

BE VII SEMESTER COMPUTER SCIENCE & ENGG.							
COURSE CONTENTS (UEC SCHEME)							
CS-7001	Compiler Design	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	2	6	70	22

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:

1. Develop a lexical analyzer to recognize a few patterns.
2. Write a programme to parse using Brute force technique of Top down parsing.
3. Develop LL (1) parser (Construct parse table also).
4. Develop an operator precedence parser (Construct parse table also)
5. Develop a recursive descent parser
6. Write a program for generating for various intermediate code forms
7. Three address code ii) Polish notation
8. Write a program to simulate Heap storage allocation strategy
9. Generate Lexical analyzer using LEX
10. Generate YACC specification for a few syntactic categories.
11. Given any intermediate code form implement code optimization techniques
12. Study of an Object Oriented Compiler

References:

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

BE VII SEMESTER COMPUTER SCIENCE & ENGG.							
COURSE CONTENTS (UEC SCHEME)							
CS-7002	Network & Web Security	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	4	70	22

UNIT - I

Introduction to Network Security, Computer Security and Cyber Security. Security Terminologies and Principle, Security Threats, Types of attacks (Operating System, application level, Shrink Wrap code, Misconfiguration attacks etc.). Introduction to Intrusion, Terminologies, Intrusion Detection System (IDS), Types of Intrusion Detection Systems, System Integrity Verifiers (SIVS). Indication of Intrusion: System Indications, File System Indications Network Indications. Intrusion Detection Tools, Post attack IDS Measures & Evading IDS Systems. Penetration Testing, Categories of security assessments, Vulnerability Assessment, Types of Penetration Testing. Risk Management.

UNIT - II

Cryptography, Classical Cryptographic Techniques, Encryption, Decryption, Code Breaking: Methodologies, Cryptanalysis, Cryptography Attacks, Brute-Force Attack, Use of Cryptography. Public key cryptography, Principles of Public key Cryptosystems, Cryptographic Algorithms RSA, Data Encryption Standard (DES), RC4, RC5, RC6, Blowfish, Key Management, Diffie-Hellman key exchange, elliptic curve cryptography.

UNIT - III

Hash Functions, One-way Hash Functions, SHA (Secure Hash Algorithm), Authentication Requirements, Authentication Functions, Kerberos. Message Authentication codes, Message Digest Functions, MD5, SSL (Secure Sockets Layer), SSH (Secure Shell), Algorithms and Security, Disk Encryption, Government Access to Keys (GAK)

Digital Signature: Analysis, Components, Method, Applications, Standard, Algorithm: Signature Generation/Verification, ECDSA, Elgamal Signature Scheme, Digital Certificates.

UNIT - IV

Trojans and Backdoors: Overt and Covert Channels, Working, Types (Remote Access Trojans, Data-Sending Trojans, Destructive Trojans, Trojans, Proxy Trojans, FTP Trojans, Security Software Disablers).

Viruses and Worms: Characteristics, Working, Infection Phase, Attack Phase. Sniffers: Definition, spoofing, Sniffing, Vulnerable Protocols, Types.

Phishing: Methods, Process, Attacks Types (Man-in-the-Middle Attacks, URL Obfuscation Attacks, Hidden Attacks, Client-side Vulnerabilities, Deceptive Phishing, Malware-Based Phishing, DNS Based Phishing, Content-Injection Phishing, Search Engine Phishing).

Web Application Security- Secured authentication mechanism, secured session management, Cross-site Scripting, SQL Injection and other vulnerabilities

Denial-of Service Attacks: Types of Attacks (Smurf Attack, Buffer Overflow Attack, Ping of Death Attack, Teardrop Attack, SYN Attack, SYN Flooding), DDoS Attack (Distributed DoS Attack.), Session Hijacking, Spoofing v Hijacking, TCP/IP hijacking, CAPTCHA Protection

UNIT - V

IP Security, Web Security, Firewalls: Types, Operation, Design Principles, Trusted Systems. Computer Forensics, Need, Objectives, Stages & Steps of Forensic Investigation in Tracking Cyber Criminals, Incident Handling. Hacking, Classes of Hacker (Black hats, grey hats, white hats, suicide hackers), Footprinting, Scanning (Types-Port, Network, Vulnerability), E-Mail Spiders, Overview of System Hacking Cycle.

List of Experiments:

1. Footprinting using footprinting tools (Open Source & Free)(ex-nslookup, ARIN, Whois, Google Earth etc.)
2. Scanning for vulnerabilities using (Angry IP, HPing2, IPScanner, Global Network Inventory Scanner, Net Tools Suite Pack.)
3. NetBIOS Enumeration Using NetView Tool, Nbtstat Enumeration Tool (Open Source).
4. Steganography using tools: Tool: Merge Streams, Image Hide, Stealth Files, Blindside, STools, Steghide, Steganos, Pretty Good Envelop, Stegdetect,.
5. Steganalysis - Stego Watch- Stego Detection Tool, StegSpy.
6. How to Detect Trojans by using – Netstat, fPort, TCPView, CurrPorts Tool, Process Viewer.
7. Lan Scanner using look@LAN, wireshark.
8. Understanding DoS Attack Tools- Jolt2, Bubonic.c, Land and LaTierra, Targa, Nemesy Blast, Panther2, Crazy Pinger, Some Trouble, UDP Flood, FSMax.

Suggested Reading:

1. William Stallings, "Cryptography and Network Security: Principles and Practice" Pearson
2. Charlie Kaufman, Radia Perlman, Mike Speciner, Michael Speciner, "Network Security - Private communication in a public world" TMH
3. Fourozon, "Cryptography & Network Security" TMH
4. Joseph Migga Kizza, Computer Network Security, Springer International Edition
5. Atul Kahate," Cryptography and Network Security" Mc Graw Hill
6. Carl Endorf, Eugene Schultz, Jim Mellander "INTRUSION DETECTION & PREVENTION" TMH
7. Neal, Krawetz, Introduction to Network Security, Cengage Learning

BE VII SEMESTER COMPUTER SCIENCE & ENGG.							
COURSE CONTENTS (UEC SCHEME)							
CS-7003	Information Storage and Management	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	2	6	70	22

Unit-I

Introduction to Storage Technology: Data proliferation, evolution of various storage technologies, Overview of storage infrastructure components, Information Lifecycle Management, Data categorization.

Unit-II

Storage Systems Architecture: Intelligent disk subsystems overview, Contrast of integrated vs. modular arrays, Component architecture of intelligent disk subsystems, Disk physical structure components, properties, performance, and specifications, RAID levels & parity algorithms, hot sparing, Front end to host storage provisioning, mapping and operation.

Unit-III

Introduction to Networked Storage: JBOD, DAS, NAS, SAN & CAS evolution and comparison. Applications, Elements, connectivity, standards, management, security and limitations of DAS, NAS, CAS & SAN.

Unit -IV

Hybrid Storage solutions; Virtualization: Memory, network, server, storage & appliances. Data center concepts & requirements, Backup & Disaster Recovery: Principles Managing & Monitoring: Industry management standards (SNMP, SMI-S, CIM), standard framework applications, Key management metrics (Thresholds, availability, capacity, security, performance).

Unit-V

Information storage on cloud :Concept of Cloud, Cloud Computing, storage on Cloud, Cloud Vocabulary, Architectural Framework, Cloud benefits, Cloud computing Evolution, Applications & services on cloud, Cloud service providers and Models, Essential characteristics of cloud computing, Cloud Security and integration.

References:

1. G. Somasundaram & Alok Shrivastava (EMC Education Services) editors; Information Storage and Management: Storing, Managing, and Protecting Digital Information; Wiley India.
2. Ulf Troppens, Wolfgang Mueller-Friedt, Rainer Erkens, Rainer Wolafka, Nils Haustein; Storage Network explained : Basic and application of fiber channels, SAN, NAS, iSESI, INFINIBAND and FCOE, Wiley India.
3. John W. Rittinghouse and James F. Ransome; Cloud Computing : Implementation , Management and Security, CRC Press, Taylor Frances Pub.
4. Nick Antonopoulos, Lee Gillam; Cloud Computing : Principles, System & Application, Springer.
5. Anthony T. Velete, Toby J.Velk, and Robert Eltenpeter, Cloud Computing : A practical Approach, TMH Pub.
6. Saurabh, Cloud Computing : Insight into New Era Infrastructure, Wiley India.
7. Sosinsky, Cloud Computing Bible, Wiley India.

BE VII SEMESTER COMPUTER SCIENCE & ENGG.							
COURSE CONTENTS (UEC SCHEME)							
CS-7011	Network Management	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	4	70	22

Unit-I

Introduction to Network Managements, Network Management Framework, Network Based Managements, Evolution of Network Management: SGMP, CMIP, SNMP. Network Implementation and Management Strategies, Network Management Categories: Performance Management, Fault Management, Configuration Management, Security Managements, Accounting Managements. Network Management Configuration: Centralized Configuration, Distributed Configuration. Selected Management Strategy.

Unit –II

Management Information Base (MIB), Structure of Management Information, NMS Presentation of the SMI, NMS Meter-ware Network View. Remote Monitoring (RMON), RMON Group. Desktop Management: Desktop Management Interface (DMI), DMI Architecture, DMI Browser, DMI/SNMP Mapping, Desktop SNMP Extension Agents. Setting up LAN Access, SNMP Configuration.

Unit-III

Introduction, layering, OSI Layering, TCP/IP Layering, Protocols & Standards, Internet standards, Internet administration, Internet Addresses, Internet protocol: introduction, IP header, IP routing, subnet addressing, subnet mask, special case of IP addresses, Comparative Study of IPV4 & IPV6, port numbers Address Resolution Protocol, ARP packet format, Proxy ARP, ARP command, ARP Example, Reverse Address Resolution Protocol (RARP): Introduction, RARP Packet format, RARP Examples, RARP server design.

Unit-IV

Delivery and Routing of IP Packets, Routing Methods, Static versus Dynamic Routing, Routing table and Routing Module, Classless Addressing: CIDR. Internet Protocol (IP), Datagram, Fragmentation, Options, IP Package. Interior and Exterior Routing, Routing information protocol (RIP), Open shortest path first protocol (OSPF), BGP, GGP. Private Networks. Virtual Private Network (VPN), Network Address Translation (NAT).

Unit –V

Internet Control Message Protocols (ICMP):- Types of message, message format, error reporting, query, checksum, ICMP Package. IGMP, IGMP Message and its Operation, IGMP Package. Transmission control protocol, Process-to-Process Communication, TCP Services Flow Control, TCP Timers. TCP Operation, TCP Package. Application layers protocol, Telnet Protocol, File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP), X-Window system protocol, Remote procedure call, and Network file system.

References:

1. Forouzan, TCP/IP Protocol Suite 4th edition, TMH
2. J.Richard Burkey, Network Management Concept and Practice, PHI
3. Stevens, TCP/IP Illustrated Volume-I, Pearson
4. Tittel: TCP/IP, Cenage Learning
5. Uyless Black, TCP/IP and related protocols, McGraw Hill.
6. Doughals E. Comer, Internetworking with TCP/IP Vol. I, Principles, Protocols, and Architecture, Prentice Hall, India.

BE VII SEMESTER COMPUTER SCIENCE & ENGG.							
COURSE CONTENTS (UEC SCHEME)							
CS-7012	Distributed Database	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	4	70	22

Unit - 1

Introduction to distributed databases, comparison of distributed and centralized systems, DDBMS, global relations, fragment and physical image, types of schemas, methods of fragmentation of a relation, levels of transparency in a distributed system, integrity constraints.

Unit - 2

Representation of database operation in form of a query, operation in form of a query, operations on a query, unary and binary tree in a query, converting a global query into fragment query, join and union operations involving a query, aggregate functions, and parametric queries.

Unit - 3

Introduction to query optimization, estimation of profiles of algebraic operations, optimization graphs, reduction of relation using semi-join and join operation. Properties and goals of transaction management, distributed transactions, recovery mechanism in case of transaction failures, log based recovery, check pointing, and communication and site failures in case of a transaction and methods to handle them, serializability and timestamp in distributed databases.

Unit – 4

Introduction to distributed deadlocks, local and global wait for graphs, deadlock detection using centralized and hierarchical controllers, prevention of deadlocks, 2 and 3 phase locking and commitment protocols, reliability in commitment and locking protocols, reliability and concurrency control, reliability and removal of inconsistency.

Unit - 5

Distributed database administration, authorization and protection in distributed databases, distributed database design, heterogeneous database system.

References:

1. Distributed Databases Principles and Systems by Stefano Ceri and Guiseppe Pelagatti, McGraw-Hill International Editions.

BE VII SEMESTER COMPUTER SCIENCE & ENGG.							
COURSE CONTENTS (UEC SCHEME)							
CS-7013	Data Mining and Warehousing	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	4	70	22

Unit-I

Introduction, to Data warehousing, needs for developing data Warehouse, Data warehouse systems and its Components, Design of Data Warehouse, Dimension and Measures, Data Marts:-Dependent Data Marts, Independents Data Marts & Distributed Data Marts, Conceptual Modeling of Data Warehouses:-Star Schema, Snowflake Schema, Fact Constellations. Multidimensional Data Model & Aggregates.

Unit-II

OLAP, Characteristics of OLAP System, Motivation for using OLAP, Multidimensional View and Data Cube, Data Cube Implementations, Data Cube Operations, Guidelines for OLAP Implementation, Difference between OLAP & OLTP, OLAP Servers:-ROLAP, MOLAP, HOLAP Queries.

UNIT-III

Introduction to Data Mining, Knowledge Discovery, Data Mining Functionalities, Data Mining System categorization and its Issues. Data Processing :- Data Cleaning, Data Integration and Transformation. Data Reduction, Data Mining Statistics. Guidelines for Successful Data Mining.

Unit-IV

Association Rule Mining:-Introduction, Basic, The Task and a Naïve Algorithm, Apriori Algorithms, Improving the efficiency of the Apriori Algorithm, Apriori-Tid, Direct Hasing and Pruning(DHP),Dynamic Itemset Counting (DIC), Mining Frequent Patterns without Candidate Generation(FP-Growth),Performance Evaluation of Algorithms,

Unit-V

Classification:-Introduction, Decision Tree, The Tree Induction Algorithm, Split Algorithms Based on Information Theory, Split Algorithm Based on the Gini Index, Overfitting and Pruning, Decision Trees Rules, Naïve Bayes Method. Cluster Analysis:- Introduction, Desired Features of Cluster Analysis, Types of Cluster Analysis Methods:- Partitional Methods, Hierarchical Methods, Density- Based Methods, Dealing with Large Databases. Quality and Validity of Cluster Analysis Methods.

References:

1. Berson: Data Warehousing & Data Mining &OLAP, TMH
2. Jiawei Han and Micheline Kamber, Data Mining Concepts & Techniques, Elsevier Pub.
3. Arun.K.Pujari, Data Mining Techniques, University Press.
4. N.P Gopalan: Data Mining Technique & Trend, PHI
5. Hand, Mannila & Smith: Principle of Data Mining, PHI
6. Tan, Introduction to Data Mining, Pearson Pub.

BE VIII SEMESTER COMPUTER SCIENCE & ENGG.							
COURSE CONTENTS (UEC SCHEME)							
CS-7021	Advance Computing Paradigm	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	4	70	22

Unit - I

Grid and Cluster Computing: Introduction to Grid Computing, Types of grids, Grid Activities, e governance, Grid Applications, Grid Computing Organizations and their roles, Grid Architecture, Grid computing Applications. Cluster Computing-Definition and Architecture of a cluster, Cluster Programming Environment and Tools.

Unit - II

Quantum Computing: History of molecular electronics, Molecular scale electronic, Quantum mechanic, Quantum Gates and Circuits, Implementation of Quantum Computer, Quantum Algorithms.

Unit - III

Nano Computing: Introduction to Nano Computing, Nano Computing Technology, Nano Information Processing, Physics of Nano Computing, Introduction to Molecular & Optical Computing.

Unit - IV

Mobile and Pervasive Computing: Mobile computing , Adaptability , Mobility Management ,Context – Aware Computing and its applications , Introduction to Ad Hoc and Sensor Networks , Approaches to Security .

Unit - V

Cloud Computing:

Overview of Cloud Computing, Cloud Components, Applications, Hardware and Infrastructure, Accessing the cloud, Cloud Storage, Future of Cloud Computing.

Reference Books

1. Janakiram , Grid Computing ,TMH Pub
2. Prabhu , Grid and Cluster Computing , PHI Pub
3. Vishal Sahani & Goswami, Nano Computing, TMH Pub
4. Bhunia , Introduction to Quantum Computing , New Age Int. Pub
5. Adelstein & Gupta, Fundamentals of Mobile and Pervasive Computing, TMH Pub
6. Velte , Cloud Computing , McGraw Hill Pub

BE VII SEMESTER COMPUTER SCIENCE & ENGG.							
COURSE CONTENTS (UEC SCHEME)							
CS-7022	Simulation & Modeling	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	4	70	22

Unit-I

Introduction to Modeling and Simulation:

Nature of Simulation. Systems , Models and Simulation, Continuous and Discrete Systems, system modeling, concept of simulation, Components of a simulation study, Principles used in modeling Static and Dynamic physical models, Static and Dynamic Mathematical models Introduction to Static and Dynamic System simulation, Advantages ,Disadvantages and pitfalls of Simulation.

Unit-II

System Simulation and Continuous System Simulation:

Types of System Simulation, Monte Carlo Method, Comparison of analytical and Simulation methods, Numerical Computation techniques for Continuous and Discrete Models, Distributed Lag Models, Cobweb Model. Continuous System models, Analog and Hybrid computers, Digital-Analog Simulators, Continuous system simulation languages ,Hybrid simulation ,Real Time simulations.

Unit –III

System Dynamics & Probability concepts in Simulation:

Exponential growth and decay models, logistic curves, Generalization of growth models, System dynamics diagrams, Multi segment models, Representation of Time Delays. Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform Continuously Distributed Random Numbers, Rejection Method.

Unit-IV

Simulation of Queueing Systems and Discrete System Simulation:

Poisson arrival patterns, Exponential distribution, Service times, Normal Distribution Queueing Disciplines, Simulation of single and two server queue. Application of queueing theory in computer system. Discrete Events ,Generation of arrival patterns, Simulation programming tasks, Gathering statistics, Measuring occupancy and Utilization, Recording Distributions and Transit times.

Unit-V

Introduction to Simulation languages and Analysis of Simulation output:

GPSS: Action times, Succession of events, Choice of paths, Conditional transfers, program control statements . SIMSCRIPT: Organization of SIMSCRIPT Program, Names & Labels, SIMSCRIPT statements Estimation methods , Relication of Runs, Batch Means , Regenerative techniques , Time Series Analysis , Spectral Analysis and Autoregressive Processes.

List of Experiments:-

1. Simulate CPU scheduling algorithm using queueing system a) FCFS b) SJF c) Priority Algo
2. Simulate multiplexer/concentrator using queueing system
3. Simulate congestion control algorithms.
4. Simulate disk scheduling algorithms.
5. Simulate a Manufacturing shop and write a program in GPSS.
6. Simulate Telephone system model and write a program in SIMSCRIPT.

References:

- Gorden G., System simulation, Prentice Hall.
- Seila, Simulation Modeling, Cengage Learning
- Law .,Simulation Modeling And Analysis, McGraw Hill
- Deo, System Simulation with Digital Computer, PHI
- Harrington, Simulation Modeling methods, McGraw Hill

BE VII SEMESTER COMPUTER SCIENCE & ENGG.							
COURSE CONTENTS (UEC SCHEME)							
CS-7023	Embedded System	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	0	4	70	22

Unit – I

Introduction to Embedded systems:

Embedded Systems Vs General Computing Systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Purpose of Embedded systems, Core of the Embedded system, Memory, Sensors and Actuators, Communication Interface, Embedded firmware, PCB and Passive Components, Characteristics and Quality attributes of a Embedded System.

Unit – II

Design of Embedded Systems with 8bit Microcontrollers-8051:

Factors for considering in selecting a Controller, Designing with 8051 microcontroller Different addressing modes supported by 8051, Instruction set for 8051 microcontroller. Fundamental issues in Hardware Software Co-Design, Computational models in Embedded Design.

Unit – III

Embedded Hardware & Firmware Design and Development:

Analog & Digital Electronic components, VLSI & Integrated circuit design, Electronic Design Automation tools , PCB layout Design and its fabrication .Embedded firmware design approaches , Embedded firmware Development Languages ,Programming in Embedded C . Integration and testing of Embedded Hardware and Firmware , Safe & robust Design, Reliability, Faults, errors & Failure, Functional Design, Architecture Design, Prototyping.

Unit -IV

Embedded System Development Environment:

Integrated Development Environment (IDE) , Types of files Generated on Cross-Compilation, Disassembler / Decompiler, Simulators, Emulators and Debugging, Boundary Scan.

Unit – V

Embedded Product Development Lifecycle (EDLC) and Trends in Embedded Industry:

What is EDLC, Objectives of EDLC, Different phases of EDLC, EDLC Approaches-Linear or waterfall model, Iterative Model, Prototyping/Evolutionary Model, Spiral Model. Processor trends in Industry, Embedded OS Trends, Development Language trends Open Standards, Frameworks and Alliances, Bottlenecks.

References:

1. Shibu, Introduction to Embedded System:, TMH
2. Barrett, Embedded Systems: Design and Applications ,Pearson Education
3. Rajkamal, Embeded System, TMH
4. Vahid ,Givargis ,Embedded System Design ,Wiley
5. Balbno, Embedded Micro Computer System Cengage Learning
6. Siewert, Real Time Embeded System & Components, Cengage Learning
7. Peckol, Embeded System, Willey Indi