T.E. (Information Technology Course) Part – I Proposed in 2010-11

Sub No.	Subject	Teaching Scheme		Examination Scheme				Marks Total
		Lect (Hrs/Week)	Pract	Theory	Term Work	Pract	Oral	
314441	Operating System	04	--	100	--	--	--	100
314442	Theory of Computation	04	--	100	--	--	--	100
314443	Computer Network Technology	03	--	100	--	--	--	100
310241	Database Management Systems	03	--	100	--	--	--	100
310253	Software Engineering	03	--	100	--	--	--	100
314444	Operating System Design Laboratory	--	04	--	25	50	--	75
314445	Information Systems Design Laboratory	01	04	--	25	--	50	75
314446	Network Laboratory	--	02	--	25		50	75
314447	Soft Skills Laboratory		02		25			25
Total		**18**	**12**	**500**	**100**	**50**	**100**	**750**
Total of Part I		**30 Hrs.**		**750 Marks**				

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

Sub No.	Subject	Teaching Scheme		Examination Scheme				Marks Total
		Lect (Hrs/Week)	Pract	Theory	Term Work	Pract	Oral	
314448	System Software Programming	04	--	100	--	--	--	100
314449	Management Information Systems	03	--	100	--	--	--	100
314450	Programming Paradigms	03	--	100	--	--	--	100
314455	Design and Analysis of Algorithms	04	--	100	--	--	--	100
314451	Human Computer Interaction & Usability	03	--	100	--	--	--	100
314452	Software Design Laboratory	01	04	--	50	50	--	100
314453	Software Devel. Tools Laboratory	--	04	--	50	--	50	100
314454	Seminar & Technical communication	--	02	--	50	--	--	50
Total		**18**	**10**	**500**	**150**	**50**	**50**	**750**
Total of Part II		**28 Hrs.**		**750 Marks**				
Total of Part – I & Part – II		**1500 Marks**						

Semester - I

Information Technology

2008 Course

314441: OPERATING SYSTEM

Teaching Scheme: **Examination Scheme:**
Lectures: 4 Hours/Week **Theory: 100 marks**

Prerequisites:

? Computer Organization (Subject Code : 214442)
? Fundamental of Data structures (Subject Code : 214441)

Objectives:

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

Unit I **Introduction** **8 Hrs.**

Architecture of OS (Ex. Monolithic, Microkernel, Layered ,Exokernel), Operating system objectives and functions, Virtual Computers, Interaction of O. S. & hardware architecture, Evolution of operating systems, Batch, multiprogramming. Multitasking, Multiuser, parallel, distributed & real -time O.S. ,System calls, O. S. Shell, Linux Shell commands , Shell programming, Awk programming.
Examples of O. S.: Linux , MS-Windows, Handheld OS .

Unit II **Process Management** **6 Hrs.**

Process , Process description, Process states, Process control, Threads, Processes and Threads, Uniprocessor Scheduling: Types of scheduling, Scheduling algorithms: FCFS, SJF, Priority, Round Robin, UNIX Multi-level feedback queue scheduling, Thread Scheduling, Multiprocessor Scheduling concept, Real Time Scheduling concept..

Unit III **Process Communication and Synchronization** **9 Hrs.**

Concurrency: Principles of Concurrency, Mutual Exclusion H/W Support, software approaches, Semaphores and Mutex, 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

Unit IV **Memory Management** **9 Hrs.**

Memory Management requirements, Memory partitioning: Fixed ,dynamic partitioning, Buddy System Memory allocation Strategies (First Fit, Best Fit, Worst Fit, Next Fit), Fragmentation, Swapping, Segmentation , Paging, Virtual Memory, Demand paging, Page Replacement Policies (FIFO, LRU, Optimal, clock) ,Thrashing, Working Set Model.

Unit V **I/O and File Management** **6 Hrs.**

I/O Management and Disk Scheduling: I/O Devices, Organization of I/O functions, Operating System Design issues, I/O Buffering, Disk Scheduling (FCFS, SCAN, C-SCAN, SSTF), Disk Caches.

File Management: Overview , File Organization and access , File Directories, File Sharing, Security issues, Record Blocking, Secondary Storage Management. Comparative study of Windows and UNIX file system.

Unit VI **Protection and Security** **5 Hrs.**

Computer security & protection: Security Threats, Attacks and assets, Intruders, Malicious softwares, Protection: Protection Policy and mechanisms, Authentications: Internal Access Authorizations, Implementations

Note: Every aspect of O.S. should be taught in comparison w.r.t. WINDOWS OS & UNIX OS

Text Books:

1. Stalling William, "Operating Systems 6th Edition, Pearson Education, ISBN 978-81-317-2528-3
2. Das Sumitabha," Unix Concepts and Applications", *3rd* Edition, Tata McGraw Hill, 2003, ISBN 0-07-053475-6.

Reference Books:

1. Milan Milenkovic "Operating Systems Concepts and Design ", ISBN 9780074632727, TMGH
2. Silbcrschatz A.,Galvin P., Gagne G.,"Operating System Concepts 8e",John Wiley and Sons,2003,ISBN 9812-53-055-X.
3. Andrew S. Tanenbaum ,Modern Operating Systems, 3/E, ISBN-13: 9780136006633, PHI
4. M. J. Bach, “The Design of The Unix Operating System”, ISBN: 978-81-203-0516-8, PHI.
5. Charles Crowley, “Operating Systems : A Design-oriented Approach” ISBN: 0074635514 TMH.

314442: THEORY OF COMPUTATION

Teaching scheme: **Examination Scheme:**
Lecturers: 4 Hours/Week **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:** **8 Hrs.**

Symbol/alphabets, string/word, language, formal language, natural and formal language

Basic Machine, Finite State machine: state tables, transition graph, acceptance and regection

Regular Expressions : Formal definition, Recursive definition of regular expression, regular set, identities of regular expressions. Languages associated with regular expression. Kleene closure.

Unit II **Finite automata(FA):** **10 Hrs.**

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

Unit III **Contexts Free Grammars and languages:** **10 Hrs.**

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 production; normal forms(ch0masky normal form and greibach normal form),Chomsky hierarchy.

Unit IV **Regular Grammar and CFL** **6 Hrs.**

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

CFL:

Properties,normal forms,etc.Pumping lemma of CFL, definition of/for CFl and application automata theory

Unit V **Push down automata(PDA)** **8 Hrs.**

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

Unit VI **Turning Machine:** **8 Hrs.**

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

Text Books:

1. Daniel I.A.Cohen,"Introduction to automata theory languages and computations", Pearson education asia,second edition
2. John C. martin," Introduction to language and theory of computation", TMH, 3rd edition.

Reference Books:

1. Hopcroft Ulman, "Introduction to automata theory, languages and computations", Pearson education Asia, 2nd edition
2. E V Krishnamurthy,"Introduction to Theory of Computer Science", EWP Second 2nd edition.
3. K.L.P Mishra,N.Chandrasekaran," Theory of computer science(automata, languages and computation)", Prentice hall india, 2nd edition

314443: COMPUTER NETWORK TECHNOLOGY

Teaching: Scheme:	**Examination Scheme:**
Lectures: 3 Hours/week	**Theory: 100 Marks**

Prerequisites: Data Communication (Subject Code: 214449)

Objectives: To learn the

1. Techniques of routing, network management
2. Services offered by transport and application layers
3. Introduction of High Speed Network

Unit I **Network Layer and Routing:** **6 Hrs.**

Network layer – I :

Design issues, packet switching, connectionless and connection oriented services, virtual circuit and datagram subnet, routing algorithms like adaptive and non-adaptive (2 each), congestion control algorithms and prevention policies, Load shading, jitter control, quality of service, internetworking.

Unit II **Network layer – II (Protocols) :** **8 Hrs.**

ARP, RARP, ICMP, IPv4, IPv6, Addressing schemes, Subnetting, Supernetting, CIDR, Unicast/multicast protocols, MPLS, VLAN, DHCP, Bootstrap, BOOTP

Unit III **Transport Layer:** **8 Hrs.**

Services and service primitives, socket and socket programming, Elements of transport protocols : Addressing, Connection establishing and releasing, Flow control and buffering, multiplexing and crash recovery, simple transport protocol, UDP : Introduction, header format RPC, TCP: introduction, model, protocol, header, connection establishing and release, connection management, transmission policy, congestion control, timer management, performance issue (concepts like : throughput, delay, bandwidth utilization, error rate, congestion and network reliability).

Unit IV **Application Layer :** **6 Hrs.**

Session layer services and protocols, Presentation layer services, WWW & HTTP, Persistent / non-persistent pipeline, FTP, TFTP, SMTP, POP3, IMPA, MIME, Domain name system (DNS) and DNS servers, Resource records, P2P, SNMP, Network management framework and it's infrastructure, MIB, SMI.

Unit V **Multimedia Networking:** **6 Hrs.**

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, Content Distribution Networks, scheduling and policing mechanism, integrated services, RSVP

Unit VI **Wireless and Broadband Network:** **6 Hrs.**

Basic overview of various technologies like wireless links-802.11, Bluetooth : basics and protocol stack, B-ISDN, Frame Relay: Architecture and layers, ATM: Cell format, Architecture, Layers, VCC, VPC, Fast Ethernet and Gigabit Ethernet : concepts and details

Text Books:

1. S. Tanenbaum : "Computer, Networks", PHI Publication, 4th edition, ISBN: 8178087855
2. James Kurose, Keith w. Ross," Computer Networking: A top down approach featuring the internet, Pearson Education, 2nd edition,2004, ISBN: 8178082470

Reference Books:

1. Behrouz A. Forouzan,"TCP-IP protocol suite ", Tata McGraw Hill Edition, 2nd edition, 2003, ISBN: 978007060004

310241: DATABASE MANAGEMENT SYSTEMS

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

Aim:
The course is designed for understanding database design and use of database management system in implementing database applications.

Objectives:
? To implement an entity relationship diagrams (ERD) to express requirements and demonstrates skills to model data requirements and create data models in to normalized designs
? To develop understanding of database systems theory in order to apply that knowledge to any particular database implementation using SQL
? To learn and understand various Database Architectures and Applications

Prerequisites:
- Discrete Structures
- Data Structures

Unit I **6 Hrs.**

Introduction to DBMS: Basic concepts, Advantages of a DBMS over file-processing Systems, Data abstraction, Database Languages, Data Models: Introduction to Hierarchical, Network, ER, and Object Relational Model, 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: Domain, Entity, Referential Integrities, Enterprise Constraints, Views, Schema diagram

Unit II **8 Hrs.**

Relational Query Languages: Relational Algebra

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 unctions, Nested Queries, Database Modification using SQL Insert, Update and Delete Queries, concept of Stored Procedures, Cursors, Triggers, assertions, roles and privileges

Programmatic SQL: Embedded SQL, Dynamic SQL.

Unit III **Relational Database Design:** **6 Hrs.**

Purpose of Normalization, Data Redundancy and Update Anomalies, Functional Dependencies: Basic concepts, closure of set of functional dependencies, closure of attribute set, canonical cover, Decomposition: lossless join decomposition and dependency preservation, The Process of Normalization: 1NF, 2NF, 3NF, BCNF, 4NF, 5NF.

Unit IV **6 Hrs.**

File Systems: File Organization, Organization of records in files, 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

Unit V **6 Hrs.**

Transaction Management: Basic concept of a Transaction, Properties of Transactions, 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

Unit VI **6 Hrs.**

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

Database Architectures: Centralized and Client-Server Architectures, 2 Tier and 3 Tier Architecture, Introduction to Distributed Database systems

Introduction to data mining using association rules, introduction to data warehousing and its components.

Text Books:

1. Silberschatz A., Korth H., Sudarshan S., "Database System Concepts", 4th Edition, McGraw Hill Publishers, 2002, ISBN 0-07-120413-X
2. Elmasri R., Navathe S., "Fundamentals of Database Systems", 4th Edition, Pearson Education, 2003, ISBN 8129702282

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. Connally T., Begg C., "Database Systems", 3rd Edition, Pearson Education, 2002, ISBN 81-7808-861-4
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
5. Atul Kahate, “Introduction to Database Management System”, 3rd Edition, Pearson Education 2009, ISBN 978-81-317-0078-5.

310253: SOFTWARE ENGINEERING

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

Objectives:

- ? To learn and understand the Concepts of Software Engineering
- ? To Learn and understand Software Development Life Cycle
- ? To apply the project management and analysis principles to S/W project development.
- ? To apply the design & testing principles to S/W project development.

Unit I **Introduction To Software Engineering** **6 Hrs**

Nature of Software, Software Process, Software Engineering Practice, software Myths, Generic Process model, Process Models: Waterfall Model, Incremental Models, Evolutionary Models, Concurrent, Specialized Process Models, Personal and Team Process Models, Agile Process models: Agile process, Extreme programming.

Unit II **Requirements Engineering** **6 Hrs**

Requirements Engineering, Initiating the process, Eliciting Requirements, Building The Requirements Model, Negotiating, Validating requirements, Requirements Analysis, Scenario-Based Analysis, Requirements Modeling strategies, Flow-Oriented Modeling, Class based modeling, **SRS.**

Unit III **Design Engineering** **6 Hrs**

Design Process, Design Concepts, The Design Model: Data Design, Architectural, interface Design Elements.

Architectural Design: Software Architecture, Architectural Styles, Architectural Design, User Interface Design: Rules, User Interface Analysis and Design, Applying Interface Design Steps, Issues, Web App Interface Design Principles

Unit IV **Testing Strategies** **6 Hrs**

A Strategic approach to Software Testing, Strategic Issues, Testing Strategy for Conventional Software and Object-Oriented Software, Testing strategies for Web App, Validation Testing, System Testing, Validation and Verification, Debugging.

Testing Tactics: Testing Fundamentals, White Box Testing: Basis Path Testing, Control Structure Testing, Black Box Testing.

Unit V **Project management Concepts** **6 Hrs**

Management Spectrum, people, product, process, project, critical practices, Process and project Metrics: Metrics in process and project domains, software measurement metrics for software quality, Estimation for software project: project planning process, software scope and feasibility, resources, Decomposition Techniques, Empirical Estimation Models, Estimation Empirical, Estimation for Object Oriented project , Specialized Estimation techniques, Make by decision.

Unit VI **Project Planning** **6 Hrs**

Risk Management: Reactive versus proactive Software Risk, Risk Identification, risk projection, risk refinement, risk mitigation, monitoring & management, The RMMM plan. Project Scheduling: Task set for Software project, defining a task network, scheduling, earned value analysis, Product Metrics: A framework for product metrices, Software Quality: Software Quality Factors, **Software configuration management**: software configuration management, the SCM Repository, SCM process.

Text Books:

1. Pressman R., "Software Engineering, A Practitioners Approach", 7th Edition, Tata MCGraw Hill Publication,2010, ISBN 978-007-126782-3

Reference Books:

1. Mall R., "Fundamentals of Software Engineering", Second Edition, Prentice Hall India, 2004, ISBN 81 -203-2445-5
2. Vliet H., "Software Engineering Princilpes and Practices", Second Edition, John Wiley and Sons, ISBN 9971-51-357-9
3. Sommerville “Software Engineering” 8th Edition, Person Education
4. Behfarooz A:, Hudson F., "Software Engineering Fundamentals", Oxford University Press, 2002, ISBN 0-19-510539-7
5. “ An Integrated Approach to Software Engineering”, Third Edition, Pankaj Jalote

314444 :OPERATING SYSTEM DESIGN LABORATORY

Teaching scheme:
Practical: 4 Hours/Week

Examination scheme:
Practical: 50 marks
Term work : 25 marks

Objectives:

? To Study the operating systems functioning and internals.

List of assignments

1 Shell programming **6 Hrs.**

A. Write a program to handle student data base with options given below,
a) Create data base. b) View Data Base. c) Insert a record.
d) Delete a record. e) Modify a record. f) Result of a particular student. g) Exit.

B. Menu driven program for
a) Find factorial of a no. b) Find greatest of three numbers c) Find a prime no
d) Find whether a number is palindrome e) Find whether a string is palindrome

C. Write shell program using command-line argument for
a. Finding biggest of three numbers
b. Reversing a number
c. Accept a number N and a word and print the word N times, one word per line
d. Sum of individual digits of a 4-digit number
(1234 -> 1+2+3+4=10)

2 AWK programming (Assignment A and B from shell programming) **6 Hrs.**

3 Implement following programs to exhibit UNIX Process Control **4 Hrs.**

A. Program where parent process sorts array elements in descending order and child process sorts array elements in ascending order.
B. Program where parent process Counts number of vowels in the given sentence
And child process will count number of words in the same sentence.

The above programs should use UNIX calls like fork, exec and wait. And also show the orphan and zombie states

4 Simulation of following CPU scheduling algorithms: **8 Hrs.**

a. FCFS
b. SJF (preemptive and non-preemptive)
c. Priority Scheduling (preemptive and non-preemptive)
d. Round Robin Scheduling

Any three in journal

5 Deadlock avoidance using Banker's Algorithm. **6 Hrs.**

6 Simulation of Memory allocation algorithms (First Fit, Best Fit , Next Fit) **6 Hrs.**

7 Simulation of Page replacement algorithms (FIFO, LRU, Optimal) **4 Hrs.**

8 Mutual Exclusion and Synchronization of threads using POSIX Semaphores and/or Mutex (Reader-Writer problem or Dinning philosopher problem) **4 Hrs.**

9 Inter-process Communication for Producer-Consumer problem in UNIX (Pipes or Shared Memory) **4 Hrs.**

10 Linux Kernel Compilation(Not in Practical Exam). Download a raw Linux Kernel(www.kernel.org) compile it and boot the machine through newly compiled kernel. **4 Hrs.**

Students must submit the term-work in the form of journal. Each assignment has to be well documented with problem definition, theory and code documentation. Staff in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.

Note :

1. The practical examination will be based on the above mentioned assignments. 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.
2. Assignments to be implemented using UNIX (Linux as a variant) Operating System.

Reference Books:

1. Unix Concepts and Applications By Sumitabha Das,ISBN 9780070635463,TMH
2. Beginning Linux Programming By Neil Matthew & Richard Stones,ISBN-978-81-265-1571-4,WILEY-INDIA.
3. UNIX Network Programming By Richard Stevens,ISBN-978-81-203-0749-0,PHI
4. UNIX Systems Programming Communication, Concurrency and Threads 2nd Edition, Kay Robbins, Steve RobbinsJun 2003, Hardback, 912 pages ISBN13: 9780130424112
5. SED and AWK Programming O'Rielly Publication, ISBN 97-881-73660-788

314445: INFORMATION SYSTEMS DESIGN LABORATORY

Teaching Scheme:	**Examination Scheme**
Practical: 4 Hours/Week	**Term Work: 25 Marks**
Theory: 1 Hour/Week	**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 a mini project.

Part I and Part II assignments are to be performed individually by the students. Where as Part III mini project is to be performed in the group of 3 as team work

Part I: Assignments on GUI Design using any front end (VB6, VB.NET, Java, Delphi or equivalent tool.**)**

1	Build a VB or VC application like basic calculator, editor, games etc. with the GUI design and VB or VC programming.	**4 Hrs.**
2	Build suitable GUI by using forms and placing controls on it for any application. (Ex. Students registration for FE admission, railway reservation, online ticket booking, new email user creation etc.). Proper data entry validations are expected.	**4 Hrs.**
3	Usage of MDI form for creating a menu and connecting other form.	**2 Hrs.**

Above exercises have been specified to give idea/prerequisite learning for the concepts required in defining the problem statement for a front end to a DBMS 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, 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).
Programming Components (Data types, variable declarations, control structures).
Overall program development life cycle (Form design, Control & events, packaging and deployment).

Part II: Study of SQL using RDBMS (Oracle/MySql/DB2/Sql Server)

(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. Mapping of ER diagram to schema design should be implemented at least up to 3NF)

1 ER/ERR Assignment

Design and draw an ER/EER diagram using standard notations for service industry (like Hospital, Airline, hotel, insurance, health case etc) and map this diagram into Database Tables. **2 Hrs.**

2 DDL/DML Assignment

a) Create Database Tables in RDBMS generated in problem 1. (Instructor should see that student's uses row level and table level integrity constraints, while creating tables) **4 Hrs.**

b) Use 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. **4 Hrs.**

c) 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.) **10 Hrs.**

3 PL/SQL assignments

a. Simple PL/SQL programs using the tables created. **2 Hrs.**

b. Write and execute Triggers. (Instructor will frame appropriate problem definition, so that students study different data types & variables, program control statements) **2 Hrs.**

Part 3: Miniproject on RDBMS and Front End development [16 Hours]

A groups of minimum 2 and maximum 3 students should be formed. This mini project is to done as a team activity.

The mini project will go through following phases:

i) Design the Database (use ER/EER diagrams and Normalization up to 3 NF if required)
ii) Create at least 5-6 tables using all types of possible constraints, and relationship (foreign key) between them.
iii) Populate the database using SQL insert/creating forms.
iv) Implement suitable functionality related to the project which involves proper data processing.

v) Create triggers and active elements to maintain the integrity of the database and perform appropriate action on database updates.
vi) Develop suitable User Interface using appropriate tools & languages.
vii) Generate at least 3-4 suitable data report related to the functionality of the system with proper heading sub headings and footers.
viii) Group of students should submit the Project Report which will be consist of Title of the Project, Abstract, Introduction, scope, Requirements, Entity Relationship Diagram with EER features, Data Dictionary, Relational Database Design, Database Normalization, Graphical User Interface, Source Code, VB Forms and Data Reports, Testing document, Conclusion.
ix) Students should take software engineering concepts in to consideration for above points. They must maintain a log book of the activities related to the projects.

Staff in charge will frame the mini project specification to be performed. There will be a variation between each group. Not more than two batches will have the same application or mini project.

Students will have a CD of the mini projects, containing exported table, programs, various diagrams drawn and other related material. Few sample system are given below.

? Performance appraisal system
? Employee Information System
? Human Resource monitoring system
? Administrations and Management of Policies for insurance agent.
? Hotel Occupancy monitoring
? Hospital staff database
? Payroll system in the college
? Passengers Database for airline industry
? Aviation Industry Information System
? Customers Feedback monitoring.
? Patients History database
? Sales Force Automation
? Marketing Info Systems
? Inventory Control Systems
? Online investment Management
? Cash Management System
? Attendance monitoring system
? Result analysis Information system

Examination

In 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 examiner will view the CD of the project group and assertion that more than two batches should not have same application. The candidates will be judged on the mini project as well as the oral exam, individually. Project group can create presentation while demonstrating their mini project and show their individual contribution to the development of the project.

Reference Books:

1. “Visual Basic 6 Programming”, Black Book DreamTeach Press
2. SQL and PL/SQL for Oracle 10g Black Book, Dr. P.S.Deshpande DreamTech Press
3. Visual Basic 6 Programming – Tata McgrawHill ,Content Development Group.
4. Urman S., Hardman R., McLAUGHLIN M., "PL/SQL Programming: Develop Database Driven PL/SQL Applications", Tata McGraw-Hill Edition, 2004, ISBN 0 -07 - 059779 - 0
5. Reese G., Yarger R., King T., Williums H., "Managing and Using MySQL", 2nd Edition, Shroff Publishers and Distributors Pvt. Ltd., ISBN 81 - 7366 - 465 - X
6. Norton P., Groh M., "Guide to Visual Basis 6", 1st Edition, Techmedia Publication, 1998, ISBN 81-7635-145-8
7. Sunderraman R, "Oracle 9i programming - a Primer", Pearson Education, ISBN 81 -297-0362-9
8. Rosenzweig B., Silvestrova E., "Oracle PL/SQL by Example", 3rd Edition, Pearson Education ISBN 81-297-0503-6

314446 :NETWORK LABORATORY

Teaching Scheme:
Practicals : 2 Hours/Week

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

Objectives:

? To study installation, maintenance of network Laboratory based on Computer Networks Technology (314443).

1 Basic TCP/IP utilities and commands. (eg: ping, ifconfig, tracert, arp, tcpdump, whois, host, netsat, nslookup, ftp, telnet etc…) **2 Hrs.**

2 Configure a router (Ethernet & Serial Interface) using router commands including access lists on any network simulator (eg. packet Tracer) **4 Hrs.**

3 Network design and implementation for small network using actual physical components with IP address scheme **2 Hrs.**

4 Network design & implementation for medium, large network using any network simulator with IP address scheme (CIDR). Eg VLAN Implementation **4 Hrs.**

5 Network analysis as well as packet header study with the help of any protocol analyzer/ packet sniffer. **2 Hrs.**

6 Installation of NS-2. Test network animation on Network Simulator2 (NS2). **4 Hrs.**

7 Socket Programming in C Language on Linux. **4 Hrs.**

a) TCP Client , TCP Server
b) UDP Client , UDP Server

8 Configuration of any three of the following of for each student **6 Hrs.**

a) Remote Login Service – TELNET/SSH
b) Configuration of FTP server and accessing it via FTP Client.
c) Installation and configuration of APACHE WEB SERVER / IIS / PWS along with HTTP server.
d) Installation and configuration of DHCP Server in Wireless Environment using an Access Point.
e) Installation and configuration of DNS Server.
f) Installation and configuration of Mail Server.

9 Case Study of existing College network with IP Address Scheme. **2 Hrs.**

Infrastructure Requirements:
College should procure few equipment for effective understanding of the concepts. It is expected that lab has networking components like router, switches, hubs etc.

Term Work:
Staff in-charge will suitably frame the above assignments and flexibility may be incorporated. Students will submit 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.

Examination:
Oral examination will be based on the term work submitted by the candidate and the associated theory of the assignment performed in the lab.

314447 : SOFT SKILLS LABORATORY

Teaching Scheme **Examination scheme**
Practical: 2 Hours/Week **Term work: 25 Marks**

Learning Objectives

- ? To help students develop their soft skills and equip them with the requisite skills to make their communication effective.
- ? To develop other skills this will make the transition from college to workplace, smoother and help them to excel in their jobs.
- ? To enhance students performance at placement interviews, group discussion and other recruitment process.
- ? Understand and participate in Group Discussions and related activities.
- ? Understand the basics of how to make an effective presentation.
- ? Learn the development of self-confidence.

Unit I **Soft skills Basics:**

What are soft skills? , global competition, hard skills (technical skills) versus soft skills, emotional intelligence, interpersonal skills, cross-cultural communication, motivation, leadership skills, decision making, negotiation skills, business etiquette, problem solving skills, conflict management, crisis management, social understanding, behaviors traits, teamwork.

Human values: Morals, values, ethics, integrity, work ethics, virtues, respect for others, caring, sharing, honesty, courage, cooperation, commitment, empathy, self confidence, challenges in work place, spirituality.

Unit II **Presentation Skills:**

Importance of Presentation Skills, 7 C's of Communication, Collecting Data, Voice & Picture Integration, Guidelines to make Presentation Interesting, Body Language, Voice Modulation, Audience Awareness, You and Your Audience, Presentation Plan, Visual Aids, Forms of Layout, styles of Presentation.

Unit III **Group Discussion:**

Group Discussion Basics, Nature of G.D, G.D and debate, importance of G.D, strategy of G.D, techniques for individual contribution, group interaction strategy. Points for GD Topics.

Unit IV **Interview Preparation:**

Interview process, characteristic of job interview, pre-interview preparation techniques, Preparing for the Interviews, frequently asked interview questions. Attending the Interview, Interview Process, Employers Expectations, General Etiquette, Dressing Sense, Postures & Gestures

Unit V **Seminar and Project report writing:**

Need of standard format for seminar and report. Process of selection of seminar topic, Writing abstract, approval, seminar report writing, printing and delivery of seminar.

Sequence of report (Abstract, certificate, list of tables, list of figures, acknowledgement, chapter, references). Guidelines for writing references of text book, journal paper, journal article, print document, e-books, internet document.

Unit VI **Other Skills**

Managing time, Meditation, Stress and stress management , Improving Personal Memory, Study skills that include Rapid reading, Notes taking, Complex problem solving, creativity, Model business letters and Effective Email communication

List of possible Assignments:

Faculty should frame at least 6 assignments based on the all units.

1 **Resume / Letter writing /Essay**

Write a personal essay and or resume or SOP (statement of purpose) which may include:

- ? Who am I (family background, past achievements, past activities of significance.)
- ? Strength and weakness (and how to tackle them)
- ? Personal Short-term Goals, long term goals and action plan to achieve them
- ? Self assessment on soft-skills

2 **Presentation Skills:**

Presenting a review to a group (Each student should be given 10 minutes to present his review)

- ? Book review (Any favorite book, which they read and summarize in 10-15 minutes about that book)
- ? Film review (Any favorite film, which they liked most and summarize in 10-15 minutes about that film)
- ? Biographical Sketch (sketch of a persons life)
- ? Any topic such as an inspirational story/personal values/beliefs/current topic

3 **Group Discussion**

- ? Group discussions could be done for groups of 5-8 students at a time for half so total need for two group discussions for each student of the batch will be required.
- ? Every student shall be given 15 minutes of presentation time & 45 minutes of discussion on his/ her GD topic.

4 Interview Skills

- ? Students participate in Mock Interviews conducted by faculty from same/other department.

5 Oral presentation

- ? Elocution, declamation, debate or extempore delivery within a group of 12-15 students.
- ? More stress should be given on proper body language, voice modulation etc.

6 Abstract/Synopsis writing

- ? Students should submit abstract/synopsis of the any seminar/project studied, along with the proper references

7 Activity Logs

- ? Find out how you really spend your time in a day.
- ? Activity logs help you to analyze how you actually spend your time. Check for amount of time that you waste.
- ? Learning from your log: Once you have logged your time for a few days, analyze your daily activity log.

Term Work:

Term work shall consist of a journal consisting of regular assignments and presentations completed in the practical class and at home, the total number of assignments should not be less than SIX, generally covering the topics mentioned above. As far as possible, submission should be word processed on a computer using a standard package by the student himself.

For the purpose of assignments, extensive use of research papers published in technical journals and articles published in magazines and newspapers may be made so that there is no repetition by the individuals.

Oral presentations exercises and group discussions should be conducted batch wise so that there is a closer interaction. Students should be sent to industrial visits for exposure to corporate environment.

Reference Books:

1. Krishna Mohan and Neers Banarge (1996), Developing Communication Skills, Macmillan India Ltd.
2. Bernice Hurst (1996), Handbook of communication skill, 2nd Edition, Kogan page
3. Susan Hodgson, Brilliant Answers to Tough Interview Questions, Pearson Education , ISBN13: 9780273714644, ISBN10: 0273714643
4. M Ashraf Rizvi , Effective technical communication, Mc-Graw Hill
5. TIME, How to Do Well in GDs and Interviews, 1/e, Pearson Education, ISBN - 9788131725542
6. R.S. Naagarazan, Professional ethics and human values, New Age international Publishers.

7. S. Taylor ,Model Business Letters, E-mails & Other Business Documents, 6th Edition, Pearson Education, ISBN13: 9780273675242,ISBN10: 0273675249
8. Dr. R. L. Bhatia, " Managing time for competitive edge"
9. Lorayne Lucas "Memory Book"- Classic Guide to Improving Your Memory at Work, at School and at Play, Random House Publishing Group, ISBN 0345337581 / 9780345337580 / 0-345-33758-1

Semester - II

Information Technology

2008 Course

314448: SYSTEM SOFTWARE PROGRAMMING

Teaching scheme: **Examination Scheme:**
Lecturers: 4 Hours/Week **Theory: 100 Marks**

Prerequisites:

- ? Computer Organization
- ? Data Structures and Files
- ? Microprocessor and Assembly Language.
- ? Theory of Computation

Objectives:

- ? To learn and understand fundamentals of Systems Programming .
- ? To design and develop various system software.

Unit I **Introduction to system software and Assembler :** **8 Hrs.**

Introduction to system software, need,
Components: Assembler, Macro processor, Compiler, Interpreter, Loader, Linker.
Assembler:
Elements of assembly language processing
A simple assembly scheme
Pass structure of Two Pass assembler
Design of II Pass assembler:
Processing of Imperative, Declarative and Assembler directives to be considered
Pass I along with data structures, Flowchart
Intermediate Code, Variants
Pass II flow chart/algorithm
Various data structures that can be used and their comparison
Concept Of Single Pass assembler: Backpatching,
Comparison of single & II pass Assembler.

Unit II **Macros** **8 Hrs.**

Macro definition and Call
Macro Expansion
Design of Macro Processor: Definition and expansion processing algorithms along with Data structures
Nested Macro calls: Call within a call and definition within a definition – Flow chart along with one example to be discussed.
C Preprocessor

Unit III **Compiler I:** **10 Hrs.**

Phases of compiler
Block Diagram
Discussion of simple assignment statement and the output generated by all phases by compiler
Lexical Analysis:
Finite Automata, Regular Expression, RE to DFA

Implementation of lexical Analyzer

Syntax Analysis

Context Free Grammars

Derivation of Parse Tress

Parsers

Top Down Parsers: Recursive Descent Parser, Predictive Parser

Bottom Up Parsing : Shift Reduce Parser, SLR parser

Unit IV **Compiler II :** **8 Hrs.**

Intermediate code formats

Postfix notation, Parse and syntax tress, Three address code, quadruples and triples

Quadruple generation for 1D and 2D arrays

Code optimization:

Machine Independent: Common Subexpression elimination, removing of loop invariants, Reduction in strengths.

Machine dependent Issues: Assignment and use of registers, Rearrangement of Quadruples for code optimization.

Issues of Code generation

Unit V **Loaders and Linkers:** **8 Hrs.**

Loader Schemes

Compile and Go Loader Scheme

General Loader Scheme

Absolute Loaders

Subroutine Linkages

Relocating Loaders

Direct Linking Loaders

Design of Absolute Loader

Design of Direct Linking Loader

Specification of Problem

Specification of Data Structures

Format of Data Bases

Algorithm/Flowchart

Dynamic linking

Other Loading Schemes: Binders, Linking Loaders, Overlays, Dynamic Binders.

Unit VI **System Software Development Tools :** **6 Hrs.**

Software tools for program development

Editors

Debug monitors

Programming Environment

User Interfaces

Lex and Yacc

Text Books:

1. John J Donovan ,"Systems Programming", Tata McGraw-Hill Edition 1991, ISBN 0-07-460482-1
2. D.M. Dhamdhere ,"Systems Programming and Operating Systems", Tata McGraw-Hill, ISBN-13:978-0-07-463579-7
3. E. Balgurusamy, "Programming in ANSI C", 4th Edition, Tata McGraw-Hill , ISBN 0-07-064822-0

Reference Books:

1. Leland L. Beck, "System Software An Introduction to Systems Programmming" 3rd Edition, Person Education, ISBN 81-7808-036-2
2. Alfred V. Aho, Ravi Sethi, Reffrey D. Ullman, "Compilers Principles, Techniques, and Tools", Addison Wesley, ISBN 981-235-885-4
3. John R. Levine, Tony Mason, Doug Brown, "lex & yacc", 1st Edition, O'REILLY, ISBN 81-7366-062-X.

314449: MANAGEMENT INFORMATION SYSTEMS

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

Prerequisites:

- ? Basics of management and their functions.
- ? Database management systems and its implementation.

Objectives:

- ? To learn and understand fundamentals of Information Systems.
- ? To learn and understand methodology and applications of MIS in manufacturing and service industry with the help of case studies.
- ? To learn how Information System supports in problem solving and managerial decision making.
- ? To learn current trends in electronic business.

Unit I **Introduction to Information System** **6 Hrs.**

Foundations of Information Systems: Need and objective of Information systems. Components and resources of information systems, Types of information systems: Operations support systems and Management support systems.

Management Information Systems: Definition, role and impact of MIS, Functions of the managers: planning, organizing, staffing, coordinating and directing, MIS as a support to the management

Management of Business: Concept of Corporate Planning, Essentiality of strategic planning, development of business strategies, types of strategies, MIS for Business Planning

Unit II **Decision Support Systems** **6 Hrs.**

Decision Support Systems (DSS): Concept and philosophy, Characteristics, Components of DSS, tools, Using Decision Support systems: What-if analysis, sensitivity analysis, Goal-seeking analysis, Optimization analysis, GDSS, programming languages for DSS

Data Warehouse in decision making, Data Mining for Decision support, Artificial Intelligent Systems, Knowledge Based Expert systems, GIS for decision making process.

Unit III **E-commerce** **6 Hrs.**

Electronic Commerce Systems (eCommerce): Introduction, scope, B2C, B2B and C2C, C2G, G2G, Essential e-Commerce processes, Electronic Payment Processes, m commerce, E-governance, basic principals and emerging trends.

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

Supply Chain Management: Role of SCM, Benefit, Challenges and

Trends in SCM

Unit IV **Applications of MIS** **6 Hrs.**

Applications in Manufacturing Sector: HR Management, Marketing Management, Finance Management, Materials Management and Marketing Management,

Applications in service: Banking, Insurance, Airline, Hotel, Hospital, Education

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

Unit V **Enterprise Management Systems** **6 Hrs.**

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

BPO Services: Business Process Outsourcing , What is BPO, Voice BPO, Inbound Call Center Services, Outbound Call Center Services, non-voice BPO, Scope of BPO, challenges in BPO management

ITES: Objectives of ITES, ITES Services and applications like Medical Transcription, Document Processing

Unit VI **Security and Ethical Challenges** **6 Hrs.**

Security and Ethical Challenges: Introduction, Ethical responsibility of Business Professionals, Cyber Crime, Hacking, Cyber Theft, Software Piracy, Patents, copy writes, Privacy issues, Health issues, cyber laws and Information Technology Act

Disaster management, System controls and audits, Contingency management and their solutions.

Global Management of Information Technology: Cultural, political and Geo-economic challenges, Platforms and Data access issues

Text Books:

1. O'Brien James , "*Management Information Systems*" , 7th Edition, Tata McGravv-Hill Publishing Company Limited, ISBN 0 - 07 – 0622003-2
2. Rober Schulthesis, Mary Sumner, "*Management information system*" , Tata McGraw-Hill Publishing Company Limited, 0.07.463879-3
3. Arpita Gopal, Chandrani Singh, "*E-world Emerging trends in Information Technology*", Excel Books, 978-81-7446-732-4

Reference Books:

1. KC Laudon, JP Loudon, "*MIS Managing digital firm, Person Education*" , 978-81317-1413-7
2. Jawadekar W., *"Management Information Systems*", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, 2002, ISBN 0 -07 - 044575 - 3

3. Lucas Henry C., "*Information Technology for Management*" Edition, Tata McGraw-Hill Publishing Company Limited, 2004, ISBN 0 - 07- 047242- 4
4. Post J, Anderson D., "*Management Information Systems*" 3rd Edition, Tata McGraw-Hill Publications, ISBN 0 - 07 - 049940 -3
5. Gupta L., "*Management Information Systems: A Managerial Perspective*", Galgotia, ISBN 81-7515-085-8
6. Brendan Read : *Designing the Best Call Center for Your Business*, 2nd Edition , CMP Book, ISBN 1578203139, 9781578203130

314450: PROGRAMMING PARADIGMS

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

Prerequisites:

- ? Data structures and Files.
- ? Theory of Computations.

Objectives:

- ? To understand the basic building blocks of programming Languages.
- ? To Learn and understand various programming paradigms.

Unit I **Introduction:** **6 Hrs.**

Role of programming languages, Need to study programming languages, Characteristics of Programming Languages, Programming language paradigms: Imperative, Object Oriented, Functional, Logic, Event Driven and Concurrent Programming, Language design issues, Language translation issues, Data Types: properties of Types and objects, Elementary data types, structured data types, Type conversion, Binding and binding times.

Unit II **Procedures:** **6 Hrs.**

Sequence Control: Implicit and explicit sequence control, sequencing with arithmetic expressions, sequencing with Nonarithmetic expressions, sequence control between statements.

Subprogram control: subprogram sequence control, attributes of data control, shared data in subprograms, different parameter passing methods, lifetime of variables, Storage management, Exceptions and exception handling. Desirable and undesirable characteristics of procedural programming. Case study of Pascal.

Unit III **Object Oriented Programming:** **8 Hrs.**

General characteristics for object based programming, Design Principles for object oriented programming, Implementing object oriented programming, desirable characteristics of object oriented programming.

Object Oriented Programming in Java :

Abstraction, Inheritance, Polymorphism, I/O, access specification, interfaces, packages, exception handling, multithreading, event handling.

AWT: working with windows, Graphics, Text, using AWT controls, layout manager and menus. Comparative study of C++ and JAVA.

Unit IV **Declarative Programming Paradigm:** **8 Hrs.**

Logic programming language model, logical statements, Resolution, Unification, Search structures, Applications of Logic programming. Case study of Prolog.

Applicative programming Paradigm:

Lambda calculus: Ambiguity, free and bound identifiers, reductions, typed lambda calculus, principles of functional programming. Case study of LISP

Unit V **Parallel Programming Paradigm :** **6 Hrs.**

Classification of computer architectures, principles of parallel programming, precedence graph, data parallelism, control parallelism, message passing, shared address space, synchronization mechanisms, mapping, granularity, compilers, operating systems.

Unit VI **Additional Programming Paradigms:** **6 Hrs.**

Data flow programming design principles, Database programming design principles, Network programming design principles, Socket programming in JAVA, Internet programming design principles, windows programming.

Text Books:

1. Roosta Seyed, "Foundations of Programming Languages Design & Implementation", 3rd Edition, Cenage learning. ISBN-13:978-81-315-1062-9.
2. Pratt T.W., Zelkowitz **"**Programming Languages : Design and Implementation **"**PHI, 2002, 3rd Edition.ISBN-81-203-1038-1

Reference Books:

1. Sebesta R. W., "Concepts of programming languages", Pearson Education 2001,4th edition.ISBN-81-317-0837-3.
2. Sethi Ravi, **"**Programming Languages: Concepts and Constructs**"** Pearson Education, ISBN: 9788177584226
3. Herbert Schildt " The Complete Reference Java2", 5th edition, Tata McGraw Hill, ISBN-13: 978-0-07-049543-2.

314455: DESIGN AND ANALYSIS OF ALGORITHMS

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

Prerequisites:

- ? Fundamentals of Data structures.
- ? Basic Algorithms ---Searching, Sorting, Graph based, structures. Basic math and probability knowledge required.

Objectives

- ? To know the basics of computational complexity analysis and various algorithm design paradigms.
- ? Provide students with solid foundations to deal with a wide variety of computational problems.
- ? To provide a thorough knowledge of the most common algorithms and data structures.
- ? To analyze a problem and identify the computing requirements appropriate for its solution.

Unit I **Introduction** **6 Hrs.**

Analysis of Algorithm Efficiency:- Analysis framework – Asymptotic notations – Analysis of Non-recursive and recursive algorithms. Amortized Analysis, Writing characteristic Polynomial equations, Solving Recurrence Equations, Proof Techniques: by Contradiction, by Mathematical Induction, direct proofs, proof by counterexample, proof by contraposition.

Unit II **Divide and Conquer and The Greedy Method** **6 Hrs.**

Characteristic; Analysis Methodology:- Merge sort – Quick Sort – Binary search – Large integer Multiplication and Strassen's Matrix multiplication- closest pair and convex Hull problems

The Greedy Method : General characteristics of greedy algorithms, Prim's and kruskal's Algorithms, Dijkstra's Algorithm, Huffman Trees.

Unit III **Dynamic Programming** **6 Hrs.**

General strategy, Principle of optimality, Warshall's and Floyd's Algorithm – Optimal Binary Search Trees – knapsack Problem

Unit IV **Backtracking** **6 Hrs.**

General method—Recursive backtracking algorithm, iterative backtracking method. 8-queens problem, sum of subsets and Graph coloring, Hamiltonian cycle and Knapsack Problem.

Unit V **Branch-Bound** **6 Hrs.**

The method, Least Cost Search, FIFO branch and bound, LC branch and bound. 0/1 Kanpsack problem –LC branch and bound and FIFO branch and bound solution. Traveling sales person problem.

Unit VI NP-Hard and NP-Complete Problems 6 Hrs.

Basic concepts, Non deterministic Algorithms, The classes of NP hard and NP complete, Cooks Theorem.

NP-Complete problems- Satisfiability problem, vertex cover problem.

NP-Hard problems-graph, scheduling, code generation problems, Simplified NP hard Problems.

Text Books:

1. Anany Levitin,'Introduction to the Design & Analysis of Algorithm Pearson ISBN 81-7758-835-4
2. Horowitz and Sahani, "Fundamentals of computer Algorithms", Galgotia. ISBN 81-7371-612-9

Reference Books:

1. Thomas H Cormen and Charles E.L Leiserson, "Introduction to Algorithm" PHI, ISBN: 81-203-2141-3
2. Gilles Brassard, Paul Bratley—Fundamentals of Algorithms , Pearson ISBN 978-81-317-1244-3

314451: HUMAN COMPUTER INTERACTION AND USABILITY

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

Aim :
This course is intended to expose the students to the concepts and practices of the human-computer interaction a multidisciplinary research field. The exposure has different purposes:

1. provide a broad understanding of the importance of human factors in developing an interactive system
2. introduce some of the popular methods used in designing for usability
3. illustrate practical applications of HCI designs.

Objective :
By the end of this course, a student will recognize the importance of human psychology in interface design process . Following are the some Objectives

1. To expose students to the central concepts of human-computer interaction.
2. To identify the main modes of human computer interaction.
3. To understand the role of ICT society.
4. To introduce students to techniques of user interface design, interaction paradigms, and current trends in HCI research and development.
5. To learn (and to apply) useful criteria for guiding the design and evaluation of user interfaces.
6. To identify key open problems in HCI and to discuss potential solutions.

Unit I **HCI introduction and basic concepts** **6 Hrs.**

Human input-output channels , human memory ,
Thinking - reasoning and problem solving
Good and poor design , What is interaction design , goals of interaction design
Models of interaction , ergonomics

Unit II **Interaction Design Basics** **6 Hrs.**

Interaction styles , elements of the WIMP Interface
Paradigms for interaction ,
The process of interaction design - Basic activities of interaction design , characteristics of interaction design process , practical issues lifecycle models for interaction design , life cycle models in HCI

Unit III **Design Process and Standards** **6 Hrs.**

HCI in the software process –Usability engineering life cycle ,
iterative design and prototyping, design rationale
Design Rules - Principles to support usability , standards, guidelines , golden rules and heuristics , HCI patterns , Multi-modal Interaction
Design for Diversity

Unit IV **6 Hrs.**

UI evaluation - What , why and when to evaluate , HutchWorld case study
Evaluation framework – evaluation paradigms and techniques, DECIDE evaluation framework
Web – Usability standards and guidelines

Unit V **Models and Theories** **6 Hrs.**

Cognitive models – hierarchical models, linguistic models,
Task analysis –Task decomposition, knowledge-based analysis, uses of task analysis
Dialogue notations and design – What is dialog , dialog design notations , diagrammatic notations
Modeling rich interactions – status event analysis , rich contexts **,**

Unit VI **Groupware** **6 Hrs.**

Groupware – groupware systems, computer mediated communication, frameworks for groupware , implementing synchronous groupware
Ubiquitous Computing – applications, virtual and augmented reality, information and data visualization

Text Books:

1. Alan J, Dix. Janet Finlay, Rusell Beale, "Human Computer Interaction", Pearson Education, 3rd Edition, 2004, ISBN 81-297-0409-9
2. Preece, Rogers, Sharp, “Interaction Design-beyond human-computer interaction”, WILEY-INDIA, ISBN 81-265-0393-9

Reference Books:

1. Ben Shneiderman, "Designing The User Interface", Pearson Education, 2001, ISBN 81-7808-262-4
2. Alan Cooper, Robert Reimann, David Cronin, “The Essentials of Interaction Design”, WILEY-INDIA, ISBN-10 81-265-1305-5
3. Wilbert O. Galitz, “The Essential Guide to User Interface Design”, WILLY, ISBN 81-265-0280-0

314452: SOFTWARE DESIGN LABORATORY

Teaching scheme:
Lecturers: 1 Hour/Week
Practical: 4 Hours/Week

Examination Scheme:
Practical : 50 Marks
Term Work : 50 Marks

Part A: System Software

1 Implementation of TWO Pass assembler with hypothetical Instruction set. Instruction set should include all types of assembly language statements such as Imperative, Declarative and Assembler Directive. While designing stress should be given on

a) How efficiently Mnemonic opcode table could be implemented so as to enable faster retrieval on op-code.
b) Implementation of symbol table for faster retrieval.

(Concepts in DSF should be applied while design)

2 Implementation of Macro Processor. Following cases to be considered

a) Macro without any parameters
b) Macro with Positional Parameters
c) Macro with Key word parameters
d) Macro with positional and keyword parameters.

(Conditional expansion , nested macro implementation not expected)

3 Regular Expression to DFA (To be taken from compiler point of view) The implementation to be done as per the algorithm covered in the book " Compiler – Design and Principles" By Aho – Ullman Sethi.

4 Lexical Analyzer for subset of C.

5 Recursive Descent parser for assignment statement.

6 Implementation of Calculator using LEX and YACC.

7 Screen Editor with following Features

i. Open an existing file
ii. Create and Save the current file.
iii. All cursor movements up, down, left, right arrow keys
iv. Delete and backspace keys.

8 Implementation of DLL.

Part B: DAA

Any two problems such as 8 queen, tower of Hanoi, Knapsack etc using different algorithmic strategy.

Staff In-charge should frame assignments based on the above topics. It is expected that this variation between assignments to individual students. Students must submit the term-work in the form of a journal at each assignment has to be well documented with problem definition, code documented \title 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.

314453: SOFTWARE DEVELOPMENT TOOLS LABORATORY

Teaching scheme:
Practical: 4 Hours/Week

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

Prerequisites:

- ? Knowledge of object oriented principles.
- ? Basics of database management systems

Objectives:

- ? To learn and understand fundamentals object oriented programming using core java
- ? To learn and understand client side programming of a small project.
- ? To learn and understand server side programming of a small project.

Unit I **Object oriented Programming using core java**

Develop mini-project in Core Java using any IDE. Following points should be covered

1. Object oriented programming Principle.
2. Effective Use of IDE and customization to improve productivity and accuracy.
3. add Set/ Get Methods,
4. Overriding methods from base class
5. Add equals() and Hashcode() methods.
6. Add constructors
7. Customization, commenting javadoc etc.

Unit II **Client Side Technologies**

Develop User interface using HTML and client side scripting JavaScript and simple Applets. Focus on changing the behavior of the pages and Form Validations through Client side scripting.
For this, reuse the mini project developed in core java in Unit I

Unit III **Server side Programming**

Develop a Server side mini-project using Servlets, JSP pages and the Java Beans. Preferably this mini-project should reuse the part of the mini project developed for Unit-I and Unit-II. Focus in this mini-project should be to understand

1. How to use an IDE environment for web application development
2. How to use tomcat through an IDE for running web applications.
3. HTTPRequest, HTTPResponse, Session etc.
4. Data persistence through JDBC

Text Books:

1. Jeff Friessen, "Beginning java 6 platform from Novice to Professional", Apress/Springer, 9788181288769
2. Kogent Learning Solutions Inc, "Web Engineering: HTML ,Javascript, PHP, Java, JSP, ASP.net, XML and Ajax", Wiley Black Book, 9788177229974
3. Gallardo, Burnette, McGrovern ," Eclipse in action: a guide for java Developers", Manning, 9788177224986

Reference Books:

1. Khalid A Mughal, "A programmer's guide to Java SCJP Certification",Third Edition, Pearson Education ,978-81-317-2688-4

314454: SEMINAR AND TECHNICAL COMMUNICATION

Teaching Scheme:	Examination Scheme:
Practical: 2 Hours/Week	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