



ACHARYA NAGARJUNA UNIVERSITY

CSE
2-year M.Tech
Post Graduate Course

(Semester System)

**COMPUTER SCIENCE &
ENGINEERING**

SYLLABUS

W.E.F. 2011 – 2012

(from the batch admitted in the year 2011)

ACHARYA NAGARJUNA UNIVERSITY:: NAGARJUNA NAGAR
REVISED REGULATIONS FOR
TWO - YEAR M.TECH. DEGREE COURSE
(CREDIT BASED SYSTEM)
 (With effect from the batch of students admitted during the academic
 year 2011-2012).

1. ELIGIBILITY FOR ADMISSION

- 1.1 The candidates, both non-sponsored and sponsored, for Admission into M.Tech programme shall have one of the following qualifications.

S.No.	Programme	Qualifications
1	Chemical Engineering	Bachelor Degree in Chemical Engineering / Chemical Technology / Biotechnology or its equivalent Degree recognized by Acharya Nagarjuna University.
2	Civil Engineering	Bachelor Degree in Civil Engineering or its equivalent Degree recognized by Acharya Nagarjuna University.
3	Computer Science and Engineering	B.Tech/B.E Computer Science and Engineering/Information Technology/M.C.A/M.Sc. Computers/M.Sc. Electronics/M.Sc. Mathematics or its equivalent Degree recognized by Acharya Nagarjuna University.
4	Electrical and Electronics Engineering	Bachelor Degree in Electrical & Electronics Engineering/Electrical Engineering/ Electrical Power Engineering/ AMIE (Electrical Engineering) or its equivalent Degree recognized by Acharya Nagarjuna University.
5	Electronics and Communication Engineering	Bachelor Degree in Electronics & Communication/ Electronic & Instrumentation Engineering/AMIE or its equivalent Degree recognized by Acharya Nagarjuna University.
6	Mechanical Engineering	Bachelor Degree in Mechanical Engineering or its equivalent Degree recognized by Acharya Nagarjuna University.

- 1.2 Admission of Non-sponsored category students : Admission of non-sponsored category students is made on the basis of GATE/PGECET rank. When GATE/PGECET qualified candidates are not available, admission will be on the basis of merit in the qualifying examination. Students with or without GATE/PGECET rank should have obtained a minimum of 50% marks in the qualifying examination to become eligible for admission.

Reservation of seats to the candidates belonging to Scheduled Castes and Scheduled Tribes is as prescribed by the State Govt./University from time to time. If suitable candidates are not available to fill all the seats reserved for S.T category, they shall be filled by students S.C. Category and vice-versa.

If suitable candidates are not available for reserved seats, they shall be filled by the general category candidates.

- 1.3 Admission of Sponsored Category students: Sponsored category students should have at least 50% marks in the qualifying examination to become eligible for admission to the Post Graduate Programme. Preference will be given to those candidates who are GATE/PGECET qualified.

The candidates must have a minimum of two years of full time work experience in a registered firm / company/ industry / educational and research institutions / any government department or government autonomous organizations in the relevant field in which the admission is being sought.

A letter from the employer must be furnished stating that the candidate is being sponsored to get admission. The employer should also indicate that the candidate will not be withdrawn midway till the completion of course. The rule of reservation shall not apply to the admission of sponsored category students.

- 1.4 The total number of full time candidates admitted into a course with or without GATE/PGECET rank should not exceed the sanctioned strength.

2.0 MEDIUM OF INSTRUCTION, DURATION AND STRUCTURE

- 2.1. The medium of instruction shall be in English.
- 2.2. The minimum and maximum period for completion of the P.G. Programme is 4 Semesters and 8 Semesters respectively for full time students.
- 2.3. Each Semester shall normally spread over sixteen weeks.
- (a) The Programme may consist of
- i. Core Courses
 - ii. Elective Courses
 - iii. Seminars
 - iv. Project Work
- (b) The structure of the Programme comprises of two semesters of course work consisting of 6 Core subjects + 6 Elective subjects plus (3 Labs + 1 Seminar) or (2 Labs + 2 Seminar) followed by two semesters of Project work. In the third semester the student should give a project seminar. At the end of fourth semester the students should submit Project Thesis.
- 2.4. Project work shall be carried out under the Supervision of a Faculty Member in the concerned department.
- 2.5. A candidate may, however, in certain cases, be permitted to work on his Project/Dissertation at the place of employment, any recognized Institution/R&D Organization/Industry with the approval of the Head of the Department concerned and Head of the Organization. In such cases, the Project Work shall be jointly supervised by a member of the faculty and a person from the Organization holding a minimum of P.G. Degree in the concerned area of specialization.

- 2.6. Five copies of the Project Report certified by the Supervisor(s) and the Head of the Department concerned shall be submitted within one Calendar Year after completion of the second semester.
- 2.7. The student is eligible for the submission of M.Tech. Project Report at the end of fourth semester if he/she passed all the course work in the first & second semesters.
- 2.8. In a special case, if any candidate unable submit his/her Project Report at the end of fourth semester due to ill health or any other reason permitted by the head of the institution, he/she will be allowed submit at a latter date.and the viva-voce examination will be conducted separately.

3.0. ATTENDANCE

- 3.1 The candidate shall put up a minimum of 75% attendance in each subject.
- 3.2. Condonation of shortage in attendance up to 10% in any subject may be condoned by the University on the recommendations of the Principal of the concerned College for reasons of ill health and the application is submitted at the time of actual illness and is supported by a certificate from the authorized Medical Officer approved by the Principal.
- 3.3. If the candidate does not satisfy the attendance requirement in any subject he or she shall not be permitted to appear for the University examination in that subject and has to repeat that subject when next offered or study any other specified subject as may be required. In case of repetition the new internal marks be taken into account.
- 3.4. Failure in securing minimum prescribed attendance in any subject of previous Semester (s) is no bar for enrollment to the next semester.

4.0. EVALUATION

- 4.1 The performance of the candidate in each semester shall be evaluated subject wise. The maximum marks for each subject, seminar etc, will be as prescribed in the curriculum. The Internal Evaluation for Theory subjects shall be based on the best of the performances in the two mid term examinations one held in the middle of the semester and another held immediately after the completion of the instruction. The internal evaluation for practical subjects is based on the day to day performance and semester end internal practical Examination.
- 4.2 The marks for Seminar will be awarded by internal evaluation made by two staff members of the faculty of the department concerned.
- 4.3 For taking the University examination in any theory or practical subject, candidates shall be required to obtain a minimum of 50% marks in Internal evaluation in that subject failing which he/she shall be required to repeat the course in that subject when next offered or study any other specified subject as may be required. In case of repetition the new internal marks will be taken into account.
- 4.4 A candidate shall be deemed to have secured the minimum academic requirement in a subject if he or she secures a minimum of 50% marks in internal evaluation.
- 4.5 In case the candidate does not secure the minimum academic requirement in any subject he/she has to reappear in the University examination in that subject or any equivalent subject prescribed

- 4.6 Failure to attain the minimum academic requirement in any subject of previous semester (s) is no bar for enrollment to the next semester.
- 4.7 The performance of the students in each semester shall be evaluated subject wise The distribution of marks between sessional work (based on internal assessment) and University Examination will be as follows:

Nature of the subject	Sessional Marks	University Exam. Marks
Theory subjects	30	70
Practicals	30	70
Seminar	100	--
Project work	50	150 (Viva voce)

5. AWARD OF CREDITS

Credits are awarded for each Theory/Practical/Seminar/Project Subjects. Each theory subject is awarded 4 credits and each practical/Seminar subjects is awarded 2 credits. Project seminar in III Semester is awarded 8 credits and Project Viva-voce at the end of IV Semester is awarded 16 credits.

6. AWARD OF GRADES

S.No.	Range of Marks	Grade	Grade Points
1	≥85%	S	10.0
2	75%-84%	A	9.0
3	65%-74%	B	8.0
4	60%-64%	C	7.0
5	55%-59%	D	6.0
6	50%-54%	E	5.0
7	≤49%	F(Fail)	0.0
8	The grade 'W' represents withdrawal/absent (subsequently changed into pass or E to S or F grade in the same semester)	W	0.0

A Student securing 'F' grade in any subject there by securing 0 grade points has to reappear and secure at least 'E' grade at the subsequent examinations in that subject

'W' denotes withdrawal/absent for a subject

- After results are declared and Grade sheets will be issued to each student which will contain the following details:
- The list of subjects in the semester and corresponding credits and Grade obtained
- The Grade point average(GPA) for the semester and
- The Cumulative Grade Point Average(CGPA) of all subjects put together up to that semester from first semester onwards

GPA is calculated based on the following formula:

$$\frac{\text{Sum of [No.Credits X Grade Points]}}{\text{Sum of Credits}}$$

CGPA will be calculated in a similar manner, considering all the subjects enrolled from first semester onwards.

7. AWARD OF DEGREE AND CLASS

A candidate who becomes eligible for the award of the degree shall be placed in the following three divisions based on the CGPA secured by him/her for the entire Programme

S.No.	Class	CGPA
1	First Class With Distinction	8.0 or more
2	First Class	6.5 or more but less than 8.0
3	Second Class	5.0 or more but less than 6.5

8. WITH-HOLDING OF RESULTS

The result of a candidate may be withheld in the following cases

- i. The candidate has not paid dues to the institution
 - ii. A case of indiscipline is pending against the candidate
 - iii. A case of malpractice in examination is pending against the candidate
- The issue of degree is liable to be withheld in such cases

9. GENERAL

- 8.1 The University reserves the right of altering the regulations as and when necessary.
- 8.2 The regulations altered will be applicable to all the candidates on the rolls irrespective of the fact that the regulations at the time of admission of the student to the programme are different
- 8.3 The Academic Regulations should be read as a whole for purpose of any Interpretation Whenever there is a dispute regarding interpretation of regulations, the decision of the Vice-Chancellor is final.

ACHARYA NAGARJUNA UNIVERSITY: NAGARJUNA NAGAR

**SCHEME FOR COMPUTER SCIENCE & ENGINEERING
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First Semester

Code	Subject	T	P	C	SM	UEM
CSE 511	Advanced Data Structures	4+1	-	4	30	70
CSE 512	Data Base Management Systems	4+1	-	4	30	70
CSE 113	Advanced Computer Architecture	4+1	-	4	30	70
cSE 514	ELECTIVE -1	4	-	4	30	70
CSE 515	ELECTIVE-II	4	-	4	30	70
CSE 516	ELECTIVE-III	4	-	4	30	70
CSE 551	Data Structures Lab	-	3	2	30	70
CSE 552	DBMS LAB	-	3	2	30	70
Total		27	9	28	240	560

One from each of the following is to be selected under each of the electives

Elective – I

CSE514(A)
Software Engineering
CSE514(B)
Object Oriented Analysis &
Design
CSE514(C)
Object Oriented Software
Engineering
CSE514(D)
Software Project Management

Elective –II

CSE515(A)
Computer Networks
CSE515(B)
Data Communications
CSE515(C)
Network Programming
CSE515(D)
Network Management
Systems

Elective-III

CSE516(A)
Advanced Operating Systems
CSE516(B)
Unix programming
CSE516(C)
System Programming
CSE516(D)
Compiler Design

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Second Semester

Code	Subject	T	P	C	SM	USM
CSE 521	Data Engineering	4+1	-	4	30	70
CSE 522	Design Analysis of Algorithms	4+1	-	4	30	70
CSE 523	Advanced Computing	4+1	-	4	30	70
CSE 524	ELECTIVE -1	4	-	4	30	70
CSE 525	ELECTIVE-II	4	-	4	30	70
CSE 526	ELECTIVE-III	4	-	4	30	70
CSE 561	Data Engineering Lab	-	3	2	30	70
CSE 562	Design Analysis of Algorithms LAB	-	3	2	30	70
	Total	27	9	28	240	560

one from each of the following is to be selected under each of the electives

Elective-1

CSE524(A)
Bioinformatics
CSE524(B)
Evolutionary Algorithms
CSE524(C)
Machine Learning
CSE524(D)
Soft Computing

Elective-II

CSE525(A)
High Speed Networks
CSE525(B)
Advanced Computer Networks
CSE525(C)
Network & Internet Security
CSE523(D)
Wireless Networks

Elective-III

CSE526(A)
Embedded Systems
CSE526(B)
Multimedia Systems
CSE526(C)
Parallel Processing
CSE526(D) Real
Time Systems

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**SCHEME FOR COMPUTER SCIENCE & ENGINEERING
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Third Semester

Code	Subject	T	P	C	SM
CSE 651	SEMINAR	--	--	8	100
	Total	--	---	8	100

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**SCHEME FOR COMPUTER SCIENCE & ENGINEERING
w.e.f 2011-2012 (Semester System)**

Fourth Semester

Code	Subject	T	P	C	SM	UEM
CSE 661	Project Viva Voce	--	---	16	50	150
	Total	---	---	16	50	150

CSE 511

ADVANCED DATA STRUCTURES

L T P M

4 1 0 100

Unit - I. Non Linear data structures

General Trees, Operations, Trees traversals, Binary Trees, Operations on binary trees, Conversion of a general tree to binary, Applications of trees, Heaps Graphs- multilink structures, representations, Graph traversals, Applications of graphs, spanning trees

Unit - II. Sorting

Growth of function, -'O' notation, Complexity of algorithm, Classification, Internal sorting, Insertion sort, Selection sort, Shell sort, Tree sort, Selection sort, Bubble sort, Quick sort, Heap sort, Distributive radix sort, External sorting, Multi way merge, External Radix Sort.

Unit - III. Searching

Sequential search, Binary search, Search trees traversals, Binary trees, Threaded binary search trees, Inserting and deleting nodes in a binary search tree, Balancing binary search tree, Height balanced(AVL) tree: Concept and construction. Weight balanced (BB) trees. Hashing Techniques, Hash function, Address calculation techniques, common hashing functions.

Collision resolution. Linear probing, Quadratic Double hashing. Bucket addressing. Deletion and rehashing.

Unit - IV. Indexed structures

Binary search trees as indexes m-way search tree: insertion, deletion, performance B-Trees searching, insertion, deletion, performance. Overview of B* - Trees and B+-Trees Random files, Multi key files Organization, multikey access, inverted file organization. Alternate key ISAM. Comparison and trade-off. File design considerations.

Text books:

1. "Data Structures and Algorithm Analysis in C". Weiss, Mark Allen, Addison Wesley
2. "Data Structure . A Pseudocode Approach with C " __Richard F. Gilberg, Behrouz A. Forouzan (Thomson Learning)

References:

1. "Introduction to data management and file design"-R.Kennith Walter, 1986
2. "An introduction to data structures with applications"-Trembley and Manohar.
3. "Data Structure using C" AM Tanenbaum, Y Langsam and MJ Augenstein, Prentice-Hall, India, 1991.
4. "Data Structure and Program Design in C" . RL Kruse, BP Leung and CL Tondo, Prentice Hall, 1991.

CSE 512

DATABASE MANAGEMENT SYSTEMS

L T P M

4 1 0 100

UNIT - I

Databases and Database Users, Database System Concepts and Architecture, Data Modeling Using the Entity-Relationship (ER) Model, The Relational Data Model and Relational Database Constraints, The Relational Algebra

UNIT - II

Functional Dependencies and Normalization for Relational Databases, Introduction to Transaction Processing Concepts and Theory, Concurrency Control Techniques, Database Recovery Techniques

UNIT - III

Distributed DBMS Concepts and Design, Distributed DBMS-Advanced Concepts Introduction to Object DBMS, Object-Oriented DBMSs-Concepts and Design Object-Relational DBMS.

UNIT - IV

Emerging database technologies and applications, XML and Internet Databases Enhanced data models for advanced applications

TEXT BOOKS:

1. Fundamentals of Database Systems, Ramez Elmasri and Navate Pearson Education, 5th edition (UNIT I,II & IV)
2. Database Systems: A practical approach to design, implementation and management-Thomas M Connolly and Carolyn E.Beggf (UNIT III)

REFERENCES:

1. Object-Oriented Database Systems, C.S.R Prabhu, Prentice Hall India.
2. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
3. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.
4. Introduction to Database Systems, C.J.Date Pearson Education
5. Principles of Distributed Database Systems, Ozsu, 2/e, PHI.

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CS 513

ADVANCED COMPUTER ARCHITECTURE

L T P M

4 1 0 100

UNIT - I

Parallel Computer Models: The state of computing, Classification of parallel computers, Multiprocessors and Multicomputers, Multivector and SIMD computers. Program and network properties: Conditions of parallelism, Data and resource Dependences, Hardware and Software parallelism, Program partitioning and scheduling, Grain Size and latency, Program flow mechanisms, Control flow versus data flow, Data flow Architecture, Demand driven mechanisms, Comparisons of flow mechanisms.

System Interconnect Architectures: Network properties and routing, Static interconnection Networks, Dynamic interconnection Networks, Multiprocessor system Interconnects, Hierarchical bus systems, Crossbar switch and multi-port memory, Multistage and combining network.

UNIT-II

Principles of Scalable Performance: Performance Metrics and Measures, Parallel Processing Applications, Speedup Performance Laws - Amdahl's law for fixed load, Gustafson's law for scaled problems, Memory Bounded Speedup Model.

Pipelining: Linear pipeline processor, nonlinear pipeline processor, Instruction pipeline Design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch Handling techniques, branch prediction, Arithmetic Pipeline Design, Computer Arithmetic principles, Static Arithmetic pipeline, Multifunctional arithmetic pipelines.

UNIT -III

MULTI Processors: Multiprocessor System Interconnect, Cache Coherence and Synchronization Mechanisms, Message-passing Mechanism. Scalable, Multi-Threaded and Dataflow Architectures, Latency-Hiding Techniques, Principles of Multithreading, Scalable and Multithreaded Architectures.

UNIT-IV

Parallel Models, Languages and Compilers: Parallel Programming Models, Parallel Languages and Compilers, Dependence analysis of Data Arrays, code optimization and Scheduling, Loop parallelization and pipelining.

Text Book:

1. Kai Hwang, "Advanced Computer Architecture"; TMH.

Reference Books:

1. D.A. Patterson and J.L.Hennessey, "Computer organization and Design", Morgan Kaufmann, 2nd Edition.
2. V.Rajaram & C.S.R.Murthy, "Parallel Computer", PHI.
3. Barry Wilkinson and Michael Allen, "Parallel Programming" Pearson Education.

CSE 514(A)

SOFTWARE ENGINEERING

L T P M

4 0 0 100

UNIT I

Introduction to Software Engineering : The evolving role of software, Changing Nature of Software, Software myths.

A Generic view of process : Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

Process models : The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

Software Requirements : Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

UNIT II

Requirements engineering process : Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models : Context Models, Behavioral models, Data models, Object models, structured methods.

Design Engineering : Design process and Design quality, Design concepts, the design model.

Creating an architectural design : Software architecture, Data design, Architectural styles and patterns, Architectural Design.

UNIT III

Object-Oriented Design : Objects and object classes, An Object-Oriented design process, Design evolution.

Performing User interface design : Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

Testing Strategies : A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics : Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

UNIT IV

Metrics for Process and Products : Software Measurement, Metrics for software quality.

Risk management : Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

Quality Management : Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

TEXT BOOKS :

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition. McGrawHill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson education.

REFERENCES :

1. Software Engineering- K.K. Agarwal & Yogesh Singh, New Age International Publishers
2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiely.
3. Systems Analysis and Design- Shely Cashman Rosenblatt, Thomson Publications.
4. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.

CSE 514 (B)	OBJECT ORIENTED PROGRAMMING	L	T	P	M
		4	0	0	100

UNIT - I

Introduction to UML : Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

Basic Structural Modeling : Classes, Relationships, common Mechanisms, and diagrams.

Advanced Structural Modeling : Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

UNIT - II

Class & Object Diagrams : Terms, concepts, modeling techniques for Class & Object Diagrams.

Basic Behavioral Modeling-I : Interactions, Interaction diagrams.

UNIT -III

Basic Behavioral Modeling-II : Use cases, Use case Diagrams, Activity Diagrams.

Advanced Behavioral Modeling : Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

UNIT-IV

Architectural Modeling : Component, Deployment, Component diagrams and Deployment diagrams.

Case Study : The College/Hospital Management System application.

TEXT BOOKS :

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

REFERENCE BOOKS:

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML, TATA McGrawHill
5. Applying UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.

**CSE 514 (C) OBJECT ORIENTED SOFTWARE
ENGINEERING**

L T P M

4 0 0 100

UNIT-1

Software & Software Engineering The nature of software, software engineering and as a branch of engineering profession, stakeholders in software engineering, software quality, software engineering projects, Developing requirements

Domain analysis, software project's starting point, problem definition and scope, What is a requirement?, type of requirements, gathering and analyzing of requirements, requirements document types, reviewing, managing change in requirements,

UNIT-II

Modeling with classes

UML, essentials of UML class diagrams, associations and multiplicity, generalization, instance diagrams,

Using design patterns

Pattern introduction, the abstraction-occurrence pattern, general hierarchical pattern, the play-role pattern, the singleton pattern, the observer pattern, the delegation pattern, the adaptor pattern, the façade pattern, the immutable pattern, the read-only interface pattern and the proxy pattern.

UNIT-III

Focusing on users and their tasks

User-centred design, characteristics of users, developing use case models of systems, the basics of user interface design, usability principles, evaluation users interfaces

Modeling interactions and behavior

Interaction diagrams, state diagrams, activity diagrams

Architect ring and designing software

The process of design, principles leading to good design, techniques for making good design decisions, software architecture, writing a good design document

UNIT-IV

Testing and inspecting to ensure high quality

Basic definitions of defect, error and failure, effective and efficient testing, defects in ordinary and numerical algorithms, defects in timing and coordination, defects in handling stress and unusual situations, documentation defects, writing formal test cases and test plans, strategies for testing large software, inspections, quality assurance in general

Managing the software process

Project management, software process model, cost estimation, building software engineering teams, project scheduling and tracking, contents of a project plan

Text Book: Object-Oriented Software Engineering Practical software development using UML and Java by Timothy C. Lethbridge & Robert Langanieri Mcgraw-Hill Co

CSE 514 (D)	SOFTWARE PROJECT MANAGEMENT	L	T	P	M
		4	0	0	100

UNIT - I

Conventional Software Management : The waterfall model, conventional software Management performance.

Evolution of Software Economics : Software Economics, pragmatic software cost estimation.

Improving Software Economics : Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

The old way and the new : The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT - II

Life cycle phases : Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process : The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

Model based software architectures : A Management perspective and technical perspective.

Work Flows of the process : Software process workflows, Iteration workflows.

UNIT - III

Checkpoints of the process : Major mile stones, Minor Milestones, Periodic status assessments.

Iterative Process Planning : Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

Project Organizations and Responsibilities : Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Process Automation : Automation Building blocks, The Project Environment.

UNIT - IV

Project Control and Process instrumentation : The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.

Tailoring the Process : Process discriminants.

Future Software Project Management : Modern Project Profiles, Next generation Software economics, modern process transitions.

Case Study: The command Center Processing and Display system- Replacement (CCPDS-R)

TEXT BOOK :

1. Software Project Management, Walker Royce: Pearson Education, 2005.

REFERENCES :

1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

CSE 515 (A) COMPUTER NETWORKS

L T P M

4 0 0 100

UNIT-I

Switching:

Circuit switching; Packet switching; Message switching

Point-to-point protocol:

Transition states; PPP layers; Link control protocol; Authentication; Network control protocol

ISDN:

Services; History; Subscriber access; ISDN layers

X.25

X.25 layers; Other protocols related to X.25

UNIT-II

Frame relay:

Introduction; Frame relay operation; Frame relay layers; Congestion control; Leaky bucket algorithm; Traffic control

Networking and Internetworking Devices:

Repeaters; Bridges; Routers; Gateways; multi-protocol routers; Brouters; Switches; Routing switches: Distance vector and link state routing

UNIT-III

TCP/IP –I

Overview of TCP/IP; Network layer; Addressing; Subnet; Other Protocol in the network layer (ARP, RARP, ICMP, IGMP); Transport layer, TCP/IP-II

UNIT-IV

Client-server model; BOOTP; DHCP; DNS; LETNET; FTP;TFTP;SMTP;SNMP; HTTP And WWW

VLAN And VPNs:

VLAN; VPN;

Network Security:

Security Aspects; Privacy; Digital Signatures; PGP; Access authentication

Text Book: Data Communications and Networking

Edition: Second update

Author: Behrouz A Forouzan

Publishers: Tata McGraw-Hill Co Ltd

ISBN: 0-07-049935-7

CSE 115 (B) DATA COMMUNICATIONS

L T P M

4 0 0 100

UNIT- I

INTRODUCTION TO DATA COMMUNICATIONS AND NETWORKING: Standards Organizations for

Data Communications, Layered Network Architecture, Open Systems Interconnection, Data Communications Circuits, Serial and parallel Data Transmission, Data communications Circuit Arrangements, Data communications Networks, Alternate Protocol Suites.

SIGNALS, NOISE, MODULATION, AND DEMODULATION :

Signal Analysis, Electrical Noise and Signal-to-Noise Ratio, Analog Modulation Systems, Information Capacity, Bits, Bit Rate, Baud, and *M*-ary Encoding, Digital Modulation.

UNIT-II

DIGITAL TRANSMISSION :

Pulse Modulation, Pulse code Modulation, Dynamic Range, Signal Voltage –to-Quantization Noise Voltage Ration, Linear Versus Nonlinear PCM Codes, Companding, PCM Line Speed, Delta Modulation PCM and Differential PCM.

MULTIPLEXING AND T CARRIERS :

Time- Division Multiplexing, T1 Digital Carrier System, North American Digital Multiplexing Hierarchy, Digital Line Encoding, T Carrier systems, European Time- Division Multiplexing, Statistical Time – Division Multiplexing, Frame Synchronization, Frequency- Division Multiplexing, Wavelength- Division Multiplexing, Synchronous Optical Network

UNIT –III

DATA COMMUNICATIONS CODES, ERROR CONTROL, AND DATA FORMATS:

Data Communications Character Codes, Bar Codes, Error Control, Error Detection, Error Correction, Character Synchronization.

DATA COMMUNICATIONS EQUIPMENT:

Digital Service Unit and Channel Service Unit, Voice- Band Data Communication Modems, Bell Systems-Compatible Voice- Band Modems, Voice- Band Modern Block Diagram, Voice- Band Modem Classifications, Asynchronous Voice-Band Modems, Synchronous Voice-Band Modems, Modem Synchronization, ITU-T Voice- Band Modem Specifications, 56K Modems, Modem Control: The AT Command Set, Cable Modems, Probability of Error and Bit Error Rate.

UNIT-IV

DATA –LINK PROTOCOLS:

Data –Link Protocol Functions, Character –and Bit- Oriented Protocols, Data Transmission Modes, Asynchronous Data – Link Protocols, Synchronous Data – Link Protocols, Synchronous Data – Link Control, High – Level Data – Link Control.

TEXT BOOKS:

1. Introduction to Data Communications and Networking, Wayne Tomasi, Pearson Education.

Reference Books

1. Data Communications and Networking, Behrouz A Forouzan, Fourth Edition. TMH.
2. Computer Communications and Networking Technologies, Gallow, Second Edition Thomson
3. Computer Networking and Internet, Fred Halsll, Lingana Gouda Kulkarni, Fifth Edition, Pearson Education.

CSE 515 (C) NETWORK PROGRAMMING

L T P M

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UNIT-I

Introduction to Network Programming: OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.

Sockets : Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function.

UNIT-II

TCP client server : Introduction, TCP Echo server functions, Normal startup, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host.

I/O Multiplexing and socket options: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server, getsockopt and setsockopt functions. Socket states, Generic socket option IPV6 socket option ICMPV6 socket option IPV6 socket option and TCP socket options.

UNIT-III

Elementary UDP sockets: Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP.

Elementary name and Address conversions: DNS, gethost by Name function, Resolver option, Function and IPV6 support, uname function, other networking information.

UNIT-IV

IPC : Introduction, File and record locking, Pipes, FIFOs streams and messages, Name spaces, system IPC, Message queues, Semaphores.

Remote Login: Terminal line disciplines, Pseudo-Terminals, Terminal modes, Control Terminals, rlogin Overview, RPC Transparency Issues.

TEXT BOOKS:

1. UNIX Network Programming, Vol. I, Sockets API, 2nd Edition. - W.Richard Stevens, Pearson Edn. Asia.
2. UNIX Network Programming, 1st Edition, - W.Richard Stevens. PHI.

REFERENCES:

1. UNIX Systems Programming using C++ T CHAN, PHI.
2. UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls, Pearson Education
4. Advanced UNIX Programming 2nd Edition M. J. ROCHKIND, Pearson Education

CSE 515 (D) NETWORK MANAGEMENT SYSTEMS

L T P M

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UNIT - I

Data communications and Network Management Overview : Analogy of Telephone Network Management, Communications protocols and Standards, Case Histories of Networking and Management, Challenges of Information Technology Managers, Network Management: Goals, Organization, and Functions, Network and System Management, Network Management System Platform, Current Status and future of Network Management.

SNMPV1 Network Management : Organization and Information and Information Models.

Managed network : Case Histories and Examples, The History of SNMP Management, The SNMP Model, The Organization Model, System Overview, The Information Model.

UNIT - II

SNMPv1 Network Management : Communication and Functional Models. The SNMP Communication Model, Functional model.

SNMP Management: SNMPv2 : Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information, The SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility With SNMPv1.

UNIT - III

SNMP Management : RMON : What is Remote Monitoring? , RMON SMI and MIB, RMON1, RMON2, ATM Remote Monitoring, A Case Study of Internet Traffic Using RMON

Telecommunications Management Network : Why TMN? , Operations Systems, TMN Conceptual Model, TMN Standards, TMN Architecture, TMN Management Service Architecture, An Integrated View of TMN, mplementation Issues.

UNIT - IV

Network Management Tools and Systems:Network Management Tools, Network Statistics Measurement Systems, History of Enterprise Management, Network Management systems, Commercial Network management Systems, System Management, Enterprise Management Solutions.

Web-Based Management:NMS with Web Interface and Web-Based Management, Web Interface to SNMP Management, Embedded Web-Based Management, Desktop management Interface, Web-Based Enterprise Management, WBEM: Windows Management Instrumentation, Java management Extensions, Management of a Storage Area Network: , Future Directions.

TEXT BOOK :

1. Network Management, Principles and Practice, Mani Subrahmanian, Pearson Education.

REFERENCES :

1. Network management, Morris, Pearson Education.

2. Principles of Network System Administration, Mark Burges, Wiley Dreamtech.

3. Distributed Network Management, Paul, John Wiley.

CSE 116 (A) ADVANCED OEPRATING SYSTEMS

L T P M

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UNIT - I

Introduction : Overview - Functions of an Operating System – Design Approaches – Types of Advanced Operating System - Synchronization Mechanisms – Concept of a Process, Concurrent Processes – The Critical Section Problem, Other Synchronization Problems – Language Mechanisms for Synchronization – Process Deadlocks - Preliminaries– Models of Deadlocks, Resources, System State – Necessary and Sufficient conditions for a Deadlock – Systems with Single-Unit Requests, Consumable Resources, Reusable Resources.

UNIT - II

Distributed Operating Systems - Introduction – Issues – Communication Primitives – Inherent Limitations -Lamport’s Logical Clock; Vector Clock; Causal Ordering; Global State; Cuts; Termination Detection. Distributed Mutual Exclusion – Non-Token Based Algorithms – Lamport’s Algorithm - Token-Based Algorithms – Suzuki-Kasami’s Broadcast Algorithm – Distributed Deadlock Detection – Issues –Centralized Deadlock-Detection Algorithms - Distributed Deadlock-Detection Algorithms.

UNIT - III

Agreement Protocols – Classification - Solutions Distributed Resource Management - Distributed File systems – Architecture – Mechanisms – Design Issues –Distributed Shared Memory – Architecture – Algorithm – Protocols – Design Issues. Distributed Scheduling – Issues – Components – Algorithms. Failure Recovery and Fault Tolerance - Basic Concepts- Classification of Failures – Basic Approaches to Recovery; Recovery in Concurrent System;Synchronous and Asynchronous Check pointing and Recovery; Check pointing in Distributed Database Systems; Fault Tolerance; Issues - Two-phase and Non-blocking Commit Protocols; Voting Protocols; Dynamic Voting Protocols.

UNIT - IV

Multiprocessor and Database Operating Systems - Structures – Design Issues – Threads – Process Synchronization – Processor Scheduling – Memory Management – Reliability / Fault Tolerance; Database Operating Systems – Introduction – Concurrency Control – Distributed Database Systems – Concurrency Control Algorithms, Case studies and Discussions.

Text Book:

1. Mukesh Singhal and N. G. Shivaratri, “Advanced Concepts in Operating Systems”, McGraw-Hill, 2000

References:

2. Abraham Silberschatz, Peterson B. Galvin, G. Gagne, “Operating System Concepts”, Sixth Edition, Addison Wesley Publishing Co., 2003.
3. Andrew S. Tanenbaum, “Modern Operating Systems”, Second Edition, Addison Wesley, 2001.

UNIT- I

Introduction to Unix:- Architecture of Unix, Features of Unix , Unix Commands – PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar,gzip.

Unix Utilities:- Introduction to unix file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin. Text processing utilities and backup utilities , detailed commands to be covered are tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, cpio

UNIT-II

Introduction to Shells :Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization.

Filters :Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count characters, Words or Lines, Comparing Files.

Grep :Operation, grep Family, Searching for File Content.

Sed :Scripts, Operation, Addresses, commands, Applications, grep and sed.

awk:Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications, awk and grep, sed and awk

Unit III

Interactive Korn Shell :Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, Options, Startup Scripts, Command History, Command Execution Process.

Korn Shell Programming :Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

Unit IV

Interactive C Shell :

C shell features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, On-Off Variables, Startup and Shutdown Scripts, Command History, Command Execution Scripts.

C Shell Programming :

Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

File Management :

File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask.

TEXT BOOKS :

1. Unix and shell Programming Behrouz A. Forouzan, Richard F. Gilberg. Thomson
2. Your Unix the ultimate guide, Sumitabha Das, TMH. 2nd Edition.

CSE 516 (C) SYSTEM PROGRAMMING

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UNIT-I

Introduction to Systems Programming: (8 Periods)
Introduction to Assembly Language Programming - Introduction to Instruction Formats, Data formats - Role of Base Register, Index Register.

UNIT-II

Introduction to Assembler: (12 Periods)
Databases used in assembler design, Design of Assembler - Single Pass & Double Pass.

UNIT-III

Introduction to Macros: (11 Periods)
Various types of Macros, Design of Macro Processor - Single Pass & Double Pass.
Introduction to Loaders: 11 Periods
Types of Loaders, databases used in Loaders, Design of Loaders - Absolute & DLL.

UNIT-IV

Introduction to Software Tools: (6 Periods)
Text editors, Interpreters, Program Generators, Debug Monitors.

TextBook:

1. Systems Programming, Donovan, Tata Mc Graw Hill

Reference:

2. System Programming, Dhamdhere (IInd Revised Edition), Tata Mc Graw Hill

UNIT – I

Introduction to compiling: Compilers, The Phases of a compiler, Compiler - construction tools.

Simple one-pass compiler: Overview, syntax definition, syntax direct translation, parsing, a translator for simple expressions.

Lexical Analysis: The role of the lexical analyzer, input buffering, simplification of tokens, Recognition of tokens, Finite Automata – Regular expression to Finite Automata. Implementing transition diagrams, a language for specifying lexical analyzers.

UNIT – II

Syntax Analysis: Role of a Parser, Top down parsing - Recursive descent parsing, Predictive parsers, Bottom up parsing - Shift Reduce parsing, LR Parsers – Construction of SLR and LALR parsing, Parser generators.

Syntax – Directed Translation: Syntax Directed definition, construction of syntax trees, Bottom-up evaluation of S – attributed definitions-attributed definitions.

UNIT – III

Runtime Environment: Source language issues, Storage organization, Storage-allocation strategies, Access to nonlocal names, Parameter passing..

Symbol Tables: Symbol table entries, Data structures to symbol tables, representing scope information.

UNIT – IV

Intermediate code Generation: Intermediate languages, Declarations, Assignment statements, Boolean expressions, Flow Control statements, Backpatching.

Code Generation- Issues in the design of code generator, Next use information, the target machines,

Basic blocks and flow graphs, Next use information, a Simple code generator, DAG Representation of Basic Blocks, Peephole optimization, Code generation from DAG.

Text Books:

1. Alfred V.Aho, Ravi Sethi, JD Ullman, 'Compilers Principles, Techniques and Tools', Addison-Wesley Publishing Company.
2. Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wiley dreamtech

References:

1. Alfred V.Aho, Jeffrey D. Ullman, 'Principles of Compiler Design', Narosa publishing
2. Lex & Yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
3. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.

4. Engineering a Compiler-Cooper & Linda, Elsevier

CSE 551

DATA STRUCTURES LAB

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1. Write a program to implement the operations on stacks.
2. Write a program to implement the operations on circular queues
3. Write a program for sorting a list using Bubble sort and then apply binary search.
4. Write a program to create a binary search tree and for implementing the in order, preorder, post order traversal using recursion
5. Write a program for finding the Depth First Search of a graph, and Breadth First Search of a graph
6. Write a program for converting a given infix expression to postfix form
7. Write a program for evaluating a given postfix expression
8. Write a program for implementing the operations of a dequeue
9. Write a program for the representation of polynomials using circular linked list and for the addition of two such polynomials
10. Write a program for quick sort
11. Write a program for Heap sort
12. Write a program for Merge sort.
13. a) Write a program for finding the transitive closure of a digraph
b) Write a program for finding the shortest path from a given source to any vertex in a digraph using Dijkstra's algorithm

CSE 551

DATA BASE MANAGEMENT SYSTEMS LAB

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Study features of a commercial RDBMS package such as ORACLE/DB2, MS Access, MYSQL & Structured Query Language (SQL) used with the RDBMS.(Select two of RDMSs)

Laboratory exercises should include defining schemas for applications, creation of a database, writing SQL queries, to retrieve information from the database, use of host languages, interface with the embedded SQL, use of forms & report writing packages available with the chosen RDBMS product.

Implement the applications, which may be programmed, for the areas given below:

4. Accounting package for a shop,
5. Database manager for a Magazine agency or a newspaper agency, Ticket booking for performances,
6. Preparing greeting cards & birthday cards,
7. Personal accounts - Insurance, loans, mortgage payments, etc., Doctor's diary & billing system,
8. Personal bank account, Class marks management, Hostel accounting,
9. Video Tape library, History of cricket scores,
10. Cable TV transmission program manager, Personal library.

CSE 521

DATA ENGINEERING

L T P M

4 1 0 100

UNIT – I

Data Warehouse – Introduction, A Multi-dimensional data model, Data Warehouse Architecture, Data Warehouse Implementation.

Data Mining – Introduction, Data Mining, Kinds of Data, Data Mining Functionalities, Classification of Data Mining Systems, Major issues in Data Mining.

UNIT – II

Data Preprocessing – Data cleaning, Data Integration & Transformation, Data Reduction, Discretization & Concept Hierarchy Generation, Data Mining Primitives.

Mining Association rules in large databases – Association rule mining, mining single-dimensional Boolean Association rules from Transactional Databases, Mining Multi-dimensional Association rules from relational databases & Data Warehouses.

UNIT – III

Cluster Analysis – Introduction, Types of data in Cluster analysis, A categorization of major clustering methods, partitioning methods, Hierarchical methods, Density-Based Methods: DBSCAN, Grid-based Method: STING; Model-based Clustering Method: Statistical approach, Outlier analysis.

UNIT – IV

Classification & Prediction – Introduction, Classification by Decision tree induction, Bayesian Classification, , Classification by Back propagation, Other Classification Methods, Prediction, Classifier accuracy.

Mining Complex Type of Data – Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Text Databases, Mining the World Wide Web.

Textbooks:

1. Data Mining Concepts & Techniques – Jiawei Han Micheline Kamber – Morgan Kaufmann Publishers.

Reference Books:

1. Data Warehouse Toolkit – Ralph Kinball – John Wiley Publishers.
2. Data Mining (Introductory and Advanced Topics) – Margaret H. Dunham – Pearson Education.
3. Data Warehousing in the real world – A Practical guide for Building decision support systems – Sam Anahory, Dennis Murray – Pearson Education.

CSE 522

DESIGN ANALYSIS OF ALGORITHMS

L T P M

4 1 0 100

UNIT I

Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis- Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis.

Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and biconnected components.

UNIT II

Divide and conquer: General method, applications- Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

Greedy method: General method, applications- Job sequencing with dead lines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT III

Dynamic Programming: General method, applications- Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

Backtracking: General method, applications- n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT IV

Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NPComplete classes, Cook's theorem.

TEXT BOOKS :

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Galgotia publications pvt. Ltd.
2. Algorithm Design: Foundations, Analysis and Internet examples, M.T. Goodrich and R. Tomassia, John Wiley and sons.

REFERENCES :

1. Introduction to Algorithms, second edition, T.H. Cormen, C.E. Leiserson, R.L. Rivest, and C. Stein, PHI Pvt. Ltd./ Pearson Education
2. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T. Lee, S.S. Tseng, R.C. Chang and T. Tsai, Mc Graw Hill.
3. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education.
4. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
5. Algorithms – Richard Johnson baugh and Marcus Schaefer, Pearson Education

CS 523

ADVANCED COMPUTING

L T P M

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UNIT I

Grid Computing : Data & Computational Grids, Grid Architectures and its relations to various Distributed Technologies Autonomic Computing, Examples of the Grid Computing Efforts (IBM).

UNIT II

Cluster setup & its Advantages, Performance Models & Simulations; Networking Protocols & I/O, Messaging systems. Process scheduling, Load sharing and Balancing; Distributed shared memory, parallel I/O .
Example cluster System - Beowlf; Cluster Operating systems: COMPaS and NanOS

UNIT - III

Pervasive Computing concepts & Scenarios; Hardware & Software; Human - machine interface. Device connectivity; Java for Pervasive devices; Application examples

UNIT - IV

Classical Vs Quantum logic gates ;One ,two & three QUbit Quantum gates; Fredkin & Toffoli gates ;Quantum circuits; Quantum algorithms.

TEXT BOOK :

1. J. Joseph & C. Fellenstein:' Grid Computing ', Pearson Education.
2. J.Burkhardt et .al :'Pervasive computing' Pearson Education
3. Marivesar:'Approaching quantum computing ', Pearson Education.

REFERENCES :

1. Raj Kumar Buyya:'High performance cluster computing', Pearson Education.
2. Neilsen & Chung L:'Quantum computing and Quantum Information', Cambridge University Press

CS 524(A) BIOINFORMATICS

L T P M

4 0 0 100

UNIT – I

(15 Periods)

1. Introduction

Definitions, Sequencing, Molecular Biology and Bioinformatics, Biological sequence/structure, Genomoe Projects, Pattern Recognition and prediction, Folding problem, Sequence Analysis, Homology and Analogy, Bioinformatics Applications, Central Dogma of Molecular Biology

2. Information Resources

Biological databases, Primary Sequence databases, Protein sequence databases, Secondary databases, Protein pattern databases, and Structure classification databases DNA sequence databases, specialized genomic resources

UNIT – II

(18 Periods)

3. DNA Sequence Analysis

Importance of DNA analysis, Gene Structure and DNA sequences, Features of DNA sequence analysis, EST (Expressed Sequence Tag) searches, Gene Hunting, Profile of a cell, EST analysis, Effects of EST data on DNA databases, The Human Genome Project

4. Pair Wise Alignment Techniques

Database Searching, Alphabets and complexity, algorithm and programs, comparing two sequences, sub-sequences, Identity and similarity, The Dot plot, Local and Global similarity, Different alignment techniques, Scoring Matrices, Dynamic Programming, Pair wise database searching

UNIT – III

(15 Periods)

5. Multiple sequence alignment & Phylogenetic Analysis

Definition and goal, The consensus, Computational complexity, Manual methods, Simultaneous methods, Progressive methods, Databases of Multiple alignments, and searching, Applications of Multiple Sequence alignment, Phylogenetic Analysis, Methods of Phylogenetic Analysis, Tree Evaluation, Problems in Phylogenetic analysis, Tools for Phylogenetic Analysis

6. Secondary database Searching

Importance and need of secondary database searches, secondary database structure and building a sequence search protocol

UNIT – IV

(12 Periods)

7. Gene Expression and Microarrays

Introduction, DNA Microarrays, Clustering Gene Expression Profiles, Data Sources and tools, Applications

8. Analysis Packages

Analysis Package structure, commercial databases, commercial software, comprehensive packages, packages specializing in DNA analysis, Intranet Packages, Internet Packages.

Text Book:

1. Introduction to Bioinformatics T K Attwood And D.J. Parry-Smith, Pearson
2. Bioinformatics methods and applications S.C. Rastogi, N. Mendiratta And P.Rastogi., PHI

Reference Books:

1. Introduction to Bioinformatics Arthur M. Lesk OXFORD Publishers (Indian Edition)
2. Elementary Bioinformatics, Imtiyaz Alam Khan, Pharma Book Syndicate

CSE 524(B) EVOLUTIONARY ALGORITHMS

L T P M

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UNIT-I

1. Fundamentals of Genetic Algorithms.
2. Genetic Modeling.

UNIT-II

3. Genetic Algorithms Revisited: Mathematical Foundations.
4. Computer Implementation of Genetic Algorithms.

UNIT-III

5. Applications of Genetic Algorithms.
6. Advanced Operators & Techniques in Genetic Search.

UNIT-IV

7. Introduction to Genetic Based Machine Learning.
8. Applications of Genetic based Machine Learning.

TEXT BOOKS:

1. S.Rajasekharan, and G.A.Vijaya Lakshmi Pai, Neural Networks, Fuzzy_Logic and Genetic Algorithms - Synthesis and Applications, PHI (2004) (Unit-I).
2. David E.Goldberg 'Genetic Algorithms' in search, optimization & Machine Learning, Pearson Education (Unit II, III & IV).

UNIT – I

Introduction to machine learning

Concept Learning and the General to Specific Ordering: Concept learning task, concept learning as search, Find-S: finding a Maximally Specific hypothesis, Version Spaces and the Candidate-Elimination algorithm, remarks on Version Spaces and Candidate-Elimination and inductive bias.

Decision Tree Learning: Decision Tree representation, appropriate problems for Decision Tree learning, hypothesis space search in Decision Tree learning, inductive bias in Decision Tree learning and issues in Decision Tree learning.

UNIT – II

Artificial Neural Networks: Neural Network representations, appropriate problems for Neural Network learning, Perceptrons, Multilayer Networks and the Backpropagation algorithm and remarks on the Backpropagation algorithm.

Evaluating Hypotheses: Estimating hypothesis accuracy, basics of sampling theory, general approach for deriving confidence intervals, difference in error of two hypotheses and comparing learning algorithms.

UNIT – III

Bayesian Learning: Bayes theorem and concept learning, maximum likelihood and least squared error hypotheses, maximum likelihood hypotheses for predicting probabilities, minimum description length principle, Bayes optimal classifier, Gibbs algorithm, Naive Bayes classifier, Bayesian belief networks and EM algorithm.

Computational learning theory: Introduction, probably learning an approximately Correct hypothesis, sample complexity for finite hypothesis spaces, and sample complexity for infinite hypothesis spaces and mistake bound model of learning.

UNIT – IV

Instance Based Learning: Introduction, k-Nearest Neighbor learning, locally weighted regression, radial basis functions, Case Based Reasoning and remarks on Lazy and Eager learning.

Genetic Algorithms: Introduction, hypothesis space search, Genetic programming and models of evolution and learning.

TEXT BOOKS:

1. Tom M. Mitchell, "Machine Learning", Mc. Graw Hill Publishing.

CSE 524(D) SOFT COMPUTING

L T P M

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UNIT-I

Neural Networks:

History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, Unsupervised and reinforcement Learning, ANN training Algorithms-perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

UNIT-II

Fuzzy Logic:

Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation.

Operations on Fuzzy Sets:

Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.

Fuzzy Arithmetic:

Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

Fuzzy Logic:

Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges.

Uncertainty based Information:

Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.

UNIT-III

Introduction of Neuro-Fuzzy Systems: Architecture of Neuro Fuzzy Networks.

Application of Fuzzy Logic: Medicine, Economics etc.

UNIT-IV

Genetic Algorithm: An Overview, GA in problem solving, Implementation of GA

Text Book

1. "An Introduction to Neural Networks", Anderson J.A., PHI, 1999.
2. "Introduction to the Theory of Neural Computation", Hertz J. Krogh, R.G. Palmer, Addison-Wesley, California, 1991.
3. "Fuzzy Sets & Fuzzy Logic", G.J. Klir & B. Yuan, PHI, 1995.
4. "An Introduction to Genetic Algorithm", Melanie Mitchell, PHI, 1998.

Reference:

1. "Neural Networks-A Comprehensive Foundations", Prentice-Hall International, New Jersey, 1999.
2. "Neural Networks: Algorithms, Applications and Programming Techniques", Freeman J.A. & D.M. Skapura, Addison Wesley, Reading, Mass, (1992).

CSE 525(A) HIGH SPEED NETWORKS

L T P M

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UNIT-I

HIGH SPEED NETWORKS

Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection, ATM Cell – ATM Service Categories – AAL. High Speed LAN's: Fast Ethernet, Gigabit Ethernet, Fibre Channel – Wireless LAN's.

UNIT-II

CONGESTION AND TRAFFIC MANAGEMENT

Queuing Analysis- Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

UNIT-III

TCP AND ATM CONGESTION CONTROL

TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO backoff – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats, ABR Capacity allocations – GFR traffic management.

UNIT-III

INTEGRATED AND DIFFERENTIATED SERVICES

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ – Random Early Detection, Differentiated Services.

PROTOCOLS FOR QoS SUPPORT

RSVP – Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms – Multiprotocol Label Switching – Operations, Label Stacking, Protocol details – RTP – Protocol Architecture, Data Transfer Protocol, RTCP.

Text Books:

1. William Stallings, "HIGH SPEED NETWORKS AND INTERNET", Pearson Education, Second Edition, 2002.

References:

1. Warland & Pravin Varaiya, "HIGH PERFORMANCE COMMUNICATION NETWORKS", Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.

2. Irvan Pepelnjk, Jim Guichard and Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003.

UNIT - I

Data Communications: Business Drivers and Networking Directions: Data communication Past and future.

Understanding the standards and their maker: Creating standards: players and Process, Current forums, Standard protocols, Layered reference models: The OSIRM, Standard computer architectures. **Introduction to Transmission Technologies:** Hardware selection in the design process.

Optical Networking: SONET/SDH standards, Dense wavelength division multiplexing (DWDM), Performance and Design considerations.

UNIT - II

Physical Layer Protocols and Access Technologies: Physical Layer, Protocols and Interfaces, Accessing the Network, Copper access technologies, Cable Access Technologies, Fiber Access Technologies, Air Access Technologies.

Common Protocols and Interfaces in the LAN environment: Data link layers protocols; LLC and MAC sub layer protocol, Ethernet, Token Ring, Token Bus and FDDI, Bridge protocols, Switching in the LAN environment.

Frame Relay: FR specification and design, VoFR: Performance and Design considerations, Advantages and disadvantages of FR.

Common WAN Protocol: ATM: Many faces of ATM, ATM protocol operation (ATM cell and Transmission), ATM networking basics, Theory of operations, BISDN protocol reference model, PHY layer, ATM layer (Protocol model), ATM layer and cell (Definition), Traffic descriptors and parameters, Traffic and Congestion control defined, AAL Protocol model, Traffic contract and QoS, User plane overview, Control plane AAL, Management plane, Sub-DS3 ATM, ATM public services.

UNIT - III

Common Protocols and Interfaces in the Upper Layers(TCP/IP): Background (Routing protocols), TCP/IP suite, Network layer (Internetwork layer), Transport layer, Application layer, Addressing and routing design.

Mature Packet Switched Protocol: ITU Recommendation X.25, User connectivity, Theory of Operation, Network layer functions, X.75 Internetworking protocol, switched multimegabit data service (SMDS), SMDS and IEEE 802.6, Subscriber Interface and Access protocol, Addressing and Traffic control.

Requirements Definition: User requirements, Traffic sizing, Traffic characteristics, Protocols, Time and Delay considerations, Connectivity, Availability, Reliability and Maintainability, Service aspects, Budget constraints,.

Traffic Engineering and Capacity planning: Background (Throughput calculations) , Traffic engineering basics (Traffic characteristics), Traditional Traffic engineering, Queued data and packet switched traffic modeling, Designing for peaks, Delay or Latency, Availability and

reliability, Network performance modeling, Creating the traffic matrix, Capacity planning and Network vision, Design tool, Categories of tools, Classes of design tool, Components of design projects, Types of design projects.

UNIT - IV

Technology Comparisons: Circuits-message-packet and cell switching methods, Packet switching service aspects, Generic packet switching network characteristics, Private versus public networking, Public network service selection, Business aspects of Packet-Frame and cell switching services, High speed LAN protocols comparisons, Application performance needs.

Access Network Design: Network design layers, Access layer design, Access network capacity, network topology and hardware, completing the access network design.

Backbone Network Design: Backbone requirements, Network capacities, Topologies, Topologies strategies, Tuning the network.

Text Books:

1. Darren L Spohn, .Data Network Design., TMH
2. D. Bertsekas, R. Gallager, .Data Networks., PHI

References:

1. W.R. Stevens, .Unix Network Programming., Vol.1, Pearson Education
2. J.Walrand, P. Varaiya, .High Performance Communication Networks., Morgan Kaufmann
3. Y. Zheng, S. Akhtar, .Networks for Computer Scientists and Engineers., Oxford
4. A.S. Tanenbaum, .Computer Networks.
5. Peterson & Davie, .Computer Networks., Harcourt Asia.
6. James D. McCabe , .Practical Computer Analysis and Design., Harcourt Asia.

UNIT - I

Security in Network: Model for Security: Threats in Networks, Stealing Passwords, Social Engineering, Bugs and Backdoors, Authentication Failures, Protocol Failure, Information Leakage.

Elementary Cryptography: Terminology and Background, Cryptography and network security. Concepts of Encryption and Decryption. Cryptanalysis, Substitution Cipher. Transpositions Good and Secure Encryption Algorithm. Trust worthy Encryption systems Data encryption standards (DES) and Advanced Encryption Standards (AES) Comparison of DES and AES.

Classical Encryption Technique: Symmetric and Asymmetric Encryption Systems, Stream and Block Ciphers, Contemporary Symmetric Ciphers, Confidentiality using Symmetric Encryption.

UNIT - II

Public Key Encryption and HASH Functions: Public Key Cryptography and RSA, Message Authentication and Hash Function, Hash Algorithms, Digital Signatures and Authentication Protocols.

Firewalls: *Basic Concepts (for understanding the firewalls rules):* TCP Segment format IP Datagram format. *Introduction:* Kinds of Firewalls, Packet Filters. Packet Filtering. Dynamic Packet Filters. Application-Level Filtering. Circuit-Level Gateways, Firewall Configurations, Demilitarized Zone (DMZ) Networks, Distributed Firewalls, Limitation of Firewalls. *Filtering Services:* Reasonable Services to Filter (Filter Rules to be applied): DNS, Web, FTP, NTP. *DNS(Domain Name Server):* DNS overview, Protocol overview, Hierarchical Structure, Root Servers, Practical Experience. *DNS Security:* Unpatched Servers, Misconfigured Servers. *DNS Cache Poisoning:* Denial of Service Attack. Distributed Denial of Service Attack. Luring Users into a Crafted Site.

UNIT - III

Web Security: Overview of Web Server Security. *Goal of Server Attack.* Web site defacement. Data corruption. Data Theft. Types of Attacks. Web Server Protection. FTP (File Transfer Protocol) SMTP (Simple Mail Transfer Protocol). NTP (Network Time Protocol), *Intrusion detection systems:* Types of IDSs. Goal for Intrusion Detection systems, IDS Strength and Limitation. *Electronic Mail Security:* Security for E-mail. Designs, Example of Secure Email Systems, Pretty Good Privacy (PGP): How PGP works? *S/MIME (Secure Multipurpose Mail Extension):* MIME overview. S/MIME functionality.

UNIT - IV

Wireless Application Protocol Security (WAP): *Privacy Enhanced Mail (PEM)* How PEM works? *Secure Socket Layer (SSL):* The Position of SSL in TCP/IP Protocol Suite. How SSL Works? The Handshake Protocol. The Record Protocol. The Alert Protocol.
Wireless Application Protocol Security (WAP): The WAP Stack. The Security Layer-Wireless Transport Layer Security (WTLS). *IP Security: Introduction and Overview:* IPSec Protocols. The Internet Key Exchange (IKE) Protocol. Security Association (SA), Authentication Header (AH), Encapsulating Security Payload (ESP), IPSec Key Management.

Text Books:

1. *.Cryptography and Network Security: Principles and practices.*, William Stallings-Third Edition.
2. *.Cryptography and Network Security.*, At Kahate.
3. *The complete Reference Network Security* by Bragg, Rhodes-Ousley.
4. *Firewalls and Internet Security* by William R. Cheswick, Steven M. Bellovin, Aviel D. Rubin
5. C. P. Pfleeger, and S. L. Pfleeger, *.Security in Computing.*, Pearson Education.

References :

1. Matt Bishop, *.Computer Security: Art and Science.*, Pearson Education
2. Kaufman, Perlman, Speciner, *.Network Security.*
3. Eric Maiwald, *.Network Security : A Beginner.s Guide.*, TMH
4. Bruce Schneier, *.Applied Cryptography.*, John Wiley.
5. Macro Pistoia, *.Java Network Security .*, Pearson Education

UNIT – I

Introduction – Applications – A Short History of Wireless Communications – A Market for Mobile Communications – A Simplified Reference Model.

Wireless Transmission – Frequencies – Signals – Antennas – Signal Propagation – Multiplexing – Modulation – Spread Spectrum.

Medium Access Control – Motivation for a Specialized MAC – SDMA – FDMA – TDMA – CDMA – Comparison.

UNIT – II

Telecommunication Systems – GSM, DECT, TETRA, UMTS and IMT-2000

Satellite Systems – History, Applications, Basics (GEO, LEO, MEO), Routing, Localization, Handover.

Broadcast Systems – Overview, Cyclic Repetition of Data, Digital Audio Broadcasting – Digital Video Broadcasting.

UNIT – III

Wireless LAN – Infrared Vs. Radio Transmission – Infrastructure and Ad Hoc Networks – IEEE, 802.11 – HIPERLAN – Bluetooth.

Mobile Network Layer – Mobile IP – Dynamic Host Configuration – Ad Hoc Networks.

UNIT – IV

Mobile Transport Layer – Traditional TCP – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery – Transmission / Time-Out Freezing – Selective Retransmission – Transaction Oriented TCP.

Wireless Application Protocol – Architecture – Wireless Datagram Protocol – Wireless Transport Layer Security – Wireless Transaction Protocol – Wireless Session protocol – Wireless

Application Environment – Wireless Markup Language – WML Script – Wireless Telephony

Application – Example Stacks with WAP.

Textbooks:

1. J.Schiller, "**Mobile communications**", Addison-Wesley, 2003

Reference Books:

1. William Stallings, "**Wireless Communication Networks**",

2. UWE Hansmann, Lothar Merk, Martin S.Nicklous, Thomas Stober, "**Principles of Mobile Computing**", 2nd Edition.

UNIT-I

Introduction

Challenges of Embedded Systems – fundamental components – examples of embedded systems – hardware fundamentals – gates – timing diagrams – memory – direct memory access – buses – interrupts – schematics – build process of embedded systems.

UNIT-II

Management and Interrupts

Memory access procedure – types of memory – memory management methods – Pointer related issues – polling versus interrupts – types of interrupts – interrupt latency – re-entrancy – interrupt priority – programmable interrupt controllers – interrupt service routines.

UNIT-III

Real-Time Operating Systems – RTOS

Desktop Operating Systems versus RTOS – need for Board Support Packages – task management – race conditions – priority inversion – scheduling – inter task communication – timers – semaphores – queues.

UNIT-IV

Embedded System Design and Implementation

Requirements of an embedded system – architecture styles and patterns – design practices – implementation aspects and choices.

Embedded Software Development Tools

Host and target machines – cross compilers – linker and locators for embedded software – address resolution – locating program components – initialized data and constant strings – PROM programmers – ROM emulators – Flash memory.

Text books:

1. Sriram V.Iyer, Pankaj Gupta, “Embedded Real-time Systems Programming”, Tata McGraw Hill publishers, 2004.
2. David E.Simon, “An Embedded Software Primer”, Pearson Education publishers, 1999.

References:

1. Raj Kamal, “Embedded Systems” Tata McGraw Hill.
2. A unified Hardware/Software Introduction, “Embedded System Design “Frank Vahid and Tony Givargis, John Wiley & Sons publishers, 2002.

UNIT - I

The convergence of computers, Communications, and entertainment products

The technology trends, Multimedia appliances, Hybrid Devices, Designers perspective, industry perspective of the future, Key challenges ahead, Technical, regulatory, Social **Architectures and issues for Distributed Multimedia systems** Distributed Multimedia systems, Synchronization, and QOS Architecture, The role of Standards, A frame work for Multimedia systems

Digital Audio Representation and processing Uses of Audio in Computer

Applications, Psychoacoustics, Digital representation of sound, transmission of digital sound, Digital Audio signal processing, Digital music making, Speech recognition and generation, digital audio and the computers Video Technology Raster Scanning Principles, Sensors for TV Cameras, Colour Fundamentals, Colour Video, Video performance Measurements, Analog video Artifacts, video equipments, World wide television standards

UNIT - II

Digital Video and Image Compression Video compression techniques, standardization of Algorithm, The JPEG Image Compression Standard, ITU-T Recommendations, The EPEG Motion Video Compression Standard, DVI Technology

Operating System Support for Continuous Media Applications Limitation of Work station Operating system, New OS support, Experiments Using Real Time Mach

Middleware System Services Architecture Goals of Multimedia System services, Multimedia system services Architecture, Media stream protocol

Multimedia Devices, Presentation Services, and the User Interface Client control of continuous multimedia, Device control, Temporal coordination and composition, toolkits, hyper applications

UNIT - III

Multimedia File systems and Information Models The case for multimedia information

systems, The file system support for continuous Media, Data models for multimedia and Hypermedia information, Content- based Retrieval of Unstructured Data

Multimedia presentation and Authoring Design paradigms and User interface, barriers to wide spread use, research trends

Multimedia Services over the Public Networks Requirements, Architecture, and protocols, Network services, applications

UNIT - IV

Multimedia Interchange

Quick time Movie File Format, QMFI, MHEG (Multimedia and Hypermedia Information Encoding

Expert Group), Format Function and representation, Track model and Object model, Real Time

Interchange

Multimedia conferencing

Teleconferencing

encing Systems, Requirements of Multimedia Communications, Shared Application Architecture and embedded Distributed objects, Multimedia Conferencing Architecture

Multimedia Groupware

Computer and Video fusion approach to open shared work place, High Definition Television and desktop computing, HDTV standards, Knowledge based Multimedia systems, Anatomy of an Intelligent Multimedia system

Text Book

1. Multimedia Systems by John F. Koegel Buford- Pearson Education

CSE 526(C) PARALLEL PROCESSING

L T P M

4 0 0 100

UNIT - I

Introduction: Parallel Processing Architectures: Parallelism in sequential machines, Abstract

model of parallel computer, Multiprocessor architecture, Pipelining, Array processors.

Programmability Issues: An overview, Operating system support, Types of operating systems, Parallel programming models, Software tools

Data Dependency Analysis: Types of dependencies loop and array dependences, Loop

dependence analysis, Solving diophantine equations, Program transformations

UNIT - II

Shared Memory Programming: General model of shared memory programming, Process model under UNIX

Algorithms for Parallel Machines: Speedup, Complexity and cost, Histogram computation,

Parallel reduction, Quadrature problem, Matrix multiplication, Parallel sorting algorithms, Solving linear systems, Probabilistic algorithms

Message Passing Programming: Introduction, Model, Interface, Circuit satisfiability, Introducing collective, Benchmarking parallel performance

UNIT - III

Parallel Programming languages: Fortran90, nCUBE C, Occam, C-Linda

Debugging Parallel Programs: Debugging techniques, Debugging message passing parallel

programs, Debugging shared memory parallel programs

Memory and I/O Subsystems: Hierarchical memory structure, Virtual memory system, Memory allocation and management, Cache allocation and management, Cache

memories and

management, Input output subsystems

UNIT - IV

Other Parallelism Paradigms: Data flow computing, Systolic architectures, Functional and logic paradigms, Distributed shared memory

Performance of Parallel Processors: Speedup and efficiency, Amdahl's law, Gustafson-Barsis's law, Karf-Flatt metric, Isoefficiency metric

Text Books:

1. Hawang Kai and Briggs F. A., .*Computer Architecture and Parallel Processing.*, McGraw Hill

2. Jordan H. F. and Alaghaband G., *Fundamentals of Parallel Processing*.
3. M.J. Quinn, *Parallel Programming*., TMH

References:

1. Shasikumar M., *Introduction to Parallel Processing*., PHI
2. Wilson G.V., *Practical Parallel Programming*., PHI
3. D. E. Culler, J.P. Singh, A. Gupta, *Parallel Computer Architecture*., Morgan Kaufman

CSE 526(D) REAL TIME SYSTEMS

L T P M

4 0 0 100

UNIT – I

Typical Real-Time applications, Hard versus Soft Real-Time systems, A reference model of Real-Time Systems.

UNIT – II

Commonly used approaches to Real-Time scheduling, Clock-Driven scheduling, Pros and Cons of Clock-driven scheduling.

UNIT – III

Priority-Driven scheduling of Periodic tasks: static assumption, Fixed-Priority versus Dynamic- Priority algorithms, Optimality of the RM and DM algorithms, A schedulability test for Fixed-Priority tasks with short response times and arbitrary response times, sufficient schedulability conditions for the RM and DM algorithms; Scheduling Aperiodic and Sporadic jobs in priority-Driven systems: Deferrable Servers, Sporadic Servers, Constant Utilization, Total Bandwidth and weighted Fair-Queuing Servers, Scheduling of sporadic Jobs.

UNIT – IV

Resources and Resources Access Control, Scheduling Flexible computations and tasks with temporal distance constraints.

Text book:

1. Jane W.S.Liu, 'Real-Time Systems', Pearson Education Asia.

Reference books:

2. C.M.Krishna and Shin, 'Real-Time Systems', Tata McGraw Hill Co. Inc., 1997.

CSE 561

DATA ENGINEERING LAB

L T P M

0 0 3 100

1. Analyzing data with ROLLAP, CUBE.
2. Cube slicing – come up with 2-D view of data.
3. Drill-down or Roll-down- going from summary to more detailed data.
4. Roll up – summarize data along a dimension hierarchy.
5. Dicing – projecting 2-D view of data.
6. Creating Star Schema/snowflake Schema.
7. Create and populate FACT table.
8. Building dimensions.
9. ETL : Extraction Options
 - a. Full extraction
 - b. Incremental extraction
 - c. Change Data Capture(CDC)
10. ETL: Transformation Options
 - a. Transformation: during extraction, in staging area, during load, etc.
 - b. Multi-state transformation
 - c. Pipelined transformation
11. ETL: DW Load options
 - a. Loader: SQL(DML)
 - b. Data Pump
12. DW index design options
 - a. B*tree index – how they work
 - b. Bitmapped index – how they work
 - c. NULL value considerations

CSE 562

DESIGN ANALYSIS OF ALGORITHMS LAB

L T P M

0 0 3 100

1. Implement Strassen's Multiplication.
2. Implement Dijkstra's Algorithm.
3. Implement Prim's Algorithm.
4. Implement Kruskal's Algorithm.
5. To determine Shortest Path in Multi-stage graph using Forward & Backward approach.
6. Implement Traveling Salesman Problem using Dynamic Programming.
7. Implement longest common sequence algorithm.
8. Implement DFS traversal of a given graph.
9. Find the strongly connected components of a graph.
10. Find the articulation bi-connected components.
11. Implement FIFO branch and bound algorithm for 0/1 Knapsack problem.
12. Implement LC branch and bound algorithm for Traveling Salesman problem.