P.G. DEPARTMENT OF COMPUTER SCIENCE (SF)

Nallamuthu Gounder Mahalingam College

(Autonomous)

(An ISO 9001:2008 Certified Institution)

Re-Accredited with 'A' Grade by NAAC

Pollachi-642001

SYLLABUS

M. Sc. COMPUTER SCIENCE (SF)

BATCH 2014-2016

S.No	Sem	Subject Code and Title		Credit points	University Examinations		
					Internal Max Mark	External Max Mark	Total Max Marks
		THEORY					
1	I	14PCS01	OBJECT ORIENTED SOFTWARE ENGINEERING	4	25	75	100
2	I	14PCS02	DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS	4	25	75	100
3	I	14PCS03	DISTRIBUTED OPERATING SYSTEM	4	25	75	100
4	I	14PCS04	ADVANCED COMPUTER ARCHITECTURE	4	25	75	100
5	I	14PCS05	DATAMINING AND WAREHOUSING	4	25	75	100
		PRACTICAL					
6	I	14PCS06	PROGRAMING LAB-I: UML	4	40	60	100
7	I	14PCS07	PROGRAMING LAB-II : DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS	4	40	60	100
		THEORY					
8	II	14PCS08	J2EE TECHNOLOGIES	4	25	75	100
9	II	14PCS09	ADVANCED NETWORKS	4	25	75	100
10	II	14PCS10	GEOGRAPHIC INFORMATION AND GLOBAL POSITIONING SYSTEMS	4	25	75	100
11	II	14PCS11	COMPUTING TECHNOLOGIES	4	25	75	100
12	II	14PCSE1	ELECTIVE-I (E-TECHNOLOGIES & SECURITY)	5	25	75	100
		PRACTICAL					
13	II	14PCS12	PROGRAMING LAB-III : J2EE TECHNOLOGIES	4	40	60	100
14	II	14PCS13	PROGRAMING LAB-IV : NETWORKS	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	14PCS14	ADVANCED TOOLS IN COMPUTING	4	25	75	100
16	III	14PCS15	OPEN SOURCE TECHNOLOGIES	4	25	75	100
17	III	14PCS16	DIGITAL IMAGE PROCESSING	4	25	75	100
18	III	14PCSE5	ELECTIVE-II (PRINCIPLES OF COMPILER DESIGN)	5	25	75	100
		PRACTICAL					
19	III	14PCS17	PROGRAMING LAB-V : OPEN SOURCE AND COMPUTING TOOLS LAB	4	40	60	100
20	III	14PCS18	PROGRAMING LAB-VI : 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	14PCS19	INDUSTRIAL PROJET WORK AND VIVA - VOCE(INDIVIDUAL)	8	-	200	200
			TOTAL	90	590	1660	2250

SEMESTER I

OBJECT ORIENTED SOFTWARE ENGINEERING	
Subject Code : 14PCS01	**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", Pearson, 3rd edition, 2007.
2. Grady Booch, James Raumbaugh and Ivar Jacobson, "The Unified Modeling Language User Guide" , Pearson, 2nd Edition, 2008.
3. Roger S. Pressman ,"Software Engineering", McGraw-Hill, 4th Edition, 1997.
4. Srinivasan Desikan & Gopalaswamy Ramesh, "Software Testing- Principle and practices ", 7th Edition.

REFERENCES

1. Bernd Bruegge, Allen H. Dutoit, "Object Oriented Software Engineering using UML, Patterns and Java", Pearson, 2nd Edition, 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 : 14PCS02	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, 2nd Edition, 2008.

REFERENCE BOOKS

1. Ellis Horrowitz, Sartaj Sahni, "Fundamentals of data structures", Galgotia Publications, Reprinted Edition, 2008.

2. Alfred V.Aho, John E.Hopcroft & Jeffery D Ullman,"Data structures and Algorithms", PHI learning pvt Ltd, Reprinted Edition, 2009.

3. Adam Drozdek, "Data Structures and Algorithms in C++", Vikas publishing house, NewDelhi,4th Edition, 2001.

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DISTRIBUTED OPERATING SYSTEM

Subject Code : 14PCS03	**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 - Introduction to DCE-Creation-Components-Cells.
Network types- LAN Technologies- WAN Technologies- Communication protocols- Internetworking.

UNIT II   **(11 Hours)**
Message Passing: Introduction- Desirable Features of a Good Message Passing system-Issues in IPC by message passing- Synchronization- Buffering- Multidatagram Messages - Encoding and Decoding of Message Data- Process Addressing- Failure Handling- Group Communication.

UNIT III   **(13 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.
Distributed Shared Memory: Introduction- General Architecture of DSM System- Design and Implementation Issues of DSM- Granularity- Structure of Shared Memory Space- Replacement Strategy.

UNIT IV   **(12 Hours)**
Synchronization: Introduction- Clock Synchronization: How computer clocks are implemented-Drifting of clocks-Mutual Exclusion-Election Algorithms: Bully algorithm-Ring algorithm.
Process Management: Introduction- Process Migration: Features-Mechanisms-Heterogeneous systems-Advantages- Threads: Motivations-Models-issues-implementation.

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- Design Principles.

Case Studies: Introduction-Amoeba-V-System-Mach-Chorus-A Comparison of Amoeba,V-System,Mach and Chorus.

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, 4th edition, 2014.
3. Dietel H.M.," An Introduction to Operating Systems", Addison Wesley, World Student Edition,2000.

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R.Nandhakumar	M.Sakthi		

ADVANCED COMPUTER ARCHITECTURE

Subject Code : 14PCS04	**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.

REFERENCES

1. Kai Hwang, "Advanced Computer Architecture –Parallelism, Scalability, Programmability", Tata Mcgraw Hill, 2003.
2. Michael J. Quinn, "Parallel Computing Theory and Practice", TMCH, 2nd Edition, 2002.
3. Barry Wilkinson, Micheal Allen, "Parallel Programming: Techniques and Applications", Prentice Hall, 2nd Edition, 1999.

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DATAMINING AND WAREHOUSING

Subject Code : 14PCS05	Total Hours : 60
Credits : 4	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, 3rd Edition, 2008.
2. C.S.R. Prabhu, "Data warehousing concepts, techniques, products and a applications", PHI, 2nd Edition, 2000.

REFERENCES

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

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A.Jagadeeshwaran	M.Sakthi		

PROGRAMMING LAB-I: UML

Subject Code : 14PCS06	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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PROGRAMMING LAB-II: DESIGN AND ANALYSIS OF COMPUTER ALGORITHM

Subject Code : 14PCS07	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 : 14PCS08	**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, 1st Edition, 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, 2nd Edition, 1996.
2. Patric Naughton, "The Java Hand Book", Tata McGraw Hill, 3rd Edition, 1996.
3. Stephen Potts, Mike Kopack, "Web Services", Pearson Education, Kindle Edition, 2004.

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ADVANCED NETWORKS

Subject Code : 14PCS09	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.

UNIT III   **(12 Hours)**

Classless And Subnet Address Extensions(CIDR): Review Of Relevant Facts-Minimizing Network Numbers-Proxy ARP-Subnet Addressing-Flexibility In Subnet Address Assignment -The Subnet Forwarding Algorithm-A Unified Forwarding Algorithm.

Protocol Layering: Introduction –Needs-Conceptual Layer_ Functionality- X.25 and ISO Model-Locus of intelligence-Principle-Network substructure-TCP/IP Model-Disadvantage-Idea behind Multiplexing and Demultiplexing.

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.

UNIT IV   **(12 Hours)**

Reliable Stream Transport Service(TCP): 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.

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): IP address-retransmission-Message format-Address Acquisition States.

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.

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GEOGRAPHIC INFORMATION AND GLOBAL POSITIONING SYSTEMS

Subject Code : 14PCS10	Total Hours : 60
Credits : 4	Hours/Week : 5

Objectives

On successful completion of the course the students should have understood the concepts of data model, geographic information system and concepts project management.

UNIT I   **(11 Hours)**

Fundamentals of GIS : Introduction – Defining GIS – Components of GIS.

Spatial Data: Maps and their influences in the character of spatial data – Thematic characteristics of spatial data – Other sources of spatial data.

UNIT II   **(11 Hours)**

Spatial Data Modeling: Entity Definition – Spatial data models – Spatial data structures – Modeling Surfaces – Modeling networks – Building computer worlds – Modeling third and fourth dimension.

Database Management: Why choose a database approach – Database data models – Creating a database – GIS database applications – Developments in databases.

UNIT III   **(13 Hours)**

Data Input and Editing: Methods of Data input – Data Editing – Towards an Integrated Databases.

Data Analysis: Measurements in GIS – Queries – Reclassification – Buffering and Neighborhood functions – Integrating data- map overlay – Spatial Interpolation – Analysis of surfaces – Network analysis.

UNIT IV   **(12 Hours)**

Issues in GIS: Data quality issues - Describing data quality and errors – Sources of errors in GIS – Finding and modeling errors in GIS – Managing GIS error - Human and organizational issues: GIS Applications – GIS Users – Justifying the investment in GIS – Choosing and Implementing a GIS – Organizational changes due to GIS - Future of GIS .

UNIT V   **(13 Hours)**

Global Positioning Systems: Introduction to GPS - Accuracy of GPS - Various Satellites used by GPS - Differential GPS - Fundamentals of GPS - Applications of GPS - GPS Receivers – Hand held GPS Receiver - Integration of GIS and GPS.

TEXT BOOK

1. Heywood, Cornelius, Carver ,"An Introduction to Geographical Information Systems", 3rd Edition, Pearson Education, 2002.
2. G. S. Rao, "Global Navigation Satellite Systems", McGraw Hill Publications, 2010.

REFERENCES
1. C. P. Lo and Albert Yeung, "Concepts and techniques of Geographic Information Systems", PHI, New Delhi, 2000.
2. Michael N. Demers, "Fundamentals of Geographic information Systems", 2nd Edition-John Wiley & Sons (ASIA) Pvt Ltd, 2001.
3. Razvi , "ArcGIS Developer's Guide for Visual Basic Applications", Onword Press, 2002.
4. Gorr and Kurland , "Learning and Using Geographic Information Systems", India Edition, 2001.

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M.Dhavapriya	**M.Sakthi**		

COMPUTING TECHNOLOGIES

Subject Code : 14PCS11	**Total Hours : 60**
Credits : 4	**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   (**11 Hours**)

Fundamentals of grid and cloud computing: 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   **(12 Hours)**

Developing cloud services: 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   **(11 Hours)**

Cloud computing for everyone: 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   **(13 Hours)**

Using cloud services: 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   **(13 Hours)**

Grid computing: 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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ELECTIVE I

S.No	SUBJECT CODE	TITLE
1	**14PCSE1**	**E-TECHNOLOGIES & SECURITIES**
2	14PCSE2	EMBEDDED SYSTEM
3	14PCSE3	MACHINE INTELLIGENCE
4	14PCSE4	NEURAL NETWORKS AND FUZZY LOGICS

E-TECHNOLOGIES & SECURITIES

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

Objectives

On Successful completion of the course the students should have understood the Technology infrastructure, Electronic commerce software and Business strategies and understand the fundamentals of security and how it attacks.

UNIT I (11 Hours)

Introduction to Electronic Commerce: Electronic Commerce– Business Models, Revenue Models, and Business Processes – Economic Forces and Electronic Commerce – Identifying Electronic Commerce Opportunities – International Nature of Electronic Commerce. **Technology Infrastructure**: The Internet and the Word Wide Web– Internet and World Wide Web – Packet – Switched Networks – Internet Protocols – Markup Languages and the Web – Intranets and Extranets – Internet Connection Options - Internet2 and The Semantic Web.

UNIT II (12 Hours)

E-Marketing: Online Marketing – E-Advertising-E-branding-**E-Security:** information system security-security on the internet – **E-Payment Systems:** Digital token based e-payment systems-classification of new payment systems-check payment systems on the internet.
E-Customer Relationship Management: customer relationship management-typical business touch points. **E-Supply Chain Management:** smart chains-smarter gains-E-supply chain components-e-supply chain architecture.

UNIT III (12 Hours)

E-Strategy: Changes in technology-defintions of knowledge-importance of knowledge management-stages-seven dimensions-value chain and e-strategy
Mobile Commerce: Technologies for Mobile Commerce– WAP Programming Model – Wireless Technologies – Different Generations in Wireless Communication – Security issues Pertaining to Cellular Technology –M-Commerce in India.

UNIT IV (10 hours)

Network security: authentication applications: kerberos –x.509 authentication service- **E-mail Security:** Pretty Good Privacy, S/MIME (Secure/Multipurpose Mail Extension). IP security.

UNIT V   **(13 hours)**

System & Web Security: Malicious Software: Viruses and Related threats, Virus counter measures, distributed Denial of service attacks. Firewalls: Firewall, Firewall Design Principles, Trusted Systems, **Web Security:** Web Security Considerations, Secure socket layers, Transport Layer Security-Secure Electronic Transaction

TEXT BOOKS

1. Gary P. Schneider, "E-Commerce Strategy, Technology and Implementation", CENGAGE Learning INDIA Private Limited, Nineth edition, 2012. (Unit I)
2. P.T. JOSEPH,"E-Commerce an Indian Perspective", Prentice Hall of India, Fourth Edition, 2013.   (Unit II & Unit III)
 3. William Stalling, "Cryptography and Network Security Principle and Practice", 4rd Edition by Pearson Publications, 2006 (Unit IV&V).

REFERENCES

1. Mike Papazologn, E-Business, Organizational and Technical Foundations, Wiley India Pvt Ltd, 2008.
2. Elias M. Awad, Electronic Commerce, Prentice-Hall of India, 2008.
3. Panko Stalling , "Cryptography and Network Security Principle and Practice", 3rd Edition,2000.
4. Bruce Schneir, "Applied Cryptography", CRC Press,2000.

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EMBEDDED SYSTEMS

Subject Code : 14PCSE2	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 : 14PCSE3	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 : 14PCSE4	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

PROGRAMMING LAB-III:J2EE TECHNOLOGIES	
Subject Code : 14PCS12	**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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PROGRAMMING LAB-IV: NETWORKS

Subject Code : 14PCS13	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.

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SEMESTER III

ADVANCED TOOLS IN COMPUTING

Subject Code: 14PCS14	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, 2002.

REFERENCES

1. Steven Holzner, "Visual Basic .NET Programming Black Book" ,Tata McGraw-Hill Publication,2000.
2. Jeffrey R. Shapiro ,"VB.NET Complete Reference", Tata McGraw-Hill Publication, 2001.
3. Mc Downell, "ASP.NET complete reference ",Jeffrey R. Shapiro ,"VB.NET Complete Reference", Tata McGraw-Hill Publication,2000.

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OPEN SOURCE TECHNOLOGIES

Subject Code: 14PCS15	**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)**

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.

UNIT V **(12 Hours)**

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 - Deleting Records - Update Records.

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: 14PCS16	**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	**14PCSE5**	**PRINCIPLES OF COMPILER DESIGN**
2	14PCSE6	GENETIC ALGORITHM
3	14PCSE7	ROBOTICS
4	14PCSE8	SIMULATION AND MODELING

PRINCIPLES OF COMPILER DESIGN

Subject Code : 14PCSE5	**Total Hours**	**: 60**
Credits **: 5**	**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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GENETIC ALGORITHMS

Subject Code: 14PCSE6	**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: 14PCSE7	**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: **14PCSE8**	**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.

UNIT III   **(13 Hours)**

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

1. Robert J. Schilling, "Fundamentals of Robotics, analysis & Control", Prentice Hall of India P. Ltd., 2002.
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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LAB EXERCISE

PROGRAMING LAB-V : OPEN SOURCE AND COMPUTING TOOLS LAB

Subject Code: 14PCS17	**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.

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

PROGRAMING LAB-VI : DIGITAL IMAGE PROCESSING LAB

Subject Code: 14PCS18	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.

Compiled by Name with Signature	Verified by HOD Name with Signature	COE	REC
T.Menaka	M.Sakthi		

SEMESTER IV

PROJECT WORK AND VIVA VOCE (INDIVIDUAL)

Subject Code : 14PCS19	**Credit : 5**

MAXIMUM MARKS   : 200

PROJECT EVALUATION   : 80+80=160

VIVA-VOCE   : 20+20=40