RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Computer Science and Engineering VII-Semester

CS-7001 Distributed System

Unit-I
Introduction to distributed systems
Architecture for Distributed System, Goals of Distributed system, Hardware and Software concepts, Distributed Computing Model, Advantages & Disadvantage distributed system, Issues in designing Distributed System,

Unit-II
Distributed Share Memory And Distributed File System
Basic Concept of Distributed Share Memory (DSM), DSM Architecture & its Types, Design & Implementations issues In DSM System, Structure of Share Memory Space, Consistency Model, and Thrashing. Desirable features of good Distributed File System, File Model, File Service Architecture, File Accessing Model, File Sharing Semantics, File Catching Scheme, File Application & Fault tolerance. Naming: - Features, System Oriented Names, Object Locating Mechanism, Human Oriented Name.

Unit-III
Inter Process Communication And Synchronization
API for Internet Protocol, Data Representation & Marshaling, Group Communication, Client Server Communication, RPC- Implementing RPC Mechanism, Stub Generation, RPC Messages. Synchronization: - Clock Synchronization, Mutual Exclusion, Election Algorithms:- Bully & Ring Algorithms**.**

Unit-IV
Distributed Scheduling And Deadlock
Distributed Scheduling-Issues in Load Distributing, Components for Load Distributing Algorithms, Different Types of Load Distributing Algorithms, Task Migration and its issues. Deadlock-Issues in deadlock detection & Resolutions, Deadlock Handling Strategy, Distributed Deadlock Algorithms,

Unit-V
Distributed Multimedia & Database system
Distributed Data Base Management System(DDBMS), Types of Distributed Database, Distributed Multimedia:- Characteristics of multimedia Data, Quality of Service Managements. Case Study of Distributed System:- Amoeba, Mach, Chorus

References:
☐ Sinha, Distributed Operating System Concept & Design, PHI
☐ Coulouris & Dollimore, Distributed System Concepts and Design, Pearson Pub
☐ Singhal & Shivratari, Advance Concept in Operating System, McGraw Hill
☐ Attiya & Welch, Distributed Computing, Wiley Pub.

Credit Based Grading System

Computer Science and Engineering VII-Semester

CS-7002 Compiler Design

Unit-I Introduction to compiling & Lexical Analysis
Introduction of Compiler, Major data Structure in compiler, BOOT Strapping & Porting, Compiler structure: analysis-synthesis model of compilation, various phases of a compiler, Lexical analysis: Input buffering , Specification & Recognition of Tokens, LEX.

Unit-II Syntax Analysis &Syntax Directed Translation
Syntax analysis: CFGs, Top down parsing, Brute force approach, recursive descent parsing, transformation on the grammars, predictive parsing, bottom up parsing, operator precedence parsing, LR parsers (SLR,LALR, LR),Parser generation.Syntax directed definitions: Construction of Syntax trees, Bottom up evaluation of S-attributed definition, L-attribute definition, Top down translation, Bottom Up evaluation of inherited attributes Recursive Evaluation, Analysis of Syntax directed definition.

Unit-III Type Checking & Run Time Environment
Type checking: type system, specification of simple type checker, equivalence of expression, types, type conversion, overloading of functions and operations, polymorphic functions. Run time Environment: storage organization, Storage allocation strategies, parameter passing, dynamic storage allocation , Symbol table

Unit –IV Code Generation
Intermediate code generation: Declarations, Assignment statements, Boolean expressions, Case statements, Back patching, Procedure calls Code Generation: Issues in the design of code generator, Basic block and flow graphs, Register allocation and assignment, DAG representation of basic blocks, peephole optimization, generating code from DAG.

Unit –V Code Optimization
Introduction to Code optimization: sources of optimization of basic blocks, loops in flow graphs, dead code elimination, loop optimization, Introduction to global data flow analysis, Code Improving transformations ,Data flow analysis of structure flow graph Symbolic debugging of optimized code.

List of Experiments:
 Develop a lexical analyzer to recognize a few patterns.
 Write a programme to parse using Brute force technique of Topdown parsing.
 Develop LL (1) parser (Construct parse table also).
 Develop an operator precedence parser (Construct parse table also)
 Develop a recursive descent parser
 Write a program for generating for various intermediate code forms
   i) Three address code ii) Polish notation
 Write a program to simulate Heap storage allocation strategy
 Generate Lexical analyzer using LEX
 Generate YACC specification for a few syntactic categories.
 Given any intermediate code form implement code optimization techniques
 Study of an Object Oriented Compiler.

References:

1. A. V. Aho, R. Sethi, and J. D. Ullman. Compilers: Principles, Techniques and Tools , Pearson Education
2 Raghavan, Compiler Design, TMH Pub.
3. Louden. Compiler Construction: Principles and Practice, Cengage Learning
4. A. C. Holub. Compiler Design in C , Prentice-Hall Inc., 1993.
5. Mak, writing compiler & Interpreters, Willey Pub.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Computer Science and Engineering VII-Semester

CS-7003 Web Engineering

UNIT-1

Web Engineering: Introduction, History, Evolution and Need, Time line, Motivation, Categories & Characteristics of Web Applications, Web Engineering Models, Software Engineering v/s Web Engineering. World Wide Web: Introduction to TCP/IP and WAP, DNS, Email, TelNet, HTTP and FTP.
Browser and search engines: Introduction, Search fundamentals, Search strategies, Directories search engines and Meta search engines, Working of the search engines.
Web Servers: Introduction, Features, caching, case study-IIS, Apache.
UNIT- 2

Information Architecture: Role, Collaboration and Communication, Organizing Information, Organizational Challenges, Organizing Web sites parameters and Intranets
Website Design: Development, Development phases, Design issues, Conceptual Design, High-Level Design, Indexing the Right Stuff, Grouping Content. Architectural Page Mockups, Design Sketches, Navigation Systems. Searching Systems, Good & bad web design, Process of Web Publishing. Web-site enhancement, submission of website to search engines.
Web security: issues, security audit. Web effort estimation, Productivity Measurement, Quality usability and reliability. **Requirements Engineering for Web Applications:** Introduction, Fundamentals, Requirement Source, Type, ,Notations Tools. Principles Requirements Engineering Activities, Adapting RE Methods to Web Application.

UNIT- 3

Technologies for Web Applications I:
HTML and DHTML: Introduction, Structure of documents, Elements, Linking, Anchor Attributes, Image Maps, Meta Information, Image Preliminaries, Layouts, Backgrounds, Colors and Text, Fonts, Tables, Frames and layers, Audio and Video Support with HTML Database integration, CSS, Positioning with Style sheets, Forms Control, Form Elements.
Introduction to CGI, PERL, JAVA SCRIPT, JSP, PHP, ASP & AJAX.
Cookies: Creating and Reading

UNIT-4

Technologies for Web Applications II:
XML: Introduction, HTML Vs XML, Validation of documents, DTD, Ways to use, XML for data files, Embedding XML into HTML documents, Converting XML to HTML for Display, Displaying XML using CSS and XSL, Rewriting HTML as XML, Relationship between HTML, SGML and XML, web personalization , Semantic web, Semantic Web Services, Ontology.

UNIT- 5

E- Commerce: Business Models, Infrastructure, Creating an E-commerce Web Site, Environment and Opportunities. Modes & Approaches, Marketing & Advertising Concepts. Electronic Publishing issues, approaches, legalities and technologies,
Secure Web document, Digital Signatures and Firewalls, Cyber crime and laws, IT Act.
Electronic Cash, **Electronic Payment Systems:** RTGS, NEFT, Internet Banking, Credit/Debit Card. **Security:** Digital Certificates & Signatures, SSL, SET, 3D Secure Protocol.

Suggested Experiments:

At least ten practical experiments based on above syllabus and a mini project is desirable to be completed by a group of three that cover following.

1. HTML/ DHTML
2. PHP
3. XML
4. Java Script, CGI, PERL
5. ASP
6. Configuration of Web Servers.

Recommended Books:

1. Roger S.Pressman, David Lowe, "Web Engineering", Tata Mc Graw Hill Publication, 2007
2. Achyut S Godbole and Atul Kahate, "Web Technologies", Tata McGraw Hill
3. Gopalan N P , Akilandeswari, "Web Technology: A Developer s Perspective" , PHI
4. Neil Gray, "Web server Programming" Wiley
5. Chris Bates, "Web Programming: Building Internet applications" Wiley
6. Moller, "An Introduction to XML and Web Technologies", Pearson Education New Delhi, 2009
7. "Web Technologies: Black Book", Kogent, Dreamtech
8. Internet & World Wide Web How to Program, Pearson education, 3rd edition, by: H.M. Deitel, P.J. Deitel, A.B. Goldberg.
9. C. Xavier, "Web Technology & Design ", Tata McGraw Hill.
10 Ivan Bay Ross, "HTML,DHTML,Java script,Perl CGI" , BPB

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Computer Science and Engineering VII-Semester

CS-7004 Elective-III (1) Embedded Systems

1. Embedded computing: Characteristics of embedded computing applications, challenges in embedded computing system design, design hardware and software components.
   Hardware fundamentals: Microprocessor, Buses, DMA, UART Programmable Array Logic Application specific IC, Watch dog timers, memory caches and instruction pipelines, interrupt basics, interrupt latency.

2. Embedded system development tools: Host and target machines, linkers and locators, JTAG port, monitor, build process in an embedded system.
   Hardware debugging aids like in build circuit emulators and logic analyzers.

3. Software architecture for implementing various tasks: round robin with / without interrupts, function queue scheduling architecture, real time operating system.

4. Rate monotonic and EDF scheduling, priority inversion, Shared data problems and intertask communication techniques : semaphores, message queue, buffers, mailboxes, reentrancy issue, timer functions, interrupts and I/O. Evaluating Operating System Performance, Power optimization strategies for professes, ACPI.

5. Network embedded system, distributed embedded architecture, hardware and software architecture, 1^2C bus, CAN bus, Myrinet, networked based design: Communication analysis performance analysis, hardware platform design, allocation and scheduling, internet embedded system.

Text Books

1. Computers as Components: Principles of Embedded Computing System Design, Wayne Wolf, Morgan Kaufman Publishers
2. An Introduction Software Primer, David E. Simon, Pearson Education

Reference Books

1. Embedded System Design – A Unified Hardware/ Software Introduction, Frank Vahid& Tony Givargis John Wiley
2. Embedded System Design, Steve Heath, Oxford: Newnes
3. Fundamentals of Embedded Software where C and Assembly Meet, David W. Lewis, Pearson LPE
4. Embedded System Architecture Programming and Design, Raj Kamal, Tata-McGraw Hill
5. Introduction to the Design of Small-scale Embedded Systems, Wilmshurst, Tim, Palgrave Macmillan
6. The 8051 Micro-controller and Embedded Systems using Assembly and C, Muhammad Ali Mazidi, Prentice Hall

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Computer Science and Engineering VII-Semester

CS-7004 Elective-III (2) Digital Image Processing

Unit-I
Digital Image fundamentals, A simple image model, Sampling and Quantization. Relationship between pixels. Imaging geometry. Image acquisition systems, Different types of digital images

Unit-II
Image transformations, Introduction to Fourier transforms, Discrete Fourier transforms, Fast Fourier transform, Walsh transformation, Hadmord transformation, Discrete Cosine Transformation.

Unit-III
Image enhancement, Filters in spatial and frequency domains, Histogram based processing. Image subtraction, Averaging, Image smoothing, Nedion filtering, Low pass filtering, Image sharpening by High pass filtering.

Unit-IV
Image encoding and segmentation, Encoding: Mapping, Quantizer, Coder. Error free compression, Lossy Compression schemes. JPEG Compression standard. Detection of discontinuation by point detection, Line detection, edge detection, Edge linking and boundary detection, Local analysis, Global processing via Hough transforms and graph theoretic techniques

Unit-V
Mathematical morphology- Binary, Dilation, crosses, Opening and closing, Simple methods of representation, Signatures, Boundary segments, Skeleton of a region, Polynomial approximation

References:
1. Rafael C Gonzalez, Richard E Woods 3rd Edition, Digital Image Processing Pearson.
2. Rafael C Gonzalez, Richard E Woods 3rd Edition, Digital Image Processing using Matlab – TMH.
3. Sonka, Digital Image Processing & Computer Vision , Cengage Learning
4 Jayaraman, Digital Image Processing, TMH.
5. Pratt, Digital Image Processing, Wiley India
6 Annadurai, Fundamentals of Digital Image Processing ,Pearson Education .

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Computer Science and Engineering VII-Semester

CS-7004 Elective-III (3) Modern Information Retrieval

1. Introduction: Information versus data retrieval, the retrieval process, taxonomy of Information Retrieval Models.
2. Classic Information Retrieval Techniques: Boolean Model, Vector model, Probabilistic Model, comparison of classical models. Introduction to alternative algebraic models such as Latent Semantic Indexing etc.
3. Keyword based Queries, User Relevance Feedback: Query Expansion and Rewriting, Document preprocessing and clustering, Indexing and Searching: Inverted Index construction, Introduction to Pattern matching.
4. Web Search: Crawling and Indexes, Search Engine architectures, Link Analysis and ranking algorithms such as HITS and PageRank, Meta searches, Performance Evaluation of search engines using various measures, Introduction to search engine optimization.
5. Introduction to online IR Systems, Digital Library searches and web Personalization.

Text Books

1. Ricardo Baeza-Yates and Berthier Ribeiro-Neto, "Modern Information Retrieval" Pearson Education
2. C. Manning, P. Raghvan and H. Schutze, "Introduction to Information Retrieval", Cambridge University Press.

Reference Books

1. Amy N. Langville and Carl D. Meyer, "Google's PageRank and Beyond: The Science of Search Engine Rankings", Princeton University Press
2. Pierre Baldi, Paolo Frasconi and PadhraicSmythe, "Modelling the internet and the web: Probabilistic methods and Algorithms", John Wiley

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Computer Science and Engineering VII-Semester

CS-7005 Elective-IV (1) Human Computer Interaction

1. Introduction to Human computer Interaction, HCI History, HCI Frameworks, HCI Paradigms. Aspects of Human Cognition.
2. Introduction to Evaluation, Predictive evaluation, heuristic evaluation, User modeling, UCD Process, Usability Principles, User-centered Design, Dialog: Command Language Interface & Graphical User Interface, Dialog: Pen & PDA.
3. Human Abilities, IRB & Ethics, Predictive Models and Cognitive Models, Descriptive Cognitive Models, Ubiquitous Computing.
4. Natural Language & Speech, Information Visualization, Universal Design & Assistive Technology, Pervasive Computing, Tangible User Interfaces
5. Help & Documentation, UI Software, UI Agents, and Case Studies: Windows Swing.

Text Books

1. Abowd and Russell Beale, "Human-Computer Interaction)", Prentice Hall
2. Donald Norman, "The Design of Everyday Things", Basic Book Publisher.
3. John Carrol, "Human-Computer Interaction in the New Millenium"

Reference Books
1. Paul Booth, "An Introduction to Human-Computer Interaction", Psychology   Press.
2. D. Hix and H. R. Hartson, "Developing User Interfaces: Ensuring Usability Through Product and Process", Publisher - John Wiley.
3. Rosson& Carroll, "Usability Engineering: Scenario-Based Development of Human-Computer Interaction", Morgan Kaufmanns.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Computer Science and Engineering VII-Semester

CS-7005 Elective-IV (2) Data Science & Big data

1. Understanding Data: Data Wrangling and Exploratory Analysis, Data Transformation & Cleaning, Feature Extraction, Data Visualization. Introduction to contemporary tools and programming languages for data analysis like R and Python.
2. Statistical & Probabilistic analysis of Data: Multiple hypothesis testing, Parameter Estimation methods, Confidence intervals, Bayesian statistics and Data Distributions.
3. Introduction to machine learning: Supervised & unsupervised learning, classification & clustering Algorithms, Dimensionality reduction: PCA & SVD, Correlation & Regression analysis, Training & testing data: Overfitting & Under fitting.
4. Introduction to Information Retrieval:Boolean Model, Vector model, Probabilistic Model, Text based search: Tokenization,TF-IDF, stop words and n-grams, synonyms and parts of speech tagging.
5. Introduction to Web Search& Big data: Crawling and Indexes, Search Engine architectures, Link Analysis and ranking algorithms such as HITS and PageRank, Hadoop File system & MapReduce Paradigm

Text Books:

1.Field Cady, "The Data Science Handbook" , 1/e ,2018,Publisher: Wiley

2. Sinan Ozdemir, "Principles of Data Science ", 1/e, 2016Packt Publishing Limited

References:

1. Peter Bruce, "Practical Statistics for Data Scientists: 50 Essential Concepts",Shroff/O'Reilly; First edition, 2017
2. Pang-Ning Tan, "Introduction to Data Mining", Pearson Edu.
3. Ricardo Baeza-Yates and Berthier Ribeiro-Neto, "Modern Information Retrieval", Pearson Education