

SHRI G.S. INSTITUTE OF TECHNOLOGY & SCIENCE, INDORE

INFORMATION TECHNOLOGY DEPARTMENT

Subject Code	Subject Name	L	T	P	Th. Credit	Pr. Credit	Maximum Marks				Total credit
							End Sem	Class Work	Sessional Work	End Sem	
IT38501	DISTRIBUTED COMPUTING	3	-	2	3	1	70	30	40	60	4

Course Outcome

1. the student will be able to explain various architectures used to design distributed systems
2. the student will be familiar with the design and implementation issues of distributed system. will be able to write code to create distributed applications using various inter-process communication technique
3. the student will gain an insight into distributed file system components and name services, DNS
4. The student will be able to explain various distributed algorithms such as logical clock and election
5. the student will be able to explain transaction and concurrency control with respect to distributed system.

Course Content

Unit1: Characterization of Distributed Systems: Introduction, Examples of Distributed Systems, Resource Sharing and the Web Challenges, Architectural Models, Fundamental Models. The Operating System Layer, Protection, Processes and Threads, Communication and Invocation.

Unit2: Networking issues for distributed systems: External Data Representation and Marshalling Group Communication, Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects, Remote Procedure Calling, Events and Notifications, Java RMI Case Study,

Unit3: Distributed File Systems: Introduction, File Service Architecture, Sun Network File System, The Andrew File System, Recent advances, Name Services and the Domain Name System, Directory and Discovery Services, Case study of the Global Name Service and X.500 Directory Service.

Unit4: Global States & Coordination: Introduction, Clocks, Events, and Process States, Synchronizing Physical Clocks, Logical Time and Logical Clocks, Global States, Distributed debugging, Failure Detectives, Distributed Mutual Exclusion, Elections, Multi cast Communication, Consensus and Related Problems.

Unit5: Transactions and Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Transaction Recovery, Case Study of CORBA: CORBA RMI, CORBA Services.

Text Books

1. G. Coulouris, J. Dollimore, T Kindberg, “Distributed Systems: Concepts and Design”, Addison Wesley Longman.

2. M. L. Liu, “Distributed Computing - Principles and Application”, Pearson Education.
3. S. Tanenbaum, “Distributed Systems - Principles and Paradigm”, Pearson Education.

Reference Books

1. S. Tanenbaum, “Distributed Operating Systems”, Prentice Hall India, 1996.
2. P.K. Sinha, “Distributed Operating Systems - Concept and Design”, Prentice Hall

SHRI G.S. INSTITUTE OF TECHNOLOGY & SCIENCE, INDORE

INFORMATION TECHNOLOGY DEPARTMENT

Subject Code	Subject Name	L	T	P	Th. Credit	Pr. Credit	Maximum Marks				Total Credit
							End Sem	Class Work	Sessional Work	End Sem	
IT38503	DATABASE MANAGEMENT SYSTEMS	3	1	2	4	1	70	30	40	60	5

Course Outcome

1. Student know about the Database, its architecture and their applications. Also know the concept of Data modeling and ER Diagram.
2. How relational model is useful and convert the ER model to relational model. Student also gain the practical knowledge of SQL for interaction and manipulation of DB.
3. Understand the concept of Functional Dependency, problem of different anomalies, and how it will overcome through normalization.
4. Illustrate the record storage and file organization of database system. Define hashing techniques and different kinds of indexes.
5. Student can understand how concurrent execution done through transaction. Also detailed study of different problems occur in concurrent transaction, and deal with different kinds of method like 2PL, treebased and timestamp locking protocol.

Course Content

Unit1: Introduction : database, database users, comparison to conventional system, characteristics of databases. Data models, schemas and instances, DBMS architecture and data independence, database languages and interfaces, classification of DBMS. Data modeling using ER-model : Basic concepts, weak entity types, ER-diagrams, subclasses, super classes, and inheritance, specialization and generalization.

Unit2: Relational data model and relational algebra: relational data model concept, Constraints-key: super key, primary key, and candidate key, Integrity Constraints- Referential Integrity. update operations, basic relational algebra operations, additional relational operations. SQL: data definition and update statements, basic queries in SQL, views, functions, constraints, joins and nested queries, co-related queries, Indexing, and PL/SQL.

Unit3: Functional dependencies and normalization: Features of good relational designs, database design approaches, anomalies, functional dependencies - Definition and rules of axioms , 1NF, 2NF, 3NF and BCNF. Dependency preservation, properties, loss less join decomposition, decomposition using multivalued dependency, more normal forms.

Unit4: Record storage and file organization: secondary storage devices, file of ordered records and file of unordered records , Hashing Techniques: Internal Hashing ,External Hashing for Disk Files, RAID. Index structure for files: single level ordered indexes, multi level indexes, dynamic multilevel indexes using B-Tree and B⁺ Tree. Query Processing and Optimization: steps of query optimization.

Unit5: Introduction to transaction processing: transaction and system concepts, desirable properties of transactions, schedules and recoverability, serializability of schedules, types of serializability and test for serializability, locking techniques for concurrency control, concurrency control based on

timestamp ordering. Multiversion schemes. Recovery: Basic concepts, techniques based on deferred update and immediate update, Shadow paging, check points.

Text Books

4. Elmasri and Navathe , “Fundamentals of database systems” ,6th edition, Pearson Education.
5. Silberschatz–Korth–Sudarshan , “Database System Concepts ”,5th edition, McGraw-Hill.
6. C. J. Date, “Introduction To Database Systems” ,8th edition, Pearson Education.

Reference Books

1. Raghu Ramakrishnan and Johannes Gehrke,”Database Management Systems”,Tata McGraw Hill.
2. Alexis Leon, Mathews Leon,Leon,”Database Management Systems”, Vikas Publishing, Chennai.

SHRI G.S. INSTITUTE OF TECHNOLOGY & SCIENCE, INDORE

INFORMATION TECHNOLOGY DEPARTMENT

Subject Code	Subject Name	L	T	P	Th. Credit	Pr. Credit	Maximum Marks				Total Credit
							End Sem	Class Work	Sessional Work	End Sem	
IT38504	WEB ENGINEERING	3	-	2	3	1	70	30	40	60	4

Course Outcome

1. The students will be able to model and design web application
2. The students will be able to identify standard tools and technologies for developing web applications
3. Develop user interface for web application using technologies such as HTML and JAVA Script
4. Outline and transform data services using XML and its related technologies
5. Develop secure web application and web services.

Course Content

Unit1: History of internet protocols, concept of www, Internet: working concepts and architecture models, basic tools and methods of internet access, ISPs, types of servers, client-server architecture. HTTP: request and response message, statelessness of HTTP, URLs, Browsers: working, types, architecture examples, helper application, plugin.

Unit2: Technologies for Web Applications: Types of web documents: static, dynamic and active, Language for creation of each type of documents, overview of a web page development language, HTML, DHTML, HTML5 Basic Concepts, Elements, Linking in HTML, Introduction to CGI, life cycle of CGI, Introduction to PERL, Writing CGI programs in perl/python.

Unit3: CGI v/s Servlets, life cycle of servlets, servlet creation in JAVA, doGet and doPost method implementation, parameters handling, Setting path and classpath variables, tomcat architecture, WAR file creation. Introduction to Java Server Pages technology, JSP tags, Session Management: methods of session management, Creating Active Pages: Java Applets basics, applet life cycle, simple hello world applet.

Unit4: Introduction to XML, XML Parser, XML DTD, XML with XSLT. Web Services, advantages of web service over web application, web service architecture. Introduction to semantic web. Search Engines: architecture, crawler, robots exclusion protocol, search engines types, working, examples.

Unit5: Web site planning, designing and management issues, Web security issues, Introduction to Web Server, Deploy website on Web Server, Firewalls: types of firewall, Introduction to MVC architecture using tools like J2EE framework, Struts etc., Digital signature: public key, private key and session key, NAT, VPN.

Text Books

1. Kahate & Godbole "Web technologies" Tata McGraw Hill.
2. Thomas A. Powell HTML& CSS: The Complete Reference (English) 5th edition McGraw Hill.
3. Gopalan & Akilandeshwari, "Web technologies-A Developer's Perspective", Prentice Hall of India.

Reference Books

1. Herbert Schild, "Complete Reference" 7th edition Tata McGraw Hill.
2. Andrew S Tanenbaum, "Computer Networks", 5th edition, Pearson Education.
3. Behrouz A forouzan, "TCP/IP protocol suite", 2nd edition, Tata McGraw Hill.

SHRI G.S. INSTITUTE OF TECHNOLOGY & SCIENCE, INDORE

INFORMATION TECHNOLOGY DEPARTMENT

Subject Code	Subject Name	L	T	P	Th. Credit	Pr. Credit	Maximum Marks				Total Credit
							End Sem	Class Work	Sessional Work	End Sem	
IT38506	COMPILER DESIGN	3	-	2	3	1	70	30	40	60	6

Course Outcome

1. analyze the phases of compiler, identify Tokens, can generate parse tree, build symbol table and generate intermediate code.
2. Explain the lexical analyzer implementation, syntax and semantic analyzer. They will also compute FIRST and FOLLOW set of a given grammar.
3. Determine the specific semantic tests- type analysis, to perform on an input to the parser for a grammar and enhance the parser to perform that analysis
4. Student will determine if a grammar satisfies the constraint on intersection of FIRST sets required for single-symbol-look ahead, top-down, look ahead parsing.
5. Apply code optimization techniques to the code generated intermediately.

Course Content

Unit1: 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.

Unit2: 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.

Unit3: 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.

Unit4: 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.

Unit5: 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.

Text Books

1. A. V. Aho, R. Sethi, and J. D. Ullman. "Compilers: Principles, Techniques and Tools", Pearson Education.

Reference Books

1. Louden, "Compiler Construction: Principles and Practice", Cengage Learning.
2. A. C. Holub, "Compiler Design in C" , Prentice-Hall Inc., 1993.
3. Mak, "writing compiler & Interpreters", Willey Pub.

SHRI G. S. INSTITUTE OF TECHNOLOGY & SCIENCE, INDORE

INFORMATION TECHNOLOGY DEPARTMENT

Subject Code	Subject Name	L	T	P	Th. Credit	Pr. Credit	Maximum Marks				Total Credit
							Theory		Practical		
							End Sem	Class Work	End Sem	Sessional Work	
IT38507	MOBILE COMPUTING	3	-	2	3	1	70	30	60	40	4

Course Outcome

1. Illustrate Wireless Technologies and its application
2. Distinguish the various communication generations like 2 G, 3G and 4G
3. Analyze the working of wireless MAC Layer and understand IEEE 802.11 standard .
4. Analyze the network and find solution for related issues using network tools
5. Classify wireless datagram, Wireless Transaction and wireless environment.

Course Content

Unit1: Introduction: Overview of Wireless Technologies, Applications, Mobility and Location Based Services, Multiplexing, Cellular System : Cell Concept, Cell Structure, Cell Types, Frequency Management and Channel assignment Strategies, Interference and System Capacity, Co-Channel Interference, Adjacent Channel Interference, Improving Coverage and Capacity in Cellular System, Cell Splitting, Types of Hand-off and their characteristics.

Unit2: Motivation : SDMA, FDMA, TDMA, CDMA. Introduction to upcoming and Recent Mobile Communication Technologies : 2G, 2.5G (GPRS), 3G, Introduction to 4G. GSM: Mobile Services, System Architecture, Radio Interface, Protocols, Handover, Security.

Unit3: Wireless LAN & MAC Layer: Infrared vs. Radio Transmission, IEEE 802.11: System Architecture, Protocol Architecture, Physical Layer, MAC Layer, MAC Management, Future Development; Hidden & Exposed Terminals problem, Near and Far Terminal Problem. Introduction to Wi-Fi and Bluetooth Architecture.

Unit4: Network & Transport Layer: Impact of mobility on algorithms, Mobile TCP, Mobile IP: Goals, Assumptions & Requirements, Entities & Terminology, IP Packet Delivery, Agent Advertisement & Discovery, Registration, Tunneling & Encapsulation, Optimizations, Reverse Tunneling, IPv6.

Unit5: Application Layer: Wireless Application Protocol Stack: Architecture, Wireless Datagram Protocol, Wireless Transaction Protocol, WAP Application Environment, Wireless Markup Language, WML Script, Introduction to Android : Native Application, SDK Features, Open Handset Alliance, Development Framework, Creating Application, Creating Virtual Device, Running and Debugging Application, Android Development Tools.

Text Books

1. J. Schiller, "Mobile Communications", 2nd edition, Pearson Education.
2. A. K. Talukder, Roopa R Yavagal, "Mobile Computing: Technology, Applications and Service Creation", 9th edition, 2008, Tata McGraw Hill.
3. Reto Meier, "Professional Android 4 Application Development", Wrox 2012.

Reference Books

1. Vijay K Garg, Kenneth Smolik, Joseph E. Wilkes, "Applications of CDMA in wireless/personal communications", Prentice Hall.
2. W. Stallings, "Wireless Communications and Networks", 2nd edition, Pearson Education.
3. Yi. Bing, "Wireless and Mobile Network Architectures", 2nd edition, 2008, Wiley India.
4. Raza B'far "Mobile Computing Principles" Cambridge University press.