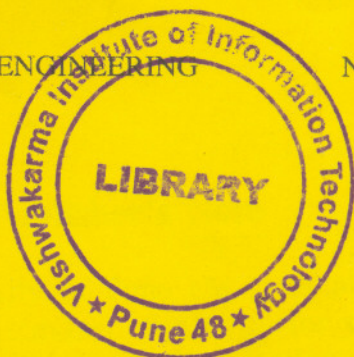


OK  
FACULTY OF ENGINEERING

No. 476



Revised Syllabus for the  
**T.E. (Information Technology)**  
**(2003 Course)**  
**(From Academic Year 2005-2006)**



**UNIVERSITY OF PUNE**

**Price : Rs. 15/-**

**University of Pune**  
**Structure of T.E. (Information Technology) 2003**

**Term - I**

Subject Code No.	Subject	Teaching Scheme Hours / Week		Examination Scheme				Total Marks Total
		Lect	Pract	Paper	T/W	Pract	Oral	
310241	Database Management Systems	4	—	100	—	—	—	100
314441	Operating System	4	—	100	—	—	—	100
314442	Multimedia Systems	4	—	100	—	—	—	100
314443	Data Communication and Networking	3	—	100	—	—	—	100
310268	Theory of Computation	3	—	100	—	—	—	100
314444	Operating Systems Lab.	—	4	—	25	50	—	75
310445	Information System Lab.	—	4	—	50	—	50	100
314446	Multimedia Lab.	—	2	—	25	50	—	75
<b>Total</b>		<b>18</b>	<b>10</b>	<b>500</b>	<b>100</b>	<b>100</b>	<b>50</b>	<b>750</b>
<b>Total of Part I (A)</b>			<b>28 Hrs</b>					<b>750</b>

## Term - II

### Information Technology / 2

Subject Code No.	Subject	Teaching Scheme Hours / Week Lect	Examination Scheme Paper	T/W	Pract	Oral	Total Marks
314447	System Software	4	100	—	—	—	100
314448	Computer Network Technology	3	100	—	—	—	100
314449	Management Information Systems.	3	100	—	—	—	100
314450	Human Computer Interface	3	100	—	—	—	100
310259	Software Engineering	4	100	—	100	—	—
314451	Software Lab	4	—	25	50	—	75
314452	Network Lab	2	—	25	—	50	75
314453	Software Development Tools Lab.	4	—	50	—	—	50
314454	Seminar & Technical Communication	2	—	50	—	—	50
<b>Total</b>		<b>18</b>	<b>500</b>	<b>150</b>	<b>50</b>	<b>50</b>	<b>750</b>
<b>Total of Part II (B)</b>		<b>30 Hrs</b>					<b>750</b>
<b>Grand Total (A) + (B)</b>							<b>1500</b>

### Information Technology / 3

#### 310241 : Database Management Systems (Syllabus common to T.E. (Computer Engg))

**Teaching Scheme :**  
**Lectures : 3 Hrs/Week**

**Examination Scheme :**  
**Theory : 100 Marks**

#### Prerequisites :

- Discrete Structures
- Data Structures and Files

#### Objectives :

- To learn and understand Database System and its components
- To learn and understand various Database Architectures and Applications

#### Unit I

**Introduction to DBMS:** Basic concepts, Advantages of a DBMS over file-processing systems, Data abstraction, Database Languages, Data Models and Data Independence, Components of a DBMS and overall structure of a DBMS, Multi-User DBMS Architecture, System Catalogs

**Data Modeling:** Basic Concepts, entity, attributes, relationships, constraints, keys, E-R and EER diagrams: Components of E-R Model, conventions, converting E-R diagram into tables, EER Model components, converting EER diagram into tables

**Relational Model:** Basic concepts, Attributes and Domains, Codd's Rules, Relational Integrity: Nulls, Entity, Referential Integrities, Enterprise Constraints, Views, Schema diagram

(06 Hrs)



## Unit II

**Relational Query Languages:** Relational Algebra and Relational Calculus: Tuple Relational and Domain Relational Calculus

**Introduction to SQL:** Characteristics and advantages, SQL Data Types and Literals, DDL, DML, SQL Operators, Tables: Creating, Modifying, Deleting, Views: Creating, Dropping, Updation using Views, Indexes, Nulls

**SQL DML Queries:** SELECT Query and clauses, Set Operations, Predicates and Joins, Set membership, Tuple Variables, Set comparison, Ordering of Tuples, Aggregate Functions, Nested Queries, Database Modification using SQL Insert, Update and Delete Queries, concept of Stored Procedures and Triggers, Introduction to QBE and QUEL Programmatic SQL: Embedded SQL, Dynamic SQL, ODBC (06 Hrs)

## Unit III

**Database Analysis and Design Techniques:** Information Systems 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 Techniques

**Relational Database Design:** Purpose of Normalization, Data Redundancy and Update Anomalies, Functional Dependencies, The Process of Normalization: 1NF, 2NF, 3NF, BCNF, 4NF, 5NF and DKNF (06 Hrs)

## Unit IV

**Storage and File Systems:** Secondary Storage, RAID, File Organization, Indices, Static and Dynamic Hashing, B-trees and B+ Trees

**Introduction to Query Processing:** Overview, Measures of query cost, Selection and join operations, Evaluation of Expressions, Introduction to Query Optimization, Estimation, Transformation of Relational Expressions (06 Hrs)

## Unit V

**Transaction Management:** Basic concept of a Transaction, Properties of Transactions, Database Architecture, Concept of Schedule, Serial Schedule, Serializability: Conflict and View, Cascaded Aborts, Recoverable and Non-recoverable Schedules, Concurrency Control: Need, Locking Methods, Deadlocks, Timestamping Methods, Optimistic Techniques, Multi-Version Concurrency Control, Different Crash Recovery methods such as Shadow-Paging and Log-Based Recovery: Deferred and Immediate, Checkpoints (06 Hrs)

## Unit VI

**Object-Oriented Databases:** Need of OODBMS, Storing Objects in Relational Database, Introduction to OO Data Models, Persistent Programming Languages, Pointer Swizzling Techniques, Persistence, Object Management Group, Object Database Standard ODMG

**Database Architectures:** Centralized and Client-Server Architectures, Introduction to Distributed Database systems (06 Hrs)



**Text Books:**

1. Silberschatz A., Korth H., Sudarshan S., "Database System Concepts", 4th Edition, McGraw Hill Publishers, 2002, ISBN 0-07-120413-X
2. Connally T., Begg C., "Database Systems", 3rd Edition, Pearson Education, 2002, ISBN 81-7808-861-4

**Reference Books:**

1. Rab P. Coronel C. "Database Systems Design, Implementation and Management", 5th Edition, Thomson Course Technology, 2002, ISBN 981-243-135-7
2. Elmasri R., Navathe S., "Fundamentals of Database Systems", 4th Edition, Pearson Education, 2003, ISBN 8129702282
3. Date C., "An Introduction to Database Systems", 7th Edition, Pearson Education, 2002, ISBN 81 -7808 - 231- 4
4. Ramkrishna R., Gehrke J., "Database Management Systems", 3rd Edition, McGraw-Hill, 2003, ISBN 0 - 07 - 123151 - X

**314441 Operating System**

**Teaching Scheme :**

**Lectures : 4 Hrs/Week**

**Examination Scheme :**

**Theory : 100 marks**

**Prerequisites :**

- Computer Organization (Subject Code: 210252)
- Programming paradigms and Methodology (Subject Code: 214444)

**Objectives :**

- To learn the evolution of Operating systems.
- To study the operations performed by Operating System as a resource manager.
- To understand the computer security issues and Operating System tools.

**Unit I : Introduction**

Architecture, Goals & Structures of O.S, Basic functions, Virtual Computers, Object Server model, Interaction of O. S. & hardware architecture, System calls & O. S. services, Batch, multiprogramming, Multitasking, time sharing, parallel, distributed & real-time O.S.

Examples of O. S.: Linux and variants, MS-Windows, Handheld OS . **(06 Hrs)**

**Unit II : Process Management**

Process description & control: Process Concept, Process states, Process description, Process control, Threads, SMP & Micro kernels: Processes and Threads, Symmetric Multiprocessing, Microkernels



Concurrency : Principles of Concurrency, Mutual Exclusion: S/W approaches, H/W Support, Semaphores, Message Passing, Monitors, Classical Problems Of Synchronization: Readers-Writers Problem, Producer Consumer Problem, Dining Philosopher problem,

Deadlock: Principles of deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, An Integrated Deadlock Strategies (06 Hrs)

### Unit III : Scheduling

Uniprocessor Scheduling: Types of scheduling: Preemptive, Nonpreemptive, Scheduling Algorithms: FCFS, SJFS, RR, Priority

Multiprocessor Scheduling: Granularity, Design Issues, Process Scheduling, Thread Scheduling, Real Time Scheduling: Characteristics, Real Time Scheduling (06 Hrs)

### Unit IV : Memory Management

Memory Management requirements, Memory partitioning: Fixed and Variable Partitioning, Memory Allocation: Allocation Strategies (First Fit, Best Fit, Worst Fit), Fragmentation, Swapping, Paging.

Virtual Memory: Concepts, Segmentation, Paging, Address Translation, Demand paging, Page Replacement Policies (FIFO, LRU, Optimal, Other Strategies), Thrashing, Working Set Model (06 Hrs)

### Unit V : 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, C-SCAN, SSTF), RAID, Disk Caches.

File Management: Concepts, File Organization, File Directories, File Sharing, Record Blocking, Free Space management, Security Issues, Secondary Storage Management (06 Hrs)

### Unit VI : Security, O.S. tools & shell Programming

Computer security & protection: Security Threats, Intruders, Malicious software, Trusted System, Protection: Protection Policy and mechanisms, Authentications: Internal Access Authorizations, Implementations, Cryptography.

O.S. tools, Shell and Command Programming, AWK Programming (06 Hrs)

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

### Text Books :

1. Stalling William, "Operating Systems", Pearson Education, 2001, ISBN 81-7808-503-8
2. Silberschatz A., Galvin P., Gagne G., "Operating System Concepts ", John Wiley and Sons, 2003, ISBN 9812-53-055-X.
3. Das Sumitabha," Unix Concepts and Appliactions", 3rd Edition, Tata McGraw Hill, 2003, ISBN 0-07-053475-6.

### Reference Books :

1. Nutt Gary, "Operating Systems", Pearson Education, 2004, ISBN 81-297-0614-8.
2. Tanenbaum Andrew S.,"Modern Operating Systems" PHI, 2001,ISBN 81-203-0974-X.



**314442 : Multimedia Systems**

**Teaching scheme :**                      **Examination Scheme :**  
**Lectures : 4 Hrs/Week**              **Theory : 100 Marks**

**Prerequisites :**

- Digital Electronics and Microprocessor  
(Subject Code: 214441)
- Data Structures and Files (Subject Code: 214449)

**Objectives:**

- To learn the storage and processing of various Multimedia components.
- To learn the fundamentals of Computer graphics.

**Unit I : 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 their controllers, video display adapters, graphics device drivers and display buffers (08 Hrs)

**Unit II : 2D graphics**

Generation of line using DDA and Bresenham's line drawing algorithm, Generation of circle using Bresenham's algorithm, Polygon scan line seed filling algorithm, 2D Line clipping using Cohen Sutherland algorithm and Lang Barky algorithms, 2D transformations translation, rotation, scaling, reflection and shear. simple problems based on the above transformations (08Hrs)

**Unit III : 3D graphics and rendering**

3D transformations 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 aliasing and antialiasing techniques in graphics (08Hrs)

**Unit IV : Audio and audio compression**

Basic concepts of audio, digitization of sound, sound processing, audio file formats Wave, VOC and MIDI, audio compression techniques such as DM, ADPCM, MPEG (08Hrs)

**Unit V : Animation and Video**

Principles of animation, 2D and 3D animation, Fundamentals of still images color models of images Fundamentals of video, color models in video. Introduction to analog and digital video (08Hrs)

**Unit VI : Compression Techniques and graphics 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 technique (take case study of JPEG

Study of Graphics file format: BMP, JPEG, GIF, TIFF (08Hrs)



**Text Books :**

1. Li Ze-Nian, Drew Mark S., "Fundamentals 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 Books :**

1. Harrington Steven, "Computer graphics : A Programming approach", Tata McGraw Hill, ISBN 0-07-026753-7
2. M Paulin Baker, Donald Hearn, "Computer Graphics", PHI, 2001, ISBN 81-203-09440-8
3. Steinmetz Ralf, Nahrstedtk, "Multimedia Computing, Communication and Applications", Pearson Education, 2004, ISBN 8178083191
4. Born Gunter, "Handbook of file formats ", Imprints Of International Thomson Learning, 1997, 1-85032-117-5

**314443 : Data Communication and Networking**

**Teaching Scheme :** **Examination Scheme :**  
**Lectures : 3 Hrs/Week** **Theory : 100 marks.**

**Prerequisites :**

- Principles of Communication Engineering.  
 (Subject Code: 204450)

**Objectives :**

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

**Unit I : Digital Transmission Fundamentals :**

Digital signals, Analog versus digital, Limits of achievable data rate in digital communication, Transmission impairment [ Attenuation and attenuation distortion, delay distortion, Thermal noise, Inter modulation noise, Impulse Noise, Cross talk, Channel capacity]

**Digital Modulation:**

Modems, Digital continuous wave modulation techniques for Modem e.g. ASK, FSK, PSK, Baud rate, QAM, Modern constellation patterns, Interface control for typical modem, EIA 232/V.24 interface.

**Error Detection and Correction**

LRC, VRC, CRC, Checksum , Hamming code

(06 Hrs)



**Unit II : Switching techniques and high speed digital access :**

Different switching techniques, Circuit switching and telephone networks, Signaling system #7 Architecture overview, Packet switching networks, T1 carrier system/E1, T3/E3 carriers, SONET/SDH, DSL Technology, ADSL technology, Cellular Telephone Systems, cable modems. (06 Hrs)

**Unit III : Data Communication Media :****Transmission Media :**

Guided Transmission Media ( Physical description, Application, Transmission Characteristics ) Twisted pair (Unshielded and shielded twisted pair ), Category 3, Category 5 UTP , Coaxial cable.

Wireless transmission unguided media( Terrestrial microwave ,Satellite microwave)

**Fiber optic Communication :**

Principle of light transmission, types and modes of fiber, Losses and dispersion in fiber, sources (light) and detectors.

**Satellite communication :**

Kepler's laws, Orbital aspects, Geostationary satellite and frequency plans, Frequency plans and polarization, transponders, Multiple access methods.(06 Hrs)

**Unit IV : 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, Half Duplex, Duplex transmission,

**Network topologies** - Hierarchical [ Tree], Horizontal[ Bus ], Star, Ring, Mesh

Types of networks, Network architectures(OSI model), TCP-IP protocol stack overview, **Network interface hardware and network hardware components-** connectors, transceivers and media converters, NICs , RS-232 and RS-449, PCI, USB Protocols.

**Devices used for extending LANs** - Repeaters, Bridges, Switches. (06 Hrs)

**Unit V : 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 [ IBM's BSC protocol], Bit oriented Protocols [HDLC], PPP **Multi point configuration of a network and multiple access techniques and protocols-** Random-access, ALOHA, Slotted ALOHA, CSMA, CSMA/CD, controlled access [reservation, polling/select, token passing], channelisation [FDMA ,TDMA,CDMA]. (06 Hrs)

**Unit VI : Local Area Network :**

LAN applications, LAN architecture, LAN topologies[ Bus, Star, Ring, Tree], Medium access control [ RR, Reservation, Contention], MAC frame format.

**IEEE 802 LAN standards :**

802.3 Ethernet (CSMA/CD), Ethernet frame IEEE 802.3 frame format, IEEE 802.3, 10 Mbps Specification (Ethernet) - 10Base5, 10Base2, 10Base2,10BaseT,10BaseF  
IEEE 802.3 100Mbps Specification (Fast Ethernet)



Gigabit Ethernet  
 FDDI,  
 IEEE 802.5 Token Ring - MAC Techniques, Physical  
 Layer Specification  
 Backbone Network - Bus backbone, Star Backbone  
 Virtual LANs. (06 Hrs)

**Text Books:**

1. Behrouz A. Forouzan , "Data Communications and Networking", Tata McGraw Hill, 2nd Edition, 2002, ISBN 0-07-043563-4
2. Stallings W., "Data and Computer Communications", Sixth Edition, Prentice Hall of India Pvt. Ltd., 2002, ISBN 81-203-2067-0
3. Dennis Roddy , John Coolen, "Electronic Communication", PHI, 2002, ISBN 81-2003-0984-7

**Reference Books :**

1. Alberto Leon-Garcia Indra Widjaja, "Communication Networks Fundamental Concepts and key Architectures", Tata McGraw Hill, 2nd Edition, 0-07-040253-3
2. Godbole A., "Data Communications and Networks", Tata McGraw-Hill Publications, 2002, 0-07-047297-1
3. Gupta P., "Data Communications", PHI, 2004, ISBN 81 - 203 - 1118 - 3
4. Shay W., "Understanding Data Communications and Networks", Third Edition, Brooks Kale Thomson Learning/Vikas Publishing House, ISBN 981-254-966-8

**310258 : Theory Of Computation**

**Teaching Scheme :** Examination Scheme :  
**Lectures : 3 Hrs/Week** **Theory : 100 Marks**

**Prerequisites :**

- Discrete Structures ( Subject Code : 210241)

**Objectives :**

- To Study the abstract computing models.
- To Study Automata Theory and types and applications of formal grammars

**Unit I**

**Basic concepts :** Symbols/Alphabet, String/Word, Language, Formal languages, 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  $\hat{I}$  moves, NFA with  $\hat{I}$  moves, NFA without  $\hat{I}$  moves, Removal of  $\hat{I}$  moves, Conversion of NFA with  $\hat{I}$  to NFA without  $\hat{I}$ , Conversion of NFA without  $\hat{I}$  to DFA, Conversion of NFA with  $\hat{I}$  to DFA, FA with output: Moore and Mealy machines -Definition, models, inter-conversion. (08 Hrs)



**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 limitations. (06 Hrs)

**Unit III****Context Free Grammars and Languages :**

Phrase structure grammar, Context Free Grammar, Context Free Language (CFL), production rules, Formalization, derivations and derivation trees, ambiguous grammar, removal of ambiguity and inherent ambiguity. Simplification of grammar - removal of unit productions, useless production, useless symbols, and  $\hat{I}$ -productions, 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. (08 Hrs)

**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 CFLs. Concept of Post Machines. (06 Hrs)

**Unit V****Turing Machine :**

Definition and Examples of TM, Recursive sets, partial Recursive functions, recursively enumerable sets, Computing a partial function with TM, Combining TMs, Variations of TM: Multi-tape TMs, Universal TM, Model of Computation and Church's Turing hypothesis, Unsolvable problems, TM's Halting problem. (06 Hrs)

**Unit VI****Applications and Comparison of :**

1. Applications of Finite Automata, RE, PDA, PM, TM Comparison FA, RE, PDA, PM, TM and their Limitations.
2. Measuring and Classifying Complexity: Growth rates of Functions. (06 Hrs)

**Text Books :**

1. Daniel I.A. Cohen, "Introduction to computer theory", Wiley Publications, 2nd edition, ISBN-9971-51-220-3.
2. John C. Martin, "Introduction to language and theory of computation", Tata McGraw Hill , Third edition, ISBN 0-07-049939-X

**Reference Books :**

1. Hopcroft Ulman, "Introduction to Automata Theory, languages and Computations", Pearson Education Asia, Second edition, ISBN 81-7808-347-7
2. K.L.P. Mishra, N. Chandrasekaran, "Theory of Computer Science (Automata, Languages and Computation)", Prentice Hall India, 2nd Edition, ISBN-81-2030-1271-6.
3. Bernard M. Moret, " The Theory of computation", Pearson Education Asia, ISBN 81-7808-487-2



### 314444 : Operating System Laboratory

**Teaching scheme :** Examination scheme :

**Practical : 4 Hrs/week** **Practical : 50 marks**  
**Term work : 25 marks**

#### Objectives :

- To Study the operating systems functioning and internals.

#### Assignments will be based on Operating System :

- Shell programming and AWK programming
- Process & communication in Unix
- CPU scheduling
- Demand Paging , memory management
- Concurrent Programming - Reader/Writer Problem
- Deadlock, Banker's Algorithm
- Multithreading
- Mutex, Semaphores
- Inter-process Communication

Staff In-charge should frame assignments with on the above topics. It is expected that there is variation between assignments to individual students. Students must submit the term-work in the form of journal. Each assignment has to be well documented with problem definition, code documented with comments. Staff in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.

#### Reference Books :

- Gary Nutt : Kernel Projects for Linux, Addison Wesley, 2001,0-201-61243-7
- Gary Nutt:Operating System, 3rd edition, Pearson Education, 2004,81-297-0614-8
- Richard Stevens: Advanced Programming in the UNIX environment, Pearson Education, 2002,81-7808-096-6.

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



**310445 : Information Systems Laboratory**

**Teaching Scheme :**                      **Examination Scheme :**  
**Practical : 4 Hrs/Week**              **Term Work : 25 Marks**  
**Oral : 50 Marks**

**Objectives:**

- To understand basics of GUI programming
- To understand and learn Visual programming paradigms and database programming.
- To understand and learn RDBMS concepts, database design principles
- To understand and learn SQL DDL, DML
- To get exposure to development experience of small systems through developing three mini projects

**Part I : Miniproject on RDBMS**

To develop a miniproject for a rdbms based system. The following exercises have been specified to give idea/prerequisite learning for the concepts required in defining the problem statement for an RDBMS system.

- 1) Design and draw an ER/EER diagram using standard notations for given problem definition and map this diagram into Database Tables.  
 (Instructor will define problem definition for each batch of reasonable complexity such that it facilitates the use of all ER/EER features such as all types of relationships including aggregation, generalization, all types of attributes, strong and weak entities,)
- 2) Create Database Tables and Indices in any desk top Database for the tables generated in problem 1. Insert tuples in each tables such that every relationship and constraint is reflected. Perform updates on these tables.

- 3) Repeat the problem in assignment 1 with any backend RDBMS database using SQL DDL statements and applying all required constraints on Tables and/or tuples.
  - Use SQL DML statements 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 tables. (Instructor should frame problem definition such that it will involve use of text manipulation functions, aggregate functions, group value functions, Date functions, conversion and transformation functions, simple queries and nested queries, renaming of attributes, removal of duplications, creating views etc.)
- 4) Write and execute Triggers and Procedures/Functions. (Instructor will frame appropriate problem definition) (Students should study different data types & variables, program control statements, triggers, procedures, functions & packages, database access using cursors.)
- 5) Generate a simple report using SQL report generation facility.

**Part II : Miniproject on the Front end of an application**

Following exercises have been specified to give idea/prerequisite learning for the concepts required in defining the problem statement for a front end to a RDBMS based system.



Front end tools support development of following concepts

- **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 bar, Numeric UpDown counter, Tab controls).
- **Properties** ( Use of important properties (Behavior, Layout, Design etc) for every controls on the form.
- **Events** (Click, double click, change, Form Load, Got Focus, Lost Focus, Key pressed etc).
- **Programming Components** (Data types, variable declarations, control structures, file support).
- **Overall program development life cycle** (Form design, Control & events, packaging and deployment).

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

### Part 3 : Miniproject on RDBMS and Front end development

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

- i) Design the Database (use ER/EER diagrams and Normalization upto 3 NF if required)
- ii) Create the tables using all types of constraints.
- iii) Create triggers and active elements to maintain the integrity the database and perform appropriate action on database updates.

- iv) Populate the database using SQL insert/creating forms in any fronted.
- v) Document the project using SE concepts: Scope, SRS, ER, Test plans and reports
- vi) Develop suitable User Interface using appropriate tools & languages.

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

Staff in charge will frame the mini project specification to be performed by a group of 3 students. There will be a variation between each group. Students will have a CD of all the mini projects. Students must submit term-work in the term of a journal. Each assignment to be well documented with problem definition, code and documented with comments. Staff in charge will assess the assignment continuously and grade as mark each assignment on completion.

**Note :** For the oral examination the candidate will have to demonstrate the mini projects and answer questions on design and documentation of the mini projects, technology used in above lab as well as on the DBMS and front end concepts used in the laboratory. The candidates will be judged 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 - a Primer, Rajshekhar Sunderraman (Pearson Education)
3. Oracle PL/SQL by Example (3rd Ed.), Benjamin Rosenzweig, Elena Silvestrova (Pearson Education)



**314446 : Multimedia Laboratory**

<b>Teaching Scheme :</b>	<b>Examination Scheme :</b>
<b>Practical: 2 Hrs/Week</b>	<b>Term Work : 50 Marks</b>
	<b>Practical : 50 Marks</b>

**Objectives :**

- To study algorithms of Graphics and Multimedia aspects.

**Assignments will be based on :**

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

Staff In-charge should frame assignments with on the above topics. It is expected that there is variation between assignments to individual students. Students must submit the term-work in the form of a journal. Each assignment has to be well documented with problem definition, code documented with comments. Staff in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.

**Note :** The practical examination will be based on the assignments performed by the candidates as part of the term-work. Questions will be asked during the practical examination to judge the understanding of the students. It is expected that the student knows the theoretical aspect of the problem.



### 314447 : System Software

**Teaching Scheme :** Examination Scheme :

**Lectures : 4 Hrs/week** Theory : 100 marks

**Prerequisites :**

- Computer Organization (Subject Code : 210252)
- Programming paradigms and Methodology (Subject Code : 214444)

**Objectives :**

To make the students :

- Gain an in depth knowledge of the design of various system softwares.
- Understand dynamic linking concepts and debugging techniques.

**Unit I :**

#### Components of System S/W, Development Tools

Language Processors- Introduction, Language processing activities, Fundamentals of Language Processing, Fundamentals of Language Specifications, Need of system s/w, translator types, Interpreters, Compilers, Interpreters, Loaders, Linkers, Preprocessors.

S/W Development Tools- S/W tools for program development, Editors, debug monitors, programming Environments, User interfaces, LEX, YACC usage, tools for program testing. (08 Hrs)

**Unit II :**

#### Assemblers & Macro Processors.

Assemblers- Elements of assembly language programming, Simple assembly scheme, Pass structure of assembler, Single pass assembler for IBM PC.

Macros & Macro Processors- Macro definition & calls, Macro expansion, Nested macro calls, Macro definitions within definition, Advanced macro facilities, Design of a macro preprocessor. (06 Hrs)

**Unit III :**

**Compilers I-** Overview of compilation process, Phases of compiler, Types of Compiler, Bootstrapping of Compiler, Lexical Analysis, Scanner Design of LA for subset of C.

**Parsers-** Parsing Techniques-Top Down Parsing & Bottom Up Parsing, Shift Reduce & Recursive Descent Parser for subset of 'C'. (08 Hrs)

**Unit IV :**

**Compilers-II** — Optimization & Code Generation, Intermediate Codes, Three Address Codes, Quadruples & Triples Machine dependent & Machine independent optimization techniques, Simple code generation algorithm. (08 Hrs)

**Unit V :**

#### Linkers & Loaders

Central Loader scheme, Absolute Loader, Subroutine Linkages, Relocating Loaders, Direct Linking Loaders, Dynamic Linking Loaders, Overlay Structure.

Design of Absolute Loader & Direct Linking Loaders. Implementation Examples-MS DOS Linker. (06 Hrs)



**Unit VI :****Dynamic Linking**

Dynamic Data Exchange, Dynamic Link Libraries, Need, Conventional dynamic linking, Class library, Dynamic Linking, DLL's, Use of call back function, far function calls, different methods of specifying link, Dynamic linking with & without import, Object Linking & Embedding, Concept of clip-boards.

**(06 Hrs)****Text Books :**

1. D.M. Dhamdhare, "Systems Programming and Operating Systems", 2nd Edition, Tata McGraw Hill, 1993, ISBN 0-07-463083-0
2. Beck Leland L., "Systems Software An Introduction to Systems Programming" Pearson Education, 3rd Edition, 1997, ISBN 0-201-43581-0
- 3.. John Donovan, "Systems Programming", Tata McGraw Hill, 1992, ISBN 0-07-460482-1

**Reference Books :**

1. Charles Petzold, "Programming Windows 3.1", Microsoft Press, ISBN 1-55615-395-3
2. Aho, Sethi, Ullman, "Compilers- Principles, Techniques & Tools", Pearson Education, 2004, ISBN 81-7808-046-X

**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

- Techniques of routing, network management
- Services offered by Transport and Application layers
- Wireless technology

**Unit I : Network Layer and Routing**

**Network Layer :** Design Issues, Packet switching, Connectionless and Connection-oriented Services, Virtual Circuit and Datagram Subnets, Routing Algorithms, Internetworking, Firewalls, Congestion prevention policies, Load shading, Jitter Control, Quality of Service, Internetworking

**Network layer Protocols :** ARP, IP protocol, IP Addresses, IPV6, ICMP, Unicast Routing Algorithms: RIP, OSPF, BGP, Multicast Routing: IGMP, Mobile IP.

**(06 Hrs)****Unit II : Transport Layer**

Services and service primitives, Sockets and Socket programming, Elements of Transport protocol: Addressing, Connection establishment and release, flow control and buffering, 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.

(06 Hrs)

### Unit III : Application Layer

Domain Name System (DNS) and DNS servers, Electronic Mail: Architecture and services, Message Formats, MIME, message transfer, SMTP, Mail Gateways, Relays, Configuring Mail Servers, File Transfer Protocol, General Model, commands, TFTP Static and dynamic web pages, WWW pages and Browsing, HTTP, LDAP, Browser Architecture, Caching in Web Browser remote login, Wireless Web

(06 Hrs)

### Unit IV : Multimedia Networking

Multimedia networking applications, streaming stored audio and video, making the best of the Best-Effort services, Protocols for Real time interactive application RTP, RTCP, RTSP, SIP, H.323/H.324, Scheduling and policing mechanisms, integrated services, RSVP.

(06 Hrs)

### Unit V : Network Configuration, Management and Modeling

### Unit VI : Wireless and Broadband Networks

Basic overview of various technologies like Wireless links-802.11, Bluetooth, ATM, Frame relay, B-ISDN, SMDS, X-25.

(06 Hrs)

### Text Books :

1. James Kurose, Keith W. Ross, "Computer Networking : A top down approach featuring the Internet, Pearson Education, 2nd Edition, 2004, ISBN 81-1808-787-1
2. Tanenbaum Andrew S., "Computer Networks", PHI, 4th Edition, 2003, ISBN 81-203-2175-8

### Reference Books :

1. Behrouz A. Forouzan, "TCP-IP Protocol Suite", Tata McGraw Hill Edition, 2nd Edition, 2003, ISBN 0-07-049551-3
2. Kershanbaum, "Telecommunication Networks"



### 314449 : Management Information Systems

**Teaching Scheme :**                      **Examination Scheme :**  
**Lecturers : 3 Hrs/Week**              **Theory : 100 Marks**

#### **Objectives :**

- To learn and understand fundamentals of Information Systems
- To learn and understand architecture, methodology and applications of MIS

#### **Unit I : (06 Hrs)**

**Foundations of Information Systems and Management :** Why Information systems? Components and resources of information systems, Information system activities, Types of information systems: Operations support systems and Management support systems

**Management Information Systems :** Definition, role and impact of MIS, Introduction to Management, Approaches to Management, Functions of the managers: Management effectiveness, planning, organizing, staffing, coordinating and directing, MIS as a 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 Corporate Planning, Essentiality of strategic planning, development of business strategies, types 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 equipments and software as per MIS needs of the organization. Ensure uptime of hardware resources, database management and end user training

#### **Unit II : (06 Hrs)**

##### **Applications 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 applications in service industry

**Cross-Functional Enterprise Systems :** Introduction, Collaboration systems in Manufacturing, Enterprise application Integration, Transaction Processing systems

#### **Unit III : (06 Hrs)**

**Enterprise Management Systems (EMS) :** Introduction, Enterprise Resource Planning (ERP) systems: Basic features, benefits, selection, implementation, EMS and MIS

**Business Process Outsourcing (BPO) :** What is BPO? Voice BPO i.e. Call center, non-voice BPO, Scope of BPO, challenges in BPO management

**Information Technology Architectures :** Hardware and Software Architectures, Examples of Different Architectures, Matching Design to Architecture



**Unit IV :** (06 Hrs)

**Customer Relationship Management (CRM) :** Introduction, What is CRM? Three phases of CRM, Benefits, challenges and trends in CRM

**Electronic Commerce Systems (eCommerce) :** Introduction, scope, B2C, B2B and C2C, Essential e-Commerce processes, Electronic Payment Processes, e-Commerce Applications

**Implementing Change :** Implementation, Research on Implementation, Implementation strategy, Integration, implementing IT, End user Resistance and Involvement, Implementing IT based Transformation of the Organization

**Unit V :** (06 Hrs)

**Decision Support Systems (DSS) :** Concept and philosophy, Using Decision Support systems: What-if analysis, sensitivity analysis, Goal-seeking analysis, Optimization analysis, Introduction to Data Warehouse: Architecture, Organization and Management of Data Warehouse, Implementation, Data Mining for Decision support, Executive Information systems, Enterprise Information portal and knowledge management systems, Introduction to Artificial Intelligent Systems, Knowledge Based Expert systems, GIS

**Unit VI :** (06 Hrs)

**Security and Ethical Challenges :** Introduction, Ethical responsibility of Business Professionals, Computer Crime, Hacking, Cyber Theft, Software Piracy, Privacy issues, Health issues

**Security Management :** Introduction, Tools, Encryption, Firewalls, e-Mail monitoring, biometric security, disaster recovery, fault-tolerant systems, system controls and audits, Contingency management and solutions

**Global Management of Information Technology :** Cultural, political and Geo-economic challenges, global business/it strategies, applications, platforms and Data access issues

**Text Books :**

1. O'Brien J., "Management Information Systems: Managing Information Technology in the Business Enterprise", 6th Edition, Tata McGraw-Hill Publishing Company Limited, 2004, ISBN 0 - 07 - 058739 - 6
2. Jawadekar W., "Management Information Systems", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, 2002, ISBN 0 - 07 - 044575 - 3

**Reference Books :**

1. Lucas Henry C., "Information Technology for Management", 7th Edition, Tata McGraw-Hill Publishing Company Limited, 2004, ISBN 0 - 07-047242- 4
2. Post G., Anderson D., "Management Information Systems", 3rd Edition, Tata McGraw-Hill Publications, ISBN 0 - 07 - 049940 - 3
3. Gupta U., "Management Information Systems: A Managerial Perspective", Galgotia, ISBN 81 - 7515 - 085 - 8



### 314450 : Human Computer Interface

**Teaching Scheme :** Examination Scheme :  
**Lectures : 3 Hrs/week** **Theory: 100 marks**

#### Unit I : Introduction (06 Hrs)

The Human - I/P, O/P channels, Human memory, Thinking, Emotion,  
 Individual differences (diversity), Human Psychology  
 The Computer: Introduction to I/P, O/P devices  
 The User: The role of users in Information Systems, User characteristics, Needs  
 The Interface: Goals of User Interaction Design, Importance of Human factors & motivations, Paradigms for Interaction.

#### Unit II : Principles of models & guidelines (06 Hrs)

**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 HCI patterns

**Models :** Types of models, cognitive models, GOMS & keystroke-level model, stages of action models, linguistic models, BNF & task action grammar, object action interface model.

#### Unit III : Design Process (06 Hrs)

**Design process :** what is a design? The process of design, user focus, aims of user centered design process, three pillars of design, participatory design, scenarios, navigation design, screen design, development methodology (LUCID).

**S/w tools :** Design tools & S/W engg. Tools

#### Unit IV : (06 Hrs)

**Design 2 : direct manipulation systems:** - visual thinking & locus, virtual environments, menu organization, item representation sequence, menu layout, Form-filling, dialog boxes, dialog design notations

**Usability :** Introduction, usability, testing & evaluation techniques, expert reviews, acceptance tests,

**Implementation support :** support, training & learning, requirements of user support, elements of windowing systems, individual windowing design, multiple windowing design, command organization strategies, command menus, natural languages in computers.

#### Unit V : Documentation and Social Issues (06 Hrs)

**Documentation :** CSCW & Web: Presentation styles- Error messages, Printed manuals, Online facilities

**CSCW :** Groupware, Goals of co-operations, Asynchronous interactions, Application to Education & Social Issues.

**Hypermedia :** Users & their tasks, O-AI model for Web-site designing.

#### Unit VI : Miscellaneous (06 Hrs)

Case studies, web, embedded, information visualization, Interactive devices, social acceptability & organizational change.



**Text Books :**

1. Alan J. Dix, Janet Finlay, Russell Beale, "Human Computer Interaction", Pearson Education, 3rd Edition, 2004, ISBN 81-297-0409-9
2. Ben Shneiderman, "Designing The User Interface", Pearson Education, 2001, ISBN 81—7808-262-4

**Reference Books :**

1. Andy Smith, "Human Computer factors: A Study of Users & Information Systems", McGraw Hill, 1997
2. Alan Cooper, "The essentials of Interaction Design", John Wiley, 2002, ISBN 81-265-0213-4

**310259 : Software Engineering**

**Teaching Scheme :**

**Lectures: 4 Hrs/week**

**Examination Scheme :**

**Theory: 100 Marks**

**Objectives :**

- To learn and understand the Concepts of Software Engineering
- To apply the principles of Software Engineering for software development

**Unit I**

**(06 Hrs)**

Introduction To Software Engineering: Software, Software Myths, Process Framework, CMMI, Process Patterns, Process Assessment, Personal and Team Process Models, Process Models: Waterfall Model, Incremental Models, Evolutionary Models, Introduction to specialized Process Models, The Unified Process

**Unit II**

**(06 Hrs)**

**Software Engineering Practice :** The Essence of Practice, Core Principles, Communication Practices, Planning Practices, Modeling Practices: Analysis and Design Modeling, Construction Practice: Coding and Testing Principals, Deployment

**System Engineering :** Computer-Based Systems, Hierarchy: System Modeling and Simulation, Business Process Engineering, Product Engineering, System Modeling: Hatley-Pirbhai Modeling and Modeling using UML



**Unit III (06 Hrs)****Requirements Engineering**

Requirements Engineering Tasks, Initiating the process, Eliciting Requirements, Developing Use-Cases, Building The Analysis Model: Requirements Analysis, Data Modeling Concepts, Object-Oriented Analysis, Scenario-Based Analysis, Flow-Oriented Modeling, Class-Based Modeling, Creating a Behavioral Model

**Unit IV (06 Hrs)**

**Design Engineering :** Design Process and design quality, Design Concepts, The Design Model, Introduction to Pattern-Based Software Design

**Architectural Design :** Software Architecture, Data Design and Architectural Design

**User Interface Design :** Rules, User Interface Analysis and Steps in Interface Design, Design Evaluation

**Unit V (06 Hrs)**

**Project Management :** The Management Spectrum, The People, The Product, The Process, The W5HH Principle, Critical Practices

**Metrics for Process and Products :** Metrics in Process and Project Domains, Software Measurement, Metrics for Software Quality, Integrating Metrics within Software Process

**Estimation :** Software Scope and Feasibility, Resources, Decomposition Techniques, Empirical Estimation Models, The Make-Buy Decision

**Unit VI (06 Hrs)**

**Change Management :** Software Configuration management, The SCM Repository, The SCM Process

**Reengineering :** Business Process Reengineering, Software Reengineering, Reverse Engineering, Restructuring, Forward Engineering

**Text Books :**

1. Pressman R., "Software Engineering, A Practitioners Approach", 6th Edition, Tata McGraw Hill Publication, 2004, ISBN 007 - 124083 - 7

**Reference Books:**

1. Peters J. Pedrycz W., "Software Engineering : An Engineering Approach", John Wiley & Sons, 2000, ISBN 9971-51-309-9
2. Vliet H., "Software Engineering Princilpes and Practices", Second Edition, John Wiley and Sons, ISBN 9971-51-357-9
3. Ghezzi C., Jazayeri M., Mandrioli D., "Fundamentals of Software Engineering", Second Edition, Prentice Hall India, 2003, ISBN 81-203-2242-6
4. Behfarooz A., Hudson F., "Software Engineering Fundamentals", Oxford University Press, 2002, ISBN 0-19-510539-7



## 314451 : Software Laboratory

Teaching scheme :

Examination scheme :

Practical : 2 Hrs./week

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 features:
  - 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 In-charge should frame assignments based on the above topics. It is expected that there is variation between assignments to individual students. Students must submit the term-work in the form of a journal. Each assignment has to be well documented with problem definition, code documented with comments. The assignments will be documented using software-engineering principles. Staff in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignment

**Note :** The practical examination will be based on the assignments performed by the candidates as part of the term-work. Questions will be asked during the practical examination to judge the understanding of the students. It is expected that the candidate knows the theoretical aspect of the problem.



**314452 : Network Laboratory****Teaching Scheme :** **Examination Scheme :****Lectures : 1 Hr./Week** **Term work : 25 marks.****Practicals : 4 Hrs./Week** **Oral : 50 marks.****Objectives :**

- To study installation, maintenance and algorithm of network.

**Laboratory based on 314448 Computer Networks Technology**

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

- HTML and XHTML: Introduction, Basic Syntax, HTML Document structure, HTML Tags, Text formatting, Graphic Objects, Lists, Tables, Frames, Forms, Style Sheets, Prominent features of HTML Editor such as MS Front Page
- XML: Introduction, Syntax, XML Document structure, Document Type Definitions (DTDs), XML Schema, CSS and XSLT
- Introduction to client-side scripts using VBScript/JavaScript
- Active Server Pages (ASP) and PHP: Introduction, General syntax, Primitives, Operations, Expressions, Control statements, Arrays, Functions, Form Handling, Session Tracking, Cookies, Database Connectivity and Access
- Case Study of a Campus Network, design details, trouble shooting
- Demonstration of a protocol analyzer tool
- 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 addresses and share C drive on each machine. Test the network by using PING command. Use protocol analyzer Software. Repeat the assignment by installing two LAN Cards in one of the machines. Repeat the same assignment by adding a router. Configure the router and use RIP.
2. Study any protocol analyzer software (eg. LanExplorer) to learn and use its important features, Study of network monitoring software like ETHREAL 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 a report on it.
3. Installation and configuration of IIS /PWS/Apache server. Study and use various facilities/commands and features
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 commands and computer-to-computer communication using modem.



7. Study of Repeater, Hub, Switch and Router.
8. Download router simulator and configure routing protocol.
9. Windows socket programming using reliable transport protocol (TCP).
10. Windows socket programming using unreliable transport protocol (UDP).
11. Socket programming on UNIX/LINUX, UDP Client Server.
12. Socket programming on UNIX/LINUX, TCP Client Server.
13. Study of FTP and SMTP commands
14. Develop a simple Web based application. Use client-side and server-side scripting

### Mini Project

**Mini-Project:** Design and implement a small network of 4/6 nodes which includes layer 2 and 3 devices and verify the working of networks with various utilities. Student should have hands on experience of making and testing of cables.

Students should work in a group to develop an Interactive Database-driven Web based application using ASP, VB and Backend Database and use Software Engineering Principals 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 journal, which will include at least Eight assignments from 3 to 14 out of which 9th and 10th are compulsory. Study experiment are mandatory. Students must submit the term-work in the form of journal. Each assignment has to be well documented with problem definition, code documented with comments. Staff in charge will assess the assignments continuously and grade or mark each assignment on completion date.

**Note :** Oral examination will be based on the term work submitted by the candidate and the associated theory of the assignment



**314453 : Software Development Tools Laboratory****Teaching Scheme :****Examination Scheme :****Practical : 4 hrs/week****Term work : 50 Marks****Unit I : Visual Programming**

**Develop a miniproject based on the visual programming paradigm.**

The following exercises 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 application using C/ SDK with objectives of exposing students to concepts of a windows program, message loop and Event handler
2. Exploring VC++ 6.0 Environment - 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 windows MFC programming concepts - Document view architecture, MFC programming involving menus, dialog boxes, Basic Graphics Device Interface commands, toolbars, status bars, printing & print previewing.

**OR**

1. Write a simple Hello World application using Java swings or AWT with objectives of exposing students to concepts of GUI, and event handler
2. Explore either JAVA SDK or any other JAVA IDE like Eclipse

3. Write a simple AWT/Swings application to understand basic AWT/SWINGS concepts like MVC Architecture, menus, dialog boxes, Basic Graphics Device Interface commands, toolbars, status bars, printing & print previewing.

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

**Objectives of Unit II and Unit III :**

Students 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. Students will understand the choice of technologies available on client and server side.

**Develop a miniproject based on the Unit II and Unit III i.e. on a web based system.** The following exercises have been specified to give idea/prerequisite learning for the concepts required in defining the problem statement for a web based system

**Unit-II : Client Side Technologies**

1. HTML, HTML Forms, DHTML, Client side scripting.(VBScript OR Java script )
2. Components on Client side
  - a) Active X Controls
 OR
  - b) Java Applets

**Unit-III : Server side Programming**

1. CGI based options like CGI scripting languages such as PERL OR PYTHON etc.



2. Server side technologies
  - a) Java beans, Java servlets / JSP  
OR
  - b) ASP or ASP.NET, COM Controls on server side
3. An access to any Database on server side for simple data access.

#### Unit IV : Objective of Unit IV :

Introduction to Programming language 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 miniproject based on the language of your choice..** The following exercises have been specified to give idea/prerequisite learning for the concepts required in defining the problem statement for a small system.

- I. Introduction to Microsoft .NET - The Microsoft .NET platform, The .NET framework..
- II. C# class fundamentals - The type system, classes, method, Properties, Arrays, Indexes, Attributes, Interfaces.
- III. C# programming - Expressions and operators, program flow control, error handling with exceptions, operator overloading.
- IV. Delegates and event handlers - using delegates as callback methods, defining delegates as static members, delegate composition, defining events with delegates.

V. Querying Metadata with Reflection - The reflection API Hierarchy, the type class, working with Assemblies and Modules, late binding with reflection, creating and executing code at Run Time.

VI. Working with assemblies - Assembly overview, building assemblies, creating shared assemblies working with global assembly cache.

#### OR

I. Java fundamentals such as classes, packages, interfaces etc

II. Multithreading

III. Java Introspection

IV. Exception handling

V. Java I/O

VI. JDBC

1. Staff members should frame MINIPROJECTS based on concepts & topics mentioned above. College can choose between the Microsoft set of technologies OR Java technologies.
2. Mini project can be assigned from any one of the streams like System, Networking, Web Application, Desktop Gaming and etc.
3. HCI consideration: Understanding Users/Personas/ Scenarios/Orchestration and flow/navigation and Inflection/Task coherence/Improving data entry/ Retrieval look and feel/Metaphor/idioms/Afferdances/ Error Messages.



4. Mini project should be assigned to and developed by group of two or three students on any of the above streams, using all steps in Software Engineering.
5. Mini projects 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, ISBN 81-7853-012-0
2. David Schneider, "An Introduction to Programming Using Visual Basic 6.0", Prentice Hall, 1999, ISBN 0-13-936428-5
3. Tom Archer, "Inside C#", Microsoft press, ISBN - 81-7853 - 050-3
4. Herbert Schildt <<http://www.amazon.com/exec/obidos/search-handle-url/index=books&field-author=Herbert%20%20Schildt/102-7195375-0357736>> , "Java 2: The Complete Reference", Osborne publishing, 5th Edition.
5. Hans Bergsten <<http://www.oreillynet.com/cs/catalog/view/au/138>> , "JavaServer Pages", O'Reilly 3rd Edition, 2003 , ISBN: 0-596-00563-6,

#### 314454 : Seminar and Technical Communication

**Teaching Scheme :**

**Examination Scheme :**

**Practical : 2 Hrs**

**Term Work : 50 Marks**

Each student will select a topic in the area of Computer Engineering and Technology preferably keeping track with recent technological trends and development. The topic must be selected in consultation with the institute guide.

Each student will make a seminar presentation in the term making use of audio/visual aids for a duration of 20-25 minutes and submit the seminar report in the form of bound journal (two copies) duly signed by the guide and Head of department. Attendance at seminars for all students is compulsory.

A panel of staff members from the institute will assess the seminar internally during the presentation.

#### Format of the Seminar Report

- Title Page with Title of the topic, Name of the candidate with Exam Seat Number, Roll Number, Name of the Guide, Name of the Department, Institution and Year
- Seminar Approval Sheet
- Abstract
- Table of Contents, List of Figures, List of Tables and Nomenclature
- Introduction with section describing organization of the report
- Literature Survey
- Details of Analytical and/or experimental work, if any
- Discussions and Conclusions
- Acknowledgement
- References



**Guidelines for setting question paper at TE (Information Technology ) 2003 course to be effected from the academic year 2005 - 2006**

- 1) Since the syllabi of all the subjects in this curriculum is unitized in SIX units, equal weight age shall be given to all the units with respect to number of questions and allotted marks
- 2) Each paper shall consists of TWO sections viz. Section A and B. Units I through III shall be under Section A and Units IV through VI shall be under section B.
- 3) Every unit shall carry TWO questions with internal choice/option offered to the candidate as follows

**Section A**

Unit - I	Q. 1	OR	Q. 2	MARKS 16
Unit - II	Q. 3	OR	Q. 4	MARKS 16
Unit - III	Q. 5	OR	Q. 6	MARKS 18

**Section B**

Unit - IV	Q. 7	OR	Q. 8	MARKS 16
Unit - V	Q. 9	OR	Q. 10	MARKS 16
Unit - VI	Q. 11	OR	Q. 12	MARKS 18

( There will be Two questions of 16 marks and One question of 18 marks in each section. Flexibility may be adopted in above in which question shall be 18 marks).