# J.J. College of Arts and Science(Autonomous)

**J.J.Nagar, Sivapuram Post, Pudukkottai - 622 422**

NAAC REACCREDITED WITH 'A' GRADE

**M.Sc. COMPUTER SCIENCE**

**Course Structure under Autonomous Status**

**Under Choice Based Credit System**

For the candidates admitted from the academic year 2016 - 2017 onwards

| Sem. | Course Code | Course Title | Hrs / Week | Credit | Exam Hrs | Internal | External | Total |
|---|---|---|---|---|---|---|---|---|
| I | P1RCSCC1 | CC I-Mathematical Foundation for Computer Science | 6 | 5 | 3 | 25 | 75 | 100 |
| | P1RCSCC2 | CC- II OOAD and UML | 6 | 5 | 3 | 25 | 75 | 100 |
| | P1RCSCC3 | CC III-Advanced Java Programming | 6 | 5 | 3 | 25 | 75 | 100 |
| | P1RCSCC4P | CC IV-Advanced Java Programming Practical | 6 | 5 | 3 | 40 | 60 | 100 |
| | P1RCSEC1 | EC I – (Anyone from the list) | 6 | 3 | 3 | 25 | 75 | 100 |
| | | **Total** | **30** | **23** | | | | **500** |
| II | P2RCSCC5 | CC V – Distributed Operating System | 5 | 5 | 3 | 25 | 75 | 100 |
| | P2RCSCC6 | CC VI – Compiler Design | 5 | 5 | 3 | 25 | 75 | 100 |
| | P2RCSCC7 | CC VII -Advanced Microprocessors and Microcontrollers | 5 | 5 | 3 | 25 | 75 | 100 |
| | P2RCSCC8 | CC VIII –Advanced Web Design | 5 | 5 | 3 | 25 | 75 | 100 |

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|---|---|---|---|---|---|---|---|---|
| | P2RCSCC9P | CC IX – Web Design Practical | 5 | 5 | 3 | 40 | 60 | 100 |
| | P2RCSEC2 | EC II (Anyone from the list) | 5 | 3 | 3 | 25 | 75 | 100 |
| | | **Total** | **30** | **28** | | | | **600** |
| III | P3RCSCC10 | CC X - Digital Image Processing | 5 | 5 | 3 | 25 | 75 | 100 |
| | P3RCSCC11 | CC XI- Distributed Technology | 5 | 5 | 3 | 25 | 75 | 100 |
| | P3RCSCC12P | CC XII – Distributed Technology Practical | 5 | 5 | 3 | 40 | 60 | 100 |
| | P3RCSCC13 | CC XIII – Data Mining and Data Warehousing | 5 | 5 | 3 | 25 | 75 | 100 |
| | P3RCSCC14 | CC XIV-Design and Analysis of Algorithms | 5 | 5 | 3 | 25 | 75 | 100 |
| | P3RCSEC3 | EC III (Anyone from the list) | 5 | 3 | 3 | 25 | 75 | 100 |
| | | **Total** | **30** | **28** | | | | **600** |
| IV | P4RCSEC4 | EC IV (Anyone from the list) | 6 | 3 | 3 | 25 | 75 | 100 |
| | P4RCSCC15PW | Project Work | 24 | 8 | | 20 | 80 | 100 |
| | **Total** | | **3 0** | **11** | | | | **200** |
| | **Grand Total** | | **120** | **90** | | | | **1900** |

CC - Core Course
EC - Elective Course

**Elective Course – I**

1. Cloud Computing
2. Grid Computing
3. Pattern Recognition

**Elective Course – II**

1. Big data Analytics
2. Ad-hoc and Wireless Sensor Networks
3. Pervasive Computing

**Elective Course – III**

1. Network Security
2. Artificial Neural Networks
3. Parallel Algorithms

**Elective Course – IV**

1. Software Quality Assurance And Testing
2. Real Time and Embedded Systems
3. Open Source Technologies

## Core Course – I

## MATHEMATICAL FOUNDATIONS FOR COMPUTER SCIENCE

**Objective:**

- To study the fundamental concepts of networks, statistics & graph theory etc.
- To understand the Fundamental concepts and tools in discreet mathematics with emphasis on their applications to computer science.
- To Learn the various testing of hypothesis.

**Unit – I Theory of inference**

Propositions - evaluation - precedence rules - tautologies - reasoning using equivalence transformation - laws of equivalence - substitution rules - a natural deduction system. Deductive proofs - inference - proofs - sub proofs.

**Unit – II Cryptography**

Introduction - Cryptography - Ceaser Cyphor Coding - Matrix encoding - scrambled codes - Hamming metric - Hamming distance - Error detecting capability of an encoding.

**Unit – III Assignment Problem & Network**

Assignment problem and its solution by Hungarian method. Project Scheduling by PERT - CPM : Phases of project scheduling - Arrow diagram - Critical path method - Probability and Cost Considerations in project scheduling - Crashing of Networks.

**Unit – IV Testing of Hypothesis**

Testing of hypothesis : Tests based on normal population - Application of chi-square, Student's-t, F-distributions - chi-square Test-goodness of fit - Test based on mean, means, variance, correlation and regression of coefficients.

**Unit – V Graph Theory**

Graph - Directed and undirected graphs – Sub graphs - Chains, Circuits, Paths, Cycles - Connectivity - Relations to partial ordering - adjacency and incidence matrices - Minimal paths - Elements of transport network - Trees - Applications.

**Text Books**


1. "The Science of Programming", David Gries. Narosa Publishing House, New Delhi, 1993.
   UNIT- II : CHAPTER 2
2. "Fundamentals of Mathematical Statistics", Gupta,S.C. and V.K. Kapoor, Sultan Chand & Sons, New Delhi, $10^{th}$ edn., 1983.
   UNIT- IV : CHAPTER 13,14
3. "Operations Research", Kanti Swarup, P.K.Gupta and Man Mohan, Sultan Chand & Sons, New Delhi, 1994.
   UNIT- III : CHAPTER 7, 21
4. "Discrete Mathematical Structures with applications to Computer Science", Trembly J.P & Manohar.P , M.C GrawHill .
   UNIT- I : CHAPTER 1
5. "Graph Theory:, V.K.BalaKrishnan, Schamu's outlines.
   UNIT- V: CHAPTER 1,2


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## Core Course – II

## OOAD AND UML

**Objective:**

1. To understand the basics of OOAD and UML.
2. To understand the concept of various object oriented methodologies.
3. To understand the concept of object oriented analysis.

**Unit-1**

Structured approach to system constructions: SSADM/SADT-An overview of object oriented systems development & Lifecycle.

**Unit-II**

Various object oriented methodologies-Introduction to UML.

**Unit-III**

Object oriented analysis – Use cases- Object classification, relationships, attributes, methods.

**Unit-IV**

Object oriented design –Design axioms – Designing classes – layering the software design :-data access layer, User interface layer, Control/business logic layer.

**Unit-V**

UML – Examples on : Behavioral models – Structural models – Architectural models from real world problems.

**TEXT BOOK:**

1. Bahrami Ali, object oriented system development, Irwin McGrawHill, 2005(First 4 units covered here). **(Unit 1:Chapter-1,2,3 Unit 2:Chapter-4,5 Unit 3:Chapter-6,7,8 Unit 4:Chapter-9,10,11)**

2. Booch Grady, Rambaugh james, Jacobson Ivar, the unified modeling language – User Guide,Person education,2006(ISBN 81-7758-372-7)(UNIT -5 Covered here).

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## Core Course – III

## ADVANCED JAVA PROGRAMMING

**Objective:**

- To learn the effective use of Java generic types
- To Use standard annotations and develop custom annotations to express meta-data in Java source files
- To Communicate between processes using network sockets.

**Unit – I JDBC**

JDBC Overview - Connection Class - Meta Data Function - SQL Exception - SQL warning - Statement - Result Set - Other JDBC Classes.

**Unit – II Networking**

Structured - TCP / IP client sockets - TCP / IP server sockets - URL - URL Connection - Datagrams - Client / Server application using RMI.

**Unit – III Java Beans**

Bean Development Kit - Jar Files - Introspection - Design Pattern for properties, events and methods - Constrained Properties - Persistence - Customizers.

**Unit – IV Servlet**

Life Cycle of Servlet – A simple Servlet – Servlet Package - Reading Servlet Parameters - HTTP Servlet Package - Cookies - Session Tracking.

**Unit – V A Tour of Swing**

JApplet – Icons and Labels – Text Fields - Buttons – Combo boxes – Tabbed Panes – Scroll Panes - Trees – Tables.

**Text Books**

1. Herbert Schildt, "The Complete Reference : Jave 2", Tata McGraw Hill fifth edition.
   [Unit-II (Chapters - 18, 24); Unit-III (Chapters – 25); Unit-IV (Chapters – 27); Unit-V (Chapters – 26, Chapter - 21);]
2. C.Muthu - "Programming with Java".
   [Unit-I (Chapters – 18)]

**References**

1. Deitel & Deitel, "Jave How to Program", Prentice Hall, 5th Edition, 2002.

## Core Course – IV

## ADVANCED JAVA PROGRAMMING PRACTICAL

**List of exercises for practical Laboratory**

1. Applet which will play two sound notes in a sequence continuously use the play() methods available in the applet class and the methods in the Audio clip interface.
2. JApplet using swing control, which will create the layout shown below and handle necessary events.

   Enter your Name:
   Enter your Age:
   Select your s/w: * Oracle *Visual Basic *Java
   Select your city : *Delhi *Mumbai *Chennai
   OK Cancel

3. Create Table, insert and update data.
4. Client/Server application using RMI.
5. Cookie and set the expiry time of the same.
6. Servlet to count the number of visitors to a web page.
7. Form and validate a password using Servlet.
8. Java Bean to demonstrate the use of the same.
9. Convert an image in RGB to a Grayscale image.
10. Chat Server using Java.

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## CORE COURSE – V

## DISTRIBUTED OPERATING SYSTEM

**Objectives:**

1. To understand the basics of DOS
2. To understand the concept of communication in distributed system
3. To understand the concept of synchronization in distributed system

**Unit-I Introduction to DOS**

What is Distributed System – Goals – Advantages and Disadvantages of DOS – Hardware concepts – Multi computers – Software concept – Network Operating System – Multi - Purpose Time Sharing System – Design Issues – Characteristics.

**Unit-II Communication in Distributed System**

Communication in Distributed Systems: Layered Protocols – Asynchronous Transfer Mode (ATM) Networks – ATM Switching – Client/Server Model – Addressing – Group Communications.

**Unit-III Synchronization in Distributed System**

Clock Synchronization – Mutual Exclusion – Election Algorithm – Bully Algorithm – Ring Algorithm – Atomic Transactions : Transaction Model – Implementation – Concurrency – Control – Dead Lock In Distributed Systems : Detection and Prevention.

**Unit-IV Processes and Processors in Distributed System**

Threads – Introduction – Thread usage – Design issues for thread packages – Implementing a Thread Packages – System Models : The Workstation Model – Using Idle Workstation – The Processor Pool Model – Hybrid Model – Processor Allocation – Fault Tolerance.

**Unit-V Distributed File System**

Distributed File System Design : The File Service Interface – Directory Server Interface – Semantics of File Sharing – Distributed File System Implementation – Trends – New Hardware – Scalability – WAN – Mobile Users – Distributed Shared Memory – Introduction – What is Shared Memory.

**TEXT BOOK:**

"Distributed Operating System" by Andrew S.Tanenbaum, Pearson Education.
**Unit-1 [Chapter 1], Unit-II [Chapters 2.1,2.2,2.3,2.5] , Unit-III [Chapter 3 ], Unit-IV [Chapter 4] , Unit-V [Chapters 5.1, 5.2, 6.2, 6.3, 6.4]**

**REFERENCE BOOK :**

**"**Distributed Operating System Concept and Design" , Pradeep.K & Singh

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## Core Course – VI

## COMPILER DESIGN

**Objectives:**

- To introduce the major concept areas of language translation and compiler design.
- To enrich the knowledge in various phases of compiler ant its use, code optimization techniques, machine code generation, and use of symbol table.
- To extend the knowledge of parser by parsing LL parser and LR parser.

**Unit – I Introduction to Compiler**

Introduction –Language processors – The structure of a compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens

**Unit – II Parsing**

Role of the parser, Writing Grammars – Context – Free Grammars – Top Down parsing – Recursive Descent parsing – Predictive parsing – bottom –up parsing – shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser.

**Unit – III Intermediate Code Generation**

Intermediate Languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – procedure calls

**Unit – IV Code Generation**

Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – A simple Code generator – DAG representation of Basic Blocks – Peephole optimization

**Unit – V Code Optimization**

Introduction – Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Storage Organization – Storage Allocation strategies – Parameter Passing

**Text Book(s)**

1. Alfred Aho, Jeffy D.Ullman, “Compilers – Principles, Techniques and Tools”, Pearson Education Asia, 2003

**References**

1. Henk Alblas and Albert Nymeyer, “Practice and Principles of Compiler Building with C”, PHI, 2001
2. Kenneth C. Louden, « Compiler Construction : Princip0les and
3. Practices », Thompson Learning, 2003.

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## Core Course – VII
## ADVANCED MICROPROCESSORS AND MICROCONTROLLERS

**Objectives:**

- To study the architecture and addressing modes of 8086/8088 and to write assembly language programs.
- To study multiprocessor and high end processor configurations.
- To learn about 80i86 and Pentium microprocessor.

**Unit – I Microprocessor and its Architecture**

Introduction – Internal Microprocessor Architecture – Real Mode Memory Addressing – Protected Mode Memory Addressing – Memory Paging.

**Unit – II Addressing Modes and Instructions**

Data Addressing Modes – Program Memory Addressing Mode – Stack Memory Addressing Modes – Push/Pop – LOAD – Effective Address – String Data Transfer – Miscellaneous Data Transfer Instructions.

**Unit – III 8086/8088 Hardware Specifications**

Pin – outs and the pin functions – Clock generator – Bus timing – Ready and the Wait state – Minimum Mode Vs Maximum Mode.

**Unit – IV I/O Interface and Direct Memory Access**

Introduction to I/O Interface – the programmable peripheral interface – the 8279 programmable keyboard – Display interface – Basic DMA operation – the 8237 DMA Controller.

**Unit – V The 80i86 and Pentium Microprocessors**

80186 Architecture – Introduction to the 80286 – Special 80386 Registers – 80386 Memory management – Introduction to the 80486 Microprocessor – Introduction to the Pentium Microprocessor – Special Pentium Registers – Pentium Memory Management.

**Text Book**

1. THE INTEL MICROPROCESSORS 8086/8088, 80186/80188, 80286, 80386, 80486, PENTIUM AND PENTIUM PRO PROCESSOR Fourth Edition, New Delhi 1997.

[**Unit-1 :** (Chapters 2); **Unit-2** : (Chapters 3,4); **Unit-3** : (Chapters 8); **Unit-4** (Chapters 10,12), **Unit-5** (Chapters 15,16, 17)].

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**Core Course – VIII**

# Advanced Web Design

**Objective:**

- To impart knowledge about the web based technologies and their applications.
- To understand the basics of web designing and to use open source tools.
- To learn about scripting languages.

**UNIT – I FUNDAMENTALS**

Introduction to the web - Web- enabling Technologies - Web service Protocol – Web Design concepts - Examining good and bad web design - Page Design Resources. Page design - HTML - Web page style considerations - Page composition - Type faces- Tag parameters – Color and graphics for web pages - WYSIWYG web page editor - Dream weaver.

**UNIT – II ADVANCE DESIGN ISSUED**

Advanced Page design - tables and frames - preparing graphics and animations forms - cascading style sheets - user interface design - page grid - page templates - usability testing.

**UNIT – III OPEN SOURCE**

PHP: Introduction – language reference – basic syntax – variables- constants – expressions – operators – control structures – functions- classes – objects –exceptions. MYSQL: Introduction – working with mysql – executing sql commands using mysql

**UNIT – IV SCRIPTING IN DESIGN**

Typography and Graphic design for the web - Creating transparent GIF – Lean graphics - Image maps – Palette map - Web programming - Web site Garage - W3C HTML validation services - Net mechanic - DHTML - XML.

**UNIT – V TOOLS AND APPLICATIONS**

Online Applications - Developing an on-line shopping application - Data Base design issues - connecting Data Base with tools such as Java, ASP, Cold Fusion- Designing Portals and Vortals.

**Text Book :**

1 Deitel and Deitel, Internet and World Wide Web how to program, Prentice Hall, 2000.

**Reference Books:**

1. Bob Breed Love, Web Programming Unleashed, Sams net Publications, 1996.
2. DHTML `O' Reiley Publications, 2000.
3. Tim Converse, Joyce Park and Clark Morgan, ”PHP 5 and MySQL”, Wiley india reprint, 2008. 2. Robert Sheldon, Geoff Moes, ”Beginning MySQL”, Wrox, 2005.
4. Alexis Leon and Mathews Leon, “Database Management Systems”, Vikas, 2008.

**Core Course – IX**

# WEB DESIGN PRACTICAL

1. Static pages (using only HTML) of an online Book store.
2. Dynamic web page for college portal using HTML.
3. Create and save an XML document at the server, which contains 10 users information. Take User Id as input and returns the user details by taking the user information from the XML document.
4. Using JavaScript sort given array in ascending and descending order.
5. Server side PHP program that displays marks, total, grade of a student in tabular format by accepting user inputs for name, number and marks from a HTML form.
6. PHP program that adds products that are selected from a web page to a shopping cart.
7. PHP program to access the data stored in a mysql table.
8. PHP program interface to create a database and to insert a table into it.
   i)PHP program using classes to create a table.
   ii)PHP program to upload a file to the server.
9. PHP program to create a directory, and to read contents from the directory.
10. MySQL table and execute queries to read, add, remove and modify a record from that table.

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**Core Course – X**

# DIGITAL IMAGE PROCESSING

**Objectives:**

- To explore the algorithms and techniques involved in Digital Image Processing
- To understand the signals, signal processing, digital imagery and digital image processing.
- To learn advanced image enhancement techniques

**Unit 1: Digital Image Fundamentals**

Introduction :Fundamental steps in Digital Image Processing – Components of an Image Processing System – Elements of visual perception-Image Sampling and Quantization : basic concepts in sampling and quantization-Representing digital images-spatial and gray level resolution – Basic relationships between Pixels –1D DFT – 2D DFT.

**Unit 2: Image Enhancement**

Basic Gray Level transformation : Image negatives-Log transformations-Power-Law transformations-Piecewise-linear transformations functions – Histogram Processing : histogram equalization-histogram matching-Enhancement using arithmetic/logic operations: Image subtractions-image averaging-Color Image Processing: color fundamentals-color models.

**Unit 3 : Image Restoration**

A Model of the image degradation/restoration process – Noise Models : spatial and frequency properties of noise – some important noise probability density functions-periodic noise-estimation of noise parameters- Restoration in the presence of Noise only –spatial filtering: Mean filters –order statistics filters – adaptive filters - periodic noise reduction by frequency domain filtering: band reject filters- band pass filters.

**Unit 4: Image Data Compression**

Error free compression: variable length coding – LZW coding – Bit plane coding – Lossless predictive coding – Lossy compression: Lossy predictive coding – transform coding – wavelet coding – Image compression standards: Binary image compressions standards – continuous tone still image compressions standards – video compressions standards.

**Unit 5: Segmentation**

Detection of discontinuities: point detection – line detection - edge detection –Edge linking and boundary detection :local processing – global processing via the though transform –global processing via graph-theoretic techniques – thresholding : foundation-the role of illumination-basic global thresholding-basic adaptive thresh holding-optimal global and adaptive thresholding - use of boundary characteristics for histogram improvement and local thresholding-thresholds based on several variables.

**Text Books :**

1. Gonzalaz R. and Wintz P., "Digital Image Processing", Addison Wesley, 2nd Ed, 1987.
   **Unit I:** Chapter 1- 1.4, 1.5, Chapter 2 – 2.1,2.4.1,2.4.2,2.4.3, 2.5,Chapter 4:4.2.1,4.2.2 **Unit II:** Chapter 3– 3.2 ,3.3.1,3.3.2, 3.4, Chapter 6-6.1,6.2; **Unit III:** Chapter: 5.1,5.2,5.3,5.4.1,5.4.2; **Unit IV:** Chapter 8 – 8.4 -8.6, Chapter 10- 10.1,10.4; **Unit V:** Chapter 10- 10.1- 10.3

**Reference Book::**

1. Anil K. Jain, "Fundamentals of Digital Image Processing", PHI, 1995.
2. Sid Ahmed M.A., "Image Processing", McGraw Hill Inc, 1995.

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## Core Course – XI

## DISTRIBUTED TECHNOLOGY

**Objectives:**

- To Create a Web form with server controls.
- To separate page code from content with code-behind pages, page controls, and components.
- To understand Display dynamic data from a data source by using ADO.NET and data binding and Debug .NET Active Server Page

**UNIT: 1 Understanding .NET Framework**

Benefits – elements – introducing ASP.Net framework – creating an ASP.Net applications – deploying – building forms with web contents – ASP.Net web-forms – using web controls – working with events.

**UNIT: 2 Using Rich Web Controls and Custom Controls**

Using the Ad Rotator control – calendar control – the tree view control – the tab strip and multipage control – the toolbar control – introduction to custom control – basic structure of web forms controls – creating custom control – adding properties and methods – handling and exposing events.

**UNIT: 3 Validating User Input**

Understanding validation control - the required field validator control – the compare validator control – the range validator control – the regular expression validator control – the custom validator control – the validation summary control – validation event – multiple validation controls and code behind – debugging ASP.Net pages; Error handling – using debugging tools.

**UNIT: 4 Introducing ADO.Net**

ADO.Net basics – ADO.Net object model – changes from ADO – communicating with OLEDB Data sources using ADO.Net – working with data grids: using a data grids - additional capabilities when designing ASPX pages – using column property – paging grid data – sorting grid data – using templates: Repeater control – data list – data grid – using SQL server with asp.net: introduction to server side data access from SQL server – revisiting T-SQL – implementing T-SQL in web applications.

**UNIT: 5 XML, ASP.NET Security and web services**

Advanced data binding and XML: an overview of XML – related specification – ASP.Net security: introduction to ASP.NET security – Forms - based authentication – integrating security methods – role based security – **Introduction to web services:** definition – elements –representing data – exchanging messages.

**Text Book:**

1. ASP.NET BIBLE by Mridula Parihar et al , WILEY – dream tech India Pvt. Ltd., 2002.

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## Core Course – XII

## DISTRIBUTED TECHNOLOGY PRACTICAL

1. Create table and insert a few records using Disconnected Access.
2. Develop a project to update and delete few records using Disconnected Access.
3. Develop a project to view the records using Gird View, Details View, Form View Controls.
4. Develop a project to generate a crystal report from an existing database.
5. Design a web page that makes uses of Ad Rotator Control.
6. Design a web page involving Multi View or Wizard Control.
7. Make use of Image Control involving two hot spots in a web page.
8. Design a simple web site that makes use of Master Pages.
9. Establish the security features in a simple web site with five pages.
10. Use state management concepts in a mobile web application.
11. Develop a web service that has an ASP.NET client.
12. Develop a web service to fetch a data from a table and send it across to the client.

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## Core Course – XIII

## DATA MINING AND DATA WAREHOUSING

**Objectives:**

- To Interpret the contribution of data warehousing and data mining to the decision support level of organizations.
- To Evaluate different models used for OLAP and data pre-processing;
- To Categorize and differentiate between situations for applying different data mining techniques.

**Unit – I Introduction**

**Introduction to data mining :** Definition – Need – process – applications – Techniques – Data Mining software - **Association Rule Mining**: Basics – The task and a naïve algorithm – The Apriori algorithm – Approaches to improve the Apriori algorithm :Apriori TID – DHP – DIC – Frequent Pattern growth – software for association rule mining.

**Unit – II Classification**

Classification - Introduction – Decision Tree – Building a Decision Tree – Split algorithm based on information theory - Split algorithm based on the Gini index – Overfitting and Pruning – Naïve Bayes Method – classification software **- Cluster analysis**: Introduction – features – types of data- computing distance – Type of cluster analysis methods - cluster analysis software.

**Unit – III Web Data Mining**

**Web Mining:** Definition – Terminology and characteristics – Hierarchy in the web – Categories: Web content mining – Web usage mining – Web structure mining; Web mining software – **Search engines:** Introduction – Characteristics – functionality – Architecture – Ranking of web page – search engine software.

**Unit – IV Data Warehousing**

**Data warehousing:** Introduction – Operational Data Stores(ODS) – Extraction and Transformation and Loading(ETL) – Data Warehouses – Meta Data – Software for ZLE, ODS, ETL and Data warehousing

**Unit – V OLAP**

**Online analytical processing**: Definition – Characteristics – motivation – Multidimensional view and data cube – data cube implementations – operations – guidelines and software. **Information Privacy**: Definition - Basic principles to protect information privacy – uses and misuses of data mining – pitfalls of data mining – current privacy principles ineffective for data mining.

**Text Book**

**1.G.K.Gupta**, Introduction to Data Mining with case studies, Prentice Hall India, 2006 (ISBN 81-203-3053-6)

[**Unit-1** : (Chapters 1,2); **Unit-2** : (Chapters 3,4); **Unit-3** (Chapters 5,6); **Unit-4** (Chapter 7); **Unit-5** (Chapters 8,9)].

**Reference Books**

1. K.P.Soman and Shyam Diwakar and V.Ajay, Insight to Data Mining Theory and Practice, Prentice Hall of India, 2006. (ISBN-81-203-2897-3).

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## Core Course – XIV

## DESIGN AND ANALYSIS OF ALGORITHMS

**Objective:**

- Analyze the asymptotic performance of algorithms.
- Write rigorous correctness proofs for algorithms.
- Apply important algorithmic design paradigms and methods of analysis.

**UNIT – I Introduction**

Fundamentals of algorithmic problem solving – Important problem types – Fundamentals of the analysis of algorithm efficiency – analysis frame work – Asymptotic notations – Mathematical analysis for recursive and non-recursive algorithms.

**UNIT – II Divide And Conquer Method And Greedy Method**

Divide and conquer methodology – Merge sort – Quick sort – Binary search – Binary tree traversal – Multiplication of large integers – Strassen's matrix multiplication – Greedy method – Prim's algorithm – Kruskal's algorithm – Dijkstra's algorithm.

**UNIT – III Dynamic Programming**

Computing a binomial coefficient – Warshall's and Floyd' algorithm – Optimal binary search tree – Knapsack problem – Memory functions.

**UNIT – IV Backtracking And Branch And Bound**

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

**UNIT – V NP-Hard And NP-Complete Problems**

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 2003.


**REFERENCES**


1. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, "Introduction to Algorithms" Prentice Hall 1990.


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## ELECTIVE COURSE – I

### 1. CLOUD COMPUTING

**COURSE OBJECTIVES:**

- To introduce the broad perceptive of cloud architecture and model
- To understand the concept of Virtualization and design of cloud Services
- To learn to design the trusted cloud Computing system

**UNIT – I CLOUD ARCHITECTURE AND MODEL**

Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

**UNIT – II VIRTUALIZATION**

Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation.

**UNIT – III CLOUD INFRASTRUCTURE**

Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

**UNIT – IV PROGRAMMING MODEL**

Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim

**UNIT – V SECURITY IN THE CLOUD**

Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

**Text Book:**

1 Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

## 2. GRID COMPUTING

**Objectives:**

- To learn the concepts and architecture of grid computing.
- To understand the need for and evolution of Grids in the context of processor- and data-intensive applications.
- To be familiar with the fundamental components of Grid environments.

**UNIT – I CONCEPTS AND ARCHITECTURE**

Introduction-Parallel and Distributed Computing-Cluster Computing-Grid Computing- Anatomy and Physiology of Grid-Review of Web Services-OGSA-WSRF.

**UNIT – II GRID MONITORING**

Grid Monitoring Architecture (GMA) - An Overview of Grid Monitoring Systems-GridICE – JAMM -MDS-Network Weather Service-R-GMA-Other Monitoring Systems-Ganglia and GridMon.

**UNIT – III GRID SECURITY AND RESOURCE MANAGEMENT**

Grid Security-A Brief Security Primer-PKI-X509 Certificates-Grid Security-Grid Scheduling and Resource Management-Scheduling Paradigms- Working principles of Scheduling -A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS.

**UNIT – IV DATA MANAGEMENT AND GRID PORTALS**

Data Management-Categories and Origins of Structured Data-Data Management Challenges-Architectural Approaches-Collective Data Management Services-Federation Services-Grid Portals-First-Generation Grid Portals-Second-Generation Grid Portals.

**UNIT – V GRID MIDDLEWARE**

List of globally available Middlewares - Case Studies-Recent version of Globus Toolkit and gLite - Architecture, Components and Features.

**TEXT BOOK**

1. Maozhen Li, Mark Baker, The Grid Core Technologies, John Wiley & Sons ,2005.

**REFERENCES**

1. Ian Foster & Carl Kesselman, The Grid 2 – Blueprint for a New Computing Infrastructure , Morgan Kaufman – 2004.
2. Joshy Joseph & Craig Fellenstein, “Grid Computing”, Pearson Education 2004
3. Fran Berman, Geoffrey Fox, Anthony J.G. Hey, “Grid Computing: Making the Global Infrastructure a reality”, John Wiley.

## 3. PATTERN RECOGNITION

**Objectives:**

- To introduce about variety of pattern recognition algorithms
- To provide some understanding of techniques used in the literature.
- To promote use of useful techniques in research.

**Unit – I Decision Theory**

Introduction and Bayerian Decision Theory – Introduction to pattern recognition, Systems, design cycles, learning and adoptation, Bayerian decision theory, minimum error-rate classification, classifiers, discriminant functions and decisions surfaces.

**Unit – II Parameter Estimation**

Maximum – Likelihood and bayerian parameter estimation - Maximum – Likelihood estimation, bayerian estimation, bayerian parameter estimation, Guarian case and general theory, problems of dimeusability, Hidden marker models.

**Unit – III Nonparameter Techniques**

Nonparameter Techniques - Density estimation, parazen windows, Kn – Nearest neighbour, estimation, The nearest neghlaur, rode, metris and nearest – neghron, classification, fuzzy lassification, approximation by series expansions.

**Unit – IV Discriminant functions**

Linear Discriminant functions - Linear discriminant functions and decision surfaces, generadized linear discrminant functions, The two category unicorly separate case, minimizing the perception criterion function, relaxation procedures, nonrepersable behaviour, Minimum squared-error procedures, The Ho – Kashyap Procedures, support vexter machines, multicategory generatization.

**Unit – V Multilayer Neural Networks**

Multilayer Neural Networks - Feed forward operations and classifications, back propagation algorithm, error factors, back propagation as feature & mapping, back propagation, bayer theory and probability, practical techniques for improving back propagation, regularization, complexity adjustment and pruning.

**Text / Reference Books:**


1. Richard O. Duda, Peter E. Hart and David G. Stork, “Pattern Classification” 2nd Edition, John Wiley
2. John Hertz, Andres Krogh & Richard G. Palmer, “Introduction to the theory of Neural Computation”, Addison Wesley


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## Elective Course – II

## 1. BIG DATA ANALYTICS

**COURSE OBJECTIVES:**

- To learn to analyze the big data using intelligent techniques.
- To understand the various search methods and visualization techniques.
- To learn to use various techniques for mining data stream.

**UNIT – I INTRODUCTION TO BIG DATA**

Introduction to BigData Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

**UNIT – II MINING DATA STREAMS**

Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

**UNIT – III HADOOP**

History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFS- Basics-Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce Features

**UNIT – IV HADOOP ENVIRONMENT**

Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance-Hadoop benchmarks- Hadoop in the cloud

**UNIT – V FRAMEWORKS**

Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper - IBM InfoSphere BigInsights and Streams. Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications.

**Text Book:**

1. Frank J Ohlhorst, “Big Data Analytics: Turning Big Data into Big Money”, Wiley and SAS Business Series, 2012.

## 2. AD-HOC AND WIRELESS SENSOR NETWORKS

**OBJECTIVES:**

- To learn about the issues in the design of wireless ad hoc networks
- To understand the working of protocols in different layers of mobile ad hoc and sensor networks
- To understand various security issues in ad hoc and sensor networks and solutions to the issues

**UNIT – I MAC & ROUTING IN AD HOC NETWORKS**

Introduction – Issues and challenges in ad hoc networks – MAC Layer Protocols for wireless ad hoc networks – Contention-Based MAC protocols – MAC Protocols Using Directional Antennas – Multiple- Channel MAC Protocols – Power-Aware MAC Protocols – Routing in Ad hoc Networks – Design Issues – Proactive, Reactive and Hybrid Routing Protocols

**UNIT – II TRANSPORT & QOS IN AD HOC NETWORKS**

TCP's challenges and Design Issues in Ad Hoc Networks – Transport protocols for ad hoc networks – Issues and Challenges in providing QoS – MAC Layer QoS solutions – Network Layer QoS solutions – QoS Model.

**UNIT – III MAC & ROUTING IN WIRELESS SENSOR NETWORKS**

Introduction – Applications – Challenges – Sensor network architecture – MAC Protocols for wireless sensor networks – Low duty cycle protocols and wakeup concepts – Contention- Based protocols – Schedule-Based protocols – IEEE 802.15.4 Zig bee – Topology Control – Routing Protocols.

**UNIT – IV TRANSPORT & QOS IN WIRELESS SENSOR NETWORKS**

Data-Centric and Contention-Based Networking – Transport Layer and QoS in Wireless Sensor Networks – Congestion Control – In-network processing – Operating systems for wireless sensor networks – Examples

**UNIT – V SECURITY IN AD HOC AND SENSOR NETWORKS**

Security Attacks – Key Distribution and Management – Intrusion Detection – Software based Anti-tamper techniques – Water marking techniques – Defense against routing attacks - Secure Ad hoc routing protocols – Broadcast authentication WSN protocols – TESLA – Biba – Sensor Network Security Protocols – SPINS.

**TEXT BOOK**

1. Subir Kumar Sarkar, T G Basavaraju, C Puttamadappa, "Ad Hoc Mobile Wireless Networks",Auerbach Publications, 2008.

**REFERENCES:**

1 Holger Karl, Andreas Willig, "Protocols and Architectures for Wireless Sensor Networks", John Wiley & Sons, Inc., 2005.

2 Erdal Çayırcı , Chunming Rong, "Security in Wireless Ad Hoc and Sensor Networks", John Wiley and Sons, 2009.

## 3. PERVASIVE COMPUTING

**Objectives:**

- To familiarize students with various application scenarios of Pervasive Computin
- To create awareness about the architecture and functioning of Pervasive Systems.
- To identify critical technologies and acquire knowledge about connectivity and information access via pervasive devices

**Unit – I Introduction to Pervasive Computing**

Pervasive Computing: Past, Present and Future Pervasive Computing-Pervasive Computing Market-m-Business-Application examples: Retail, Airline check-in and booking-Sales force automation-Health care-Tracking-Car information system-E-mail access via WAP

**Unit – II Device Technology**

Device Technology: Hardware-Human Machine Interfaces-Biometrics-Operating Systems-Java for Pervasive devices

**Unit – III Device Connectivity**

Device Connectivity: Protocols-Security-Device Management Web Application Concepts: WWW architecture-Protocols-Transcoding-Client authentication via internet

**Unit – IV WAP and Beyond**

WAP and Beyond: Components of the WAP architecture-WAP infrastructure WAP security issues-WML-WAP push-Products-i-Mode-Voice Technology: Basics of Speech recognition-Voice Standards-Speech applications-Speech and Pervasive Computing

**Unit – V PDA**

PDA: Device Categories-PDA operation Systems-Device Characteristics Software Components-Standards-Mobile Applications-PDA Browsers Pervasive Web Application architecture: Background-Scalability and availability Development of Pervasive Computing web applications-Pervasive application architecture.

**Text Book(s)**

1. Pervasive Computing, Technology and Architecture of Mobile Internet Applications, Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaech & Klaus Rindtorff, Pearson Education, 2006

**References**

1. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, McGraw Hill edition, 2006

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## Elective Course – III

## 1. NETWORK SECURITY

### Objectives:

- To Incorporate approaches to secure networks.
- Understand principles of web security.
- Identify and describe the common types of security threats aimed at computer networks and explain the typical techniques.

**Unit – I Introduction and Classical Encryption Techniques**

**The OSI Security Architecture** – Security Attacks – Security Services-Security Mechanisms-A Model For Network Security – Classical Encryption Techniques: Symmetric Ciphers Model- Substitution Techniques – Transposition Techniques – Rotor Machines – Steganography.

**Unit – II Public Key Cryptography**

**Principles Of Public - Key Crypto Systems** – Public key cryptosystems – Applications for public key cryptosystems – Requirements for public key cryptography - Public key cryptanalysis - **RSA Algorithm** – Description of the algorithm – The security of RSA.

**Unit – III Network Security Applications**

**Electronic Mail Security:** Pretty Good Privacy – PGP Services – Cryptographic Keys and Key Rings – General format of PGP message – PGP Message Generation – PGP Message Reception – RFC 822 – **MIME** – MIME content types – MIME transfer encodings - **S\MIME** Functionality – S\MIME content types – cryptographic algorithms – S/MIME certificate processing.

**Unit – IV Web Security**

**Web Security** Considerations – Web Security threats - **Secure Socket Layer** – SSL Architecture – SSL Record Protocol – Change cipher spec protocol – Alert protocol - handshake protocol - **Transport Layer Security - Secure Electronic Transaction** – overview – Key features – SET participants – Dual signature – payment processing –purchase request – payment authentication – payment capture.

**Unit – V System Security**

**Intruders:Classification** of intruders – Intrusion techniques - Intrusion Detection-statistical anamoly detection – rule based detection – Audit record – The Base Rate Fallacy – Distributed Intrusion Detection – Honeypots – Intrusion detection exchange format - Password Management – Password selection strategies - **Malicious Software:** Viruses And Related Threats - Virus CounterMeasures – Distributed Denial Of Service Attacks .

### Text Book:

1. William Stallings, "Cryptography and Network Security – Principles and Practices", Prentice-Hall, Third edition, 2007

**UNIT 1:Chapter 1,2; UNIT 2:Chapter 9; UNIT 3:Chapter 15; UNIT 4:Chapter 17; UNIT 5; Chapter 18,19;**

**References:**

1. Johannes A. Buchaman, "Introduction to Cryptography", Springer – Verlag
Atul Kahate, "Cryptography and Network Security", TMH

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## 2. ARTIFICIAL NEURAL NETWORKS

**Objectives:**

- To introduce the neural networks as means for computational learning.
- To present the basic network architectures for classification and regression.
- To give design methodologies for artificial neural networks.

**Unit – I BASICS OF ARTIFICIAL NEURAL NETWORK**

BASICS OF ARTIFICIAL NEURAL NETWORK: Characteristics of Neural Networks – Historical development of Neural Network principles – Artificial Neural Networks: Terminology – Models of Neuron – Topology – Basic Learning Laws.

**Unit – II ACTIVATION AND SYNAPTIC DYNAMICS**

ACTIVATION AND SYNAPTIC DYNAMICS : Introduction – Activation Dynamic Models – Synaptic Dynamic Model – Learning Models – Learning Methods.

**Unit – III FUNCTIONAL UNITS OF ANN FOR PATTERN RECOGNITION TASKS**

FUNCTIONAL UNITS OF ANN FOR PATTERN RECOGNITION TASKS: Pattern Recognition Problem – Basic Functional Units – Pattern Recognition Tasks by the Functional Units – FEED FORWARD NEURAL NETWORKS: Introduction – Analysis of Pattern Association Networks – Analysis of Pattern classification Networks – Analysis of Pattern Mapping Networks.

**Unit – IV FEEDBACK NEURAL NETWORKS**

FEEDBACK NEURAL NETWORKS : Introduction – Analysis of Linear Auto Associative FF Networks – Analysis of Pattern Storage Networks. COMPETITIVE LEARNING NEURAL NETWORKS : Introduction – Components of a Competitive Learning Network – Analysis of Feed back Layer for Different Output Functions – Analysis of Pattern Clustering Networks – Analysis of Feed Mapping Network.

**Unit – V APPLICATIONS OF NEURAL SYSTEMS**

APPLICATIONS OF NEURAL SYSTEMS : Applications of Neural Algorithms and Systems character Recognition – Expert Systems Applications – Neural Network Control Applications, Spatio – Temporal Pattern Recognition – Neocognitron and other Applications.

**Text Books:**

1. For Units I to IV: "ARTIFICIAL NEURAL NETWORKS", B.YEGNANARAYANAN, Eastern Economy edition – Chapter 1, 2.
2. For Unit – V: "INTRODUCTION TO ARTIFICIAL NEURAL SYSTEMS" JACEK M.ZURADA (1994) – Jaico Publishing House.

**Reference Books:**

1. "Introduction to the theory of Neural Computation", - J.Hertz, A.Krogh., and R.G. Palmer, Addison – Wesley 1991

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## 3. PARALLEL ALGORITHMS

**Objectives:**

- To learn parallel algorithms development techniques for shared memory and DCM models.
- To study the main classes of fundamental parallel algorithms.
- To study the complexity and correctness models for parallel algorithms

**UNIT – I INTRODUCTION**

Introduction to Parallel Algorithms – Models of computation – Selection – Mergin on EREW and CREW – Median of two sorted sequence – Fast Merging on EREW – Analyzing Parallel Algorithms.

**UNIT – II SORTING & SEARCHING**

Sorting Networks – Sorting on a Linear Array – Sorting on CRCW, CREW, EREW – Searching a sorted sequence – Searching a random sequence – Bitonic Sort.

**UNIT – III ALGEBRAIC PROBLEMS**

Permutations and Combinations – Matrix Transpositions – Matrix by Matrix multiplications – Matrix by vector multiplication.

**UNIT – IV GRAPH & GEOMETRY :** Connectivity Matrix – Connected Components – All Pair Shortest Paths – Minimum Spanning Trees – Point Inclusion – Intersection, Proximity and Construction Problems.

**UNIT – V OPTIMIZATION & BIT COMPUTATIONS**

Prefix Sums – Job Sequencing – Knapsack - Adding two integers – Adding n integers – Multiplying two integers – Selection.

**REFERENCES:**


1. Selim G. Akl, The Design and Analysis of Parallel Algorithms, Prentice Hall, New Jercy, 1989.
2. Michael J. Quinn, Parallel Computing : Theory & Practice, Tata McGraw Hill Edition, 2003.
3. Joseph JaJa, Introduction to Parallel Algorithms, Addison-Wesley, 1992.

**Elective Course – IV**

## 1. SOFTWARE QUALITY ASSURANCE AND TESTING

**Objectives:**

- To understand the fundamental concepts and theory of Software testing and Software Quality Management
- To Implement process that ensures the Software is developed with good quality standards
- To quality management methods to effectively organize staff and lead a successful development of the Software product.

**Unit – I Introduction**

Principles of Testing - Software Development Life Cycle Models.

**Unit – II Types of Testing**

White Box Testing - Integration Testing - System and acceptance testing.

**Unit – III Testing Fundamentals - 2 & Specialized Testing**

Testing Performance Testing - regression testing - Testing of Object Oriented Systems - Usability and Accessibility Testing.

**Unit – IV Test Management**

Testing Planning, Management, Execution and Reporting.

**Unit – V Test Automation**

Software Test Automation - Test Metrics and Measurements

**Text Book**

1. "Software Testing" - Srinivasan Desikan, Gopalaswamy Ramesh, Pearson Education, 2006. **[Unit-1 (Chapters - 1, 2); Unit-2 (Chapters – 3, 5, 6); Unit-3 (Chapters – 7, 8, 11, 12);Unit-4 (Chapters – 15); Unit-5 (Chapters – 16, 17)]**

**References**


1. Introducing Software testing - Louis Tamres, Addison Wesley Publications, First Edition
2. Software testing, Ron Patten, SAMS Techmedia, Indian Edition, 2001.
3. Software Quality - Producing Practical, Consistent Software - Mordechai Ben-Menachem, Gray S Marliss, Thomson Learning, 2003.

## 2. REAL TIME AND EMBEDDED SYSTEM

**Objectives:**

- To Present an overview of the real-time embedded systems.
- To Compute required for the real-time embedded systems.
- To learn the Communication required for the real-time embedded systems.

**Unit – I INTRODUCTION**

Introduction to Embedded systems – Processor and memory organization-Devices and buses for Device Networks – Device drivers and Interrupt servicing mechanism.

**Unit – II RTOS**

RTOS – Programming tools – Case studies- Hardware- software Co0design in an Embedded system

**Unit – III REAL TIME SYSTEMS**

Basic Real time concepts – Computer hardware – Language issues – Software life Cycle

**Unit – IV REAL TIME SPECIFICATIONS**

Design techniques – Real-time kernels – Intertask communication and synchronization – Real –time memory management

**Unit – V MULTIPROCESSING SYSTEMS**

Multiprocessing Systems - Hardware/Software integration- Real time Applications

**Text Book(s)**


1. Raj Kamal, 'Embedded Systems Architecture, Programming and Design', Tata Mc-Graw-Hill,2003
2. Phillip A.Laplante, "Real –Time Systems Design and Analysis, An Engineer's Handbook", Prentice-Hall of India,2002


**References**


1. R.J.A.Buhr, D.L.Bailey, "An Introduction to Real Time Systems: Design to networking with C/C++", Prentice- Hall, International, 1999. 2. Grehan Moore and Cyliax, "Real Time Programming: A guide to 32 Bit
2. Embedded Development Reading: Addison- Wisley-Longman", 1998. 3. Haeth, Steve, "Embedded systems Design", Newnes,1997.


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## 3. OPEN SOURCE TECHNOLOGIES

**Unit I Introduction to Open Source**

Open Source - Open Source vs. Commercial Software - What is Linux? - Free Software - Where I can use Linux? Linux Kernel - Linux Distributions.

**Unit II Introduction to Linux**

Linux Essential Commands - File System Concept - Standard Files - The Linux Security Model - VI Editor - Partitions Creation - Shell Introduction - String Processing - Investigating and Managing Processes - Network Clients - Installing Application.

**Unit III Apache Web Server**

Introduction - Apache Explained - Starting, Stopping and Restarting Apache - Modifying the Default Configuration - Securing Apache - Set User and Group - Consider Allowing Access to Local Documentation - Don't Allow Public_html Web sites - Apache control with .htaccess.

**Unit IV MY SQL**

Introduction to MY SQL - The show Databases and Table - The USE Command - Create Database and Tables - Describe Table - Select, Insert, Update and Delete statement - Some Administrative detail - Table Joins - Loading and Dumping a Database.

**Unit V PHP**

PHP Introduction - General Syntactic Characteristics - PHP Scripting - Commenting your code - Primitives, Operations and Expressions - PHP Variables - Operations and Expressions Control Statement - Array - Functions - Basic Form Processing - File and Folder Access - Cookies - Sessions - Database Access with PHP - MySQL - MySQL functions - Inserting Records - Selecting Records 0 Deleting Records - Update Records.

**Text Book**

1. "Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP", James Lee and Brent Ware, Dorling Kindersley (India) Pvt.
   **[Unit-1 (Chapters - 1, 2); Unit-2 (Chapters – 2); Unit-3 (Chapters – 3); Unit-4 (Chapters – 5); Unit-5 (Chapters – 12)]**

**Reference Book**

1. "Setting Up Lamp : Getting Linux, Apache, MySQL, and PHP and working Together", Eric Rosebrock, Eric Filson, Published by John Wiley and Sons, 2004.

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## MICRO PROCESSORS AND INTERFACING LAB

1. Addition - 8 bit / Multi byte numbers
2. Subtraction - 8 bit / Multi byte numbers
3. Multiplication - 8 bit / Multi byte numbers
4. Division - 8 bit / Multi byte numbers
5. Finding smallest / biggest number in a given list
6. Arranging numbers in ascending / descending order
7. Finding the presence / location of a given number / name in a list
8. Displaying characters in different forms like scrolling, blinking etc.
9. Study of DAC in volume control
10. Biometric identification like finger print, gas
11. Keyboard interfacing
12. Study of traffic lights model.