research and development units of industries and academic institutions.

2. CONDITION FOR ADMISSION

A candidate who has passed B.Sc Computer Science/B.C.A/B.Sc Computer Technology/B.Sc Information Science/Technolgy degree of this University or any of the degree of any other University accepted by the syndicate as equivalent thereto subject to such conditions as may be prescribed therefore shall be permitted to appear and qualify for the **M. Sc Computer Science** degree examination of this University after a course of study of two academic years.

3. DURATION OF THE COURSE

The programme for the degree of **Master of Science in COMPUTER SCIENCE** shall consist of **two Academic years** divided into four semesters. Each semester consist of 90 working days.

**4. STRUCTURE OF M. Sc (Computer Science) PROGRAMME UNDER
CBCS PATTERN FOR AFFILIATED COLLEGES
(FROM 2012 AND THEREAFTER)**

CURRICULUM AND SCHEME OF EXAMINATIONS

Course	Number of Credits	Hours Per Week	Examination Duration (hrs)	Marks		
				I. A	ESE	Total
Semester-I						
Course-12UPCSC2C01 Discrete Structures	4	4	3	25	75	100
Course-12UPCSC2C02 Web Technology	4	4	3	25	75	100
Course-12UPCSC2C03 Design and Analysis of Algorithms	4	4	3	25	75	100
Course-12UPCSC2C04 Distributed Database Management system	4	4	3	25	75	100
Course- 12UPCSC2C05 Compiler Design	4	4	3	25	75	100
Course-12UPCSC2C06 Web Technology-Lab	2	4	3	40	60	100
Course-12UPCSC2C07 Algorithms-Lab	2	4	3	40	60	100
Semester-II						
Course-12UPCSC2C08 Dot Net Programming	4	4	3	25	75	100
Course-12UPCSC2C09 Real Time Operating Systems	4	4	3	25	75	100
Course-12UPCSC2C10 Advanced Java Programming	4	4	3	25	75	100
Elective-I	4	4	3	25	75	100
EDC-I	4	4	3	25	75	100
Course-12UPCSC2C11 Dot Net–Lab	2	4	3	40	60	100
Course-12UPCSC2C12 Java –Lab	2	4	3	40	60	100
Semester-III						
Course-12UPCSC2C13 Computer Graphics	4	4	3	25	75	100
Elective-II	4	4	3	25	75	100
Course-12UPCSC2C14	4	4	3	25	75	100

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Soft Computing						
Course-12UPCSC2C15 C# Programming	4	4	3	25	75	100
EDC-II	4	4	3	25	75	100
Human Rights		2	3	-	100	100
Course-12UPCSC2C16 C# –Lab	2	4	3	40	60	100
Course-12UPCSC2C17 Mini Project	2	4	3	40	60	100

Semester-IV						
Course-12UPCSC2C18 Mobile Computing	4	4	3	25	75	100
Course-12UPCSC2C19 Advanced Computing	4	4	3	25	75	100
Elective-III	4	4	3	25	75	100
Course-12UPCSC2C20 Dissertation and Viva-Voce	6	-	-	50	150	200
Total no. of Credits } Core } Elective } Non Major Elective	70 12 8					
Grand Total	90					
Total Marks						2300

EDC-EXTRA DISIPLINARY COURSE

Students are expected to opt EDC (Non major elective) offered by other departments.

I. A – INTERNAL ASSESSMENT

E. E – EXTERNAL EXAMINATIONS

The content of the syllabus and regulations may be followed for first and second semesters as per the regulations passed in the academic year 2006-2007.

Elective Course Code :

List of Electives

Elective Course -I

Course 12UPCSC2E01	- Operations Research
Course 12UPCSC2E02	- Statistical Methods
Course 12UPCSC2E03	- Numerical Methods
Course 12UPCSC2E04	- Theory of Computation

Elective Course -II

Course 12UPCSC2E05	- Artificial Intelligence
Course 12UPCSC2E06	- Embedded System
Course 12UPCSC2E07	- Network Security
Course 12UPCSC2E08	- Image Processing

Elective Course -III

Course 12UPCSC2E09	- Software Engineering
Course 12UPCSC2E10	- Object Oriented Analysis and Design
Course 12UPCSC2E11	- Windows Programming
Course 12UPCSC2E12	- Data Mining

EXAMINATIONS

THEORY

EVALUATION OF INTERNAL ASSESSMENT

Test	:	10 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: 15x 1 = 15

Answer all the questions
Objective type three questions from each unit

PART- B: 5x4 = 20

Answer all the questions
Either or type for each unit

PART- C: 5x 8 = 40

Answer all the questions
Either or type for each unit

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

PARACTICAL / SOFTWARE DEVELOPMENT

EVALUATION OF INTERNAL ASSESSMENT

Test 1	:	15 Marks
Test 2	:	15 Marks
Record	:	10 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

QUESTION PAPER PATTERN

1. One compulsory question from the given list of objectives : 30 Marks
2. One Either/OR type question from the given list of objectives : 30 Marks

Distribution of Marks

Problem Understanding	:	05 Marks
Program writing	:	10 Marks
Debugging	:	10 Marks
For Correct Results	:	05 Marks

Mini-Project Viva-voce (joint) : 60 Marks

DISSERTATION

Evaluation (External)	:	50 Marks
Viva-voce (joint)	:	100 Marks

5. REGULATIONS OF PROJECT WORK

- a. Students should do their five months [**Dec To Apr**] Project work in Company / Institutions.
- b. The Candidate should submit the filled in format as given in **Annexure-I** to the department for approval during the Ist Week of January in their Project semester.
- c. Each internal guide shall have maximum of eight Students.
- d. Periodically the project should be reviewed minimum three times by the advisory committee.
- e. The Students should prepare three copies of the dissertation and submit the same to the college on **30th April** for the evaluation by examiners. After evaluation one copy is to be retained in the College Library and one copy is to be submitted to the University (Registrar) and the student can hold one copy.
- f. A Sample format of the dissertation is enclosed in **Annexure-II**.
- g. Format of the **Title page** and **certificate** are enclosed in **Annexure III**.
- h. The Students should use OHP / Power Point Presentation during their Project Viva voce Examinations.

6. PASSING MINIMUM

The candidate shall be declared to have passed the examination if the candidate secures not less than 50% marks in the University examination in each paper / practical. However submission of a record notebook is a must.

For the project work and viva-voce a candidate should secure 50% of the marks for pass. The candidate should compulsorily attend viva-voce examination to secure pass in that paper.

7. CLASSIFICATION OF SUCCESSFUL CANDIDATES

Candidates who secure not less than 60% of the aggregate marks in the whole 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 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 course at the first appearance.

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

8. COMMENCEMENT OF THIS REGULATION

These regulations shall take effect from the academic year 2006-07, i.e., for students who are to be admitted to the first year of the course during the academic year 2006-07 and thereafter.

09. TRANSITORY PROVISION

Candidates who were admitted to the PG course of study before 2006-2007 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, there will be permitted to appear for the examination only under the regulations then in force

ANNEXURE - I
PERIYAR UNIVERSITY

College Name :
Course :
Student Name :
Register Number :
Title of the Project :
Address of Organization / Institution :
Name of the External Guide :
Designation :
Place :
Date : Signature of External
Guide (with seal)
Name of the Internal Guide :
Qualification :
Teaching Experience :
Place :
Date : Signature of Internal Guide

Principal

[Approved or not Approved]

[University Use]

ANNEXURE II

COLLEGE BONAFIDE CERTIFICATE

COMPANY ATTENDANCE CERTIFICATE

ACKNOWLEDGEMENT

CONTENTS

SYNOPSIS

Page No.

1. INTRODUCTION
ORGANIZATION PROFILE
SYSTEM CONFIGURATION
HARDWARE CONFIGURATION
SOFTWARE CONFIGURATION
 2. SYSTEM STUDY
EXISTING SYSTEM
DRAWBACKS
PROPOSED SYSTEM
SYSTEM STUDY
FEATURES
 3. SYSTEM DESIGN AND DEVELOPMENT
FILE DESIGN
INPUT DESIGN
OUTPUT DESIGN
CODE DESIGN
DATABASE DESIGN
SYSTEM DEVELOPMENT
 4. TESTING AND IMPLEMENTATION
CONCLUSION
BIBLIOGRAPHY
- APPENDICES
- A. DATA FLOW DIAGRAM
 - 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 Science in Computer Science

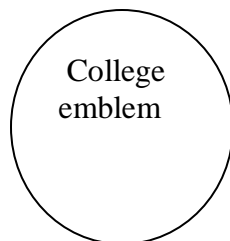
to the

Periyar University, Salem - 11

By

STUDENT NAME

REG. NO.



COLLEGE NAME

(AFFILIATED TO PERIYAR UNIVERSITY)

PLACE with Pin Code

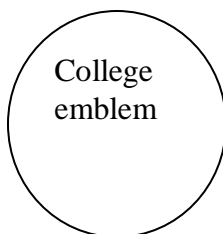
MONTH – YEAR

B. Format of the Certificate

COLLEGE NAME

(AFFILIATED TO PERIYAR UNIVERSITY)

PLACE with PIN CODE



MONTH – YEAR

PROJECT WORK

TITLE OF THE DISSERTATION

Bonafide Work Done by

STUDENT NAME

REG. NO.

A Dissertation submitted in partial

Fulfillment of the requirements for the degree of

Master of Science in Computer Science

to the Periyar University, Salem - 11.

INTERNAL GUIDE

HEAD OF THE DEPARTMENT

Submitted for the Viva-Voce Examination held on _____

Internal Examiner

External Examiner

Course-12UPCSC2C01 DISCRETE STRUCTURES

Credits: 4

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 set – Functions – Definition and Introduction – Composition of functions – Inverse functions – Binary and n-ary 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.Hopcroft 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-12UPCSC2C02WEB TECHNOLOGY

Credits: 4

Unit – I: HTML & CSS

HTML Introduction – Basic HTML – The Document Body – Text –Hyperlinks – Adding MoreFormatting – Lists – Tables – Using Color and Images – Images – Multimedia Objects – Frames –Forms – The HTML Document Head in Detail – XHTML – CSS Introduction – Using Styles – Definingyour Own Styles – Properties and Values in Styles – Formatting Blocks – Layers.

Unit – II: XML & Ajax

Basic XML – Document Type Definition – XML Schema – Document Object Model – Presenting XML –Using XML Parser - Essential Ajax - Ajax and the DOM, XML, CSS and Dynamic HTML.

Unit – III: JAVA Script

What is Dynamic HTML – Java Script Basics – Variables – String Manipulation –MathematicalFunctions – Statements – Operators – Arrays – Functions – Data and Objects – Regular Expressions –Exception Handling – Built-in Objects – Events – Dynamic HTML with Java Script

Unit – IV: PHP & MySQL

Why PHP and MySQL - Server-Side Web Scripting - Getting Started with PHP - Adding PHP to HTML -Syntax and Variables - Control and Functions - Passing Information between Pages – Strings – Arrays and Array Functions – Numbers - MySQL Database Administration - PHP/MySQL Functions -Displaying Queries in Tables - Building Forms from Queries.

Unit –V: Perl

The Basic Perl Program – Scalars – Arrays – Hashes Control Structures – Processing Text – Regular Expressions – Using Files – Subroutines – Bits and Pieces – Handling XML with Perl – Handling the DOM with Perl.

Text Books

1. Web Programming (Building Internet Applications), Chris Bates 2nd edition, Wiley India private Ltd; New Delhi- 2002. Chapters Covers: 1-8, 14
2. Ajax Bible, Steven Hoizner, Wiley India private Ltd; New Delhi - 2007.Chapters Covers: 1, 8-11.
3. PHP5 and MySQL Bible, Tim Converse and Joyce Park with Clark Morgan, Wiley Publishing,Inc. 2004. Chapters Covers: 1-10, 14-17

Reference Books

1. Steven M. Schafer, "HTML, CSS, JavaScript, Perl, Python and PHP - Web standards Programmer's Reference", Wiley Publishing, Inc. 2005.
2. Mitch Conrad, Kay Ether, Michal D. Thomas, "XML problem Design – solution", Wiley India private Ltd; New Delhi- 2006.
3. Steve Suehring, "JavaScript step by step" Prentice-Hall of India Private Limited, 2008.

Course-12UPCSC2C03 DESIGN AND ANALYSIS OF ALGORITHMS

Credits: 4

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. AnanyLevitin “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-12UPCSC2C04 DISTRIBUTED DATABASE MANAGEMENT SYSTEM

Credits: 4

UNIT-I

Introduction: Distributed Data processing- Distributed database system (DDBMSS) - Promises of DDBMSs- Complicating factors and Problem areas in DDBMSs- Overview of Relational DBMS Relational Database concepts- Normalization- Integrityrules- Relational Data Languages- Relational DBMS

UNIT-II

Distributed DBMS Architecture: DBMS Standardization- Architectural models forDistributed DBMS- Distributed DBMS ArchitectureDistributed Database Design: Alternative design Strategies- Distribution design issues- Fragmentation- Allocation - Semantic Data Control: View Management- Data security- Semantic Integrity Control

UNIT-III

Overview of Query Processing: Query processing problem- Objectives of QueryProcessing- Complexity of Relational Algebra operations- characterization of Queryprocessors- Layers of Query Processing-Introduction To Transaction Management: Definition of Transaction- Properties oftransaction- types of transaction

UNIT-IV

Distributed Concurrency Control: Serializability theory- Taxonomy of concurrencycontrol mechanisms- locking bases concurrency control algorithms- Parallel Database Systems: Database servers- Parallel architecture- Parallel DBMStechniques- Parallel execution problems- Parallel execution for hierarchical architecture.

UNIT-V

Distributed Object Database Management systems: Fundamental Object concepts andObject models- Object distribution design. Architectural issues- Object management- Distributed object storage- Object query processing-Transaction management.

Text Books:

1. M.TamerOzsu, Patrick Valduriez, “Principles of Distributed Database Systems”,Springer,ThirdEdition-2011, Chapters: 1-3,6,10,11,14,15

Reference Books:

1. StefanoCeri ,GiuseppePelagatti, “Distributed Databases principles and systems”,
TMH- 2008

Course-12UPCSC2C05

COMPILER DESIGN

Credits: 4

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. AlfredV.Aho and Jeffrey D.Ullman, “Principles of Compiler Design”, NarosaPublishing 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. Alfred 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-12UPCSC2C06

WEB TECHNOLOGY LAB

Credits: 2

1. Design Online Book Store using List and Frames
2. Design a Time Table using Table and Images
3. Embedding Video and Audio Files in HTML
4. Design Event Web Page using Style Sheet (Font/Text, Color and Border Properties)
5. Write an XML document to display your bio-data. Write an XSL style sheet and attach that to the XML document. Validate the document using DTD or XSD.
6. Write a Ajax Program to get the User name suggestions in Registration Form
7. Web page using XML with Java Script
8. Design Image Mapping using Java Script
9. Registration Form Validation using Java Script
10. Simple Game using Event handling in Java Script
11. History of web pages using DOM
12. String Functions in PHP
13. Accessing the Student Exam Result Database(MySQL) using PHP
14. Online Shopping cart with Table operations(Insert, Select, Delete, Update) using PHP
15. Pattern matching with regular expressions using Perl.
16. Database connectivity using Perl.

Course-12UPCSC2C07

ALGORITHMS LAB

Credits: 2

1. Apply the divide and Conquer technique to arrange a set of numbers using merge sort method.
2. Perform Strassen's matrix multiplication using divide and conquer method.
3. Solve the knapsack problem using greedy method.
4. Construct a minimum spanning tree using greedy method.
5. Construct optimal binary search trees using dynamic programming method of problem solving.
6. Find the solution for traveling salesperson problem using dynamic programming approach.
7. Perform graph traversals.
8. Implement the 8-Queens Problem using backtracking.
9. Implement knapsack problem using backtracking.
10. Find the solution of traveling salesperson problem using branch and bound technique.

Course-12UPCSC2C08

DOT NET PROGRAMMING Credits: 4

Unit – I

Introduction to .NET - .NET Defined – The .NET Framework - Visual Basic .NET. VB6 and VB .NET Differences – Data Type Changes- Arrays- Operators- User Defined Types- Null Values, Variables- Procedures- Properties- Control Flow- Form-based Application Changes- Application Types- Data Access- Object Oriented Programming and VB .NET – Encapsulation- Inheritance, Polymorphism - Data Types, Variables, and Operators – Arrays –Conditional Logic.

Unit –II

Procedures - Dialog Boxes – Introduction to Dialog Boxes- File IO and System Objects – Directory object - Error Handling –Namespaces –Classes and Objects –Multithreading.

Unit –III

Data Access – Introduction to Data Access in .NET - ADO.NET - Data Access in Visual Studio .NET – Visual Studio .NET Database Tools, Visual Studio .NET and ADO.NET - Visual Studio .NET and XML - Manipulating XML in Code - Windows Forms – Introduction to System.Windows.Form - Controls – Specific Controls – Base Controls, Derived Controls, Display Controls, Dialog Controls, Miscellaneous Controls.

Unit –IV

“Visual” Inheritance – Irregular Forms – Other Namespaces and Objects in the Catalog – Introduction to Web Development - Introduction to ASP.NET - Page Framework – HTML Server Controls.

Unit –V

Web Controls – Validation Controls –User Controls –Events – Cascading Style Sheets – State Management – ASP.NET Applications – Creating Web Application, Deleting an Application, global.asax, Understanding web.config.

Text Book:

1. Bill Evjen, Jason Beres, et al, “Visual Basic .NET Programming”, Wiley India Publication,2002 – Chapters 1-15,21-41.

Reference Books:

1. David Chappell, Understanding .NET , Pearson education, 2002
2. David.S.Platt, Introducing Microsoft .Net , PHI, 2003.
3. G.AndrwDuthie , Microsoft ASP .NET Programming with Microsoft Visual C# .NET step by step , PHI ,2003.
4. George Shepherd, Microsoft ASP .NET 3.5 , PHI, New Delhi, 2008.
5. Steven Holzner, Visual Basic .NET Programming Black Book , Dreamtech Press.
6. EvangelosPetroutsos, Mastering Visual Basic .NET ,BPB Publications.
7. Barbara Doyle, Programming in C#, Cengage Learning publications –I Edition – 2008

8. Kathleen Kalata , Web Applications using ASP .NET 2.0 - Cengage Learning publications.

Course-12UPCSC2C09 REAL TIME OPERATING SYSTEM Credits: 4

Unit-I

Introduction - Mutual Exclusion, Thread Synchronization & Scheduling: Mutex implementation in SROS - Interrupts handling in RTOS - Interrupt Handler in SROS - Creation of thread in RTOS & SROS - RTOS & SROS Initialization and starting - Semaphore – Mailbox

Unit-II

Timer Support: Need for Timer Support - Timer Support Implementation in RTOS & SROS - Priority Inversions: Bounded & Unbounded Priority Inversion

Unit-III

Deadlocks: Simple Examples - Resource Allocation Graph - Necessary Conditions for Deadlocks - Dealing with Deadlocks

Unit-IV

Schedulability of a real-time Application: Basic Rate Monotonic Analysis - Extended Rate Monotonic Analysis.

Unit-V

Other Components of RTOS: I/O Sub System - Network Stack - File System.

Text Book:

1. ChowdaryVenkateswaraPenumuchu, "Simple Real-time Operating System: A Kernel Inside View for a Beginner" - - Trafford Publishing, 2007.
Chapters (1, 2, 3, 4, 5, 6 and 7)

Reference Books:

1. Khawar M. Zuberi, "Real-time operating system services for networked embedded systems", University of Michigan, 1998.
2. Hephaestus Books, "Articles on Real-Time Operating Systems, Including: Plan 9 from Bell Labs, Real-Time Operating System, Transaction Processing Facility, OS-9, Dnix, Rxs-11, Qnx, Rt-11, Symbian OS, Psos, Vxworks, Rdos, Versatile Real-Time Executive", Hephaestus Books, 2011.
3. Books, LLC, General Books LLC, "Real-Time Operating Systems: Real-Time Operating System, Os-9, Qnx, Rxs-11, Plan 9 from Bell Labs, Psos, Rt-11, Symbian O", General Books LLC, 2010.
4. Colin Walls, "Building a Real Time Operating System: Rtos from the Ground Up", illustrated Edition, Elsevier Science, 2009.

Course-12UPCSC2C10ADVANCED JAVA PROGRAMMING Credits: 4

Unit-I

Introduction to Advanced Java: Overview of the Java Platform- History of Java Platform- Object Oriented Programming in Java- Standard SDK tools- *javadoc* Comments- Building Programs with Application Developer- Recent Additions to Java 2 Platform

Unit-II

I/O, Serialization and Multithreading: Programming I/O – Byte Oriented Stream classes – File I/O Basics- Character Streams- The New I/O (NIO) Programming Interface – Object Serialization- Threads and Multiple Threading – Life Cycle of Thread – Creating and Running Threads – Synchronizing Threads – Communicating Between Threads – Grouping Threads

Unit-III

Network Programming and Security: Introduction – Working with URLs – Working with Sockets – Remote Method Invocation – Introduction to Security – Cryptography – Secure Socket Layer – Security Policy Definition and Enforcement – Java Authentication and Authorization Service

Unit-IV

Building Web Applications: Introduction - The Technology of Web – Servlets – The Servlet API – Building a Web Application with Continuity – Java Server Pages (JSP) – JSP Tags and API – Java Coding in JSPs – Frameworks for Building Web Applications – Building Robust Web Applications

Unit-V

Enterprise JavaBeans: Introduction – Enterprise Programming – What are EJBs – EJB Clients – Entity EJBs – Message Driven Beans – EJB Transactional Characteristics – EJB Security

Text Book:

1. Joe Wigglesworth & Paula McMillan, “Java Programming: Advanced Topics”, Third Edition, Thomson Learning Inc., 2007. (Chapters: 1, 3, 5, 11, 12,13 and 14)

Reference Books:

1. Ian Evans, “Your First Cup: An Introduction to Java EE Platform”, Vervante, 2009.
2. Jim Keogh,” The Complete Reference J2EE”, Tata McGrawHill Publishing Company Ltd,2002.
3. Carl Albing, Michael Schwarz, “Java Application Development on Linux”, Prentice Hall PTR, Pearson Education, 2005.
4. Calvin Austin and Monica Pawlan, “Advanced Programming for the Java 2 Platform”, 2000.

Course-12UPCSC2C11

DOT NET LAB

Credits: 2

A. Implement the following using VB.NET

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

B. Implement the following using ASP.NET

1. Create a master page to serve as a template for the Web site's pages.
2. Create a admin page with an editable master-detail view for browsing, inserting, updating, and deleting records.
3. Create a simple web site
4. Create and open a connection to a database using ADO.NET
5. Create, read, update, and delete records in a database using ADO.NET
6. Use SqlDataSource to populate a DropDownList and GridView
7. Use ObjectDataSource to Populate a GridView
8. Create a feedback form.

Course-12UPCSC2C12

JAVA LAB

Credits: 2

1. Implement a minimum processing of banking application
2. To develop a simple real life application program to illustrate use of multithread
3. Write a Client /server echo program for UDP socket
4. Write a Client /server echo program for TCP socket
5. Write a simple temperature conversion web application program using JSP
6. Write a simple JSP program for college admission
7. Write a calculator program using Stateless Session Bean
8. Write a program to implement Message Driven Bean
9. Write a program to implement Session Bean for Shopping Cart for Online Book Store
10. Write a program to access databases using EJB

Course-12UPCSC2C13Computer Graphics

Credits:4

Unit-I

Overview: Video display devices – Raster and Random scan system – Input devices
Output primitives: Points and Lines – Line drawing algorithms – Loading the frame buffer – Line function.

Unit-II

Circle generating and Ellipse generating algorithm Pixel addressing and object geometry – Filled area primitives – Fill area function – Cell array – Character generation. Attributes of output primitives: Line attributes – Color and Grayscale levels – Area fill and Character attributes – Antialiasing. 2D Geometric transformations: Basic transformations – Composite – Reflection and Shear – Transformations between Coordinate systems.

Unit-III

Affine transformations – Functions – Raster methods 2D Viewing: Viewing Pipeline – Coordinate reference frame – Window to Viewport – Viewing functions – Clipping operations – Line, Polygon, Text and Exterior clipping – GUI and Interactive input methods: User dialogue – Input of Graphical data – Input functions – Initial value – Picture construction – Virtual reality environments..

Unit-IV

3D Concepts: Display methods Object Representations – Polygon surface – Curved lines and surface – Quadratic – Spline representation. 3D Geometric and Modeling transformations: Translation – Rotation – Scaling – Reflections – Shears – Composite transformations – functions. 3D Viewing: Pipeline – Coordinates – Projections – Clipping – Functions..

Unit-V

Visible surface detection methods: Classification – Back face – Depth buffer – A buffer – Depth sorting – BSP – Area subdivision – Octree – Ray casting Color models and Applications: Properties of light – Standard primaries and Chromaticity diagram – RGB, YIQ, CMY, and HSV color models. Computer animations: Design – functions – Raster animations – Key frame systems – Motion specifications.

Text Book:

1. Donald Hearn M. Pauline Baker, “Computer Graphics”, Second Edition, PHI Private Limited, 2004.
(Chapters: 2.1- 2.3, 2.5, 3.1 - 3.6, 3.10 - 3.14, 4.1, 4.3 - 4.5, 4.8, 5.1, 5.3 - 5.8, 6.1 - 6.8, 6.10 – 6.11, 8.1 – 8.6, 9.1, 10.1 – 10.3, 10.6, 11.1 – 11.6, 12.1 – 12.3, 12.5, 12.7, 13.1 – 13.10, 15.1 – 15.2, 15.4 – 15.7, 16.1 – 16.3, 16.5 – 16.6)

Reference Books:

1. F.S Hill, JR, "Computer Graphics using Open GL", Second Edition, PHI, 2005
2. R.G.S Asthana, N. K. Sinha, "Computer Graphics for Scientists and Engineers"
Second Edition, New Age international Publishers, 2003

Course-12UPCSC2C14 **SOFT COMPUTING** **Credits: 4**

Unit – I: Fundamentals of Neural Networks

Neural Networks – Application scope of Neural Networks – Fuzzy Logic – Artificial Neural Network: An Introduction – Fundamental Concept – Evolution of Neural Networks – Basic Models of Artificial Neural Network- Important terminologies of ANNs- McCulloch – Pitts Neuron – Linear separability – Hebb Network

Unit – II: Supervised Learning Networks

Introduction – Perceptron Networks – Adaptive Linear Neuron (Adaline) – Multiple Adaptive Linear Neurons – Back-propagation Network - Radial Basis Function Network – Associative Memory Networks – Introduction – Training Algorithms for Pattern Association – Hebb Rule – Outer Products Rule – Auto associative Memory Network

Unit – III: Unsupervised Learning Networks

Introduction – Fixed Weight Competitive Nets – Maxnet – Mexican Hat Net – Hamming Network – Kohonen Self-Organizing Feature Maps – Learning Vector Quantization

Unit – IV: Fuzzy Sets

Introduction – Classical sets – Fuzzy sets – Classical Relations and Fuzzy Relations – Cartesian product of Relation – Classical Relation – Fuzzy Relations – Tolerance and Equivalence Relations – Noninteractive Fuzzy Sets-

Unit – V: Membership Functions and Defuzzification

Introduction- Features of the membership functions – Fuzzification – Methods of Membership value assignments – Rank ordering – Angular fuzzy sets – Defuzzification- Lambda-cuts of Fuzzy sets – Lambda-cuts for Fuzzy Relations – Defuzzification Methods – Fuzzy Arithmetic -Fuzzy Measures

TEXT BOOK:

1. S.N.Sivanandam , S.N Deepa , Principles of Soft Computing , Wiley India Edition- 2007 (Chapters: 1,2,3,4,1,4,2,4,3,5,7,8,9,10,11.1,11.2,11.4)

REFERENCE BOOKS:

1. Fakhreddine O. Karray, Clarence De Silva, Soft Computing and Intelligent Systems Design, Pearson, 2009.
2. Rajasekaran. S and VijayalakshmiPai, Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI,

Course-12UPCSC2C15 C# PROGRAMMING

Credits: 4

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. Herbert Schildt, "The Complete Reference: C#", Tata McGraw-Hill, 2004.
3. Jeff Ferguson, Brian Patterson, Jason Beres, Pierre Boutquin, and Meeta Gupta, "C# Programming Bible", Wiley Dreamtech India (P) Ltd., 2002.
4. J. Liberty, "Programming C#", 2nd edition, O'Reilly, 2002.
5. Burton Harvey, Simon Robinson, Julian Templeman, Karli Watson, "C# Programming With the Public Beta", Wrox Press, 2000.

Course-12UPCSC2C16

C# LAB

Credits: 2

Console Application

1. To Develop the C# Program for Payroll System using Classes and Constructors.
2. To implement C# program for String Handling using String and Arrays.
3. To implement C# program for Handling File Handling.

Windows Application

4. To Develop the C# program for Editor.
5. To Develop the C# program for Message Display.
6. To implement the C# Program for Mouse Handling.
7. To Develop the C# program for Pop-up Calculator.

Web Application

8. To Develop the C# program for Students Information.
9. To Develop the C# program for Online Library.
10. To Develop the C# program for Inventory Control.

Course-12UPCSC2C18 MOBILE COMPUTING

Credits: 4

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-12UPCSC2C19

ADVANCED COMPUTING

Credits: 4

Unit-I: Introduction – Grid Computing

Grid Computing - The data Centre, the Grid and the distributed/High performance computing – Cluster computing and Grid computing – Meta computing – Scientific, business and E-Governance Grids, web services and Grid computing

Unit-II: Grid Computing Architecture

Technologies and architecture for Grid computing – Web services and the Service oriented Architecture(SOA)- OGSA for Resource distribution – Stateful web services in OGSA – Web services Resource Framework(WSRF) – Resource approach to stateful services – WSRF specification – The Grid and the databases

Unit-III: Cluster Computing

Approaches to parallel computing – How to achieve low cost parallel computing through clusters – Definition and architecture of a cluster – 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

Unit-IV: Fundamentals of Cloud Computing

Fundamentals – Short history of cloud computing – Cloud Architecture – Cloud Storage – Cloud Service – Pros and Cons of cloud computing – Benefits from cloud computing.

Unit-V: Cloud Services

Need for Web-Based Application – The cloud Service Development – Cloud Service Development Types – Cloud Service development tools.

Text Books:

1. C.S.R Prabhu, Grid and Cluster computing, Prentice Hall of India,2008. (Units I , II & III)
2. Michael Miller, “Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online”, Que, 2008. (Units IV & V)

References Books:

1. Fran Berman, Geoffrey Fox, J.G. Anthony Hey, “Grid Computing : Making the Global Infrastructure a reality”, John Wiley & sons, 2003.
2. Joshy Joseph & Craig Fellenstein, “Grid Computing”, Pearson Education, 2004.
3. Hmar Abbas, “Grid Computing: A Practical Guide to technology and Application Charles River media, 2003.

ELECTIVES

Course-12UPCSC2E01 OPERATIONS RESEARCH

Credits: 4

Unit – I

Linear Programming Problem(LPP):

Formulations and graphical solution of (2 variables) canonical and standard terms of linear programming problem.

Unit – II

Algebraic Solution: Simplex algorithm, Simplex methods – solving problems with slack variable

Unit – III

Transportation Model: North West corner Method, Least cost method, and vogel's approximation method. **Assignment Model :** Hungarian assignment model – Travelling sales man problem.

Unit – IV

Replacement Problem: Replacement policy for equipment that deteriorate gradually, Replacement of item that fail suddenly-Individual and group replacement, Problems in mortality and staffing.

Unit – V

Project Scheduling PERT/CPM

Networks – Fulkerson's Rule – Measure Of Activity – PERT Computation – CPM Computation – Resource Scheduling.

Reference Books:

1. KantiSwarup, P.K. Gupta & Manmohan – Operation Research 1996.
2. S.Kalavathy: Operations Research – Second Edition – Vikas Publishing House Pvt.Ltd., 2

Course-12UPCSC2E02STATISTICAL METHODS

Credits: 4

Course-12UPCSC2E03NUMERICAL METHODS

Credits: 4

Unit – I Transcendental Equation

Introduction, Bisection Method, Iteration Method, Method Of False Position, Newton – Rapson Method.

Unit – II System of Simultaneous Linear algebraic Equation

Direct Methods: Gauss elimination Method- Gauss Jordan Method; Iterative Methods: Gauss Jacobi's Method, Gauss Seidal method.

Unit – III Interpolation

Interpolation with equal intervals: Newton's forward interpolation formula, Newton's backward interpolation formula. Interpolation with unequal intervals: Divided difference formula, Lagrange's interpolation formula.

Unit –IV Numerical Differentiation and Integration

Differentiation: First and second derivatives of numerical differentiation;
Integration: Trapezoidal and Simpson's rule

Unit –V Numerical Solutions of Ordering Differential Equations

Taylor series method, Euler Method, Runge-kutta second and fourth order Methods, predictor and corrector methods.

Reference:

1. S.S.Sastry, "Introductory methods of numerical analysis", PHI, New Delhi 1982.
2. M.K.Jain, S.R.K.Iyengar and R.K.Jain "Numerical methods for science and Engineering computation", Wiley Eastern Limited – 2nd edition –1995.

Course-12UPCSC2E04 THEORY OF COMPUTATION Credits: 4

Unit-I

Finite Automata and Regular Expressions: Deterministic and Non-Deterministic Finite Automata, Finite Automata with ϵ -moves, regular expressions equivalence of NFA and DFA, two-way finite automata, Moore and Mealy machines, applications of finite automata.

Unit-II

Push Down Automata Theory: Context-Free Languages and Derivation Trees-Ambiguity in Context-Free Grammars Chomsky Normal Form Greibach Normal Form. Push Down Automata Definition, Acceptance by Push Down Automata Push Down Automata and Context Free Languages, properties of CFL

Unit-III

Introduction to Compiling: Compilers- Analysis of the source program - Phases of a compiler - Compiler construction tools - Lexical Analysis: Role of Lexical Analyzer - Input Buffering Specification of Tokens.

Unit-IV

Basic Parsing Techniques -Shift reduce parsing- operator precedence parsing -Recursive descend parsing predictive parsing LR parsing Simple LR parsing - canonical LR parsing - LALR parsing.

Unit-V

Intermediate Code Generation: Intermediate languages -Declarations -Assignment Statements -Boolean Expressions - Case Statements - Back patching -Procedure calls. Code Optimization: Principle Sources of optimization, Loop Optimization, DAG - Representation of basic blocks, Global Data Flow Analysis. Code Generation, Problems in code generation Register allocation and assignment, Code Generation from DAGs, Peephole Optimization.

Text Book:

1. John E. Hopcroft and Jeffrey D. Ullman, "Introduction to Automata Theory, Languages and Computation", Narosa Publishers, 2002.
2. A.V. Aho, J.D. Ullman, "Principles of Compiler design", Addison Wesley, 1998.

Reference Books:

1. Alfred Aho, Ravi Sethi, Jeffrey D Ullman, "Compilers Principles, Techniques and Tools", Pearson Education Asia, 2003.
2. Tremblay, A.S., and Sorenson, P.G., "The Theory and Practice of Compiler Writing", McGraw-Hill Int. Edition, 1985.
3. Michael Sipser, "Introduction to the Theory of Computations", Brooks/Cole, Thomson Learning, 1997.
4. John c. Martin, "Introduction to Languages and the Theory of Computation", Tata McGraw-Hill, 2003.

Course-12UPCSC2E05 ARTIFICIAL INTELLIGENCE

Credits: 4

Unit-I

The AI problems – AI techniques – problems, problem space & search – Defining the problem as a state search – production systems – problem Characteristics – Heuristic search techniques – Generate & test – hill climbing – Best first search – problem reduction.

Unit-II

Game playing mini-max procedure – Adding alpha-beta Cutoffs – Using predicate logic – Representing simple facts & logic – Representing instance & is a relationships – computable functions & predicates – Resolution – Natural Deduction.

Unit-III

Representing knowledge using rules – Procedural Versus declarative knowledge – logic programming – Forward Versus backward reasoning – Matching – Control knowledge – Symbolic reasoning under uncertainty – Introduction to non-monotonic reasoning – logics for non-monotonic reasoning.

Unit-IV

Expert systems – Definition – Expert Systems Versus Conventional programs – knowledge representation using rules – knowledge representation using semantic nets – knowledge representation using Frames – stages of building an Expert system – choosing a tool for ES.

Unit-V

Difficulties in developing an ES – Inherent limitations of ES – common pitfalls in planning an ES – choosing an appropriate problem – Resources for building the system – choosing the ES – building a tool – pitfalls in dealing with the domain expert – pitfalls during the development process.

Text Books:

1. Elaine Rich, Kevin Knight, “Artificial Intelligence”, Tata McGraw Hill, II Edition. (Chapters 1, 2, 3, 4, 5, 6, 7, 12,15)
2. Donald A. Waterman, “A Guide to Expert Systems”, Pearson Education, Addison Wesley. (Chapters 1, 2, 3, 4, 7, 9, 12, 13, 16, 17, 18, 19)

Reference Books:

1. Nills J. Nilsson , “Artificial Intelligence”, Narosa pub
2. P.H. Winston, “Artificial Intelligence”, Addison Wesley
3. David W. Rottson, “Principles of AI & ES Development”, MGH
4. Fredrick Hayer Roth Donald A. Waterman &Doughlas, B.Leant, “Building ES”, Addison Wesley.

Course-12UPCSC2E06 EMBEDDED SYSTEMS

Credits:4

Unit-I

An Introduction to Embedded Systems:

Embedded Systems, Processor Embedded into a System – Embedded Hardware Units and Devices in a System – Embedded Software in a System– Examples of Embedded Systems – Embedded System-on-chip (Soc) and Use of VLSI Circuit Design Technology – Complex Systems Design and Processors – Design Process in Embedded System – Formalization of System Design – Design Process and Design Examples – Classification of Embedded Systems – Skills Required for an Embedded Systems – Skills Required for an Embedded System Designer.

Unit-II

8051 and Advanced Processor Architectures, Memory Organization and Real-world Interfacing:

8051 Architecture – Real World Interfacing – Introduction to Advanced Architectures – Processor and Memory Organization – Instruction Level Parallelism – Performance Metrics – Memory-Types, Memory-Maps and Addresses – Processor Selection – Memory Selection.

Unit-III

Devices and Communication Buses for Devices Network:

IO Types and Examples – Serial Communication Devices – Parallel Device Ports – Sophisticated Interfacing Features in Device Ports – Wireless Devices – Timer and Counting Devices – Watchdog Timer – Real Time Clock – Networked Embedded Systems – Serial Bus Communication Protocols – Parallel Bus Device Protocols – Parallel Communication Network Using ISA, PCI, PCI-X and Advanced Buses – Internet Enabled Systems-Network Protocols – Wireless and Mobile System Protocols.

Unit-IV

Interprocess Communication and Synchronization of Processes, Threads and Tasks

Multiple Processes in an Application – Multiple Threads in an Application- Tasks – Task States – Task and Data – Clear-cut Distinction between Functions, ISRS and Tasks by their Characteristics – Concepts of Semaphores – Shared Data – Interprocess Communication – Signal Function – Semaphore Functions – Message Queue Functions – Mailbox Functions – Pipe Functions – Socket Functions – RPC Functions.

Unit-V

Embedded Software Development Process and Tools:

Introduction to Embedded Software Development Process and Tools – Host and Target Machines – Linking and Locating Software – Getting Embedded Software into the Target System – Issues in Hardware - Software Design and Co-design.

Testing, Simulation and Debugging Techniques and Tools:

Testing on Host Machine – Simulators – Laboratory Tools

Text Book:

1. Raj Kamal :Embedded Systems Architecture, Programming, and Design, Tata McGraw-Hill Publishing Company Limited, 2008.(Chapter 1, 2, 3, 7, 13, 14).

Reference Books:

1. Arnold S. Berger ,“Embedded System Design: An Introduction to Processes, Tools and Techniques”, CMP Books, 2002.
2. Michael Barr, Anthony J. Massa, “Programming Embedded Systems: With C And Gnu Development Tools”, O’Reilly Media, Inc., 2006.
3. Tammy Noergaard, “Embedded Systems Architecture: A Comprehensive Guide for Engineers and Programmers”, Elsevier Inc., 2005.
4. Elecia White, “Making Embedded Systems”, O’Reilly Media, Inc., 2012.

Course-12UPCSC2E07 NETWORK SECURITY

Credits:4

Unit-I

Primer on Networking – Active vs Passive attacks – Layers and Cryptography – Authorization – Viruses, Worms, Trojan Horses – Multilevel model of security -
(Chapters: 1.1 to 1.4, 1.6, 2.1, 2.3 to 2.4, 2.6)

Unit-II

Data link layer: Design Issues - Error Detection and Correction -Elementary protocol – Sliding window protocols – Protocol verification. MAC sub layer: Channel allocation – multiple access protocol.
(Chapters: 3.1 to 3.5, 4.1 to 4.2)

Unit-III

Network Layer: Design Issues –Network Layer in the Internet. Transport Layer: Services – Internet transport protocol – Performance Issues: Application Layer: DNS – WWW: Architectural overview – Static and dynamic web documents - Security: Cryptography – Symmetric key and Public key algorithms.
(Chapters: 5.1, 5.6, 6.1, 6.4 to 6.5)

Unit-IV

TCP / IP: Introduction to Network Layer - IPv4 Addresses - Delivery and Forwarding of IP – Packets - Internet Protocol Version 4 (IPv4) - Mobile IP - Unicast Routing Protocols (RIP, OSPF and BGP) - Multicasting and Multicast Routing Protocol. Transport layer: Introduction to the Transport Layer - User Datagram Protocol (UDP) - Transmission Control Protocol (TCP)
(Chapters: 4 – 8, 11 - 15)

Unit-V

Application layer: Introduction – Host configuration – DNS – Remote login – File transfer – Network management. Next generation: IPV6 addressing – protocol – ICMVP6.
(Chapters: 17-21, 24, 26 - 28)

Text Book:

1. Andrew S Tanenbaum, “Computer Networks”, Fourth Edition, PHI Private Limited, 2005. (Unit I – III)
2. [BehrouzForouzan](#), TCP/IP Protocol Suite, Fourth Edition, TMGH, 2010
(Unit IV and V)

Reference Books:

1. Uyles Black, Computer Networks, Second Edition, PHI, 2005
2. B.A. Forouzan, “Data Communication and Networking”, Third Edition, Tata McGraw Hill, 2004.
3. VivekAcharya, TCP / IP and Distributed system, Firewall media 2006

Course-12UPCSC2E08 **IMAGE PROCESSING**

Credits:4

Unit-I

Digital Image Fundamentals

Image formation, Image transforms – Fourier transforms, Walsh, Hadamard, Discrete cosine, and Hotelling transforms.

Unit-II

Image Enhancement and Restoration

Histogram modification techniques - Image smoothening - Image Sharpening - Image Restoration - Degradation Model – Noise models - Spatial filtering – Frequency domain filtering.

Unit-III

Image Compression and 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 Planningreation

Patterns and pattern classes - Decision-Theoretic methods - Structural methods.

TEXT BOOK:

1. Gonzalez.R.C& Woods. R.E., Digital Image Processing, 2ndEdition, 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-12UPCSC2E09 SOFTWARE ENGINEERING

Credits: 4

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-12UPCSC2E10 OBJECT ORIENTED ANALYSIS AND DESIGN

Credits: 4

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 Interlay 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-12UPCSC2E11 WINDOWS PROGRAMMING

Credits:4

Unit-I

Windows Evolution - Windows Versions- Windows, Standards, and Open Systems - Windows Principles - Windows File Systems - Interlude: Unicode and Generic Characters- Unicode Strategies - Standard Devices and Console I/O - File and Directory Management. 64-Bit File System - File Pointers - File Attributes and Directory Processing - File Processing Strategies - File Locking - The Registry Management.

Unit -II

Exceptions and Handlers: Floating-Point Exceptions - Errors and Exception-Termination Handlers- Console Control Handlers - Vectored Exception Handling. Memory Management, Memory-Mapped Files, and DLLs: Win32 and Win64 Memory Management Architecture- Heaps - Managing Heap Memory- Dynamic Link Libraries - DLL Entry Point - DLL Version Management - Process Management: Windows Processes and Threads - Process Creation- Process Handle Counts - Process Identities - Duplicating Handles - Exiting and Terminating a Process - Waiting for a Process to Terminate- Processes in a Multiprocessor Environment - Process Execution Times- Generating Console Control Events- Job Objects.

Unit-III

Threads and Scheduling: Thread Overview - Thread Basics - Thread Management - Using the C Library in Threads- Performance Impact - Thread Local Storage - Process and Thread Priority and Scheduling-Thread States. Thread Synchronization: The Need for Thread Synchronization-Thread Synchronization Objects- Mutexes- Semaphores- Events.

Unit-IV:

Interprocess Communication: Anonymous Pipes - Named Pipes - Named Pipe Transaction Functions - Comments on the Client/Server Command Line Processor - Mailslots. Pipe and Mailslot Creation, Connection, and Naming -Network Programming with Windows Sockets: Windows Sockets- Socket Server Functions - Socket Client Functions- Comparing Named Pipes and Sockets- In-Process Servers - Line-Oriented Messages, DLL Entry Points, and TLS - Datagrams - Berkeley Sockets vs. Windows Sockets - Overlapped I/O with Windows Sockets - Windows Sockets 2 -Windows Services:Writing Windows Services-Overview- The main() Function - The ServiceMain() Functions - The Service Control Handler - Managing Windows Services.

Unit -V

Securing Windows Objects: Security Attributes - Security Overview: The Security Descriptor. Security Descriptor Control Flags - Security Identifiers- Managing ACLs - Reading and Changing Security Descriptors- Securing Kernel and Communication Objects - Overview of Additional Security Features. Win64 Programming: 64-Bit Architecture Overview - The Win64 Programming Model - The Data Types.

Text Books:

1. Johnson M. Hart ,Windows System Programming, 3rd Edition , Addison-Wesley Professional, 2005. Chapters: 1-9, 11-16

Reference Book:

1. Charles Petzold, "Programming Windows", Microsoft Press, Fifth Edition

Course-12UPCSC2E12 DATAMINING

Credits: 4

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, MichelenKamber, “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. ArunK.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.