P.G. DEPARTMENT OF COMPUTER SCIENCE (SF)

Nallamuthu Gounder Mahalingam College

(Autonomous)

(An ISO 9001:2000 Certified Institution)

Accredited with 'A' Grade by NAAC

Pollachi-642001

SYLLABUS

I-IV SEMESTERS

M. Sc. COMPUTER SCIENCE (SF)

BATCH 2013-2015

S.No	Sem	Subject Code and Title		Credit points	University Examinations		
					Internal Max Mark	External Max Mark	Total Max Marks
		THEORY					
1	I	13PCS01	OBJECT ORIENTED SOFTWARE ENGINEERING	4	25	75	100
2	I	13PCS02	DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS	4	25	75	100
3	I	13PCS03	DISTRIBUTED DATABASE SYSTEMS	4	25	75	100
4	I	13PCS04	ADVANCED COMPUTER ARCHITECTURE	4	25	75	100
5	I	13PCS05	NETWORK SECURITY AND CRYPTOGRAPHY	4	25	75	100
		PRACTICAL					
6	I	13PCS06	OBJECT ORIENTED SOFTWARE ENGINEERING LAB (UML)	4	40	60	100
7	I	13PCS07	DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS LAB	4	40	60	100

S.No	Sem	Subject Code and Title		Credit points	University Examinations		
					Internal Max Mark	External Max Mark	Total Max Marks
		THEORY					
8	II	13PCS08	J2EE TECHNOLOGIES	4	25	75	100
9	II	13PCS09	ADVANCED NETWORKS	4	25	75	100
10	II	13PCS10	ADVANCED OPERATING SYSTEM	4	25	75	100
11	II	13PCS11	PRINCIPLES OF COMPILER DESIGN	4	25	75	100
12	II	13PCSE1	ELECTIVE-I (DATAMINING AND WAREHOUSING)	5	25	75	100
		PRACTICAL					
13	II	13PCS12	J2EE TECHNOLOGIES LAB	4	40	60	100
14	II	13PCS13	NETWORK PROGRAMMING LAB	4	40	60	100

S.No	Sem	Subject Code and Title		Credit points	University Examinations		
					Internal Max Mark	External Max Mark	Total Max Marks
		THEORY					
15	III	13PCS14	ADVANCED TOOLS IN COMPUTING	4	25	75	100
16	III	13PCS15	OPEN SOURCE TECHNOLOGIES	4	25	75	100
17	III	13PCS16	DIGITAL IMAGE PROCESSING	4	25	75	100
18	III	13PCSE5	ELECTIVE-II (COMPUTING TECHNOLOGIES)	5	25	75	100
		PRACTICAL					
19	III	13PCS17	OPEN SOURCE AND COMPUTING TOOLS LAB	4	40	60	100
20	III	13PCS18	DIGITAL IMAGE PROCESSING LAB	4	40	60	100

S.No	Sem	Subject Code and Title		Credit points	University Examinations		
					Internal Max Mark	External Max Mark	Total Max Marks
		PROJECT					
21	IV	13PCS19	INDUSTRIAL PROJET WORK AND VIVA - VOCE(INDIVIDUAL)	8	-	200	200
			TOTAL	90	590	1660	2250

LIST OF ELECTIVES (I & II)

S.No	Sem	Subject Code and Title		Credit points	University Examinations		
					Internal Max Mark	External Max Mark	Total Max Marks
		ELECTIVE I					
1	II	**13PCSE1**	**DATAMINING AND WAREHOUSING**	3	25	75	100
2	II	13PCSE2	EMBEDDED SYSTEMS	3	25	75	100
3	II	13PCSE3	MACHINE INTELLIGENCE	3	25	75	100
4	II	13PCSE4	NEURAL NETWORKS AND FUZZY LOGIC	3	25	75	100
		ELECTIVE II					
5	III	**13PCSE5**	**COMPUTING TECHNOLOGIES**	3	25	75	100
6	III	13PCSE6	GENETICS ALGORITHM	3	25	75	100
7	III	13PCSE7	SIMULATION AND MODELING	3	25	75	100
8	III	13PCSE8	ROBOTICS	3	25	75	100

SEMESTER I

OBJECT ORIENTED SOFTWARE ENGINEERING	
Subject Code : 13PCS01	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives

Object oriented analysis and design has emerged as a new paradigm of analysis and design of the systems. This subject is designed to help in learning object oriented analysis and design concepts. This course is having coverage of UML diagrams and will help in developing understanding in the area of system analysis and design concepts using object-oriented approach. This subject will cover different aspects of testing and SE models with explaining object modeling dynamic modeling and functional modeling.

UNIT I **(12 hours)**

Object Oriented Systems Development Life Cycle: Introduction – The software development process – building high-quality software.

Object Oriented Methodologies: Introduction: Toward Unification – Too many methodologies – Survey of some of the Object Oriented Methodologies – Rumbaugh Object Modeling Technique – The Booch Methodology – The Jacobson Methodologies.

UNIT II **(13 hours)**

UML diagrams: Class diagrams – Object diagrams – Components – Use Cases – Activity Diagrams – State diagrams – Deployment – Collaborations – Deployment.

Note: Concepts with examples only.

UNIT III **(12 hours)**

The process-The software process-Software process models-The linear sequential model-The prototyping model-The RAD model-Evolutionary software process models-The formal methods model-Fourth generation techniques. Project management concepts- Software project planning.

UNIT IV **(11 hours)**

Analysis modeling- Design concepts and principles- Design methods.

UNIT V **(12 hours)**

Software Testing-Types of testing-White box Testing-Black box Testing-Integration Testing-System and Acceptance testing-Performance Testing-Regression Testing.

TEXT BOOK

1. Grady Booch , “Object Oriented Analysis and Design”, Presley edition.
2. Grady Booch, James Raumbaugh and Ivar Jacobson, “The Unified Modeling Language User Guide” ,2nd Edition,2008.
3. Roger S. Pressman ,”Software Engineering”, Fourth Edition.
4. Srinivasan Desikan & Gopalaswamy Ramesh, “Software Testing- Principle and practices “, Seventh Edition.

REFERENCES

1. Bernd Bruegge, Allen H. Dutoit, “Object Oriented Software Engineering using UML, Patterns and Java”, Pearson 2004.
2. Craig Larman, “Applying UML and Patterns”, Pearson, 2nd Edition, 2002.

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T.Loganathan	**M.Sakthi**		

DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS	
Subject Code: 13PCS02	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives

On successful completion of the course the students should have understood the various design and analysis of the algorithms.

UNIT I **(12 Hours)**

Introduction:- algorithm definition and specification – performance analysis –Elementary Data structures:- stacks and queues – trees – dictionaries – priority queues – sets and disjoint set union – graphs – basic traversal and search techniques.

UNIT II **(13 Hours)**

Divide – and – conquer: - General method – binary search – merge sort – quick sort –The Greedy method:- General method – knapsack problem – minimum cost spanning tree –single source shortest path.

UNIT III **(13 Hours)**

Dynamic Programming - general method – multistage graphs – all pair shortest path –optimal binary search trees – 0/1 Knapsack – traveling salesman problem – flow shop scheduling.

UNIT IV **(12 Hours)**

Backtracking:- general method – 8-Queens problem – sum of subsets – graph coloring – Hamiltonian cycles – knapsack problem.

UNIT V **(10 Hours)**

Branch and bound:- The method – 0/1 Knapsack problem – traveling salesperson.

TEXT BOOK

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran "Computer Algorithms", Galgotia Publications, 2008.

REFERENCE BOOKS

1. Ellis Horrowitz, Sartaj Sahni, "Fundamentals of data structures", Galgotia Publications, 2008.
2. Alfred V.Aho, John E.Hopcroft & Jeffery D Ullman,"Data structures and Algorithms", PHI learning pvt Ltd, NewDelhi, 2009
3. Adam Drozdek, "Data Structures and Algorithms in C++", Vikas publishing house, NewDelhi, 2001.

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T.Menaka	M.Sakthi		

DISTRIBUTED DATABASE SYSTEM	
Subject Code : 13PCS03	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives

Main objective is to understand the principles and foundations of distributed databases. This course addresses architecture, design issues, integrity control, query processing and optimization, Transactions, and concurrency control & distributed transaction reliability.

UNIT I **(12 Hours)**

Distributed databases: An overview -Features of distributed Vs centralized databases -Why DDB? DDBMS-Promises / problem areas in implementing a DDB

DDBMS Architecture - DBMS Standardization - Architectural models for DDBMS-DDBMS architecture.

UNIT II **(11 Hours)**

Distributed database design -Alternative design strategies –Top down Design Process-Bottom up Design Process- Distributed design issues- Fragmentation - Types of Data Fragmentation – Horizontal Fragmentation-Vertical Fragmentation-Hybrid Fragmentation-Allocation.

UNIT III **(13Hours)**

Overview of Query processing: Query processing problems - Objectives of query processing - Complexity of relational -algebra operations - Characterization of query processors- Layers of query processing

Query decomposition & data localization - Query decomposition - Localization of distributed data

UNIT IV **(13 Hours)**

Optimization of distributed queries - Query optimization -Centralized query optimization - Join ordering in fragment queries. Distributed query optimization Algorithms.

Management of Distributed Transactions - Framework for transaction management - Supporting atomicity of distributed transactions- Concurrency control of distributed transactions- Architectural aspects of distributed transactions.

UNIT V **(11 Hours)**

Concurrency control

Foundations of distributed concurrency control: Serializability in a Centralized Database-Serializability in a Distributed Database - 2-Phase-Locking as a Distributed Concurrency Control Method-Time and Timestamps in a Distributed Database.

Distributed deadlocks: Deadlock Detection Using Centralized or Hierarchical Controllers-Distributed Deadlock Detection-False Deadlocks-Distribution Deadlock Prevention.

Concurrency control based on timestamps: Basic Timestamp Mechanism-The Conservative Timestamp Method.

Optimistic methods for distributed concurrency Control: Validation using Timestamps on Data Items and Transactions- Validation using only Transaction Timestamps.

Distributed DBMS reliability

Reliability concepts & measures- Failures & fault tolerance in distributed systems- Failures in DDBMS- Local reliability protocols- Distributed reliability protocols- Dealing with site failures- Network partitioning.

TEXT BOOKS

1. M. Tamer Ozsu and Patrick Valduriez, "Principles of Distributed Database Systems", Pearson Education Asia, 3rd Edition 2011.
2. Stefano Ceri and Giuseppo Pelagatti , "Distributed Database; Principles & Systems",Tata McGraw-Hill International Editions 2nd edition 1985.

REFERENCES

1. Raghuramakrishnan and Johannes Gehrke, "Database Management Systems" 3rd edition 2002.
2. Saeed Rahimi and Frank S.Haung, "Distributed database management systems : a practical approach" , Hoboken, N. J. Wiley Publications 2nd edition.
3. David A. Bell, Jane B. Grimson, "Distributed Database systems", Addison-Wesley Pub. Co., 2nd edition 1992.

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M.Dhavapriya	**M.Sakthi**		

ADVANCED COMPUTER ARCHITECTURE	
Subject Code : 13PCS04	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives

On successful completion of the course the students should have understood the trends and principles of parallel processing in computers.

UNIT I **(11 Hours)**

Introduction to parallel processing – Trends towards parallel processing – Parallelism in uniprocessor Systems – Parallel Computer structures – Architectural Classification schemes – Flynn' Classification – Feng's Classification – Handler's Classification – Parallel Processing Applications

UNIT II **(12 Hours)**

Solving Problems in Parallel: Utilizing Temporal Parallelism – Utilizing Data Parallelism – Comparison of Temporal and Data Parallel Processing – Data parallel processing with specialized Processor – Inter-task Dependency. Instructional Level Parallel Processing – Pipelining of Processing Elements – Delays in Pipeline Execution – Difficulties in Pipelining

UNIT III **(13 Hours)**

Principles Linear Pipelining – Classification of Pipeline Processors – General Pipeline and Reservation tables – Arithmetic Pipeline – Design Examples – Data Buffering and Busing structure – Internal forwarding and Register Tagging – Hazard Detection and Resolution – Job sequencing and Collision prevention – Vector processing requirements – Characteristics –Pipelined Vector Processing methods

UNIT IV **(13 Hours)**

SIMD Array Processors – Organization – Masking and Data routing – Inter PE communications – SIMD Interconnection Networks – Static Vs Dynamic – Mesh connected Iliac – Cube interconnection network – Shuffle-Exchange and Omega networks - Multiprocessor Architecture and programming Functional structures – interconnection Networks.

UNIT V **(11 Hours)**

Parallel Algorithms: Models of computation – Analysis of Parallel Algorithms Prefix Computation – Sorting – Searching – Matrix Operations.

TEXT BOOKS

1. Kai Hwang, Faye A. Briggs, "Computer Architecture and Parallel Processing", Tata McGraw-Hill International Editions, 1985.

2. V. Rajaraman, C. Siva Ram Murthy, "Parallel Computers Architectures and Programming", PHI, 2003.

REFERENCE S

1. Kai Hwang, "Advanced Computer Architecture –Parallelism, Scalability, Programmability", Tata Mcgraw Hill, 1993.
2. Michael J. Quinn, "Parallel Computing Theory and Practice", TMCH, Second Edition, 2002.
3. Barry Wilkinson, Micheal Allen, "Parallel Programming: Techniques and Applications", Prentice Hall, 1999.

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M.Sakthi	M.Sakthi		

NETWORK SECURITY AND CRYPTOGRAPHY	
Subject Code : 13PCS05	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives

On Successful completion of the course the students should have understood the process of implementing the cryptographic algorithms.

UNIT I **(11 Hours)**

Introduction to Cryptography – Security Attacks – Security Services –Security Algorithm - Stream cipher and Block cipher - Symmetric and Asymmetric-key Cryptosystem Symmetric Key Algorithms: Introduction – DES – Triple DES – IDEA – Blowfish –RC5.

UNIT II **(14 Hours)**

Public-key Cryptosystem: Introduction to Number Theory - RSA Algorithm – Key Management - Diffie-Hell man Key exchange – Elliptic Curve Cryptography Message Authentication and Hash functions – Digital Signatures and Authentication Protocol.

UNIT III **(12 Hours)**

Network Security Practice: Authentication Applications – Kerberos – X.509 Authentication services and Encryption Techniques. E-mail Security – PGP – S / MIME.

UNIT IV **(13 Hours)**

Web Security - Secure Socket Layer – Secure Electronic Transaction. System Security - Intruders and Viruses – Firewalls– Password Security.

UNIT V **(10 Hours)**

Case Study: Implementation of Cryptographic Algorithms – RSA – DSA – ECC (C /JAVA Programming).Network Forensic – Security Audit - Other Security Mechanism: Introduction to Stenography – Quantum Cryptography – Water Marking - DNA Cryptography.

TEXT BOOKS

1. William Stallings, “Cryptography and Network Security”, PHI/Pearson Education,2008

2. Bruce Schneir, “Applied Cryptography”, CRC Press,2000.

3. A.Menezes, P Van Oorschot and S.Vanstone, “Hand Book of Applied Cryptography”, CRC Press, 1997

4. Ankit Fadia,”Network Security”, MacMillan,2003.

REFERENCE S

1. William Stallings,” Data and Computer Communications”, Pearson Education, sixth edition, 2000.

2. Douglas E. Comer, David L. Stevens, “Internetworking with TCP/IP Volume II”,Prentice Hall, 1991

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A.Jagadeeswaran	**M.Sakthi**		

OBJECT ORIENTED SOFTWARE ENGINEERING AND TESTING LAB	
Subject Code : 13PCS06	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Practical assignment: Create a UML diagrams for the following applications.

- Single sign-on to Google Application
- Banking system
- ATM Processing System
- Quiz system
- Student information system
- Gas agency
- Tourism and travel management system
- Online shopping Domain
- Construction management system
- Library domain model
- Inventory management system
- payroll processing system
- Hotel management system
- Ration shop management system
- Real estate

Note: The applications are developed using Class, Object, Use case, Sequence, Activity, Collaboration, Deployment, Component diagrams.

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S.Sharmila	**M.Sakthi**		

DESIGN AND ANALYSIS OF COMPUTER ALGORITHM LAB	
Subject Code: 13PCS07	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Program to implement the concept for

- Permutation Generator
- Towers of Hanoi
- Circular Queue
- Stack using Linked list
- Doubly linked list
- Tree traversal(inorder, preorder, postorder)
- Graph traversal Using Depth first search
- Graph traversal Using Breadth first search
- Binary search
- Merge sort using divide and conquer
- Quick sort
- Insertion of element into heap
- Implementation of 8-Queens problem
- Traveling sales man problem
- Knapsack using Greedy Method
- Minimum Cost Spanning tree
- Optimal Binary Search
- 0/1 Knapsack problem using dynamic programming
- All pairs shortest path
- Flow shop scheduling.
- Knapsack problem using backtracking

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SEMESTER II

J2EE TECHNOLOGIES	
Subject Code: 13PCS08	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives

On Successful completion of the course the students should have understood the features of Java and the Web services.

UNIT-I **(10 Hours)**

Introduction to JFC: JPanel-JFrame-JApplet-JSplitPane-JTabbedPane-JViewport-JMenu-Items and Labels - JtextField - JTextArea - JButtons - JButton Classes - JCheckBoxes - JRadioButton-JComboBoxes-JList.

UNIT-II **(10 Hours)**

Advanced JFC Components: JTrees-JTables-JInternalFrame-JDesktop Manager-JProgressbar.

UNIT-III **(12 Hours)**

Java Beans: Introduction to Java Bean-Advantages of a Java Bean-Application Builder tools-The Bean Developer Kit(BDK)-Jar files-Introspection-Developing a Simple Bean-Using Bound Properties-Using Bean Info Interface-Constrained Properties-Persistence-Customizers-Java Bean API.

UNIT–IV **(14 Hours)**

Servlet Overview and Architecture: Movement to Server Side Java-Practical Applications for Java Servlets-Java Servlet Alternatives-Reason to use Java Servlets-Java Server Architecture –Servlet Basics-The Lifecycle of Servlet-A Basic Servlet.

Servlet Chaining: Definition for Servlet Chaining-Uses of Servlet Chains-A Practical example using Servlet Chaining-Servlets and JDBC-Two Tier and Three Tier Database access models-JDBC Servlet-Session Tracking-Using Cookies-Using Session Objects.

UNIT-V **(14 Hours)**

Java Server Page (JSP): Beans - Conditions - Directives - Declarations – ImplicitVariables -Expressions.

RMI (Remote Method Invocation) : Introduction - RMI Architecture-Bootstrapping and RMI Registry - The RMI Compiler - Object Specialization and Parameter Passing - A Simple example.

TEXT BOOKS

1. Patric Naughton,Herbert Schildt, " The Complete Reference-Java", Tata McGraw Hill, 5th Edition ,2001.
2. Sams Series,James GoodWill, "Developing Java Servlets",SAMS Techmedia,1st Edition 2004.
3. Dr.Sathya Raj pantham, "Pure Java Swing" , Tech Media Publication 2000.
4. Sam Series, "Java RMI", Tata McGraw Hill, 1996

REFERENCES

1. Harley Hahn, "The Internet – Complete Reference", Second edition, Tata McGraw-Hill International Editions, 1996.
2. Patric Naughton, "The Java Hand Book", Tata McGraw Hill, 1996.
3. Stephen Potts, Mike Kopack, "Web Services", Pearson Education, 2004.

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ADVANCED NETWORKS	
Subject Code : 13PCS09	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives

On Successful completion of the course the students should have gained in-depth knowledge of Internet protocols and their functionalities.

UNIT I **(10 Hours)**

Introduction and overview: The Motivation For Internetworking-The TCP/IP Internet-Internet Services-History and scope of the Internet-The Internet Architecture Board-The IAB Reorganization. Review Of Underlying Network Technologies: Two Approaches To network Communication-Wide Area And Local Area Networks-Ethernet Technology-Switched Ethernet-Asynchronous Transfer Mode.

Internetworking Concept And Architectural Model-Classful Internet Addresses-Mapping Internet Addresses To Physical Addresses(ARP): The Address Resolution Problem-Two Types Of Physical Addresses-Resolution Through Direct Mapping-Resolution Through Dynamic Binding-The Address Resolution Cache-ARP Cache Timeout-ARP Refinements-Relationship Of ARP To Other Protocols-ARP Implementation-ARP Encapsulation And Identification-ARP Protocol Format-Automatic ARP Cache Revalidation-Reverse Address Resolution(RARP).

UNIT II **(14 Hours)**

Internet Protocol: Connectionless Datagram Delivery (IPv4): A Virtual Network-Internet Architecture and Philosophy-The Conceptual Service Organization-Connectionless Delivery System-Purpose of the Internet Protocol-The IPv4 Datagram-Internet Datagram Options.Internet Protocol: Forwarding IP Datagrams: Forwarding In An Internet-Direct And Indirect Delivery-Table-Driven IP Forwarding-Next-Hop Forwarding- The IP Forwarding Algorithm-Forwarding With IP Addresses- Internet Protocol-Error And Control Messages(ICMP): The Internet Control Message Protocol-Error Reporting Vs. Error Correction-ICMP Message Delivery-ICMP Message Format-Testing Destination Reachability And Status(ping)-Echo Request And Reply Message Format-Reports Of Unreachable Destinations-Congestion And Datagram Flow Control-Source Quench Format-Classless And Subnet Address Extensions(CIDR): Review Of Relevant Facts-Minimizing Network Numbers-Proxy ARP-Subnet Addressing-Flexibility In Subnet Address Assignment-Variable-Length Subnets-Implementation Of Subnets With Masks-Subnet Mask Representation-Forwarding In The Presence Of Subnets-The Subnet Forwarding Algorithm-A Unified Forwarding Algorithm-Broadcasting To Subnets-Protocol Layering.

UNIT III **(12 Hours)**

User Datagram Protocol(UDP): Identifying The Ultimate Destination-The User Datagram Protocol-Format Of UDP Messages-UDP Pseudo-Header-UDP Encapsulation And Protocol Layering-Layering And The UDP Checksum Computation-UDP Multiplexing, Demultilplexing , And Ports-Reserved And Available UDP Port Numbers.

Reliable Stream Transport Service(TCP)- Routing Architecture: Cores, Peers, And Algorithms: The Origin Of Routing Tables-Forwarding With Partial Information-Original Internet Architecture And Cores-Beyond The Core Architecture To Peer Backbones-Automatic Route Propagation-Distance Vector(Bellman-Ford) Routing-Reliability And Routing Protocols-Link-State(SPF) Routing-Routing Between Peers(BGP)- BGP Characteristics-BGP Functionality And Message Types-BGP Message Header-BGP OPEN Message-BGP UPDATE Message-Compressed Mask-Address pairs-BGP path Attributes-BGP KEEPALIVE Message-The Internet Routing Architecture-BGP NOTIFICATION Message.

UNIT IV **(12 Hours)**

Internet Multicasting: Hardware Broadcast-Hardware Origins Of Multicast-Ethernet Multicast-IP Multicast-The Conceptual Pieces-IP Multicast Addresses-Multicast Address Semantics-mapping IP Multicast To Ethernet Multicast-Hosts And Multicast Delivery -Basic Multicast Forwarding paradigms-Consequences Of TRPF-Multicast Trees-The Essence Of Multicast Route Propagation-Reverse Path Multicasting-Multicast Routing Protocols-Reliable Multicast And ACK Implosions.Mobile IP-Mobility, Routing, and Addressing-Mobile IP Characteristics- The Two-Crossing Problem-Communication With Computers On The Home Network-Client-Server Model Of Interaction-Bootstrap And Auto-configuration (DHCP)-The Domain Name System(DNS)

UNIT V **(12 Hours)**

Remote Login And Desktop (TELNET, SSH): Remote Interactive Computing-TELNET Protocol-Accommodating Heterogeneity-Passing Commands That Control The Remote Side-Forcing The Server To Read A Control Function-TELNET Options-TELNET Option Negotiation-Secure Shell (SSH)-Other Remote Access Technologies. File Transfer And Access(FTP, TFTP, NFS)-Electronic mail(SMTP, POP, IMAP, MIME)-World Wide Web (HTTP)-Network Management(SNMP)-A Next Generation IP(IPv6).

TEXT BOOKS

1. Douglas E. Comer, “Internetworking with TCP/IP Volume I”, Prentice Hall, 2010.

REFERENCES

1. Douglas E. Comer, David L. Stevens, “Internetworking with TCP/IP Volume II”, Prentice Hall, 2010. Uyless Black, “TCP/IP & Related Protocols”, Tata McGraw-Hill, 2005.

2. A.Menezes, P Van Oorschot and S.Vanstone, “Hand Book of Applied Cryptography”, CRC Press, 2011.

3. Ankit Fadia,”Network Security”, MacMillan, 2003.

4. Achyit S Godbole, ”Data Communications And Computer Networks”, - Tata McGraw Hill, fourteenth edition, 2011.

Compiled by Name with Signature	Verified by HOD Name with Signature	COE	REC
R.Nandhakumar	M.Sakthi		

ADVANCED OPERATING SYSTEMS	
Subject Code: 13PCS10	**Total Hours:60**
Credits : 4	**Hours/Week :5**

Objectives

On successful completion of the course the students should have understood the concepts of Operating System, understood the Inter-process communication, understood the concepts distributed Operating System .

UNIT I (11 Hours)

Distributed Computer Operating System Fundamentals: What is a Distributed Computing System?-Evolution of Distributed Computing Systems- Distributed Commuting System Models-Why are Distributed Computing System Gaining Popularity? - What is a Distributed Operating System? - Issues in Designing a Distributed Operating System- Introduction to DEC.

Message Passing: Introduction- Desirable Features of a Good Message Passing- Synchronization- Buffering- Multidatagram Messages - Encoding and Decoding of Message Data- Process Addressing- Failure Handling- Group Communication.

UNIT II (11 Hours)

Remote Procedure Calls: Introduction- The RPC Model- Transparency of RPC- Implementing RPC Mechanism- Stub Generation- RPC Messages- Marshaling Arguments and Results- Server Management- Parameter-Passing Semantics- Call Semantics- Communication Protocols for RPCs- Complicated RPCs- Client-Server Binding- Exception Handling- Security- Some Special Types of RPCs- RPC in Heterogeneous Environments- Lightweight RPC- Optimizations for Better Performance.

UNIT III (13 Hours)

Distributed Shared Memory: Introduction- General Architecture of DSM System- Design and Implementation Issues of DSM- Granularity- Structure of Shared Memory Space- Consistency Models- Replacement Strategy- Thrashing- Other Approaches to DSM- Heterogeneous DSM- Advantages of DSM.

Synchronization: Introduction- Clock Synchronization- Event Ordering- Mutual Exclusion- Deadlock- Election Algorithms.

UNIT IV **(12 Hours)**

Resource Management: Introduction- Desirable Features of a Good Global Scheduling Algorithm- Task Assignment Approach- Load-Balancing Approach- Load-Sharing Approach.

Process Management: Introduction- Process Migration- Threads.

UNIT V **(13 Hours)**

Distributed File Systems: Introduction- Desirable Features of a Good Distributed File System- File Models- File-Accessing Models- File-Sharing Semantics- File-Caching Schemes- File Replication- Fault Tolerance- Atomic Transactions- Design Principles.

Naming: Introduction- Desirable Features of a Good Naming System- Fundamental Terminologies and Concepts-System-Oriented Names- Object-Locating Mechanisms- Human-oriented Names-Name Caches- Naming and Security.

TEXT BOOK

1. Pradeep k. Sinha, "Distributed Operating Systems Concepts and Design", PHI publications 3rd edition, 2000.

REFERENCES

1. James L. Peterson & A. Silberschatz, "Operating System Concepts", Addison Wesley, World Student Edition 2nd Edition ,2001.

2. Andrew S. Tenenbaum, " Modern Operating Systems", Prentice Hall, India

3. Dietel H.M.," An Introduction to Operating Systems", Addison Wesley, World Student Edition,2000.

Compiled by Name with Signature	Verified by HOD Name with Signature	COE	REC
S. Sharmila	M.Sakthi		

PRINCIPLES OF COMPILER DESIGN	
Subject Code : 13PCS11	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives

On successful completion of the course the students should have to understood the different phases of compiler. One can design C compiler on his own.

UNIT I (10 Hours)

Introduction : Structure of a compiler - Compiler writing tools - Basic constructs of high level programming languages : Data structures, parameter transmission. Lexical Analysis - Role of a lexical analyzer - Finite automata - Regular expressions to finite automata Minimizing the number of states of a deterministic finite automaton - Implementation of a lexical analyzer.

UNIT II (12 Hours)

Parsing techniques - Context free grammars - Derivations and parse - Capabilities of context free grammars. Top down bottom up parsing - Handles - Shift reduce parsing - Operator - Parsing - recursive descent parsing - Predictive parsing.

UNIT III (13 Hours)

Automatic parsing techniques - LR parsers - Canonical collection of LR (0) items – Construction of SLR parsing tables - LR(l) sets of items construction - Construction of canonical LR parsing tables.

UNIT IV (13 Hours)

Syntax Directed Translation - Semantic actions - Implementation of syntax directed translators - Intermediate code : Postfix notation: quadruples: Indirect triples - methods of translation of assignment statements, Boolean expressions and control statements.

UNIT V (12 Hours)

Symbol tables and c ode generations - Representing information in symbol table - Data structures for symbol tables - Introduction to code optimization: Basic blocks: Dag representation – Error deduction and recovery - Introduction to code generation.

TEXT BOOK

1. Aho. A.V and Ullman J.D, “Principles of Compiler Design”, Addison Wesley publishing company, 2002.

REFERENCES

1. Dhamdhere D.M, “Compiler construction principles and practice”, Mac Millan India Ltd, 2008.
2. Holub Allen I, “Compiler design in C”, PHI learning pvt Ltd, Delhi, 2010.
3. V.Aho Etal, “ Principles of Compiler design”, Narosa publishing house,2002.

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ELECTIVE I

S.No	SUBJECT CODE	TITLE
1	**13PCSE1**	**DATAMINING AND WAREHOUSING**
2	13PCSE2	EMBEDDED SYSTEM
3	13PCSE3	MACHINE INTELLIGENCE
4	13PCSE4	NEURAL NETWORKS AND FUZZY LOGICS

DATAMINING AND WAREHOUSING	
Subject Code : 13PCSE1	**Total Hours : 60**
Credits : 5	**Hours/Week : 5**

Objectives

On Successful completion of the course the students should have understood the Association rules, Clustering techniques and Data warehousing.

UNIT I **(11 Hours)**

Basic data mining tasks – data mining versus knowledge discovery in databases – data mining issues – data mining metrics – social implications of data mining – data mining from a database perspective.

Data mining techniques: Introduction – a statistical perspective on data mining – similarity measures – decision trees – neural networks – genetic algorithms.

UNIT II **(12 Hours)**

Classification: Introduction – Statistical – based algorithms - distance – based algorithms – decision tree - based algorithms - neural network – based algorithms –rule – based algorithms – combining techniques.

UNIT III **(13 Hours)**

Clustering: Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms - Partitional Algorithms.

Association rules: Introduction - large item sets - basic algorithms – parallel & distributed algorithms – comparing approaches- incremental rules – advanced association rules techniques – measuring the quality of rules.

UNIT IV **(12 Hours)**

Data warehousing: an introduction - characteristics of a data warehouse – data marts – other aspects of data mart. Online analytical processing: introduction - OLTP & OLAP systems– data modeling –star schema for multidimensional view –data modeling – multifact star schema or snow flake schema – OLAP TOOLS – State of the market – OLAP TOOLS and the internet.

UNIT V **(12 Hours)**

Developing a data WAREHOUSE: why and how to build a data warehouse –data warehouse architectural strategies and organization issues - design consideration – data content – metadata distribution of data – tools for data warehousing – performance considerations – crucial decisions in designing a data warehouse.

Applications of data warehousing and data mining in government: Introduction -national data warehouses – other areas for data warehousing and data mining.

TEXT BOOKS

1. Margaret H. Dunham, "Data mining introductory and advanced topics", Pearson education, 2003.
2. C.S.R. Prabhu, "Data warehousing concepts, techniques, products and a applications", PHI, Second Edition.

REFERENCES

1. Jiawei Han & Micheline Kamber, " Data mining Concepts & Techniques", 2001, Academic press.
2. Arun K.Pujari, " Techniques", Universities Press (India) Pvt. Ltd., 2003.
3. Alex Berson, Stephen J. Smith, "data warehousing, data mining, & OLAP, TMCH, 2001.

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EMBEDDED SYSTEMS	
Subject Code : 13PCSE2	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives

On successful completion of the course the students should have to understood the different types Embedded systems processors and its solutions in programming concepts using C and C++.

UNIT I **(13 hours)**

INTRODUCTION: Introduction to Embedded systems, processor in the system, Other hardware units, Software Embedded into a system, Exemplary Embedded Systems, Embedded System-On-Chip(SOC) and in VLSI Circuit. Processor and Memory Organisation: Structural units in processor, Memory Devices, Memory selection for Embedded system, Allocation of memory to program segments and blocks and memory map of a system, Direct memory access

UNIT II **(10 hours)**

Devices and Buses for Device Networks : I/O Devices, Device drivers, Parallel port device drivers in a system, Serial port device drivers in a system, Devices drivers for internal programmable timing devices, Interrupt servicing mechanism, Context and periods for context switching, Deadline and interrupt latency.

UNIT III **(13 hours)**

Programming concepts and embedded programming in C and C++:Software programming in assembly language and in high level language, 'C' program elements :header and source files and preprocessor directives, program elements: macros and functions, program elements : data types, data structures, modifiers, statement, loops and pointers, queues, stacks, list and ordered lists, embedded programming in C++,embedded programming in java, 'c' program compiler and cross-compiler, source code engineering tools for embedded C/C++, optimisation of memory needs.

UNIT IV **(12 hours)**

Program modeling concepts in single and multiprocessor systems software-development process: modeling processes for software analysis before software implementation, programming models for event controlled or response time constrained real time programs, modeling of multiprocessor systems. software engineering practices in the embedded software development process: software algorithm complexity, software development process life cycle and its models, software analysis, software design, software implementation, software testing, validating and debugging, real time programming issues and during the software development process, software project management, software maintenance.

UNIT V **(12hours)**

Inter-process communication and synchronization of processes, tasks and threads: multiple processes in an application, problem of sharing data by multiple tasks and routines, inter process communication, real time operating systems: operating system services, I/O subsystem, network operating systems, real-time and embedded system operating systems, interrupt routines in RTOS environment: handling of interrupt source call by the RTOS,RTOS task scheduling models, interrupt latency and response times of the tasks as performances matrices

TEXT BOOK

1. Raj Kamal, "Embedded Systems" , Architecture, programming and design Tata McGraw-Hill International Editions ,2008.

REFERENCES

1. Steve Heath, Elsevier, "Embedded Systems Design",Elsevier India pvt Ltd, 2nd Edition,2003
2. Qing Li & carotene Yao, "Real Time Concepts for Embedded System", CMP books, NewYork,2006.

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MACHINE INTELLIGENCE	
Subject Code: 13PCSE3	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives

On successful completion of the course the students should have to understood the different types of Intelligence problems and its solutions.

UNIT I **(12 hours)**

Introduction: What is AI?-History of AI?-Intelligent Agents- Agents and Environment-Good Behavior: Concept of Rationality-The nature of Environments- the Structure of Agents. Solving problems by searching-Example problems-searching for solutions-Uninformed search strategies-Searching with partial Information.

UNIT II **(13 hours)**

Informed search and exploration-Informed search strategies-Heuristic functions-Local search algorithms and optimization problems-local search in continuous spaces-Constraint satisfaction problems-backtracking search for CSPs-local search for constraint satisfaction problems-The structure of problems-Adversarial search-games-optimal decisions in games-Alpha beta pruning-Imperfect, real-time Decisions.

UNIT III **(13 hours)**

Knowledge Representation: first order logic (FOL) –Syntax and semantics of FOL – Using FOL- Knowledge Engineering in FOL-Inference in FOL-Propositional Vs first order inference- Unification and Lifting-Forward chaining-backward chaining-categories and objects-actions –situations-Events.

UNIT IV **(11 hours)**

Learning: Learning from Observations-forms of learning-Inductive learning-learning decision trees-Ensemble Learning-Knowledge in learning-Logical formulation of learning – knowledge in learning-Explanation based learning-learning using relevance information-Inductive logical programming.

UNIT V **(11 hours)**

Communication- communication as action –A formal grammar for fragment of English-Syntactic Analysis-Augmented Grammars-Semantic Interpretation-Ambiguity and disambiguation –discourse understanding-Grammar Induction.

TEXT BOOK

1. Stuart Russel, Peter Norwig, "Artificial Intelligence – A modern approach", Pearson Education, 2nd Edition,2002.

REFERENCES

1. Elaine Rich, Kevin Knight, "Artificial Intelligence", Tata McGrawHill. 2nd Edition,2003.

2. D.W . Paterson," Introduction To Artificial Intelligence And Expert Systems", Prentice Hall Of India. 2nd Edition.1990

3. Peter Jackson, "Introduction To Expert Systems" Addison Wesley Pub. Company. 2nd Edition,1990

4. R.J. Schalkoff," Artificial Intelligence and Engineering Approach " MC-Graw Hill,1st Ed.1990

5. N.J. Nilsson," Principles of Artificial Intelligence ",Narrows Publishing House.1992

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NEURAL NETWORKS AND FUZZY LOGICS	
Subject Code: 13PCSE4	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives

The concept of fuzziness involved in various systems and provide comprehensive knowledge of fuzzy logic control and adaptive fuzzy logic and to design the fuzzy control using genetic algorithm. To provide adequate knowledge of application of fuzzy logic control to real time systems.

UNIT I **(12 Hours)**

INTRODUCTION TO NEURAL NETWORKS

Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Characteristics of ANN,McCulloch-Pitts Model, Historical Developments, Potential Applications of ANN.

UNIT II **(12 Hours)**

ESSENTIALS OF ARTIFICIAL NEURAL NETWORKS

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

UNIT III **(12 Hours)**

SINGLE LAYER FEED FORWARD NETWORKS

Introduction, Perception Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perception Networks, Limitations of the Perception Model.

UNIT IV **(12 Hours)**

MULTI- LAYER FEED FORWARD NETWORKS

Credit Assignment Problem, Generalized Delta Rule, Derivation of Backpropagation (BP) Training, Summary of Backpropagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

UNIT V **(12 Hours)**

ASSOCIATIVE MEMORIES

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

TEXT BOOKS

1. Jacek M. Zurada, "Introduction to Artificial Neural Systems", Jaico Publishing home, 2002.
2. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", Tata McGraw-Hill International Editions , 2008.

REFERENCES

1. Laurance Fausett, Englewood cliffs, N.J., "Fundamentals of Neural Networks", Pearson Education, 1992.
2. H.J. Zimmermann, "Fuzzy Set Theory & its Applications", Allied Publication Ltd., 1996.
3. Simon Haykin, "Neural Networks", Pearson Education, 2003.
4. John Yen & Reza Langari, "Fuzzy Logic – Intelligence Control & Information", Pearson Education, New Delhi, 2003.

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Lab Exercise

J2EE TECHNOLOGIES LAB

Subject Code: 13PCS12	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

- Write an 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.
- Create a Japplet using swing control, which will create the layout shown below and handle necessary events.

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

OK Cancel

- Use JDBC connectivity and create Table, insert and update data.
- Write a program in Java to implement a Client/Server application using RMI.
- Write a program in Java to create a Cookie and set the expiry time of the same.
- Write a program in Java to create Servlet to count the number of visitors to a web page.
- Write a program in Java to create a form and validate a password using Servlet.
- Develop a Java Bean to demonstrate the use of the same.
- Write a program in Java to convert an image in RGB to a Grayscale image.
- Develop Chat Server using Java.

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NETWORK PROGRAMMMING LAB	
Subject Code : 13PCS13	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

- Design a LAN with a given set of requirements. The design should include topology, hardware and software requirements like cable, connectors,hubs/switches/bridges, interface cards along with a budget for the LAN.
- Design and Implement a GUI or text based network monitoring tool to record network statistics like packets sent and received, percentage errors, desktop grabbing, remote monitoring.
- Design a simple wireless communication system between two computers.

ICMP

- Define struct called state information that contains all the local information that an ICMP module needs to access or modify.
- Define a struct called ICMP pseudoheader that can hold entries for header needed to calculate the checksum for ICMP. Using this declaration, write a function called ICMPchsum to calculate checksum field for an ICMP packet. The function takes two arguments
    - pointer to ICMP packet
    - pointer to header.

BootStrap and Autoconfiguration

- Create a header file to include all constants that you think are needed to implement BOOTP algorithm in C. (use #define directive)
- Create a header file to include all constants that you think are needed to implement DHCP algorithm in C. (use #define directive)

Routing Protocols

- Write a C code to implement RIP

Transport Layer

- Write a program to simulate main module of TCP

Socket and Client Server Model

- Design a client server application for solving roots of a quadratic equation by making use of appropriate API's

Application Layer

- Implement FTP / TFTP / SNMP / SMTP
- Design a chat application with the following features: Single/ Multiline messages, emoticons, single as well as multiple windows, conversation with single and multiple people.
- Design and implement a firewall for your network. It should have the following facilities: blocking specific IP address, pages with specific content.

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SEMESTER III

ADVANCED TOOLS IN COMPUTING	
Subject Code: 13PCS14	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives

On Successful completion of the course the students should have gained knowledge in XML, DOM technologies and understood the basics of ASP.NET, and Programming in ASP.NET and Web forms.

UNIT I **(10 hours)**

DOTNET Framework -Introduction to DOTNET- DOT NET class framework- Common Language Runtime- Overview- Elements of .NET application - Memory Management- Garbage Collector : Faster Memory allocation ,Optimizations- Common Language Integration- Common type system Reflection API- User and Program Interface VB.NET: Control flow –conditional statements-Loops-methods**.**

UNIT II **(12 hours)**

ASP.NET Controls: Overview of dynamic web page, introduction & features of ASP.NET, understanding ASP.NET controls, applications, web servers, installation of IIS. Web forms, web form controls, server controls, client controls, adding controls to web form, buttons, text box, labels, checkbox, radio buttons, list box. Adding controls a runtime, Running a web application, creating a multiform web project, Form validation: client side and server side validation, Validation controls: required field comparison range, Calendar control, Ad rotator control, Internet Explorer control.

UNIT III **(12 hours)**

ADO.NET: Overview of ADO.NET, Introducing ADO.NET and data management – Characteristics of ADO.NET, ADO.NET data Access- SQL connections –Data binding-types of Data binding- single valued Data binding-Data List ,Data Grid and repeater using templates with datalist –Data binding with multiple templates-selecting and editing.

UNIT IV **(13 hours)**

XML in .NET: Xml's Role in .NET-XML Basics basics-attributes –comments-XML classes-XML validation-XML display and Transforms-XML in ADO.NET

Web Services: Introduction, State management, view state, session state, application state, service description language, building & consuming a web service. Web application development, Caching, Threading concepts, Creating threads in .NET, Managing threads, Thread Synchronization, features of .NET, role based security & code access security, permissions.

UNIT V **(13 hours)**

C#: Introduction Language features- Variables and Expressions, type conversion - Flow Control- Functions, Delegate- Debugging and error handling, exception handling (System Defined and User Defined)- Object Oriented Concepts- Defining classes, class members, Interfaces, properties- Access modifiers, Implementation of class, interface . And properties- Concept of hiding base class methods, Overriding- Event Handling - Collections, Comparisons and Conversions- Defining and using collections, Indexers, iterators- Type comparison, Value Comparison- Overloading Conversion operators, as operator- Generics- Using generics- Defining Generics, generic Interfaces, Generic methods-Generic Delegates.

TEXT BOOKS

1. Jeffrey R. Shapiro, "VB.NET Complete Reference", Tata McGraw-Hill Publication Edition 2002.

2. Dave Mercer, "ASP.NET: A Beginner's Guide", Tata McGraw-Hill Publication Company Limited, Edition 2002.

3. H.M. Deitel P.J.Deitel T.R. Nieto T.M. Lin P.Sadu , "XML How to Program",Tata McGraw-Hill Publishing, Edition 2002.

4. The complete reference ASP.NET,Tata McGraw Hill, 5th Edition.

REFERENCES

1. Steven Holzner, "Visual Basic .NET Programming Black Book" ,Tata McGraw-Hill Publication

2. Jeffrey R. Shapiro ,"VB.NET Complete Reference", Tata McGraw-Hill Publication

3. Mc Downell, "ASP.NET complete reference ",Jeffrey R. Shapiro ,"VB.NET Complete Reference", Tata McGraw-Hill Publication

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OPEN SOURCE TECHNOLOGIES	
Subject Code: 13PCS15	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives

On Successful completion of the course the students should have gained knowledge in PHP Programming and Linux.

UNIT I **(11 Hours)**

OPEN SOURCE

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

UNIT II **(12 Hours)**

LINUX

Introduction: 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 **(13 Hours)**

APACHE

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 **(12 Hours)**

PHP

PHP Basics-What is PHP file? Introduction- PHP installation-Basic PHP syntax- PHP variables-Rules for PHP variables-creating(declaring)-PHP Variable scope : Local, Global, Static,Parameter-String variables:concatenation-strlen()-strpos(). String functions-PHP Operators: Arithmetic, Assignment, Increment/Decrement, Comparison, Logical, Array operators.PHP Condition statements: if, if..else, switch statements. Looping statements: while, do…while, for, foreach. Array- Sorting arrays- Sort functions for array: sort(), rsort(), asory(), ksort(), arsort(), krsort()-PHP functions.

UNIT V **(12 Hours)**

MySQL

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.

TEXT BOOK

1. James Lee and Brent Ware,"Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP", Dorling Kindersley(India) Pvt. Ltd, 2008

REFERENCES

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

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DIGITAL IMAGE PROCESSING	
Subject Code: 13PCS16	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives

On Successful completion of the course the students should have to understand the fundamentals of Digital Image Processing, image compression and segmentation

UNIT I **(10 hours)**

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

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

UNIT II **(12 hours)**

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

UNIT III **(13 hours)**

Image Restoration: A model of the Image Degradation / Restoration Process – Noise models – Restoration is the process of noise only – Spatial Filtering – Periodic Noise reduction by frequency domain filtering –Modeling the Degradation function –Direct Inverse Filtering-Wiener Filtering-Constrained Least Squares(Regularized)Filtering-Wiener Filtering-Constrained Least squares(regularized)Filtering-Iterative Nonlinear Restoration using the Lucy-Richardson Algorithm-Blind Deconvolution –Image Reconstruction from projections.

UNIT IV **(12 hours)**

Image Compression: Fundamentals – Image compression models – Elements of Information Theory – Error Free compression – Lossy compression – Image compression standards-coding redundancy-spatial redundancy.

UNIT V **(13 hours)**

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

TEXT BOOKS

1. Rafael C. Gonzalez, Richard E. Woods, “Digital Image Processing”, PHI/Pearson Education,2rd Edition,2009.

2. Rafael C. Gonzalez, Richard E. Woods, “Digital Image Processing”, PHI/Pearson Education,3rd Edition,2009.

3. Rafael C. Gonzalez, Richard E.Woods,Steven L.Eddins ”Digital Image Processing Using MATLAB” , Tata McGraw-Hill International Editions,2nd Edition ,2005.

REFERENCES

1.Nick Efford, “Digital Image Processing a practical introducing using Java”, Pearson Education, 2004.

2. B. Chanda, D. Dutta Majumder, “Digital Image Processing and Analysis”, PHI, 2003.

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ELECTIVE II

S.No	SUBJECT CODE	TITLE
1	**13PCSE5**	**COMPUTING TECHNOLOGIES**
2	13PCSE6	GENETIC ALGORITHM
3	13PCSE7	ROBOTICS
4	13PCSE8	SIMULATION AND MODELING

COMPUTING TECHNOLOGIES	
Subject Code: 13PCSE5	**Total Hours : 60**
Credits : 5	**Hours/Week : 5**

Objectives:

On successful completion of the course the students should have understood the concepts of cloud computing, understood the developing cloud services, understood the Centralizing Email communications and cloud computing services.

UNIT I

FUNDAMENTALS OF GRID AND CLOUD COMPUTING (**11 Hours)**

Introduction to Grid computing- Merging the Grid Services Architecture with the Web Services Architecture. Introduction to Cloud computing – History of Cloud Computing –How Cloud Computing works-Companies in the Cloud Computing Today

UNIT II

DEVELOPING CLOUD SERVICES **(12 Hours)**

Computing in the Cloud: The Pros and Cons of Cloud Computing-Benefits of Cloud Computing. Developing Cloud Services: Web Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2- Google App Engine – IBM Clouds.

UNIT III

CLOUD COMPUTING FOR EVERYONE **(11 Hours)**

Centralizing Email communications – collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation

UNIT IV

USING CLOUD SERVICES **(13 Hours)**

Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating

on Event Management – Collaborating on Contact Management – Collaborating on Project Management –Collaborating on Databases – Storing and Sharing Files – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis.

UNIT V

GRID COMPUTING **(13 Hours)**

Open Grid Services Architecture (OGSA) – Sample Use Cases that drive the OGSA – The OGSA Platform Components – Open Grid Services Infrastructure (OGSI) – OGSA Basic Services.

TEXT BOOKS

1. Joshy Joseph & Criag Fellenstein, "Grid Computing", PHI, PTR, 2009.
2. Michael Miller, "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing, August 2009.

REFERENCES

1. Jose C.Cunha, Omer F.Rana (Eds), "Grid Computing", Springer International Edition, 2006.
2. Anthony T. Velte and others, "Cloud Computing" TATA Mc-Graw Hill Publications, New Delhi, 2011.

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GENETIC ALGORITHMS

Subject Code: 13PCSE6	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives:

On successful completion of the course the students should have understood the concepts of algorithms and cellular modules.

UNIT I : (12 hours)

Basics of biological evolution - Darwin, DNA, etc. Basics of Gas – selection, recombination and mutation - Choices of algorithm: (mu,lambda) - (mu+lambda), steady- state, CHC, etc. Linkage and epistasis. The standard test functions. Fitness and objective functions: scaling, windowing etc. Representational issues: binary, integer and real-valued encodings; permutation-based encodings. Operator issues: different types of crossover and mutation, of selection and replacement. Inversion and other operators.

UNIT II: (13 hours)

Constraint satisfaction: penalty-function and other methods; repair and write-back; feasibility issues. Experimental issues: design and analysis of sets of experiments by t-tests, F-tests, bootstrap tests etc.Some theory: the schema theorem and its flaws; selection takeover times; optimal mutation rates; other approaches to providing a theoretical basis for studying GA issues.Rival methods: hill-climbing, simulated annealing, population-based incremental learning, tabu search, etc. Hybrid/memetic algorithms.

UNIT III: (11 hours)

Multiple-solutions methods: crowding, niching; island and cellular models. Multi-objective methods: Pareto optimisation; dominance selection; VEGA; COMOGA.

UNIT IV: (12 hours)

Genetic programming: functions and terminals, S-expressions; parsimony; fitness issues; ADFs. Evolving rules and rule-sets. SAMUEL and related methods. Classifier systems: the Pittsburgh and Michigan approaches. Credit allocation: bucket-brigade and profit-sharing. Hierarchic classifier systems.

UNIT V : **(12 hours)**

Genetic planning: evolving plans, evolving heuristics, evolving planners, optimizing plans. Ant Colony Optimization: Basic method for the TSP, local search, application to bin packing. Applications: engineering optimization; scheduling and timetabling; data-mining; neural net design; etc. Some further ideas: co-evolution; evolvable hardware; multi-level Gas; polyploidy GAs.

TEXT BOOK

1. M. Mitchell:,"An Introduction to Genetic Algorithms", MIT Press, 1996.

REFERENCES

1. W. Banzhaf, P. Nordin, R. E. Keller, F. D. Francone, "Genetic Programming: An Introduction" Morgan Kaufmann, 1998.
2. E. Bonabeau, M. Dorigo, G. Theraulez, "Swarm Intelligence: From Natural to Artificial Systems", Oxford University Press, 1999

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SIMULATION AND MODELING

Subject Code: 13PCSE7	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives

On Successful completion of the course the students should have Gained Knowledge of Simulation & Modeling Techniques.

UNIT I **(12 Hours)**

Principle of computer modeling and simulation- Monte Carlo simulation. Nature of computer modeling and simulation. Limitations of simulation- areas of application- System and environment – components of a system – Discrete and continuous systems. Models of a system – A variety of modeling approaches.

UNIT II **(13 Hours)**

Random number generation – Technique for generating random numbers – Midsquare method – The midproduct method –Linear congruential method-Mixed Generators-Multiplicative Generators .Tests for random number – The Kolmogorov Smirnov test – The chi-square test. Random variable generation – Inverse transform technique – Exponential distribution –Uniform distribution – Weibull distribution-Empirical continuous distribution

UNIT III **(12 Hours)**

Generating Random Variates – General Approaches to Generating Random Variates.Empirical discrete distribution – Discrete uniform distribution – Poisson distribution –Geometric distribution – Acceptance-Rejection technique for Poisson distribution – Gamma distribution.

UNIT IV **(13 Hours)**

Design and evaluation of simulation experiments – Input-Output analysis –Verification and validation of simulation models – Variance-Reduction Techniques.

Discrete event simulation – concepts in discrete-event simulation – Manual simulation using event scheduling, single channel queue, two server queue, simulation of inventory problems.

UNIT V **(10 Hours)**

Simulation languages – GPSS – SIMSCRIPT – SIMULA – Programming for discrete event systems in GPSS and C.

Case Study: Simulation of LAN – Manufacturing system – Hospital management system.

TEXT BOOKS

1. Jerry Banks and John S. Carson II, “Discrete Event System Simulation”, Prentice Hall Inc, 1984.

REFERENCES

1 Francis Neelamkovil, “Computer Simulation and Modeling”, John Wiley & Sons, 1987.

2.Averil M. Law, “Simulation Modeling and Analysis”, Tata McGraw Hill Education Private Limited ,Fourth edition.

3. Narsingh Deo, “System Simulation with Digital Computer”, Prentice Hall of India, 1979.

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ROBOTICS

Subject Code: 13PCSE8	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

Objectives:

On successful completion of the course the students should have understood the concepts of robot technology, Robot kinematics, Configuration of a robot controller, Applications for manufacturing and Simulation of robotic work cells.

(12 Hours)

Unit I

Fundamentals of robot Technology: Robot anatomy. Work volume. Drive systems. Control - Systems and dynamic performance - Accuracy and repeatability - Sensors in robotics – Robot reference frames and coordinates and robot kinematics.

(11 Hours)

Unit II

Robot kinematics: Matrix representation - Homogeneous transformations - Forward and inverse kinematics - Robot dynamics - Differential motions of a frame - Jacobian static force analysis.

(13 Hours)

Unit III

Configuration of a robot controller: End effectors - Mechanical and other types of grippers - Tools as end effectors - Robot and effectors interface - Gripper selection and design - Introduction to robot languages.

Unit IV **(12 Hours)**

Applications for manufacturing - Flexible automation - Robot cell layouts – Machine interference - Other considerations in work cell design - Work cell control – Interlocks – Robot cycle time analysis.

Unit V: **(12 Hours)**

Simulation of robotic work cells - Typical applications of robots in material transfer, machine loading/unloading; processing operations; assembly and inspection.

TEXTBOOKS

1. Saeed B. Niku , “Introduction to Robotics analysis, Systems & Applications”, Pearson Education Singapore P. Ltd., 2002.

REFERENCES

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2. S.R. Deb, “Robotic Technology and Flexible Automation” ,Tata McGraw Hill Publishing Co. Ltd., 2003.
3. R.K. Mittal,I.J. Nagrath, “Robotics & Control”, Tata McGraw & Hill, 2005.

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S.Sharmila	M.Sakthi		

Lab Exercise

OPEN SOURCE AND COMPUTING TOOLS LAB	
Subject Code: 13PCS17	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

- Create a program to implement looping in vb.net
- Create a program to implement conditional statements
- Create a calculator using basic controls
- Create a notepad editor using Context menu strip and menu controls
- Create an application to illustrate the use validation controls.
- Create an application for library management system
- Create an application for Pay roll processing system
- Create a program to generate electricity Bill
- Create a Xml program for menu card.
- Create a Xml program to flight reservation
- Create a program to implement object oriented technology in C#
- Create a overloading program using C#.
- Write a 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.
- Write a PHP program that adds products that are selected from a web page to a shopping cart.
- Write a PHP program to access the data stored in a mysql table.
- Write a PHP program interface to create a database and to insert a table into it.
- Write a PHP program using classes to create a table.
- Write a PHP program to upload a file to the server.
- Write a PHP program to create a directory, and to read contents from the directory.
- Write a shell program to find the details of an user session.
- Write a shell program to change the extension of a given file.
- Create a MySQL table and execute queries to read, add, remove and modify a record from that table.

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R.Nandhakumar	**M.Sakthi**		

DIGITAL IMAGE PROCESSING LAB	
Subject Code: 13PCS18	**Total Hours : 60**
Credits : 4	**Hours/Week : 5**

- Crop, Resize, Rotate an image
- Crop an image using Simulink
- Resize an image using Simulink
- Rotate an image using Simulink
- Adjusting the contrast in color image using Simulink
- Adjusting the contrast in intensity image using Simulink
- Conversion from Color to GreyScale
- Finding Histogram of a gray and negative image
- Arithmetic Operations
- Blurring with Deconvulution Algorithm
- Sharpening of an image using Simulink
- Unsharp Masking and High Boost Filtering using Simulink
- Removing Salt & Pepper noise
- Remove Noise (Median Filter) using Simulink
- Deblurring with Wiener Filter
- Correct Non-Uniform Illumination using Simulink
- Count Object in an image using Simulink
- Image Compression using Discrete Cosine Transform.
- Performing Morphological Operations.
- Edge Detection using Prewitt, Sobel and Roberts.

Note: Laboratory works are to be done on MATLAB 7.0 tool.

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T.Menaka	**M.Sakthi**		

SEMESTER IV

PROJECT WORK AND VIVA VOCE (INDIVIDUAL)	
Subject Code : 13PCS19	**Credit : 5**

MAXIMUM MARKS : 200

PROJECT EVALUATION : 80+80=160

VIVA-VOCE : 20+20=40