Faculty of Engineering & Technology

Board of Studies in Computer Science & Engineering

Proposed Curriculum structure of T.E. (CSE)

Part – I **W.E.F. 2008-09**

Sr. No.	Subject Code	Subjects	Teaching Scheme (Hours/Week)		Examination Scheme (Marks)			
			Lecture	Practical	Theory	TW	Practical	Total
01	CSE/IT	Operating Systems	4	2	100	50	--	150
02	CSE /IT	Software Engineering	4	2	100	50	--	150
03	CSE/IT	Database Management Systems	4	2	100	--	50	150
04	CSE	Information Theory and Coding	4	--	100	--	--	100
05	CSE/IT	Programming in Java	4	2	100	--	50	150
06	CSE/IT	Software Development Laboratory – I (VB.NET)	--	2	--	--	50	50
		Total of I	**20**	**10**	**500**	**100**	**150**	**750**

Part – II

Sr. No.	Subject Code	Subjects	Teaching Scheme (Hours/Week)		Examination Scheme (Marks)			
			Lecture	Practical	Theory	TW	Practical	Total
07	CSE/IT	Computer Networks	4	2	100	50	--	150
08	CSE/IT	Design and Analysis of Algorithms	4	2	100	50	--	150
09	CSE/IT	Digital Image Processing	4	2	100	--	50	150
10	CSE	Formal Languages and Automata Theory	4	--	100	--	--	100
11	CSE/IT	Software Testing and Quality Assurance	4	2	100	--	50	150
12	CSE/IT	Software Development Laboratory – II (ASP.NET)	--	2	--	--	50	50
		Total of II	**20**	**10**	**500**	**100**	**150**	**750**
Total of I and II					**1000**	**200**	**300**	**1500**

Mrs. M. S. Joshi
Chairperson, B.O.S.
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Title of the subject: Operating Systems (OS)

Course Code: CSE/IT - ....

Teaching Scheme :
Lectures: 4 Hrs / week
Practical: 2 Hrs/ week

Examination Scheme :
Theory Paper: 100 marks (3 hrs)
Term Work: 50 marks

Objectives:

- To provide the students complete knowledge of Operating Systems principles.
- To have a clear understanding of OS design methodologies adapted by designers
- To study the design concepts with illustration to a few particular Operating Systems

Contents:

Unit 1: (8 hrs)

Introduction: Introduction to OS, OS as extended machine, OS as resource manager, History of OS:- first to fourth generation (simple batch system , time - sharing systems, Real-time systems, parallel systems, distributed system), OS concepts (Process , Files, Shell), System calls

Process Management:

The process model, process states, PCB (process control block), Threads

Process Synchronization:

Intercrosses communication (IPC), race condition, critical sections, mutual exclusion with busy waiting,

sleep & wake-up, semaphores, event counters, monitors, message passing, classical IPC problems:

Dining philosophers problem, Readers & Writers problems.

Unit 2: (8 hrs)

Process scheduling:

Round Robin scheduling, priority scheduling, multiple queues, shortest job first, policy driven

scheduling, two level scheduling

Memory management:

Memory management without swapping or paging, use of multiprogramming.

Swapping**:** Multiprogramming with fixed and variable partitions, memory management with bitmaps, linked lists and buddy system.

Allocation of swap space, Virtual Memory: Paging, segmentation.

Page Replacement Algorithms: Optimal page replacement, Not-Recently used page replacement, First-in-first -out, least recently used random page replacement.

Unit 3: (8 hrs)

Principles of I/O Hardware: I/O devices, Device controlling.

Principle of I/O software: Goals of I/O software, Interrupt handlers, Device drivers, device - independent I/O software, user space I/O software.

Deadlocks: Resources, deadlock modeling, the Ostrich algorithm, detection & recovery, deadlock prevention, deadlock avoidance (Banker's Algorithm)

Unit 4: (8 hrs)

RAM disks: RAM disks H/W & S/W , overview of RAM disk driver.

Disks: Disk H/W disk S/W (disk scheduling algorithms)

Terminals: Terminal H/W & S/W, Clocks H/W & clocks S/W

File System: The user view of the file system: Files, directories,
File system implementation: Implementing files with Contiguous, Linked list, index and index-nodes (UNIX), disk space management, Implementing directories, file storage, Directory structures, shared files, file system reliability, consistency & performance.

Unit 5: **(8 hrs)**

Security: security environment, flaws generic security attacks, user authentication, design principles of security.

Protection Mechanism: Protection domains, access control lists, capabilities, protection models

Case study: i) Windows NT: Introduction, MS-Windows & windows NT, History, architecture, features ii) LINUX: From the context of OS concepts

Text Books:

1. Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall
2. Andrew S. Tanenbaum, "Operating System Design & Implementation", Second edition, Pearson Education
3. Abraham Silberschatz, Peter Galvin, "Operating System Concepts", Fifth edition, Addison Wesley

Reference Books:

1. Garry Nutt, "Operating Systems A Modern perspective", Second Edition, Addison Wesley, 2000
2. Milan Milenkovic, "Operating System: Concepts & design" - TMH publication
3. William Stallings, "Operating systems", Prentice Hall, 1997
4. Deital H.M., "Operating Systems", Addison Wesley, 2001

Term Work

The term work shall consist of at least 10 experiments / assignments based on the above syllabus and

assessment of term work should be done as follows:

* Continuous lab assessment
* Actual practical performance in Laboratory
* Oral Examination conducted (internally) at the time of submission.

Suggestive list of experiments:

1. Simulate copy and more command
2. Simulating First-fit and Best-fit method of partitioned memory allocation
3. Simulate and performance measurement in Shortest Job First, First Come First Served and priority scheduling algorithms for processor scheduling.
4. Program illustrating deadlock detection.
5. Simulate and performance measurement in FIFO and LRU page replacement algorithm.
6. Program illustrating creation, Synchronization of processes. Use Fork, EXEC, WAIT system calls
7. Write TSR (Terminate and Stay Resident Program) illustrating concept of DOS interrupts.
8. Implementation and illustrating process/semaphore concept using Dining philosopher or Reader-writer problem.
9. Case study: Windows NT
10. Case study: LINUX

Title of the subject: Software Engineering (SE)

Course Code: CSE/IT ….

Teaching Scheme:

Lectures: 4 Hrs / week
Practical: 2 hrs/week

Examination Scheme:

Theory Paper: 100 marks (3 hrs)
Term Work: 50 Marks

Objectives:

To be aware of

- Different life cycle models, Requirement analysis process
- Analysis modeling and specification
- Architectural and detailed design methods
- Implementation and testing strategies
- Verification and validation techniques
- Project planning and management

Unit 1: **(8 hrs)**

The Product & the Process:

Software-characteristics, components, & applications, Software Myths, Process Framework, Software Process, Layered Technology, Capability Maturity Model, Software Process Models, Waterfall Model, Linear Sequential Model, Prototyping Model, RAD Model, Incremental Model, Fourth Generation Techniques, The Unified Process, Software Development Life Cycle.

Software Engineering Concepts:

Essence of Practices, Communication Practices, Software Phases, Planning Phase, Modeling Phase – Analysis & Design, Construction Phase – Coding & Testing, Deployment System Engineering, System Engineering, Information Engineering, Product Engineering.

Unit 2: **(8 hrs)**

Project Management Concepts:

The Management Spectrum, People, Problem, Process, Project, Software Process & Project Metrics, Software Scope, Resources, Software Project Estimation, Decomposition Techniques, Empirical Estimation Model.

Requirement Analysis: Concepts & Principles:

Requirement Analysis, Communication Techniques, Analysis Principles, Software Prototyping, Analysis Modeling, Data Modeling, Functional Modeling, Behavioral Modeling, Structured Modeling, Data Dictionary.

Unit 3: **(8 hrs)**

Design Concepts & Methods:

Design Process & Principles, Design Concepts, Effective Modular Design, Architectural Design, Interface Design, Procedural Design, Object Oriented Design, Unified Modeling Language (UML): Basic Notations , Class diagram , State diagram activity diagrams , Use-case diagrams sequence diagrams.

Unit 4: **(8 hrs)**

Coding:

TOP-DOWN and BOTTOM-UP structure programming, information hiding, programming style, and internal documentation, verification, metrics, monitoring and control.

Software Testing Methods:
Software Testing Fundamentals, Test Case Design, White Box Testing, Black Box Testing.

Unit 5: Software Quality Assurance: (8 hrs)
Quality Concept, Quality Movement, Formal Technical Review.
Re-engineering: Business Process Engineering, 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
2. K.K.Aggarwal , Yogesh Singh , "Software Engineering" , New Age International Publishers
3. Meilir Page-Jones- " Fundamentals of Object Oriented Design in UML" , Pearson Education
4. Ian Sommerville, "Software engineering", Pearson education, 6th edition.
3. Rajesh Prasad, Yogesh Sharma, Nihar Ranjan, Bhavna Tiple, "Software Engineering"

Reference Books:
1.Pankaj Jalote , "Software Engineering " , Narosa Publishing House.
2.Peters J. Pedrycz W., "Software Engineering: An Engineering Approach", John Wiley & Sons, 20007 ISBN 9971-5 1-309-9
3.Shari Lawrence Pfleeger, Joanne M Atlee , "Software Engineering", 3/e, ISBN-13: 9788131720981, Pearson

Term Work:
The term work shall consist of at least **One** detailed case study based on the above syllabus.

Students should work in a group (**minimum 2 to maximum 4 students per group)** to develop any one case study using Software Engineering Principles to develop the project and should submit necessary documents such as SRS, Design details, User interface, neatly documented code, testing methods etc.

Staff In-charge should frame assignments based on the above mentioned topics and ensure unique distribution of the same.

The assessment of term work should be done as follows:

* Continuous lab assessment
* Actual performance in the work
* Oral Examination conducted (internally) at the time of submission.

Suggestive List of Case Studies:
1. Insurance Management System.
2. Traffic Management and Analysis System.
3. Library Management System.
4. Railway Reservation System.
5. Blood Bank Management System.
6. Online Examination System.
7. Hospital Management System.
8. Pathology Lab Management System.
9. Time-table Management System.
10. Hostel Management System.
11. Yield Management in Agro based industry.
12. Whether Forecasting Management.

Title of the Subject: Database Management Systems (DBMS)

Course Code: CSE/IT –

Teaching Scheme:
Lectures : 4 Hrs/Week
Practical : 2 Hrs/Week

Examination Scheme :
Theory Paper : 100 Marls (3 Hrs)
Practical Exam. : 50 Marks (3 Hrs)

Objectives –

- To present an introduction to database management systems (DBMS)
- To give emphasis on how to organize, maintain and retrieve--efficiently, and effectively--information from a DBMS

Contents -

Unit 1: Introduction –the Database environment and Entity-Relationship model **(8 hrs)**
Purpose of database system, View of data-data abstraction, instances and schemas, Database Architecture, Database users, Data models-the E-R model, Entity sets, Relationship sets, Attributes, Constraints, E-R diagram, weak entity sets, Extended ER features-specialization and Generalization, Aggregation.

Unit 2: Logical database design -The relational model and Normalization **(8 hrs)**
Structure of relational model, Keys, Relational algebra operators, Mapping ER diagram to relational schemas, Functional dependencies, 3NF,BCNF and dependency preservation, multivalued dependency and 4NF,closure of functional dependencies, closure of attribute sets, canonical cover, lossless decomposition

Unit 3: Physical database design-Introduction to SQL, Object-oriented model **(8 hrs)**
Data definition, Set operations, aggregate functions, Views, Joined relations, nested sub queries, null values, recursive queries, integrity constraints, authorization., complex data types, structured types and inheritance in SQL, array and multiset types in SQL, object-identity and reference types in SQL.

Unit 4: Data and Database Administration and Client/server databases **(8 hrs)**
Creating a database, creating data dictionary, Managing data integrity, Managing password security and resources, Managing Users, managing roles, Centralized and client-server architectures.

Unit 5: Transaction management, Concurrency control and Recovery and Security **(8 hrs)**
Transaction state, ACID properties of transaction, Serializability, Two-Phase commit, Three Concurrency problem, deadlock, Statistical databases, and data encryption.

Text/Reference Books:

1. Abraham Silberschatz and Henry Korth, Sudarshan : "Database System Concepts", 4th Edition, ISBN : 0-07-120413-X, Tata McGraw-Hill.
2. Elmasri and Navathe : "Fundamentals of Data base Systems" (3rd Ed.), Addison-Wesley, 1999.

Practical Examination:

The term work shall consist of at least **8** experiments/ assignments based on the syllabus above.

The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.

Assessment of term work should be done at the time of practical examination which will consider the points below and the marks should be awarded accordingly.

* Continuous lab assessment
* Actually performing practicals in the laboratory during the semester

Suggestive List of Experiments –

1. Study of database administrative commands

The following points should be covered:-

1. Creating users
2. Managing passwords
3. creating and assigning roles
4. creating database
5. creating tablespaces

2. Creating Entity-Relationship diagram using case tool

3. Writing SQL statements using Oracle/ MySQL

The following tasks are to be covered under the topic:-

1. Writing basic SQL SELECT statements
2. Restricting and sorting data
3. Displaying data from multiple tables
4. Aggregating data using group functions
5. Manipulating data
6. Creating and managing tables
7. Including constraints
8. Creating views
9. Controlling user access
10. sub queries

4. Normalization in oracle

5. Creating forms and reports using oracle

6. Creating relationships and object-relational tables and queries using oracle

1. Studying collection types
2. Creating object tables
3. Creating tables using varray's and nested table types
4. Writing queries to retrieve data
5. Creating tables using reference type

7. Team project

(Form voluntary teams with 2 to 4 students per team.)

Design, implement, document and demonstrate a database system using Oracle/ MySQL.

Title of the subject: Information Theory and Coding (ITC)

Course Code: CSE ……

Teaching Scheme:
Lectures: 4 Hrs / week

Examination Scheme:
Theory Paper: 100 marks (3 hrs)

Objectives:

- To have a complete understanding of discrete sources
- To understand encoding and decoding of digital data streams, error-control coding.
- To introduce methods for cryptography
- To have a knowledge of compression techniques.
- To introduce the concepts of multimedia communication.

Contents-

Unit 1: Discrete Sources and Entropy (8 hrs)

Overview of Digital Communication and Storage Systems, Discrete Information Sources and /entropy, source coding, Dictionary Codes and Lempel-Ziv Coding, Arithmetic coding, Source Models and Adaptive Source Coding.

Shannon's Coding Theorems: Random coding, The average random code, A discussion of Shannon's

Second Theorem, Shannon-Fano Coding, Shannon's Noiseless-Coding Theorem.

Unit 2 Signals and Systems (8 hrs)

Introduction, Analog to digital conversion, Sampling theorem, Classification of signals, discrete time signals and systems, simple manipulation on discrete time signals, Input/Output description of system, classification of discrete time systems, interconnection of discrete time systems

Unit 3: Information Theory and Cryptography (8 hrs)

Cryptosystems, Attacks on Cryptosystems, Perfect Secrecy, Language Entropy and Successful Cipher-text Attacks, Computational security, Diffusion and Confusion, Product Cipher Systems, Codes, Public-key Cryptosystems, Data Encryption standard (DES), Keys and key Management.

Unit 4: Error Control Coding (8 hrs)

Coding for reliable digital transmission and storage, types of codes, error checking codes, error correcting codes, coding schemes, linear block codes, cyclic codes, error trapping, decoding for cyclic codes, convolution codes

Unit 5: Compression Algorithms (8 hrs)

Huffman coding, Adaptive Huffman Compression, Statistical Compression, Dictionary Based Compression, Sliding Window Compression, Speech Compression, RLE, Lossy Compression schemes, Image Compression using DCT.

Reference Books:

1. Richard B. Wells, "Applied Coding and Information Theory for Engineers", Pearson Education
2. Proakis J G, Manolikis D.G., "Digital Signal Processing: Principles, Algorithms, and Applications", PHI
3. Sayood, Khalid, "Introduction to Data Compression", Second edition, Morgan Kaufmann Publication
4. Bruce Schneier, "Applied Cryptography: Protocols, Algorithms and /source code in C, John Wiely
5. Simon Haykin, "Communication Systems", John Wiley and Sons, 4th Edition, 2001.
6. Ranjan Bose, "Fundamentals of Information Theory, Coding and Cryptography",

Title of the Subject : Programming in Java

Course Code: CSE/IT –

Teaching Scheme:
Lectures: 4 Hrs/Week
Practical : 2 Hrs/Week

Examination Scheme:
Theory Paper: 100 Marks (3 Hrs)
Practical Exam: 50 Marks (3 Hrs)

Objectives –

- To train the student for programming using true object oriented language-JAVA
- To train the students on the concepts of Swing, Applets, JDBC etc.

Contents -

Unit 1: (8 hrs)

Basics of Java: Java's importance to the internet, Java's Magic: The Byte Code, Java Buzzwords, Data types, basic syntax of Java

Classes in Java: Introduction to Methods, Constructors, This Keyword, Overloading Methods, Overloading Constructors, Using objects as Parameters, A closer look at argument passing, Returning objects, Understanding Static, Command Line Arguments.

Inheritance: Basics, Using Super, Method Overriding, Abstract methods and Class, Using Final with Inheritance, Packages, Importing Packages and Interfaces.

Unit 2: (8 hrs)

Exception handling: Fundamentals, Exception Types, Uncaught Exceptions, Using Try and Catch, Multiple Catch Clauses, Throw, throws, finally, Built-in Exceptions and creating your own Exception Sub Classes.

M**ultithreading:** Java Thread Model, The Main thread, Creating a Thread, Creating Multiple Threads, Using Alive ( ) and Join ( ),Thread Priorities, Synchronization, Interthread Communication, Suspending, Resuming and Stopping Threads.

Unit 3: (8 hrs)

Applets: An Overview of Applets, the Life Cycle of an Applet, creating applets, the Graphics Class, Using Colors, Displaying Text, Using Applets in a Web Page

JDBC: DBMS, RDBMS Concepts, Introduction to SQL, Basics of Database Connectivity, Introduction to JDBC, JDBC Architecture, Steps to create JDBC Application, JDBC Interfaces, classes and Exceptions

Unit 4: (8 hrs)

Event Handling:

Model View Controller, Event Classes, Event Listeners, Adapter Classes,
Intoduction to Abstract Window Toolkit (AWT),

Swing: Labels, Buttons, Canvases, Check Boxes, Choices, Text Fields And Text Areas, Lists, Panels, Windows and Frames, JApplet class, Menus And Menu Bars,

Unit 5: (8 hrs)

I/O Package:

Files and Directories, Overview of Codes and Streams, Buffered Character Streams, the Print Writer Class, Byte Streams

Servelets:

Introduction To Web Application Development, Server Side Programming, Introduction To Servelets, Servelet Lifecycle, Servelet With HTML, Server Side Includes, HTTP Tunneling, Servelets With JDBC, Steps to configure Tomcat for server

Text Books:

1. Herbert Schildt: "The Complete Reference Java2", 5th Edition TMH Publications.

2. Deitel & Deitel: “How To Program JAVA”, Pearson Education
3. E Balguruswamy: “Programming with Java- A Primer”, TMH

Reference Books :

1. Core Java Vol I and Vol II : Sun Microsystems Press

Reference websites:

1. www.java.sun.com/docs/books/tutorial

(Tools to be used –

JDK 1.2 onwards, TextPad / EditPlus, Eclipse 3.x, Tomcat 5.x, JBoss 4.x, Ant 1.6.x, Struts 1.2)

Practical Examination:

The term work shall consist of at least 10 experiments/ assignments based on the syllabus above.

The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.

Assessment of term work should be done at the time of practical examination which will consider the points below and the marks should be awarded accordingly.

* Continuous lab assessment
* Actually performing practicals in the laboratory during the semester

Suggestive list of experiments:

1. Design a simple class to represent Time
2. Design a class to demonstrate overloaded constructor in java
3. Design a program to display string array in sorted order
4. Design a class to demonstrate use of inheritance and interface
5. Design a class to create a package and use package in another class
6. Design a program to create user defined exception class
7. Design a class to read from keyboard and save data in file
8. Design a program to display digital clock in applet
9. Design a program to create logon form for user
10. Program to create list of images and display selected image in applet
11. Program to create a frame to enter details of student
12. Program to change background color of any swing component using scroll bar.
13. Program to create text editor for new, open and save functions.
14. Program to create free hand drawing tool using keyboard.
15. Program to demonstrate pop up menu.
16. Program to save student details in a database
17. Program to display student details in a frame
18. Program to create a simple client-server communication using RMI
19. Program to create a simple chat application between client- server using networking.
20. Program to create a Basic Servelet

Title of the subject: Software Development Lab –I (VB.NET)

Course Code: CSE/IT - ……

Teaching Scheme:
Practical: 2 Hrs/ week

Examination Scheme:
Practical Exam: 50 marks (3 hrs)

Objectives:

- To provide the students, complete knowledge of VB.NET programming principles.
- To provide a proper expertise on Software development using these techniques

Contents:

Windows forms, Components and Controls, MDI applications, Menus, Mouse and Keyboard events, using Timer, Collecting user Input using Buttons, Edit Text Boxes, Check Boxes, Radio Buttons, Combo Boxes, List box, Picture box, Tree view, creating user controls, File stream and Text IO operations, creating exe file to install project on any computer system.

Practical Examination:
The term work shall consist of at least 10 experiments/ assignments based on the syllabus above.

The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.
Assessment of term work should be done at the time of practical examination which will consider the points below and the marks should be awarded accordingly.

* Continuous lab assessment
* Actually performing practicals in the laboratory during the semester

Suggestive List of Experiments:

1. Study VB.Net Introduction.
2. Design form to create a calculator application
3. Design a logon form and validate it
4. Design a form to create digital clock
5. Design a form to select image from list and display it in the picture box
6. Design Traffic signal application
7. Design a form to open and save file using menus
8. Design a form to demonstrate windows explorer
9. Design a user control for logon form
10. Deployment of project

Title of the subject: Computer Networks (CN)

Course Code: CSE/IT - ……

Teaching Scheme :
Lectures: 4 Hrs / week

Examination Scheme :
Theory Paper: 100 marks (3 hrs)

Practical: 2 Hrs/ week Term Work: 50 marks

Objectives:

- To train the students on basic principles of Computer Networks.
- To learn the Networking concepts and methodologies.

Contents-

Unit 1- Introduction : **(8 Hrs)**

Overview of computer networks, Network hardware and software, Switches, routers, Reference model-OSI and TCP/IP and their comparison, Network layer – Network layer design issues, Various Routing algorithms and congestion control algorithms, Internetworking, The networking layer in the internet and in ATM network.

Unit 2- Transport Layer : **(8 Hrs)**

The Transport Service, Elements of Transport Protocols, Internet Transport Protocols, TCP and UDP, ATM AAL layer protocols, Performance issues.

Unit 3- TCP/IP : **(8 Hrs)**

The TCP/IP architecture, The Internet Protocols, Ipv6, User gram Protocol, DHCP and mobile IP, Internet protocols, Multi cast routing.

Unit 4- The Application Layer : **(8 Hrs)**

Network security – Principles of cryptography, Secret-key and Public-key algorithms, Authentication protocols, Digital scanners, Domain Name System –The DNS name space, Resource records, Name Servers, Simple Network Management Protocol – the SNMP model, Abstract syntax notation, Structure of management information, Managements information base, The SNMP protocol, Electronic mail-Architecture and services, The user agent, Message formants and message transfer, Email privacy, Usenet news, User view of Usenet
Implementation.

Unit 5- Multimedia Information and Networking: **(8 Hrs)**

Digital Representation of Analog Signals, Techniques for increasing compression, The Real-Time Transport Protocol, Session control protocols.

Text Books :

1. Andrew S Tanenbaum**, "**Computer Networks"**,** Third Edition, Prentice HI
2. Forozon , "Data Communication and Networking" , Tata McGraw Hill
3. William Stallings, "Local and Metropolitan Area Networks", 6/e, Pearson, ISBN-10: 8131720217

Term Work

The term work shall consist of at least 10 experiments/ assignments based on the above syllabus and assessment of term work should be done as follows:

* Continuous lab assessment
* Actual practical performance in Laboratory

* Oral Examination conducted (internally) at the time of submission.

Suggestive list of experiments:

1. Setting up a dial-up connection for internet access
2. Setting up of broadband connection,
3. Details of switches, its configuration, specifications and various products and different manufacturers
4. Design of a network for a computer lab
5. Study of wireless networks
6. Study of various internet providers along with the present plans available for different type of customers
7. Creating network cable using crimping tool

Title of the subject: Design and Analysis of Algorithms (DAA)

Course Code: CSE/IT –

Teaching Scheme:
Lectures: 4 hrs/week
Practical: 2 hrs/week

Examination Scheme:
Theory Paper: 100 marks (3 hrs)
Term Work: 50 Marks

Objectives:

- To study different methods to devise an algorithm
- To use computational complexity to analyze algorithms
- To develop an ability to encode a task into an optimum algorithm

Contents:

Unit 1: **(8 Hrs)**

Introduction and a brief review of Elementary Data Structures
Definition of an Algorithm, Algorithm specification, Performance analysis: -Space and time complexity, Asymptotic Notation, Practical Complexities, Performance Measurement, heap and heap sort, sets and disjoint set, Union, graphs, hashing.

Unit 2: **(8 Hrs)**

Divide and Conquer
General method of Divide and Conquer, Binary search, finding the maximum and minimum, merge sort, quick sort, Selection, Strassen's Matrix Multiplication.

Unit 3: **(8 Hrs)**

The greedy method: -
General method, Knapsack Problem, Tree vertex splitting, Job sequencing with deadlines, Minimum cost spanning trees, optimal storage on tape, optimal merge Patterns, Single sources shortest paths.

Unit 4: **(8 Hrs)**

Dynamic programming and Basic search and traversal techniques
The General method of Dynamic Programming, Multistage graphs, All Pairs shortest Paths, Optimal binary search trees, 0/1 knapsack, Reliability design, the traveling salesperson problem, Flow shop scheduling.

The techniques for binary trees, Techniques for graphs, connected components and spanning trees, Biconnected Components and DFS

Unit 5: **(8 Hrs)**

Backtracking and Branch and Bound technique,
The general method of backtracking, The 8- queens problem, sum of subsets,
Graph coloring, Hamiltonian cycles, Knapsack problem using backtracking.
The method of branch and bound, 0/1 knapsack problem, Traveling sales person problem using branch and bound.

Text Books:

1. E. Horowitz and S. Sahni, "Fundamentals of Computer Algorithms", Galgotia Pub

2. Aho, Hopcroft, Ulman, “The Design and Analysis of Computer Algorithms”, Addison Wesley

Term Work

The term work shall consist of at least 10 experiments/ assignments based on the above syllabus and

assessment of term work should be done as follows:

* Continuous lab assessment
* Actual practical performance in Laboratory
* Oral Examination conducted (internally) at the time of submission.

Suggestive List of Experiments:

Program development and analysis of following programs.

1. Implementing Stack and Queue.

2. Implementing heap sort.
3. Finding the maximum and minimum using divide and conquer method.
4. Implementing merge sort or quick sort using divide and conquer method.
5. Implementing Knapsack problem using greedy method.
6. Finding minimum cost spanning trees using greedy method.
7. Finding All Pairs shortest Paths.
8. Implementing traveling sales person problem using dynamic programming.
9. Finding shortest path for multistage graph using dynamic programming.
10. Implementing 8- queens problem using backtracking method.

Title of the Subject : Digital Image Processing (DIP)

Course Code: CSE/IT-

Teaching Scheme :
Lectures : 4 Hrs/Week
Practical : 2 Hrs/Week

Examination Scheme :
Theory Paper : 100 Marks (3 Hrs)
Practical Exam. : 50 Marks (3 Hrs)

Objectives –

- To train the student for Image processing fundamentals
- To train the students for processing using related software
- To train the students for color image processing

Contents -

Unit 1: **(8 hrs)**

Fundamentals of Image Processing: Image Acquisition, Image Model, Sampling, Quantization, Relationship between pixels and distance measurement, connectivity, Image Geometry, Photographic film. Histogram: Definition, Decision of Contrast biasing on histogram, Operations basing on histograms like image stretching, image sliding, Image classification. Definition and Algorithm of Histogram equalization

Image Transforms: A brief discussion on following transforms: Fourier Transform, DFT, FFT, WALSH Transformation, HADAMARD Transformation, DCT, Wavelet transform.

Unit 2: **(8 hrs) Image Enhancement** (by Spatial Domain Methods) Arithmetic and Logical operations, pixel or point operations, size operations) Smoothing filters – Mean, Median , Mode filters. Low pass filters, high pass filters, sharpening filters.

Image Enhancement: (by Frequency Domain Method) : Design of Low Pass, High Pass, Edge enhancement, Sharpening filters in frequency domain. Buffer Worth Filter, Homomorphic filters in frequency domain and spatial domain.

Unit 3: **(8 hrs)Image Compression:** Fundamentals: Coding redundancy, interpixel redundancy, psychovisual redundancy, Fidelity criterion: MSE, PSNR, Compression ratio, Losslesss compression: Variable length coding, LZW coding, Lossy compression: transform coding, wavelet coding, Image Compression standards,

File formats: bmp format, Graphics Interchange format, Tagged Image File Format

Unit 4: **(8 hrs) Image Segmentation:** Definition, Characteristics of segmentation, Detection of Discontinuities, Thresholding, Pixel based segmentation method, Region based segmentation methods – segmentation by pixel aggregation, segmentation by sub region aggregation, histogram based segmentation, split and merge technique, Watershed segmentation, Use of motion in segmentation (spatial domain technique only).

Unit 5: **(8 hrs)**

Morphological Image Processing: Dilation and erosion, Opening and closing, The Hit or Miss

transformation, Basic Morphological algorithms: Boundary extraction, region filling, Applications of Gray-scale morphology.

Color Image Processing: Color fundamentals, color models (RGB, CMY, HIS, YcbCr), Color transformations: formulation, color complements, color slicing, tone and color corrections.

Reference Books:

1. Rafael C Gonzalez, Richard E Woods, "Digital Image Processing", Pearson Education
2. Rafael C Gonzalez, Richard E Woods, Eddins, "Digital Image Processing using MATLAB", Pearson Education
3. Anil K Jain Publisher, "Fundamentals of Digital Image Processing", PHI
4. B Chanda & D Dutta Majumder, "Digital Image Processing and Analysis", PHI

Practical Examination:
The term work shall consist of at least 10 experiments/ assignments based on the syllabus above. It should consist of assignments on above topics using software like MATLAB/ Octave or any other software of similar nature.

The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.

Assessment of term work should be done at the time of practical examination which will consider the points below and the marks should be awarded accordingly.

- Continuous lab assessment
- Actually performing practicals in the laboratory during the semester

Suggestive list of experiments:

It should consist of programs/ assignments on above topics using software like MATLAB/ Octave/ DIPUM toolbox.

1. **Program to filter an image using averaging filter in spatial domain**
2. **Program to sharpen an image using high pass filter in spatial domain**
3. **Program for compressing an image using Huffman coding**
4. **Program for morphological operations- erosion, dilation, opening and closing**
5. **Program for Reconstructing image using morphological operations**
6. **Program to segment an image using Watershed technique**
7. **Program for segmentation using region growing method**
8. **Program for detecting edges in an image**
9. **Program for compression of image using wavelet transform**
10. **Program for enhancement of color image**
11. **Program for illustrating color image processing**
12. **Program for creation of watermarking**

Title of the subject : Formal Languages and Automata Theory (FLAT)

Course Code - CSE

Teaching Scheme: Theory: 4 Hrs/Week

Examination Scheme: Theory paper: 100 marks (3 hrs)

Objectives:

- To study abstract models of computations
- To create a background for design of compilers
- To be able to apply these models in practice for solving problems in diverse areas such as string searching, pattern matching and language design.

Contents:

Unit 1: Finite Automata (8 hrs)

Introduction to Finite Automata, Structural representation, Automata and complexity. The Central Concepts of Automata Theory, Deterministic Finite Automata, Nondeterministic Finite automata, FA with epsilon transitions, Applications of FA, FA with output : Moore and Mealy machine.

Unit 2: Regular Expressions and Languages (8 hrs)

Regular Expressions, Finite automata and Regular Expression, Algebraic laws for RE, Ardens theorem, Pumping lemma of Regular languages, Applications of pumping lemma, Closure and Design properties of regular languages, Equivalence and minimization of Automata, Applications of Regular Expressions.

Unit 3: Context Free Grammars and Languages (8 hrs)

Context Free Grammars, Parse trees, Applications of CFG, Ambiguity in grammars and languages. Properties of Context Free Languages: Normal Forms for CFGs , Pumping lemma for CFLs, Decision Problems involving context free languages..

Unit 4: Pushdown Automata (8 hrs)

Pushdown Automata – Definition, Languages of PDA, Equivalence of PDA's and CFG's (Grammar to PDA and PDA's to Grammars), Deterministic Pushdown Automata, Parsing and Pushdown Automata.

Unit 5: Turing Machine (8 hrs)

The Turing machine – Notation for TM, Instantaneous description for TM , Transition diagram for TM, The language of a TM. , TM and halting, Programming techniques for TM, Extensions to the basic TM: Multitape TM, Nondeterministic TM, TM and computers, Universal TM, Recursive and Recursively enumerable languages.

Text Books:

1. John E. Hopcroft , Rajeev Motwani , Jeffrey D. Ullman, "Introduction to Automata Theory Languages, and Computation" 3rd ed. , Pearson Education, ISBN: 81-317-1429-2

2. K.L.P. Mishra, N. Chandrasekaran, "Theory of Computer Science: Automata, Languages and Computation" 3rd ed. , PHI , ISBN : 978-81-203-2968-3

3. John C Martin, "Introduction to Languages and The Theory of Computation", 3rd ed. ,Tata McGraw Hill , ISBN : 0-07-066048-4

Title of the Subject : Software Testing and Quality Assurance (STQA)

Course Code: CSE/IT –

Teaching Scheme :
Lectures : 4 Hrs/Week
Practical : 2 Hrs/Week

Examination Scheme :
Theory Paper : 100 Marls (3 Hrs)
Practical Exam. : 50 Marks (3 Hrs)

Objectives:

- To identify correctness, completeness and quality of developed Software.
- To train students to create good test cases and improve the quality of software

Unit 1- Introduction to Basic of software testing & Terminology (8 hrs)
Quality Concepts, Quality Assurance, Quality Control, Necessity of testing, Objectives of testing, Software Development & Software Testing Life Cycle, Testing Standards:-IEEE, CMM, ANSI, Object – oriented testing, Web testing, GUI testing

Unit 2- Levels Of Testing (8 hrs)
Verification and Validation Model, Techniques of Verification:-Peer Review, Walkthrough, Inspection, Unit testing, Integration testing, Function Testing
System testing**:-**Installation Testing, Usability Testing, Regression testing,
Performance testing**:-**Load Testing**,** Stress Testing**.** Security testing**,** Volume testing
Acceptance testing**:-**Alpha testing, Beta testing, Gamma testing.

Unit 3- Testing methods and Testing tools (8 hrs)
Black Box methods**:-**Equivalence partitioning**,** Boundary-value analysis**,** Error guessing.
White Box methods**:-**Statement coverage**,** Decision coverage**,** Condition coverage.
Testing Tools:-Win Runner, Load Runner.

Unit 4- Test Planning & Documentation (8 hrs)
Testing Strategy**:-**type of project, type of software**.** Test Plans, Test Case, Test Data,
Risk Analysis.

Unit 5- Defect Management and Test Reporting (8 hrs)
Defect Reporting, Tracking Workflow, Test reporting.

Reference Books :
1. Dr. K.V.K.K. Prasad, “Software testing tools”, Dreamtech Publications
2. Rex Black, “Software testing “, Wrox Publications
3. Roger Pressman, “Software Engineering- a practitioners approach”, McGraw Hill
4. Boris Bezier, “Software testing techniques”, Dreamtech Publications
5. Ron Pattorn, “Software testing “, Tech Publications
6. Cem Kener , “Testing Computer Software”, Van Nostrand Publications

Reference Websites:
1. www.onestoptesting.com
2. www.wikipedia.org

(Tools to be used:
The practicals are to be conducted by using the following tools or any other tools of similar nature: Win runner 7.0/ Load runner/ Silk test 5.0/ QTP 6.4/ Test Director/ SQA 6.1.)

Practical Examination:
The term work shall consist of at least 10 experiments/ assignments based on the syllabus above.

The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record. Duration of examination is three hours.

Assessment of term work should be done at the time of practical examination which will consider the points below and the marks should be awarded accordingly.

* Continuous lab assessment
* Actually performing practicals in the laboratory during the semester

Suggestive list of experiments:

1. Study of Testing tools
2. Introduction to Win runner
3. Recording test in analog and context sensitive mode
4. Synchronizing test
5. Checking GUI Objects
6. Checking Bitmap Objects
7. Creating data driven test
8. Maintaining test script
9. Project (Creating test report)
10. Developing test cases for a particular task

Title of the subject: Software Development Laboratory-II (ASP.NET)

Course Code: CSE/IT ….

Teaching Scheme: **Examination Scheme:**

Practical: 2 hrs/week Practical Exam: 50 Marks (3 hrs)

Objectives:

- To Study website development using GUI environment.
- To develop programming skills with ASP.NET

Contents:

Unit 1: Introduction
Internet terminology, Web Server, Browser, Client Vs Server Side Scripting
Introduction to Java Script (Client Side Script) – Variables, Document Object Model, Functions, Event Handling.
Introduction to .NET framework, ASP.NET namespace hierarchy, Page life cycle, view state, postback, Ispostback property, HTML and Web Controls

Unit 2: Web Controls
Text Box, Label, Button, Link Button, Hyperlink Button, Image Button, List Box, Drop DownList, CheckBox, Radio Button, CheckBoxList, RadioButtonList, Panel

Unit 3: Validation Controls & Rich Controls
RequiredFieldValidator, RangeValidator, CompareValidator,
RegularExpressionValidator, CustomValidator and ValidationSummary
Rich Controls – Calendar Control, AdRotator Control

Unit 4: ADO.NET: Overview of ADO.NET, Advantages of ADO.NET, Connected and disconnected data access, Connection, Command, DataReader, DataAdapter, DataSet, DataTables DataGrid Control, DataList Control and Repeater Control

Unit 5: Passing Data between Pages & Web Services
Cache, Session, Context, QueryString, Post, Global.asax
Introduction to web services

Reference Books:

1. ASP.NET: Stephen Walther - Unleashed.

2. Asp. Net: The Complete Reference: TATA Mc GRAW HILL

Suggestive List of Experiments:

1. Online Test using Java Script with time limit.
2. Online Test using ASP.NET (Use View State, Panel, Textbox, Radio Button, Button etc.)
3. Design Sign Up form and validate User Name (Minimum 8 character Maximum 15 and only characters and under score), Password (Minimum 8 Characters) and Retype Password (Both should be same), Phone No(Only digits), Email-id etc.
4. Save Signup form information in Database.
5. Design a web page to display, add, delete & edit information from database.
6. Design a meeting scheduler using Calendar control.
7. Display Advertisements using adRotator Control
8. Create a simple web service i.e. Fahrenheit to Celsius conversion

And,

Mini Project (Compulsory):

Guidelines for Mini Project:

- Allow **minimum 2 to maximum 4** students per mini project group
- Take the topic from students in **first 15 days** from the start of the semester.
- Follow Software Development Life Cycle Phase for mini project development.

Mini Project shall follow the steps below:

1. Define the problem with specifications
2. Define the functionality of the project
3. Design a solution for the project
4. Implement the solution.
   (Also Keep a record of total number of man hours spent for the mini project.)
5. Present and evaluate the project.

The report of this Mini project is to be submitted in typed form with Spiral Binding. The report should have all the necessary diagrams, charts, printouts and source code. The work has to be done in groups.

The **suggestive format** of the report is as follows:
(Only one report should be submitted per group as a part of term work submission.)

Title of the Mini Project:
Names & Roll Nos of the students:
Name of the guide:
Chapter 1: Introduction
Chapter 2: Requirement specifications
Chapter 3: Design and implementation
(This chapter will include the entire design process with necessary DFDs, other diagrams, design methodologies and other design and implementation details.)
Chapter 4: Performance Analysis
(This chapter will include Testing and evaluation process. It should also mention about the method of testing used. It will include test case analysis with results. It should also indicate how better the designed system performs with tabular results.)
Chapter 5: Conclusions (This should include conclusion & future scope)

Practical Examination:

The term work shall consist of at least 5 **experiments based on the syllabus above.**

and a mini project. **The mini project may relate to any topic studied throughout the third year.**

The Practical Examination shall consist of writing and performing an experiment / assignment and oral based on the syllabus as per the journal record and the **mini project**. Duration of examination is three hours.

Assessment of term work should be done at the time of practical examination, which will consider the points below and the marks should be awarded accordingly.

- Continuous lab assessment
- Actually performance of practicals in the laboratory during the semester
- Mini project developed by the student