

TEIT Syllabus w. e. f. 2005-06

T.E. (Information Technology Course) Part-I

Sub No.	Subject	Teaching Scheme		Examination Scheme				Marks Total
		Lect	Pract	Theory	T/W	Pract.	Oral	
		(Hrs. / Week)						
314441	Operating Systems	04	--	100	--	--	--	100
314442	Multimedia systems	04	--	100	--	--	--	100
314443	Data Communication & Networking	03	--	100	--	--	--	100
314444	Database Management Systems	04	--	100	--	--	--	100
310245	Theory of computation	03	--	100	--	--	--	100
314444	Operating System Laboratory	--	04	--	025	50	--	75
310445	Information Systems Laboratory	--	04	--	50	--	50	100
314446	Multimedia Laboratory	--	02	--	25	50	--	75
Total		18	10	500	100	100	050	750
Total of Part I		28 Hrs.		750 Marks				

T.E. (Information Technology Course) Part-II

Sub No.	Subject	Teaching Scheme		Examination Scheme				Marks Total
		Lect	Pract	Theory	T/W	Pract.	Oral	
		(Hrs. / Week)						
314447	System Software	04	--	100	--	--	--	100
314448	Computer Network & Technology	03	--	100	--	--	--	100
310253	Software Engineering	04	--	100	--	--	--	100
314449	Management Information System	03	--	100	--	--	--	100
314450	Human Computer Interface	03	--	100	--	--	--	100
314451	Software Laboratory	--	04	--	025	050	--	075
314452	Network Laboratory	1	02	--	025	--	050	075
310456	Software Development Tools Laboratory	--	04	--	050	--	--	050
314454	Seminar & technical communication	---	2	---	50	---	---	50
Total		18	12	500	150	050	050	750
Total of Part II		30 Hrs.		750 Marks				
Total of Part-I & Part-II		1500 Marks						

314441: OPERATING SYSTEM

Teaching Scheme:
Lectures: 4 Hrs./week

Examination Scheme:
Theory: 100 Mark

Prerequisites:

- Computer organization (subject code: 210252)
- Programming paradigms and methodology (subject code: 214444)

Objectives:

- To learn the evolution of operating system.
- To study the operation performed by operating system as a resource manager.
- To understand the computer security issues and operating system tools.

Unit 1. Introduction

Architecture, goals and structure of operating system, and basic function, virtual computer object server model. Interaction of operating system and hardware architecture, system call operation system services batch, multiprogramming, multitasking, time-shared. Parallel distributed and real time system.

O.S. Examples: Linux and variants, MS- Windows, Handheld O.S

(06 Hrs)

Unit 2. Process Management

Process description & control: Process Concept, Process Status. Process description, Process Control, threads, SMP and Micro kernels.

Concurrency: Principles of Concurrency- mutual exclusion: software and hardware approaches. Semaphores, message passing, monotirs, and classical problem of synchronization: reader's writer problem. Producer consumer problem, dining philosopher problem.

Deadlock: principal of deadlock, Deadlock problem prevention, Avoidance, deadlock detection, an integrated deadlock strategies.

(06 Hrs)

Unit 3.Scheduling

Uni-processor scheduling: types of scheduling: primitive, non primitive, scheduling algorithms: FCFS, SJFS, RR, priority

Multiprocessor scheduling: granularity, design issues process scheduling, thread scheduling, real time scheduling: characteristic, real time scheduling (06 Hrs)

Unit 4. Memory Management:

Memory Management requirements, memory partitioning: memory allocation. Fixed and variable partitioning,, allocation strategies (First Fit, Best Fit, worst fit), fragmentation, Paging, swapping.

Virtual Memory: Concepts, Segmentation, Paging, Address Translation, Demand Paging.

Page Replacement Policies (FIFO, LRU, optimal, other strategies), Thrashing working sets model.

Unit 5. I/O Devices & files:

I/O management & disk scheduling: I/O Devices, organization of I/O functions, operating system design issues, I/O Buffering, Disk scheduling (FCFS, SCAN,

CSCAN, SSTF), RAID, Disk caches.

.file management: concept, file organization, files and directories, File sharing, record file blocking, Free-space management. Security Issues., secondary storage Management. (06 Hrs)

Unit 6: security, O.S tools & shell programming

Computer security & protection: security threats, intruders, malicious software, trusted system, protection: protection policy and mechanism, authentication: internal access authorization, implementations, cryptography. O.S. tools, shell and command programming (06 Hrs)

Note: Every aspect of O.S should be taught in comparison W.R.T WINDOWS 2000 & UNIX.

Text Books:

1. Silberschatz A, Galvin P, Gagne G : " Operating System Concepts." john wiley and sons , 2003, ISBN 9812-53-055-X.
2. William Stalling: "Operating Systems", pearson education,2001,ISBN 81-7808-503-8
3. das sumitabha," unix concept and applications",3rd edition,tata mcgraw Hill,2003,ISBN 0-07-053475-6

References

1. Garry Nutt : "Operating Systems", Pearson Education, 2004,ISBN 81-297-0614-8.
2. Tanenbaum Andrew S," modern operating system"PHI,2001, ISBN 81-203-0974-X

310446: OPERATING SYSTEM LABORATORY

Teaching: Scheme
Lectures: 4 Hrs./week

Examination Scheme:
Term work: 25 Marks
Practical: 50 marks

Objectives:

To study the operating system functioning and internals.

Assignments will be based on Operating System:

1. Shell Programming and AWK Programming.
2. Process and Communication in Unix.
3. CPU Scheduling
4. Demand Paging, memory management.
5. Concurrent Programming-reader/Writer Problem.
6. Deadlock, Bankers algorithm.
7. Multithreading.
8. Mutex, Semaphores.
9. Inter-process Communication.

Staff Incharge should suitably frame minimum six assignments on the above topics. Students will submit the term work in the form of a journal, which will include assignments with problem statement. Implementation and result, practical examination will be based on the term work.

Candidates are expected to know the theory of the assignments.

Recommended Books for Operating System Lab

1. Gary Nutt : Kernel projects for LINUX.
2. Gary Nutt, Operating System, 3rd edition Pearson Education.
3. Richard Stevens: advanced programming in the UNIX environment ,pearson education ,2002,81-7808-096-6

314442: MULTIMEDIA SYSTEMS

Teaching Scheme:

Lectures: 4 Hrs./week

Examination Scheme:

Theory: 100 Marks

Prerequisites:

- Digital electronics and microprocessor (subject code: 214441)
- Data structure and files (subject code: 214449)

Objectives:

- To learn the storage and processing of various multimedia components.
- To learn the fundamentals of computer graphics.

Unit 1.

Introduction to multimedia, multimedia authoring tools and multimedia devices:

Introduction to multimedia, multimedia authoring and multimedia devices Overview of multimedia, multimedia building blocks, multimedia authoring, different authoring tools. Overview of devices such as magnetic devices, optical devices, scanners, CRT display there controllers, video display adapter, graphic device driver and display buffers.

Unit 2.

2D graphics

Generation of line using DDA and bresenhama line drawing algorithm, generation of circle using bresenhams algorithm, polygon scan line seed filling algorithm, 2D line clipping using cohen Sutherland algorithm and lang barky algorithms, 2D transformation translation, rotation, scaling, reflection, and shear simple problems based on the above transformation

Unit 3.

3D Graphics and rendering

3D transformation translation, scaling, rotation about any axis not parallel x, y or z axis segmentation with a perspective of generation 2D animation, introduction to rendering illumination models, gourad and phong shading alising and antialiasing techniques in graphics.

Unit 4.

Audio and audio compression

Basic concept of audio, digitization of sound, sound processing, audio file format wave, voc and MIDI, audio compression techniques such as DM, ADPCM, MPEG.

Unit 5.

Animation and video

Principal of animation, 2D and 3D animation, fundamental of still images color models of images fundamental of video, color model in video. Introduction to analog and digital video

Unit 6.

Compression Techniques and graphic file format

Introduction and need for data compression, broad categories of compression techniques. Types of lossless compression techniques such as Huffman and LZW and run length encoding, lossy compression techniques and hybrid compression techniques (take case study of JPEG)

Study of graphic file format: BMP, JPEG, GIF, TIFF.

Text Books:

1. Li Ze-Nian, Drew Mark S, "fundamental of multimedia", Pearson education ,2004,ISBN 81-297-0438-2
2. Rogers David F," procedural elements for computer graphics ", Tata McGraw Hill, 2001,ISBN 0-07-047371-4.

Reference

1. Harrington Steven,"Computer graphics: a programming approach", Tata McGraw Hill
2. M Paulin Baker, Donald Hearn,"computer graphic",PHI,2001
3. Steinmetz Ralf, Nahrstedtk, "Multimedia computing,Communication and Applications",Pearson education,2004
4. Born Gunter,"Handbook of file formats", Imprints of international Thomson Learning.

314443: DATA COMMUNICATION AND NETWORKS

Teaching Scheme:
Lectures: 4 Hrs./week

Examination Scheme:
Theory: 100 Marks

Prerequisites:

- Principal of communication engineering. (Subject code: 204450)

Objectives:

- To make student gain an in-depth knowledge of digital transmission techniques.
- To study physical, data link and network layer of OSI model.

Unit 1.

Digital transmission fundamentals:

Digital signals, analog verses digital, limit of achievable data rate in digital communication, transmission impairment [attenuation and attenuation distortion, thermal noise, impulse noise, cross talk, channel capacity]

Unit 2.

Switching techniques and high speed digital access

Different switching technique, circuit switching and network, signaling system #7 architecture overview, packet switching networks, T1 carrier system/E1, T3/E3 carriers, SONET/SDH, DSL technology, ASDL technology, cellular telephone system, cable modem.

Unit 3.

Data communication media:

Transmission media:

Guided transmission media (physical description, application, transmission characteristic) twisted pair (unshielded and shielded twisted pair), category 3, category 5 UTP, and coaxial cable.

Wireless transmission unguided media (terrestrial microwave, satellite microwave)

Fiber optic communication:

Principal of light transmission, types and mode of fiber, losses and dispersion in fiber, sources and detectors.

Satellite communication:

Kepler's laws, orbital aspects, geostationary satellite and frequency plans, frequency plan and polarization, transponders, multiple access methods.

Unit 4.

Network Fundamentals:

Need of networks/advantages of network, structure of communication network(DTE, DCE, application process, logical and physical connection),

Point to point, multidrop configuration, simplex, duplex, and half duplex transmission.

Network topologies-Hierarchical,[tree], horizontal [bus], star, ring, mesh, types of networks, network architecture(OSI model), TCP/IP protocol stack overview

Network interface hardware and network hardware components- connectors, Tran receivers and media converters, NICS, RS-232 and RS-449, PCI, USB protocols.

Devices used for extending LANs-repeaters, bridges and switches.

Unit 5

Data Link layer control and protocols:

Line discipline, flow and error control, stop and wait ARQ, go back N ARQ, selective repeat ARQ

Character oriented protocol [IBMs BSC protocol [HDLC], PPP

Multi point configuration of a network and multiple access technique and protocols-random access, ALOHA, slotted ALOHA, CSMA, CSMA/CD,

Controlled access [reservation, polling /select, token passing],

Channelisation [FDMA, TDMA, CDMA].

Unit 6

Local area Networking:

Lan application, Lan architecture, LAN topologies [bus, star, ring, tree], medium access control [RR, reservation, contention], MAC frame format

IEEE 802 Lan standards:

Ethernet (CSMA/CD), Ethernet frame IEEE 802.3, 10 Mbps specification (Ethernet)-10Base5, 10Base2, 10BaseT, 10BaseF

IEEE 802.3 100Mbps specification (fast Ethernet)

Gigabit Ethernet

FDDI,

IEEE 802.5 Token ring –MAC technique, Physical layer specification

Backbone network-bus backbone, star backbone, Virtual lans.

Books

1. Behrouz A. Forouzan, "Data Communication and Networking" Tata McGraw Hill, 2nd edition,2002
2. Stallings W, "Data and Computer Communication", sixth edition, prentice hall of India pvt. Ltd, 2002
3. Dennis Roddy and John Coolen : "Electronic Communication" ,PHI,2002

Reference

1. Alberto Leon-Garcia Indra Widjaja," Communication Networks Fundamental Concept and key architectures", Tata McGraw Hill, 2nd edition
2. God bole A," Data communication and networks",Tata McGraw-Hill Publication, 2002 *e*
3. Gupta P; "Data communication", PHI, 2004
4. Shay W; "Understanding Data Communication And Networks", Third edition, brooks kale
5. Thomson learning/vikas publishing house

310245 THEORY OF COMPUTATION

Teaching Scheme:
Lectures: 3 Hrs./week

Examination Scheme:
Theory: 100 Marks

Prerequisites:

- Discrete structure (subject code: 210241)

Objectives:

- To study the abstract computing model.
- To study automata theory and types and applications of formal grammar

Unit I

Basic concept: symbol/alphabets, string/word, language, formal language, natural and formal language

Finite automata (FA):

Definition of FA, representation (tabular form of state transition function and machine transition function, transition graphs, and adjacency matrix), finite control of FA over string, language acceptance by FA, deterministic finite automaton (DFA) and non-deterministic finite automaton (NFA), concept of ϵ moves, NFA with ϵ moves, NFA without ϵ moves, removal of ϵ moves, conversion of NFA without ϵ to DFA, conversion of NFA with ϵ to DFA, FA with output: Moore and mealey machines-definition, models, inter conversion

Unit II

Regular Expressions and Languages:

Recursive definition of regular expression, Regular set, identities of regular expressions, regular expression and FA, conversion of RE to DFA (RE-NFA-DFA), properties of regular languages, Kleen's theorem, pumping lemma, equivalence and minimization of DFA, FA limitation.

Unit III

Context free Grammars and Languages:

Phrase structure grammar, context free grammar, context free languages (CFL), production rules, formalization, derivation and derivation trees, ambiguous grammar, removal of ambiguity and inherent ambiguity, simplification of grammar-removal of unit production, useless production, useless symbol, and ϵ production; normal forms (chomsky normal form and greibach normal form), chomsky hierarchy.

Regular grammar-Definition, left linear and right linear regular grammar, regular grammar and finite automata, FA to RG and RG to FA, inter conversion between left linear and right linear regular grammar.

Unit IV

Push down automata (PDA):

Definition, deterministic, push down automata (DPDA), non-deterministic push down Automata (NPDA), the language of PDA. Equivalence of PDA's and CFG's, closure properties of CFL's. Concept of post machines.

Unit V

Turing Machine:

Definition and example of TM, Recursive sets, partial recursive function, recursively enumerable sets, computing a partial function with TM, combining TM's, variations of TM: Multi-tape TM's, Universal TM, model of computation and church's Turing hypothesis, unsolvable problem, TM's halting problem.

Unit VI

Application and Comparison of:

1. Application of finite automata, RE, PDA, PM, TM comparison FA, RE, PDA, PM, TM and their limitations.
2. Measuring and classifying complexity.
3. Growth rates of functions.

Text Books:

1. Daniel I.A.Cohen, "Introduction to computer theory", Wiley publications, 2nd edition
2. John C. Martin, "Introduction to Language and Theory of computation", Tata McGraw Hill, Third edition.

Reference Books:

1. Hopcroft Ulman, "Introduction to automata theory, languages and computations", Pearson education asia, second edition.
2. K.L.P Mishra, N. Chandrasekaran, "Theory of Computer science(automata, languages and computation)",prentice hall India.2nd edition
3. Bernard M.Moret, "The Theory of Computations", Pearson education Asia.

310241: DATABASE MANAGEMENT SYSTEMS

Teaching: Scheme:
Lectures: 4 Hrs./week

Examination Scheme:
Theory: 100 Marks

Prerequisites:

- Discrete structure.
- Data structure and files.

Objectives:

- To learn and understand database system and its component.
- To learn and understand various database architectures and application.

Unit 1.

Introduction to DBMS:

Basic Concept, advantages of a DBMS over file processing system, data abstraction , data base languages, data model and data independence, component of DBMS and overall structure of DBMS, multi-user DBMS architecture system catalog.

Data modeling:

Basic concept, entity, attribute, relationships, constraints, keys, E-R and EER diagrams: component of E-R model, convention, converting E-R diagram into tables, EER model component, converting EER diagram into tables.

Relational model: Basic concept, attribute and domains, CODD's rules, relational integrity: nulls, entity, referential integrity, enterprise constraints, views, schema diagram.

Unit 2

Relational query languages:

Relational algebra and relational calculus: tuple relational and domain relational calculus.

Introduction to SQL: characteristic and advantages, SQL data types and literals, DDL/DML, SQL operator, tables: creating, modifying, deleting, views: creating, dropping, updation using views, indexes, nulls

SQL DML Queries: select query and calculus, set operation, predicate and join, set membership, tuple variable, set comparison, ordering of tuple, aggregate functions, nested queries, database modification using SQL insert, update and delete Queries, concept of stored procedure and triggers, introduction to QBE and QUEL programmatic SQL, embedded SQL, Dynamic SQL, ODBC.

Unit 3

Database analysis and design techniques:

Information system lifecycle, application lifecycle, planning system definition, requirement analysis, design, DBMS selection, application design: transaction and user interface design prototyping, implementation data conversion and loading testing data and database administration, fact finding technique.

Relational database design: purpose of normalization, data redundancy and update anomalies, and functional dependencies. The process of normalization: 1NF, 2NF, 3NF, BCNF, 4NF, 5NF and DKNF

Unit 4

Storage and file systems:

Secondary storage, RAID, file organization, indices, static and dynamic hashing B-trees and B+ trees.

Introduction to query processing: overview, measure of query cost, selection and join operation, evaluation of expression, introduction to query optimization, estimation, transformation of relational expressions.

Unit 5

Transaction management:

Basic concept of a transaction, properties of transaction, database architecture, concept of schedule, serializability: conflict and view, cascade abort, recoverable and non recoverable schedule, concurrency control: need, locking method, deadlock, time stamping method, optimistic technique, multiversion concurrency control, different crash recovery method such as shadow paging and log based recovery: deferred and immediate, checkpoints.

Unit 6

Object oriented databases:

Need of OODBMS, storing of objects in relational database, introduction to OO data model, persistent programming languages, pointer swizzling technique, persistence, object management group, object database standard ODMG

Database architecture: centralized and client server architecture, introduction to distributed database systems.

Text books:

1. Silberschatz A; Korth ; Sudarshan S; "Database system concept", 4th edition, McGraw hill publication, 2002
2. Connally T, Begg C; "Database system", 3rd edition, pearson education, 2002

Reference Books

1. Rab P. Coronel C. "Database System Design , Implementation and Management", 5th edition,Thomson Course Technology,2002
2. Elmsari R, Navate S, "fundamental of database system"4th edition,Pearson education,2003
3. Date C, "An Introduction to Database System", 7th Edition, Pearson Education,2002
4. Ramkrishna R,Gehrke J,"database management system",3rd edition, McGraw-hill,2003

310253: SOFTWARE ENGINEERING

Teaching Scheme
Lectures: 4 Hrs./week

Examination Scheme
Theory: 100 Marks

Objectives:

- To learn and understand the concept of software engineering.
- To apply the principal of software engineering for software development.

Unit 1

Introduction to software engineering: software, software myths, process framework, CMMI, process pattern, process assessment, personal and team process models.
Process models: waterfall model, incremental models, evolutionary models, Introduction to specialized process models, the unified process.

Unit 2

Software engineering practice: the essence of practice, core principle, communication practices, planning practices, modeling practices: analysis and design modeling, construction practice: coding and testing principal, deployment

System engineering: computer based system, hierarchy: system modeling and simulation, business process engineering, product engineering, system modeling: hatley-pirbhai modeling and modeling using UML

Unit 3

Requirement engineering

Requirement engineering tasks, initiating the process, eliciting requirement, development use-cases, building the analysis model: requirement analysis, data modeling concept, object oriented analysis, scenario based analysis, floe oriented modeling, class based modeling, creating a behavioral model

Unit 4

Design Engineering: Design process and design quality, design concept, the design model, introduction to pattern based software design.

Architectural design: software architecture, data design and architectural

User interface design: rules, user interface analysis and step in interface design, design evaluation.

Unit 5

Project management: the management spectrum, the people, the product, the process, the w5HH principle, critical practices

Metrics for process and product:

Metrics in process and project domains, software measurement, matrices for software quality, integrating metrics within software process

Estimation: software scope and feasibility, resources, decomposition technique, empirical estimation models, the make-buy decision

Unit 6

Change management: software configuration management, the SCM repository, the SCM process

Reengineering: Business process reengineering, software renaming, reverse engineering, restructuring, forward engineering.

Text Books

1. Roger Pressman : Software Engineering, A Practitioner's Approach, 6th Ed., Tata McGraw Hill, Publication Company,2004.

Reference books:

1. Peters J.pedrycz W, “Software Engineering: An Engineering Approach”, John Wiley & Sons 2000
2. Vliet H, “Software Engineering Principal and Practices”, second edition, John Wiley & sons
3. Ghezzi C, Jazayeri M, Mandrioli D, “Fundamental of Software Engineering”, Second Edition, Prentice Hall India,2003
4. Behfarooz A,Hudson F,” Software Engineering: Fundamentals”,Oxford University Press,2002

314444: OPERATING SYSTEM LABORATORY

Teaching Scheme:
Lectures: 4 Hrs./week

Examination Scheme:
Term work: 25 Marks
Practical: 50 marks

Objectives: to study the operating system functioning and internals.

Assignments will be based on Operating System:

1. Shell Programming and AWK Programming.
2. Processes and Communication in Unix.
3. CPU Scheduling.
4. Demand Paging, memory management.
5. Concurrent Programming-reader/Writer Problem.
6. Deadlock, Bankers algorithm.
7. Multithreading.
8. Mutex, Semaphores.
9. Inter-process Communication.

Staff Incharge should suitably frame minimum six assignments on the above topics. Students will submit the term work in the form of a journal, which will include assignments with problem statement. Implementation and result, practical examination will be based on the term work.

Candidates are expected to know the theory of the assignments.

Recommended Books for Operating System Lab

1. Gary Nutt : Kernel projects for LINUX.
2. Gary Nutt, Operating System, Pearson Education.
1. Richard Stevens, Advanced Unix Programming, Addison Wesley.

Note: -The practical examination will be based on the assignment performed by the candidate as part of the term-work. Question will be asked during the practical examination to judge the understanding of the student. It is expected that the student know the theoretical aspect of the problem.

310445: INFORMATION SYSTEMS LABORATORY

Teaching Scheme:
Lectures: 4 Hrs./week

Examination Scheme:
Term work: 25 Marks
Oral: 50 marks

Objectives:

- To understand basic of GUI programming.
- To understand and learn visual programming paradigm and database programming.
- To understand and learn RDBMS concept, database design principal
- To understand and learn SQL, DDL, DML
- To get exposure to development experience of small system through developing three mini projects.

Unit 1

Mini project on RDBMS

To develop a mini project for a RDBM based system. The following exercise have been specified to give idea/prerequisite learning for the concept required in defining the problem statement for an RDBMS system

1. Design and draw an ER/EER diagram using standard notation for given problem definition and map this diagram into database table(Instructor will define problem definition for each batch of reasonable complexity such that it facilitate the use of all ER/EER features such as all types of relationship including aggregation, generalization, all types of attribute, strong and weak entities)
2. Create database tables and indices in any desktop database for the table generated in problem1.insert tuples in each tables such that every relationship and constraint is reflected. Perform update on these tables.
3. Repeat the problem in assignment 1 with any backend RDBMS bat abase using SQL DDL statement and applying all required constraints on tables and/or tuples
 - Use SQL DML statement such as INSERT, UPDATE, DELETE to insert the data into tables and to update/delete the data inserted into/ from tables if required.
 - Write and execute SQL queries to extract information from the table (instructor should frame problem definition such that it will involve use of text manipulation functions aggregate functions, group value functions, date function, conversion and transformation function, simple queries and nested queries, renaming of attribute, removal of duplication, creating views etc)
4. Write and execute triggers and procedures/functions.(instructor will frame appropriate problem definition)(students should study different data types & variable, program control statements, triggers, procedures, functions & packages, database access using cursors)
5. Generate a simple report using SQL report generation facility.

Unit 2

Mini project on the front end of an application

Following exercise has been specified to give idea/prerequisite learning for the concept required in defining the problem statement for a front end to a RDBMS based system.

Front-end tools support development of following concept

Controls (text boxes, labels, option & command buttons, check boxes, list boxes & combo boxes, shapes, panels, frames, rich text boxes, scroll bars, grid control, control arrays, image& picture boxes, message boxes, progress bars, numeric up down counter, tab controls)

Properties (use of important properties (behavior, layout, design etc) for every control of the form

Events (click, double click, change, form load, got focus, lost focus, key pressed etc.)

Programming component (data types, variable declaration, control structure, file support)

Overall program development lifecycle (form design, control & event packaging and deployment)

Instructor will frame appropriate problem definition for a mini project using appropriate controls, properties, events etc. the control and the GUI should constitute on interactive interface to your application.

Unit 3

Mini project on RDBMS and front end development

Instructor will assign a mini project to a group of four student based on the RDBMS and front-end system. The mini project will go through following phases:

1. Design the database (use ER/EER diagrams and normalization upto NF if required)
2. Create the table using all types of constraints.
3. Create triggers and active element to maintain the integrity the database and perform appropriate action on database updates.
4. Populate the database using SQL insert/creating forms in any mfronted.
5. Document the project using SE concept: Scope, SRS, ER, test plans and reports
6. Develop suitable user interface using appropriate tools & languages.

The desktop database can be chosen from MS ACCESS or open source databases mysql. The backend databases can be either MS SQL server, ORACLE or mySQL, or equivalent databases. Front end development tools can be chosen from the VB6, VB.NET, Java, Delphi or equivalent tool.

Staff in charge will frame the mini project specification to be performed by a group student. There will be a variation between each group. Student will have a CD of all mini projects.

Note: for the oral examination the candidate will have to demonstrate the mini projects answer questions on design and documentation of the mini project, technology used in about lab as well as on the DBMS and front end concept used in the laboratory. The candidates will judge on the mini project as well as the oral exam.

Reference Books:

1. oracle 9i-the complete reference, Kevin Loney,George Koch(TMh)
2. oracle 9i programming-Aprimer, Rajshekher Sunderraman
3. oracle PL/SQL by example (3rd ed),Benjamin Rosenzweig,Elena Silvestrova

314446: MULTIMEDIA LABORATORY

Teaching: Scheme:
Practical: 2 Hrs./week

Examination Scheme:
Term work: 50 Marks
Practical: 50 marks

Objectives:

To study algorithms of graphics and multimedia aspects.

Assignments are based on Multimedia Systems.

1. Line generation using DDA and Bresenham's algorithm. Generation of circle using Bresenham's
2. algorithm.
3. Polygon filling using scan line seed fill algorithm.
4. Write a program to perform 2-D transformation.
5. Line clipping using Cohen Sutherland algorithm.
6. Polygon clipping using Sutherland Hodgeman algorithm.
7. 2D animation using segmentation
8. Presentation using any authoring tool
9. Playing audio or video player using VB.
10. Implementation of LZW compression.
11. Write a tool to create a multimedia presentation.

Staff in charge should suitably frame the assignments. Flexibility may be incorporated. Students will submit term work in the form of a Journal, which will include at least 10 assignments from multimedia systems. Assignments must contain problem definition, implementation and result, oral examination will be based on term work. Candidates are expected to know the theory behind the assignments.

314447: SYSTEM SOFTWARE

Teaching: Scheme:
Lectures: 4 Hrs./week

Examination Scheme:
Theory: 100 Marks

Prerequisites:

1. Computer Organization (Subject Code: 210252)
2. Programming para digram and methodology (Subject Code: 214444)

Objectives:

To make the students:

1. Gain an in depth knowledge of the design of various system softwares.
2. Understand dynamic linking concept and debugging techniques.

Unit1

Components of System Software, Development tools:

Language processors: introduction, language processing activities, fundamentals of language processing, fundamental of language specification, Need of system software, translator types, interpreters, compilers, loaders, Linkers, preprocessors.

S/W Development tools –S/W tool for program development, editors, debug monitors, programming environments, user interface, LEX, YACC usage, tool for program testing.

Unit 2

Assemblers and Macroprocessor:

Assemblers, element of assembly language programming, simple assembly scheme, pass structure of assembler, single pass assembler for IBM PC.

Macros & Macro processor-macro definition & calls, macro expansion, nested macro calls, macro definition within definition, advanced macro facilities, design of a macro preprocessor.

Unit 3

Compilers I:

Overview of compilation process, phase of compiler, types of Compiler, Bootstrapping of compiler, Lexical analysis. Scanner design of lexical analyzer for subset of 'C'.

Parsers-Parsing Techniques: top down and bottom up passing, shift reduce and recursive descent parser. Parser for subset of 'C'.

Unit 4

Compilers II:

Optimization & code generation, intermediate codes, three address codes, quadruples & triple machine dependent & machine independent optimization technique, simple code, genration algorithm.

Unit 5

Linkers and Loaders:

Central Loader Scheme, absolute loader, subroutine linkages. Relocation loaders. Direct linking loader, Dynamic Linking loader, overlay structure.

Design of Absolute loader, direct linking loader. Implementation example-MS DOS

Unit 6

Dynamic linking:

Dynamic data exchange, Dynamic Link Libraries-The need, conventional dynamic linking, the class library, dynamic linking, DLLs, use of call back functions, far function calls. Different methods of specifying link. Dynamic linking with and without import, object linking and embedding, concept of clipboards.

Books

1. L. Beck: "System Software an introduction to system programming", Pearson Education, 3rd edition..
2. D. M. Dhamdhere: "System Programming and Operating System", 2nd edition, Tata McGraw Hill.
3. John Donovan," system programming ", Tata McGraw Hill.

Reference

1. Charles Petzold: "Programming Windows 3.1", Microsoft Press.
2. Aho, Sethi Ullman, "Compilers Principals, Techniques & Tools", Pearson education, 2004

314448: COMPUTER NETWORK TECHNOLOGY

Teaching: Scheme:
Lectures: 4 Hrs./week

Examination Scheme:
Theory: 100 Marks

Prerequisites:

Data Communication and networking (subject code: 314443)

Objectives:

To learn the

1. Techniques of routing, network management
2. Services offered by transport and application layers
3. Wireless technology.

Unit 1

Network Layer and Routing:

Network layer:

Design issues, packet switching, connectionless and connection oriented services, virtual circuit and data gram subnet, routing algorithm, internetworking firewalls, congestion prevention policies, Load shading, jitter control, quality of service, internetworking.

Network Layer:- ARP, IP protocol, IP addresses, IPV6, ICMP, Unicast routing algorithm: RIP, OSPF,BGP, multicast routing: IGMP, mobile IP

Unit 2

Transport Layer:

Services and service primitives, socket and socket programming, Elements of transport protocols:. Addressing, connection, Establishing and releasing a connection flow control, multiplexing and crash recovery, simple transport protocol, UDP: introduction, RPC, TCP: introduction, model, protocol, header, connection, Establishing and release, connection management, transmission policy, congestion control, timer management, introduction too wireless TCP and UDP, performance issue.

Unit 3

Application Layer

Domain name system (DNS) and DNS servers, electronic mail: architecture and transport protocol: addressing, connection establishment and release, flow control and biffering, multiplexing, crash recovery, simple transport protocol, UDP: introduction, RPC, TCP, introduction, model, protocol, header, connection establishment and release, connection management, transmission policy, congestion control, timer management, introduction to wireless TCP and UDP, performance issues.

Unit 4

Multimedia Networking

Multimedia networking applications, streaming stored audio and video, making the best of the best-effort services, protocol for real time interactive application RTP, RTCP, RTSP, SIP, H.323/H.324, scheduling and policing mechanism, integrated services, RSVP.

Unit 5

Network configuration, Management and modeling

What is network management and its infrastructure, internet-standard management framework, bootstrap protocol, DHCP, BOOTP? Analysis of loss and delay, queuing theory, m/m: 1queue.

Unit 6

Wireless and broadband networks

Basic overview of various technologies like wireless links-802.11, bluetooth, ATM, frame relay,B-ISDN,SMDS,X-25

Books

1. A. S. Tanenbaum : "Computer Networks", PHI Publication, 4th edition.
2. James Kurose, Keith W. Ross," Computer Networking: A top down Approach Featuring the Internet, Pearson Education, 2nd edition,2004.

Reference Books:

1. Behrouz A. Forouzan,"TCP-IP Protocol Suite ", Tata McGraw Hill Edition, 2nd edition, 2003
2. Kershanbaum, "Telecommunication Networks".

314449: MANAGEMENT INFORMATION SYSTEMS

Teaching: Scheme:
Lectures: 3 Hrs./week

Examination Scheme:
Theory: 100 Marks

1. Foundation of Information systems and Management:

Why information systems, component and resources of information system, information system activities, and types of information system, Operations support systems, and management support systems,

Management information system:

Definition, role and impact of MIS, introduction to management, approaches to management, function of the managers: management effectiveness, planning, organizing, staffing, coordinating and directing, MIS as support to the management and a tool for management process, organization structure and theory: organization structure, behavior, organization as a system, MIS: organization

Strategic Management of Business:

Concept of appropriate planning, essentiality of strategic planning, development of business strategies, type of strategies, MIS for Business planning, information technology and corporate strategy, integrating technology with business environment, managing information technology.

Infrastructure Management:

Selection, maintenance of hardware, communication equipment and software as per MIS needs of the organization. Ensure uptime of hardware resource, database management and end user training.

Unit 2

Application of MIS

Manufacturing sector:

Introduction, personal management, marketing management, accounting and finance management, production management, materials management and marketing management, MIS applications in banking and insurance sector

Service sector:

Introduction, MIS application in service industry

Cross-functional enterprise system:

Introduction, collaboration system in manufacturing, enterprise application integration, transaction processing system.

Unit 3

Enterprise management system (EMS):

Introduction, enterprise resource planning (ERP) system: basic feature, benefits, selection, implementation, EMS and MIS

Business process outsourcing (BPO):

What is BPO? Voice BPO i.e calls center, non-voice BPO, and scope of BPO, challenges in BPO management

Information technology architectures:

Hardware and software architecture, example of different architecture, matching design to architecture

Unit 4

Customer Relationship Management (CRM):

Introduction, what is CRM? Three phases of CRM, benefits, challenges and trends in CRM

Electronic Commerce System (e-commerce):

Introduction, scope, B2C, B2B and C2C, Essential e-Commerce processes, electronic payment processes-commerce applications

Implementing Change:

Implementation, research on implementation, implementation strategy, and integration, implementing IT, End user Resistance and involvement, Implementing IT based Transformation of the Organization.

Unit 5

Decision Support System (DSS):

Concept and philosophy, using decision support system what if analysis, sensitivity analysis, goal-seeking analysis, optimization analysis, introduction to data-warehouse, implementation, data mining, for decision support, executive information system, enterprise information portal and knowledge management system, introduction to artificial intelligent system, knowledge based expert system, GIS

Unit 6

Security and ethical challenges:

Introduction, ethical responsibility of business professionals, computer crime, hacking, cyber theft, software piracy, privacy issues, and health issues

Security Management:

Introduction, tools, encryption, firewalls, e-mail monitoring, biometric security, disaster recovery, fault tolerant system, system controls and audits, contingency management And solutions

Global Management of Information Technology:

Cultural, political and geo-economical challenges, global business/it strategies, applications, platforms and data access issues

Text Books

1. Management Information Systems: managing information technology in the business enterprise”, 6th Edition, James O. Brien TATA McGraw Hill.
2. Management Information Systems: 2nd Edition, Jawadekar W; Tata McGraw Hill.

Reference Books:

1. Lucas Henry C;” Information Technology for Management”, 7th edition, Tata Mgraw Hill Publishing Company, 2004
2. Post G, Anderson D. “Management Information System”, 3rd edition , Tata McGraw Hill Publication
3. Gupta U;” Management Information System: A Managerial Perspective”, Galgotia,

314450: HUMAN COMPUTER INTERFACE

Teaching: Scheme:
Lectures: 3 Hrs./week

Examination Scheme:
Theory: 100 Marks

Introduction:

The Human –I/P, O/P channels, Human Memory, thinking, emotion, individual difference (diversity), human psychology
The Computer :Introduction to I/P,O/P devices
The User: Role of user information system, User characteristic, Needs
The Interface: Goals of user interaction Design, Importance of human factors & motivation, paradigms for interaction.

Principles of models and Guidelines:

Principle 1: Recognize diversity

Principle 2: 8 golden rules of id

Principle 3: prevent errors

Guidelines for data display, guidelines for data entry, Study of HCL patterns

Models: Types of models, cognitive models, GOMS & keystroke –level model, stages of action model, Linguistic models, BNF & task action grammar, and object action interface model.

Design Process:

What is design process? , Design process, user focus, aims of user, center design process, three pillars of design, participatory design, scenarios, navigation design, screen design, development methodologies (LUCID)

S/W tools: Design tools & S/W Engineering Tools.

Design 2:direct manipulation system:

Visual thinking & locus, virtual environment, menu organization, item representation sequence, menu layout, form filling dialog boxes, dialog design notations

Usability: Introduction, usability, testing & evaluation techniques, expert review, acceptance test.

Implementation support:

Support, training & learning, requirement of user support, element of windowing systems, Individual window design, multiple window design, command organization strategies command menus, natural languages in computer.

Documentation and social issues

Documentation: CSCW & Web: presentation style-error messages, printed manuals, and on line facilities

CSCW: Group ware, goals of co-operation, Asynchronous interactions, application to education & social issues

Hypermedia: User & their task, O-AI model for Web-site designing.

Miscellaneous

Case studies, web, embedded, information visualization, interactive devices, social acceptability & Organizational change.

Books

1. Designing the User Interface, Ben Shneiderman, Pearson Education, 2001.
2. Human-Computer Interaction, Alan J. Dix, Janet E. Finlay, and Rusell Beale, Pearson education, 3rd edition, 2004.

Reference Books:

1. Andy smith," Human Computer Factors:" A study of User & Information system, McGraw hill, 1997
2. Alan Coopen," The Essentials of Interaction Design", John Wiley, 2002

314451: SOFTWARE LABORATORY

Teaching: Scheme:
Practical: 2 Hrs./week

Examination Scheme:
Term work: 25 Marks
Practical: 50 marks

1. Write a C program to convert a given regular expression to DFA.
2. Write a C program to convert a given regular grammar to DFA.
3. Design a 2-pass assembler with respect to hypothetical instruction set.
4. Design a macro processor with following feature
 - a. Positional and keyword parameters
 - b. Conditional expansion.
5. Design a Lexical Analyzer for the subset of “C” language.
6. Implement a recursive descent parser or shift-reduce parser in c Language.
7. Design a Line or Screen editor.
8. Write a Dynamic Link Library and test it.

Staff Incharge should suitably frame assignment based on the above topics. It is expected that there is variation between assignments to individual student. Students shall submit the term work in the form of a journal, which will include assignments with problem statement and software Principals.

Note: Practical examination will be based on the term work. Question will be asked during the practical examination to judge the understanding of the student. It is expected that the candidate knows the theoretical aspect of the problem.

314452: NETWORK LABORATORY

Teaching: Scheme:
Lectures: 4 Hrs/week
Practical: 4 Hrs./week

Examination Scheme:
Term work: 25 Marks
Oral: 50 marks

Objectives:

To study installation, maintenance and algorithm of network.

Laboratory based on 314448 Computer Network Technology

Course teacher should conduct classroom lectures and demonstrations to cover following topics

1. HTML and XHTML: Introduction, basic syntax, HTML document structure, HTML tags, text formatting, graphic object, lists, tables, frames, forms, style sheets, prominent feature of HTML editor such as MS front page.
2. XML: introduction, syntax, XML document structure, document type definition (DTDs), XML schema, CSS, and XSLT
3. Introduction to client-side script using Vbscript / javascript
4. Active server pages (ASP) and PHP: introduction, general syntax, primitives, operations, expressions, control statement, arrays, functions, form handling, session tracking, cookies, database connectivity and access
5. Case study of a Campus Network, design details, trouble shooting
6. Demonstration of a protocol analyzer tool
7. Network configuration and administration in Linux, Novel Netware and Windows

List of suggested assignments:-

1. Study of existing LAN and understand the design and various components. Set up a small network of 3 to 4 computers and Hub/switch as directed by the instructor. Use LAN card, UTP cables and connectors. Install LAN cards and crimp the connectors. Assign unique IP address and share C drive on each machine. Test the network by using PING command use protocol analyzer software. Repeat the same assignment by adding a router. Configure the router and use RIP.
2. Study any protocol analyzer software to learn and use its important features, study of networks monitoring software like ETHEREAL software. Assignment to examine TCP/IP and non TCP/IP protocols (IPX/SPX) and capture them using protocol analyzer software.
 - a. Download any protocol analyzer suitable to network
 - b. Install it and test it.
 - c. Observe the result and make report on it.
3. Installation and configuration of IIS/PWS/Apache server. Study and use various facilities/commands and futures
4. PC-to-PC communication through RS-232 port (COM) using null modem configuration and optical link.
5. Program to implement sliding window protocol.
6. Modem command and computer –to-computer communication using modem.
7. Study of repeaters, hub, switch and router.

8. Download router simulator and configure routing protocol.
9. Window socket programming using reliable transport protocol (TCP)
 2. Window socket programming using unreliable transport protocol (UDP)
 3. Socket programming on UNIX/LINUX, UDP client server.
 4. Socket programming on UNIX/LINUX, TCP client server.
 5. Study of FTP and SMTP commands
 6. Develop a simple web based application. Use client-side and sever side scripting

Mini Project

Mini-project design and implement a small network of 4/6 nodes, which include layer2 and 3 devices and verify the working of networks with various utilities. Student should have hands on experience of making and testing of cables.

Student should work in a group to develop an interactive database-driven web based application using ASP, VB and backend database and use software engineering principles to develop the project and should deliver necessary documents such as SRS, design details, user interface, neatly documented code etc.

Staff in-charge will suitably frame the above assignments and flexibility may be incorporated. Students will submit term work in the form of a journal, which will include at least 8 assignments. Assignments must contain problem definition, implementation and result.

Note: Oral examination will be based on term work; Candidates are expected to know the theory behind the assignments.

314453: SOFTWARE DEVELOPMENT TOOLS LABORATORY

Teaching: Scheme:
Practical: 4 Hrs./week

Examination Scheme:
Term work: 50 Marks

Unit 1

Visual Programming

Develop a mini-project based on the visual programming paradigm.

The following exercise have been specified to give idea/prerequisite learning for the concepts required in defining the problem statement for a small system

1. Write a simple hello windows applications using C/SDK with objectives of exposing students to concept of a window program, message loop and event handler.
2. Exploring VC++ 6.0 environment, introducing VC++ 6.0 tools.
3. Write a simple hello windows SDI and /or MDI application using wizard to understand basic window MFC programming concept –document view architecture, MFC programming involving menus, dialog boxes, basic graphics device interface commands, toolbars, status bar, printing & print previewing.

You may choose any other visual programming language with the instructor's prior's permission

Objectives of unit 2 and unit 3

Student should get an idea about the complete end-to-end web development process. This includes understanding the typical two-tier web setup including the role of the web servers. Student will understand the choice of technologies available on client and server side.

Develop a mini-project based on the unit II and unit III i.e. on a web-based system.

The following exercise have been specified to give idea/prerequisite learning for the concept required in defining the problem statement for web based system

Unit 2

Client side technologies

1. HTML, HTML forms, DHTML, client side scripting (Vbscript or java script)
2. Component on client side
Active x controls
OR
Java Applets

Unit 3

Server side programming

1. CGI based options like CGI scripting languages such as PERL OR PYTHON etc.
2. Server side technologies
Java beans, Java servelets/JSP
OR
ASP or ASP.NET, COM controls on server side
3. An access to any database on server side for simple data access.

Unit 4

Objective of Unit 4

- Introduction to programming languages like JAVA OR C#
- Possibly as a desktop or a language for the web environment
- Introduction to versatile programming language (like JAVA OR C#)

Develop a mini-project based on the language of your choice.

The following exercise have been specified to give idea/prerequisite learning for the concept required in defining the problem statement for a small system

1. I. Introduction to Microsoft .NET –The Microsoft.NET platform, The.NET framework.
2. C# class fundamentals –The type system, classes, method, properties, arrays, indexes, attributes, interfaces.
3. C# programming –expression and operators, program flow control, error handling with exceptions, operator overloading
4. Delegates and event handlers –using delegates as callback method, defining delegates as static members, delegates composition, defining event with delegates
5. Querying metadata with reflection-the reflection API Hierarchy, the type class, working with assembly and modules, late binding with reflection, creating and executing code at run time.
6. Working with assemblies-assembly overview, building assembly, creating shared assemblies working with global assembly cache.

OR

1. Java fundamentals such as classes, packages, interfaces etc
2. Multithreading
3. Java Introspection
4. Exception handling
5. Java I/O
6. JDBC

Staff members should frame MINIPROJECT based on the concept & topics mentioned above. College can choose between the Microsoft set of technologies OR java technologies.

1. Mini project can be assigned from any one of the streams like system, Networking, Web application, desktop gaming and etc.
2. HCL consideration: understanding users/persons/scenarios/orchestration and flow/navigation and inflection/Task coherence/Improving data entry/ retrieval look and feel/metaphor idioms/affordance/error messages.
3. Mini project should be assigned to and developed by group of two or three student on any of the above streams, Using all steps in software engineering.
4. Mini project should be assigned at the beginning of term.

Continuous assessment of mini project will be based on design and implementation of mini project. Software engineering aspects should be used while designing the project. Mini project report should include design of project in terms of paper documents in form of SRS and design documents.

Reference Books:

1. Jeff prosise” Programming windows with MFC”, 2nd edition, Microsoft press, 1999
2. David Schneider “ An introduction to programming using visual basic 6.0”, prentice hall, 1999
3. Tom Archer,”Inside C#”, Microsoft press
4. Herbert Schildt, “Java 2: The complete reference “, Osborne publishing, 5th edition.
5. Hans Bergsten,” Javaserer pages”, Ireilly 3 rd edition, 2003