Shobhit
Institute of Engineering & Technology
Deemed to-be-University
EDUCATION EMPOWERS

Scheme of Teaching and Syllabi
For
Master of Computer Applications
(M.C.A. 2 yrs.)

Approved and adopted in year 2020 (Board of Studies, August 3, 2020)
by 23rd Academic council (Agenda no-3.2 f)

Department of Computer Science & Engineering

Scheme of Teaching

M.C.A. 1st Year

SEMESTER-I			
Subject Code	**Subject Name**	**L-T-P**	**Cr**
CSCA 501	Operating Systems	3-1-0	4
CSCA 503	Database Management System	3-1-0	4
CSCA 505	Analysis and Design of Algorithms	3-1-0	4
CSCA 507	Intelligent Systems	3-1-0	4
CSCA 509	Software Engineering	3-1-0	4
CSCA 551	DBMS Lab.	0-0-4	2
CSCA 553	Operating System Lab.	0-0-4	2
	TOTAL	**15-5-8**	**24**
SEMESTER-II			
Subject Code	**Subject Name**	**L-T-P**	**Cr**
CSCA 502	Data Warehousing and Data Mining	3-1-0	4
CSCA 504	Linux and X – Windows Programming	3-1-0	4
CSCA 506	Java Programming and Website Design	4-1-0	5
CSCA 508	Computer Networks	3-1-0	4
CSCA 510	Elective I	4-1-0	5
CSCA 552	Java Programming Lab.	0-0-4	2
CSCA 554	Linux And Network Admin. Lab.	0-0-4	2
	TOTAL	**17-5-8**	**26**

Scheme of Teaching
M.C.A. 2nd Year

SEMESTER-III			
Subject Code	**Subject Name**	**L-T-P**	**Cr**
CSCA 601	Object Oriented Software Engineering	3-1-0	4
CSCA 603	Distributed Operating System	3-1-0	4
CSCA 605	Advanced DBMS	3-1-0	4
CSCA 607	Elective II	3-1-0	4
CSCA 609	Elective III	3-1-0	4
CSCA 651	Object Oriented System Design Lab.	0-0-4	2
CSCA 653	Minor Project	0-0-4	2
	TOTAL	**15-5-8**	**24**
SEMESTER-IV			
Subject Code	**Subject Name**	**L-T-P**	**Cr**
CSCA 602	Dissertation	0-0-40	20
CSCA 604	Seminar and Progress Reports	0-0-20	10
	TOTAL	**0-0-60**	**30**

Elective I			
Subject Code	**Subject Name**	**L-T-P**	**Cr**
CSCA 510A	Multimedia Technologies	4-1-0	5
CSCA 510B	Microprocessors	4-1-0	5
CSCA 510C	Advanced Computer Architecture	4-1-0	5
Elective II			
Subject Code	**Subject Name**	**L-T-P**	**Cr**
CSCA 607A	Compiler Design	3-1-0	4
CSCA 607B	Introduction to E-Commerce &ERP	3-1-0	4
CSCA 607C	Security of Information System	3-1-0	4
CSCA 607D	Web Engineering	3-1-0	4
Elective III			
Subject Code	**Subject Name**	**L-T-P**	**Cr**
CSCA 609A	Management Information System	3-1-0	4
CSCA 609B	Neural Networks	3-1-0	4
CSCA 609C	Logic & Functional Programming	3-1-0	4
CSCA 609D	Operational Research	3-1-0	4
CSCA 609E	.Net Framework	3-1-0	4

SYLLABUS

Program Outcome :

1 Will demonstrate basic knowledge in computing discipline.

2 Will demonstrate the ability to design and conduct experiments, interpret and analyze data, and report results.

3 Will demonstrate the ability to design and develop software that meets the Software industry demands.

4 Capacity to analyze a problem, and identify and formulate the computing requirements appropriate to its solution.

5 Capacity to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.

6 Will demonstrate an understanding of their professional and ethical responsibilities.

7 Will be able to communicate effectively in both verbal and written forms.

8 Will have the confidence to apply engineering solutions in global and societal contexts.

9 Should be capable of self-education and clearly understand the value of lifelong learning.

10. Awareness of the need for and an ability to engage in continuing professional development.

11 An skill of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects.

Program Educational Objectives (PEOs) :

1. To prepare students for successful careers in Industry that meets the needs of Indian and multinational Companies.
2. To develop the ability among students to synthesize data and technical concept for application to project design.
3. To provide opportunity for students to work as part of teams on multidisciplinary projects.
4. To provide students with a sound foundation in the mathematical, scientific and technical foundations necessary to formulate, solve and analyze real life problems.

Operating Systems

CSCA 501	Cr	L	T	P
	4	3	1	0

Course Objectives

1. Recognize the concepts and principles of operating systems.
2. Provide comprehensive introduction to understand the underlying principles, techniques and approaches which constitute a coherent body of knowledge in operating systems.
3. To teach understanding how the various elements that underlie operating system interact and provides services for execution of application software.

Course Outcomes

CO1 Understand the basics of operating systems like kernel, shell, types and views of operating systems
CO2 Describe the various CPU scheduling algorithms and remove deadlocks.
CO3 Explain various memory management techniques and concept of thrashing
CO4 Use disk management and disk scheduling algorithms for better utilization of external memory
CO5 Recognize file system interface, protection and security mechanisms.
CO6 Explain the various features of distributed OS like UNIX, Linux, windows etc.

Course Content

Unit-I

Operating system concepts: OS definition and services; Types and features : batch systems, multiprogramming, multitasking, parallel systems, distributed systems, real-time systems, time-sharing systems, PC systems; System Calls types, System Programs

Unit-II

Process vs. Thread: process states, process control block; interprocess communication; Process Synchronization:, Classical problems of synchronization; CPU Scheduling: Criteria; Algorithms: FCFS, SJF, Priority, Round- Critical section problem and solution criteria, Semaphores Robin, Real-time.

Unit-III

Memory Management: Paging and Segmentation approaches, virtual memory, DemandPaging and Page Replacement algorithms; Deadlocks: necessary conditions, prevention, avoidance and recovery, banker's algorithm.

File management: File system Structure, allocation methods: Contiguous allocation, Linkedallocation, indexed allocation: free space management: Bit vector, linked list, grouping, counting: Directory implementation: Linear List, Hash table. Device Management: Disk structure, Disk scheduling:, Selecting Disk Scheduling algorithm.

Unit-IV

Devices, Virtual Devices; Device Characteristics-Hardware Consideration, Input or Output Devices, Storage Devices, Channels and Control Units, Independent Device Operation, Buffering, Multiple Paths, Block Multiplexing, Device Allocation Consideration, Secondary-

Storage Structure: Disk Structure, Disk Scheduling, Disk Management, Swap- Space Management, Disk Reliability, Stable-Storage Implementation

Unit-V

Information Management: Introduction, A Simple File System, General Model of a File System, Symbolic File System, Basic File System, Access Control Verification, Logical File System, Physical File System File-System Interface: File Concept, Access Methods, Directory Structure, Protection, Consistency Semantics File-System Implementation: File- System Structure, Allocation Methods, Free-Space Management, Directory Implementation, Efficiency and Performance, Recovery.

Reference Books:

1. Silbersachatz and Galvin, "*Operating System Concepts*", Pearson, 5th Ed., 2001
2. Madnick E., Donovan J., "*Operating Systems*", Tata McGraw Hill, 2001
3. Tannenbaum, "*Operating Systems*", PHI, 4th Edition, 2000

Database Management System

CSCA 503	Cr	L	T	P
	4	3	1	0

Course Objectives:
The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

Course Outcomes:
Upon successful completion of this course, students should be able to:
CO1:Describe the fundamental elements of relational database management systems
CO2:Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
CO3:Design ER-models to represent simple database application scenarios
CO4:Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
CO5:Improve the database design by normalization.
CO6:Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.

Course Content
Unit-I
Introduction: Concept & Overview of Database management system(DBMS), Comparison of DBMS with file processing system, Data Models- Entity-Relationship, Network, Relational and Object Oriented Data Models, Database Languages, Database Users, Three Schema architecture of DBMS, overall structure of DBMS. Entity-Relationship (ER) Model: Basic concepts, Design Issues, Mapping Constraints, Keys, Entity-Relationship Diagram, Weak Entity Sets, Extended E-R features.

Unit-II
Relational Database Design: Basic terminologies, integrity constraints, Functional Dependency, Different anomalies in designing a Database, Decomposition and its properties, Normalization using functional dependencies (1NF, 2NF, 3NF,BCNF), Normalization using multi-valued dependencies(4NF, 5NF).

Unit-III
Query Languages: Relational Algebra, characteristics and various operations, **Structured Query Language(SQL):** Characteristics of SQL, SQL data types and literals. Concept of Data definition language, Data manipulation language, Data Control Language. Basic Structure, Set operations, Aggregate Functions, Null Values, views, Sub-queries. Introduction to Tuple Calculus.

Unit-IV
Transaction Processing: Transaction system, Testing of serializability, recoverable schedule, Concurrency control, Locking techniques for concurrency control, Time stamping protocols for

concurrency control, Validation based protocol, Recovery from transaction failures, log based recovery, checkpoints, shadow paging, deadlock handling.

Unit-V

File Organization & Data warehousing: File & Record Concept, Fixed and Variable sized Records, Types of Single-Level Index. Data warehousing: Introduction, basic concepts, data warehouse architecture, various models, basic operations.

Reference Books:

1. Henry F. Korth and Silberschatz Abraham, "*Database System Concepts*", Mc.Graw Hill.5th edition, 2006.
2. Elmasri Ramez and Novathe Shamkant, "*Fundamentals of Database Systems*", Addision Wesley Publishing Company, 6th edition, 2010.
3. Ramakrishnan: "*Database Management System"*, McGraw-Hill, 3rd edition, 2007.
4. Date C J, "*An Introduction to Database System*", Addision Wesley, 8th edition, 2004.
5. Ivan Bayross, "*SQL, PL/SQL: The programming language with oracle*" BPB

Analysis and Design of Algorithms

CSCA 505	Cr	L	T	P
	4	3	1	0

Course Objectives

1. Analyze the asymptotic performance of algorithms.
2. Write rigorous correctness proofs for algorithms.
3. Demonstrate a familiarity with major algorithms and data structures.
4. Apply important algorithmic design paradigms and methods of analysis.
5. Synthesize efficient algorithms in common engineering design situations.

Course Outcomes

At the end of the course students will be able to :

1. Explain the time and space complexity of the algorithm.
2. Describe elementary data structure like binary search tree, Red Black tree, binomial, B tree and Fibonacci heap.
3. Compare between design techniques of algorithm like Divide and Conquer, Dynamic algorithm, Greedy algorithm, backtracking and Amortized algorithm.
4. Demonstrate different graph traversal algorithm like BFS, DFS, Prim's, Kruskal's, single source shortest path and all pair shortest path .
5. Examine different string matching algorithm like naïve string matching, robin-karp algorithm, kurth-morrispratt algorithm.
6. Distinguish between NP-hard and NP-completeness problem.

Course Content

Unit-I

Preliminaries: Review of growth of functions, Recurrences: The substitution method, The iteration method, The master method, Data Structures for Disjoint Sets.

Divide and Conquer Approach: Merge Sort, Quick sort, Medians and Order statistics, Strassen's algorithm for Matrix Multiplications.

Unit-II

Dynamic Programming: Elements of Dynamic Programming, Matrix Chain Multiplication, Longest common subsequence and optimal binary search trees problems.

Greedy Algorithms: Elements of Greedy strategy, An activity selection problem, Huffman Codes, A task scheduling problem.

Unit-III

Graph Algorithms: Representation of Graphs, Breadth First Search, Depth First Search, Topological Sort, Strongly Connected Components, Algorithm for Kruskal's and Prim's for finding Minimum cost Spanning Trees, Dijkstra's and Bellman Fort Algorithm for finding Single source shortest paths. All pair shortest paths and matrix multiplication, Floyd – Warshall algorithm for all pair shortest paths.

Unit-IV

String matching: The naïve String Matching algorithm, The Rabin-Karp Algorithm, String Matching with finite automata, The Knuth-Morris Pratt algorithm.

Unit-V

NP-Complete Problem: Polynomial-time verification, NP-Completeness and Reducibility, NP-Completeness Proof, NP-Complete problems.

Reference Books:

1. T. H. Cormen, C. E. Leiserson, R. L. Rivest, Clifford Stein, "*Introduction to Algorithms*", 2nd Ed., PHI, 2004.
2. A. V. Aho, J. E. Hopcroft, J. D. Ullman, "*The Design and Analysis of Computer Algorithms*", Addition Wesley, 1998.
3. Ellis Horowitz and Sartaz Sahani, "*Computer Algorithms*", Galgotia Publications, 1999.
4. D. E. Knuth, "*The Art of Computer Programming*", 2nd Ed., Addison Wesley, 1998

Intelligent Systems

CSCA 507	Cr	L	T	P
	4	3	1	0

Course Objective

To provide a strong foundation of fundamental concepts in Artificial Intelligence2.To provide a basic exposition to the goals and methods of Artificial Intelligence3.To enable the student to apply these techniques in applications which involve perception, reasoning and learning

Course Outcomes

At the end of the course students will be able to

CO1: Define the various searching techniques, constraint satisfaction problem and example problems- game playing techniques.
CO2: Classify AI techniques in applications which involve perception, reasoning and learning.
CO3: Demonstrate about AI techniques for knowledge representation, planning, uncertainty management and exploration methods.
CO4: Distinguish the knowledge of real world Knowledge representation, the modern view of AI as the study of agents that receive precepts from the environment and perform actions
CO5: Defend a real world problem for implementation and understand the dynamic behavior of a system. **CO6:** Formulate the machine learning techniques to design AI machine and enveloping applications for real world problems.

Course Content

Unit-I

Foundational issues in intelligent systems: AI History and Applications: Defining AI: Acting Humanly (Turing Test Approach), Thinking Humanly(Cognitive Modeling Approach), Thinking Rationally (laws of thought approach), Acting Rationally(Rational Agent Approach); Foundations of Artificial Intelligence; History of AI, AI techniques, Expert Systems.

Problem Solving by Search: Defining the problem as a State Space Search Strategies: Breadth – first Search, Depth- first search, Depth limited search , Iterative Depending depth first search. **Heuristic Search Techniques:** Hill Climbing, Simulated Annealing, Best First Search: OR Graphs, Heuristic Functions, A* Algorithm, AND –OR graphs, AO* Algorithm.

Unit-II

Knowledge Representation: Graphs, Frames structures and related structures, Semantic Nets and Partitioned Nets, Scripts, AI programming languages, Introduction to PROLOG, Production Rules, Knowledge Based systems, Inference engine, Forward deductions and backward deductions, Matching production rules against working memory.

Unit-III

Processing and understanding Natural Languages: Understanding Natural Languages: Applications of Natural Languages, Natural Language processing, Parsing techniques: Rules of parsing, Top down parsing, Bottom up parsing, Transformational grammars, Context free grammar, Transition networks, Fillmore's grammars, Shanks Conceptual Dependency.

Unit-IV

Expert System: Existing Expert Systems (DENDRAL, MYCIN), Architecture of expert system, Features of Expert system, Genetic algorithm, Fuzzy logic, Neural Networks, Intelligent Agents, Meta Knowledge, Expertise Transfer, Self Explaining System, User and expert systems.

Unit-V

Pattern Recognition: Introduction to Pattern Recognition, Structured Description, Symbolic Description, Machine perception, Line Finding, Interception, Semantic & Model, Object Identification, Speech Recognition.

AI **Progrmming Languages(PROLOG):** Introduction, How Prolog works, Backtracking, CUT and FAIL operators, Built –in Goals, Lists, Search in Prolog.

Reference Books:

1. Elaine Rich, Kevin Knight and Shivashankar B. Nair, "*Artificial Intelligence*", Tata McGraw-Hill, Third edition, 2009.
2. Char Nick, "*Introduction to Artificial Intelligence*", Addision Wesley, 2007.
3. Stuart Russell and Peter Norvig, "*Artificial Intelligence: A Modern Approach*"", Prentice Hall, Third Edition, 2010.
4. Patrick Henry Winston and Berthold Horn, "*LISP*", Addison Wesley, Third Edition, 2010.
5. Marcellous, "*Expert Systems Programming*", Prentice Hall Inc., Third Edition, 2009.
6. Elamie, "*Artificial Intelligence*", Academic Press, Third Edition, 2007.
7. Dan W. Patterson, "*Artificial Intelligence and Expert Systems*", PHI Learning Private Limited, Third Edition, 2009.

Software Engineering

CSCA 509	Cr	L	T	P
	4	3	1	0

Course Objectives

The program will prepare our students to be successful professionals in the field with solid fundamental knowledge of software engineering.

1. Be successful professionals in the field with solid fundamental knowledge of software engineering
2. Utilize and exhibit strong communication and interpersonal skills, as well as professional and ethical principles when functioning as members and leaders of multi-disciplinary teams
3. Apply their foundations in software engineering to adapt to readily changing environments using the appropriate theory, principles and processes

Course Outcomes

At the time of graduation, all Software Engineering students will have demonstrated:

CO1:How to apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment

CO2: An ability to work in one or more significant application domains

CO3: Work as an individual and as part of a multidisciplinary team to develop and deliver quality software

CO4: Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle

CO5: Demonstrate an ability to use the techniques and tools necessary for engineering practice

Course Content

Unit-I

Introduction to Software Engineering, Software Components, Software Characteristics, SoftwareCrisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary

Development Models, Iterative Enhancement Models.

Unit-II

Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS. Software Quality Assurance (SQA): Verification and Validation,

Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, COCOMO-II, Putnam resource allocation model, Risk Management.

Software Design: Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design.

Unit-III

Software Metrics: Software measurements: What & Why, Token Count, Halstead Software Science Measures, Design Metrics, Data Structure Metrics, Information Flow Metrics.

Software Reliability: Importance, Hardware Reliability & Software Reliability, Failure and Faults, Reliability Models, Basic Model, Logarithmic Poisson Model, Software Quality Models, CMM & ISO 9001.

Unit-IV

Software Testing: Testing process, Design of test cases, functional testing: Boundary value analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing, Path Testing, Data flow and mutation testing, Unit Testing, Integration and System Testing, Debugging, Alpha & Beta Testing, Testing Tools & Standards.

Unit-V

Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering. Software Configuration Management Activities, Change Control Process, Software Version Control, An Overview of CASE Tools. Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management.

Reference Books:

1. K. K. Aggarwal & Yogesh Singh, "*Software Engineering*", 2nd Ed., New Age International, 2005.
2. R. S. Pressman, "*Software Engineering – A practitioner's approach*", 5th Ed., McGraw Hill Int. Ed., 2001.
3. Stephen R. Schach, "*Classical & Object Oriented Software Engineering*", IRWIN, 1996.
4. James Peter, W. Pedrycz, "*Software Engineering: An Engineering Approach*", John Wiley & Sons.
5. I. Sommerville, "*Software Engineering*", Addison Wesley, 2002.

DBMS Lab.

CSCA 551

Cr	L	T	P
2	0	0	4

1. Create a database and write the programs to carry out the following operation
2. Add a record in the database,
3. Delete a record in the database,
4. Modify the record in the database
5. Generate queries, Generate the report, List all the records of database in ascending order.,
6. Develop a menu driven project for management of database system:, Library information system: Engineering,, MCA, 2. Inventory control system , Computer Lab, College Store, , Student information system, Academic, Finance , Time table development system, CSE, IT & MCA Departments , Electrical & Mechanical Departments
7. Function
   Usage of S/w:
   1. VB, ORACLE and/or DB2
   2. VB, MSACCESS
   3. ORACLE, D2K
   4. VB, MS SQL SERVER 2000

Operating System Lab.

CSCA 553

Cr	L	T	P
2	0	0	4

Study of WINDOWS 2000 Operating System.
Administration of WINDOWS 2000 (including DNS, LDAP, Directory Services)
Study of LINUX Operating System (Linux kernel, shell, basic commands, pipe & filter commands).
Administration of LINUX Operating System.
Writing of Shell Scripts (Shell programming).
Programming for CPU Scheduling algorithms
.

Note: At least 5 to 10 more exercises to be given by the teacher concerned.

Data Warehousing and Data Mining

CSCA 502 **Cr L T P**

Course objective:

1. To understand data mining principles and techniques.
2. To introduce DM as a cutting edge business intelligence method and acquaint the students with the DM techniques for building competitive advantage through proactive analysis, predictive modeling, and identifying application and new trends in data mining.

Course outcomes (CO):

At the end of course, Students will be able to **4 3 1 0**

CO1: Describe the basic concepts and techniques of Data Warehouse and Data Mining.
CO2: Demonstrate the gathering and analysis of large sets of data to gain useful business understanding.
CO3: Differentiate the data generalization and frequent pattern mining that can be discovered by association rule mining,
CO4: Explain the classification, clustering and prediction in Data mining.
CO5: Identify business applications and trends of data mining.

Unit-I

Introduction: What is Data Mining, Data Mining Functionalities, Classification of Data Mining Systems, Major Issues in Data Mining. Data Preprocessing: Needs Preprocessing, Descriptive Data Summarization,Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

Unit-II

Data Warehouse and OLAP Technology: What is Data Warehouse, A Multidimensional Data Model, Data Warehouse Architecture and Implementation, from Data Warehousing to Data Mining.Mining Frequent Patterns, Associations Rules: Basic Concepts, Efficient and Scalable Frequent Item Set Mining Methods, Mining Various kinds of Association Rules.

Data Processing: Requirement for pre processing, Data Cleaning and its various techniques, Data Integration and Transformation, Data Reduction:- Data Cube Aggregation, attribute subset selection, Numerosity Reduction, Concept hierarchy generation. Attribute oriented induction Concept Description and Data Generalization, implementation of AOI, Mining Class comparisons. Mining frequent patterns, A priori Algorithm, F P Growth, Mining various kind of Association rule: correlation analysis,.

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Unit-III

Classification and Predictions: Basics and issues regarding Classification & Prediction, Classification by Decision tree induction, Bayesian Classification, Rule- based Classification, Classification by Back propagation; Multilayer feed-forward Neural Network, Back-propagation Algorithm, Classification methods K-nearest neighbor classifiers, Genetic Algorithm, constraints based mining, accuracy and error measure.

Unit-IV

Cluster analysis: Requirement of clustering in data mining, Data types in cluster analysis, Categories of clustering methods, partitioning methods: K-mean and K- mediods. Hierarchical Clustering: agglomerative and divisive clustering, BIRCH, and Chameleon. Density Based Methods-DBSCAN, OPTICS. Grid Based Methods- STING, CLIQUE. Model Based Method – expectation- maximization, Outlier Analysis: statistical distribution method, distance based method.

Unit-V

Applications and Trends in data mining: Benefits of data mining, Data Mining Applications: in retail industry banking and finance, and telecommunication industry Social impact on data mining,, data mining interfaces.

Reference Books:

1. Jiawei Han, Micheline Kamber,"*Data Mining Concepts & Techniques*" Elsevier, 2nd edition 2010.
2. M.H.Dunham, "*Data Mining :Introductory and Advanced Topics*", Pearson Education,1st edition ,2007.
3. Sam Anahory, Dennis Murray, "*Data Warehousing in the Real World : A Practical Guide for Building Decision Support Systems* ", Pearson Education, 1st edition, 2008.
4. Pieter Adriaans, Dolf Zantinge, " *Data Mining*", Pearson Education, 4th edition,2009.

Linux and X-Windows Programming

CSCA 504

Cr	L	T	P
4	3	1	0

Course Objectives

1. To understand and make effective use of linux utilities and shell scripting language tosolve problems
2. To implement in C some standard linux utilities like mv,cp,ls etc.
3. To Develop the skills the necessary for systems programming including file system programming, process and signal management and interprocess communication

Course Outcomes

CO1:Students will be able to understand the basic commands of linux operating system and can writeshell scripts
CO2:Students will be able to create file systems and directories and operate them
CO3:Students will be able to create processes background and fore ground etc..by fork() system calls
CO4:Students will be create shared memory segments, pipes ,message queues and can exercise interprocess communication

Course Content

Unit-I

Introduction – Short History - Why is Linux So Successful?- UNIX Flavors - BSD, SysV, Linux - Standards - System Architecture - The Kernel - The Shell - Utilities - Tools and Applications - **Linux Programming Security** – Users and Groups - PUID & PGID - Real and Effective IDs - Authenticating Users - File System Permissions.

Unit-II

Programming under Linux- Privileged Execution Mode - Kernel Mode Vs. User Mode - Systemcalls

Files - Using Files - Using Links - Working With Directories - Obtaining File Information - File Permissions - Special Permissions – **Signals** - The Way the Kernel Handles Signal - Types of Signals - Results of a Process - Receiving a Signal - Handling Signals - Signals List - Sending Signals - Handling Signals - Response to Signals - Activation of pause, signal - System Call for Signal Handling - Error Handler.

Unit-III

Shell in Linux: Available shells under Linux (viz. Bash, TCSH, Korn or so on), different shell features, editors, shell commands, shell scripts: shell variables, environmental variables, purpose of shell scripts, writing, storing and executing scripts, Filters- The grep family, advanced filters-sed and awk.

Unit-IV

Using the X-Windows System: What is X clients, servers and Windows Management, Exploring X Applications X – Lib Programming Model, creating and managing windows,

Unit-V

Handling events: key board and mouse management, an overview of drawing graphics, text handling colormap and manipulation.

Reference Books:

1. Barkakati N. "*X-Windows System Programming*", PHI, 2001
2. Cox K, "*Red Hat Linux Administrator's Guide*", PHI, 2001
3. Peterson Richard, "*The Complete References Linux*", 2nd Ed., Tata McGraw Hill, 2000
4. O'Reilly and Associates Vol. 0: *Protocol Reference Manual*, 1992
5. O'Reilly and Associates Vol. 1: *Xlib Programming Manual*, 1992
6. O'Reilly and Associates Vol. 2: *Xlib Programming Manual*, 1992
7. Bach, "*The Design of the Unix Kernel*", PHI, 2000 32 w.e.f. session 2004-2005

Java Programming and Website Design

CSCA 506	Cr	L	T	P
	5	4	1	0

Course Objectives:
1: Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.
2: Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms.
3: Understand the principles of inheritance, packages and interfaces.

Course Outcome
CO1: Identify classes, objects, members of a class and relationships among them needed for a specific problem
CO2: Write Java application programs using OOP principles and proper program structuring
CO3: Demonstratethe concepts of polymorphism and inheritance
CO4: WriteJava programs to implement error handling techniques using exception handling

Course Content
Unit-I
JAVA BASICS: Review of Object oriented concepts, History of Java, Java buzzwords, JVM architecture, Data types, Variables, Scope and life time of variables, arrays, operators, control statements, type conversion and casting, simple java program, constructors, methods, Static block, Static Data, Static Method String and String Buffer Classes, Using Java API Document.

Unit-II
INHERITANCE AND POLYMORPHISM: Basic concepts, Types of inheritance, Member access rules, Usage of this and Super key word, Method Overloading, Method overriding, Abstract classes, Dynamic method dispatch, Usage of final keyword.
PACKAGES AND INTERFACES: Defining package, Access protection, importing packages, Defining and Implementing interfaces, and Extending interfaces. I / O STREAMS: Concepts of streams, Stream classes- Byte and Character stream, Reading console Input and Writing Console output, File Handling.

Unit-III

Input/Output Programming: Basics, Streams, Byte and Character Stream, predefined streams, Reading and writing from console and files. Using Standard Java Packages (lang, util, io,net). Networking: Basics, networking classes and interfaces, using java.net package, doing TCP/IP and Data-gram Programming

Unit-IV

AWT CONTROLS: The AWT class hierarchy, user interface components- Labels, Button, Text Components, Check Box, Check Box Group, Choice, List Box, Panels – Scroll Pane, Menu, Scroll Bar. Working with Frame class, Colour, Fonts and layout managers. EVENT HANDLING: Events, Event sources, Event Listeners, Event Delegation Model (EDM), Handling Mouse and Keyboard Events, Adapter classes, Inner classes.

Unit-V

Website Designing: Overview of Internet and Intranet Services, HTML Tags, Tables, Frames, Graphical and animation techniques, Static & Dynamic Web Pages, DHTML, ASP, Javascript

Reference Books:

1. Patrick Naughton and Herbertz Schildt, "*Java-2 The Complete Reference*", TMH, 1999.
2. Rick Dranell, "*HTML 4 unleashed*", Techmedia Publication, 2000
3. Shelley Powers, "*Dynamic Web Publishing*", 2nd Ed., Techmedia, 1998.
4. E. Balaguruswamy, "*Programming with Java: A Primer*", TMH, 1998.
5. Horstmann, "*Computing Concepts with Java 2 Essentials*", John Wiley
6. Decker & Hirshfield, "*Programming Java: A introduction to programming using JAVA*", Vikas Publication, 2000.

Computer Networks

CSCA 508	Cr	L	T	P
	4	3	1	0

Course Objectives

1. To develop an understanding of computer networking basics
2.To develop an understanding of different components of computer networks, various protocols, modern technologies and their applications

Course Outcomes

CO1: Recognize the technological trends of Computer Networking.
CO2: Discuss the key technological components of the Network.
CO3:Evaluate the challenges in building networks and solutions to those.

Course Content

Unit-I

Introduction and The Physical Layer: Uses of Computer Networks, Network Hardware, Network Software, Reference Model (OSI, TCP/IP Overview), The Physical Layer, Theoretical Basis for Data communication, Guided Transmission Media, Wireless Transmission, Communication Satellites, Digital Signal Encoding Formats – NRZ-L, NRZI, Bipolar-AMI, Manchester, Differential Manchester, Digital Modulation – ASK, FSK, PSK, QPSK, Digitization – Sampling Theorem, PCM, DM, Analog Modulation – Introducing AM,FM, PM, The Public Switched Telephone Network, The Mobile Telephone System.

Unit-II

The Data Link Layer: Data Link Layer Design Issues, Error Detection and Correlation, Flow Control Protocols, Stop-and-wait Flow Control, Sliding – Window Flow Control, Error Control, Stop-and-wait ARQ, Go-back-N, Selective-repeat, Example of Data Link Protocols- HDLC.

Unit-III

The Medium Access Control Sub Layer: The Channel Allocation Problem, Multiple Access, Protocols, Ethernet, wireless LANs, Blue Tooth, Data Link Layer Switching.

Unit-IV

The Network Layer: Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, Quality of Service, Internetworking, The Network Layer in the Internet.

Unit-V

The Transport Layer and Network Security: The Transport Service, Elements of Transport Protocols, A Simple Transport Protocol, The Internet Transport Protocols; UDP, TCP, Performance Issues.

Reference Books:

1. S. Tananbaum, "Computer Networks", 4th Ed., Pearson, 2003
2. W. Stallings, "Data and Computer Communications", 7th Ed., Pearson, 2002.
3. Black U, "Computer *Networks-Protocols, Standards and Interfaces*", PHI 1996
4. Comer E. Doughlas, "*Computer Networks and Internets*", 2nd Ed., Pearson, 2000
5. Comer E. Doughlas, "*Internetworking with TCP/IP, Vol. 1*, PHI, 2000
6. Laura Chappell (Ed), "*Introduction to Cisco Router Configuration*", Techmedia, 99.

Java Programming Lab.

CSCA 552	**Cr**	**L**	**T**	**P**
	2	**0**	**0**	**4**

Development following programs:

- Servlets ,
- Networking,
- I/O ,
- JDBC,
- Beans
- RMI

You may use Visual Age or equivalent software.

Linux and Network Admin. Lab.

CSCA 554	**Cr**	**L**	**T**	**P**
	2	**0**	**0**	**4**

1. Basic Commands of Linux operating system.
2. Command line arguments
3. Local and Environmental Variable
4. Arithmetic Operators (+,-,*,/.**,%)
5. Logical Operators (AND, OR NOT)
6. Conditional Statement
7. Shell Parameters
8. Case Statement
9. Iteration Statement (For loop, While Loop Etc)
10. Function
11. File System
12. Grep Family

Elective I

Multimedia Technologies

CSCA 510A	**Cr**	**L**	**T**	**P**
	5	**4**	**1**	**0**

Course Objectives

1. To learn and understand technical aspect of Multimedia Systems.
2. To understand the standards available for different audio video and text applications.
3. To Design and develop various Multimedia Systems applicable in real time.
4. To learn various multimedia authoring systems.

Course Outcomes

CO1: Identify the essential features of graphics/image data types, file formats, and colour models in images and video.
CO2: Explain the technical details of multimedia data representations.
CO3: Perform a comparative analysis of the major methods and algorithms for multimedia data compression.
CO4: Explain the technical details of popular multimedia compression standards.
CO5: configure and manage multimedia content delivery platforms.

Course Content

Unit-I

Introductory Concepts: Multimedia – Definitions, CD-ROM and the Multimedia Highway, Uses of multimedia, Introduction to making multimedia – The Stages of project, the requirements to make good multimedia, Multimedia skills and training, Training opportunities in Multimedia. Motivation for multimedia usage, Frequency domain analysis, Application Domain & ODA etc. Multimedia-Hardware and Software: Multimedia Hardware – Macintosh and Windows production Platforms, Hardware peripherals – Connections, Memory and storage devices, Media

software – Basic tools, making instant multimedia, Multimedia software and Authoring tools, Production Standards.

Unit-II

Multimedia – making it work – multimedia building blocks – Text, Sound, Images, Animation and Video, Digitization of Audio and Video objects, Data Compression: Different algorithms concern to text, audio, video and images etc., Working Exposure on Tools like Dream Weaver, 3D Effects, Flash Etc.,

Unit-III

Multimedia and the Internet: History, Internet working, Connections, Internet Services, The World Wide Web, Tools for the WWW – Web Servers, Web Browsers, Web page makers and editors, Plug-Ins and Delivery Vehicles, HTML, VRML, Designing for the WWW – Working on the Web, Multimedia Applications – Media Communication, Media Consumption, Media Entertainment, Media games.

Unit-IV

Multimedia-looking towards Future: Digital Communication and New Media, Interactive Television, Digital Broadcasting, Digital Radio, Multimedia Conferencing,

Unit-V

Assembling and delivering a project-planning and costing, Designing and Producing, content and talent, Delivering, CD-ROM technology.

Reference Books:

1. Steve Heath, "*Multimedia & Communication Systems*", Focal Press, UK, 1999.
2. Tay Vaughan, "*Multimedia: Making it work*", TMH, 1999.
3. K. Andleigh and K. Thakkar, "*Multimedia System Design*", PHI, PTR, 2000.
4. Keyes, "Multimedia *Handbook*", TMH, 2000.
5. Ralf Steinmetz and Klara Naharstedt, "*Multimedia: Computing, Communications & Applications*", Pearson, 2001.
6. Steve Rimmer, "*Advanced Multimedia Programming*", MHI, 2000.

Microprocessors

CSCA 510B	**Cr**	**L**	**T**	**P**
	5	**4**	**1**	**0**

Course Objective

1. Describethe Intel 8085/8086 architecture with explanation of internal organization of some popular microprocessors/microcontrollers.

2. Describe the general architecture of a microcomputer system and architecture &organization of 8085 & 8086 Microprocessor and understand the difference between 8085 and advanced microprocessor.

Course Objectives

CO1: Understand and realize the Interfacing of memory & various I/O devices with 8085 microprocessor
CO2: Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming.
CO3: Understand the architecture and operation of Programmable Interface Devices and realize the programming & interfacing of it with 8085 microprocessor.

Course Content

Unit-I

THE 8085 PROCESSOR: Introduction to microprocessor, 8085 microprocessor: Architecture, instruction set, interrupts structure, and assembly language programming.

Unit-II

MEMORY INTERFACING: Semiconductor memory and its types- Static and dynamic RAM, ROM, EPROM, EEROM and NOVRAM- Interfacing memory- Interfacing SRAM, DRAM, EPROM etc. Timing of RAM and ROM signals.

Unit-III

THE 8086 MICROPROCESSOR ARCHITECTURE : Architecture, block diagram of 8086, details of sub-blocks such as EU, BIU; memory segmentation and physical address computations, program relocation, addressing modes, instruction formats, pin diagram and description of various signals.

Unit-IV

INSTRUCTION SET OF 8086 : Instruction execution timing, assembler instruction format, data transfer instructions, arithmetic instructions, branch instructions, looping instructions, NOP and HLT instructions, flag manipulation instructions, logical instructions, shift and rotate instructions, directives and operators, programming examples.

Unit-V

INTERFACING DEVICE: Interfacing using 8212 chip. The 8255 PPI chip: Architecture, control words, modes and examples. Interfacing D/A and A/D converters

DMA: Introduction to DMA process, 8237 DMA controller,

INTERRUPT AND TIMER: 8259 Programmable interrupt controller, Programmable interval timer chips.

Reference Books:

1. *Microprocessor Architecture, Programming & Applications with 8085:* Ramesh S Gaonkar; Wiley Eastern Ltd.
2. The Intel Microprocessors 8086- Pentium processor: Brey; PHI
3. *Microprocessors and interfacing*: Hall; TMH
4. *The 8088 & 8086 Microprocessors-Programming, interfacing, Hardware & Applications* : Triebel & Singh; PHI
5. *Microcomputer systems: the 8086/8088 Family: architecture, Programming & Design:* Yu-Chang Liu & Glenn A Gibson; PHI.
6. *Advanced Microprocessors and Interfacing* : Badri Ram; TMH

Advanced Computer Architecture

CSCA 510C	Cr	L	T	P
	5	4	1	0

Course Objectives

To make students know about the Parallelism concepts in Programming

1. To give the students an elaborate idea about the different memory systems and buses.
2. To introduce the advanced processor architectures to the students.
3. To make the students know about the importance of multiprocessor and multi-computers.
4. To study about data flow computer architectures

Course Outcomes

CO1: Demonstrate concepts of parallelism in hardware/software.
CO2 : Discuss memory organization and mapping techniques.
CO3 :Describe architectural features of advanced processors.
CO4 : Interpret performance of different pipelined processors.
CO5: Explain data flow in arithmetic algorithms

Course Content

Unit-I

Parallel computer models: The state of computing , Multiprocessors and multicomputers, Multivector and SIMD computers, Architectural development tracks Program and network properties :Conditions of parallelism, Data and resource dependences,Hardware and software parallelism,Program partitioning and scheduling, Grain size and latency, Program flow mechanisms,Control flow versus data flow,Data flow architecture,Demand driven mechanisms,Comparisons of flow mechanisms

Unit-II

System Interconnect Architectures: Network properties and routing, Static interconnection networks, Dynamic interconnection Networks, Multiprocessor system interconnects,Hierarchical bus systems, Crossbar switch and multiport emory,Multistage and combining network. Processors and Memory Hierarchy : Advanced processor technology, Instruction-set Architectures,CISC Scalar Processors, RISC Scalar Processors, Superscalar Processors,VLIW Architectures, Vector and Symbolic processors Memory Technology :Hierarchical memory technology, Inclusion, Coherence and Locality,Memory capacity planning, Virtual Memory Technology

Unit-III

Backplane Bus System: Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt, Cache addressing models, Direct mapping and associative caches.

Unit-IV

Pipelining :Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch handling techniques, Arithmetic Pipeline Design, Computer arithmetic principles, Static arithmetic pipeline, Multifunctional arithmetic pipelines

Unit-V

Vector Processing Principles: Vector instruction types, Vector-access memory schemes. Synchronous Parallel Processing: SIMD Architecture and Programming Principles, SIMD Parallel Algorithms, SIMD Computers and Performance Enhancement

Reference Books:

1. Kai Hwang, "*Advanced Computer Architecture*"; TMH, 2000.
2. J.P.Hayes, "*Computer Architecture And Organization*", MGH, 1998.
3. M.J Flynn, "*Computer Architecture, Pipelined and Parallel Processor Design*" Narosa Publishing, 1998.
4. D.A.Patterson, J.L.Hennessy, "*Computer Architecture: A quantitative approach*", Morgan Kauffmann, 2002.
5. Hwang and Briggs, "Computer *Architecture and Parallel Processing*"; MGH.

Object Oriented Software Engineering

CSCA 601	**Cr**	**L**	**T**	**P**
	4	**3**	**1**	**0**

Course Objectives

In this course students will learn how to:
Develop models using the UML notation;
Apply an iterative, agile process;
Analyze requirements with use cases;
Create domain models;
Relate analysis and design artifacts;

Course Outcomes

CO1: Interact with a "client" to elicit project requirements by developing and refining scenarios and use cases.
CO2: Extract an Object Model and Dynamic Model of system functionality and performance from the requirements.
CO3: Design and implement structured, robust, maintainable object-oriented systems across multiple platforms and appropriate programming languages from the specifications developed.
CO4: Develop teamwork and management skills to divide tasks and effectively develop projects in large software teams.
CO5: Research, evaluate and use various CASE tools for object-oriented software engineering

Course Content

Unit-I

Object modeling: Objects and classes, links and associations, generalization and inheritance, grouping constructs, aggregations, generaliazation as extension and restrictions, multiple inheritence, meta data, candidate keys, dynamic modeling: events and states nesting, concurrency,

Unit-II

Functional modeling: data flow diagrams, specifying operations. Analysis: Object modeling, dynamic modeling, functional modeling, adding operations, iteration. System design: Subsystems, concurrency, allocation to processors and tasks, management of data stores,

Unit-III

Control implementation boundary condition, architectural frameworks, object design, optimization, implementation of control,

Unit-IV

Adjustment of inheritance, design of associations, documentation, comparision of methodologies. Implementation: Using a programming language databases system,

Unit-V

Programming styles, reusability, extensibility, robustness, programming in the large, and case study.

Reference Books:

1. Booch, G., *Object oriented analysis and design*, Benjamin Cummins Publishing Co., 2nd edition, 1991.
2. Rebecca Wires Bracket, *Designing object oriented software*, Prentice Hall of India, New Delhi, 2nd edition, 1998.
3. Rumbaugh, J., *Object oriented modeling and design*, Prentice Hall of India, New Delhi, 2nd Edition, 1991.

Distributed Operating System

CSCA 603	Cr	L	T	P
	4	3	1	0

Course Objectives

1. To introduce concepts related to distributed computing systems
2. To get knowledge in distributed architecture, naming, synchronization, consistency and Replication , fault tolerance, security, and distributed file systems
3. To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed

Course Outcomes

CO1: Understand the principles and desired properties of distributed systems on which the Internet and other distributed systems are based

CO2: Understand and apply the basic theoretical concepts and algorithms of distributed systems in problem solving

CO3: Recognize the inherent difficulties that arise due to distributed-ness of computing resources

CO4: Identify the challenges in developing distributed applications

CO5: Design a distributed system that fulfills requirements with regards to key distributed systems properties

Course Content

Unit-I

Introduction: Introduction to Distributed System, Goals of Distributed system, Hardware and Software concepts, Design issues. Communication in distributed system: Layered protocols, ATM networks, Client – Server model, Remote Procedure Calls and Group Communication.

Unit-II

Synchronization in Distributed System: Clock synchronization, Mutual Exclusion, Election algorithm, the Bully algorithm, a Ring algorithm, Atomic Transactions, Deadlock in Distributed Systems, Distributed Deadlock Prevention, Distributed Deadlock Detection.

Unit-III

Processes and Processors in distributed systems: Threads, System models, Processors Allocation, Scheduling in Distributed System, Real Time Distributed Systems.

Unit-IV

Distributed file systems: Distributed file system Design, Distributed file system Implementation, Trends in Distributed file systems.

Distributed Shared Memory: What is shared memory, Consistency models, Page based distributed shared memory, shared variables distributed shared memory.

Unit-V

Case study MACH: Introduction to MACH, process management in MACH, communication in MACH, UNIX emulation in MACH.

Reference Books:

1. *Distributed Operating System* – Andrew S. Tanenbaum, PHI.

Advanced DBMS

CSCA 605	**Cr**	**L**	**T**	**P**
	4	**3**	**1**	**0**

Course Objective

The course should enable the student to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively information from a DBMS.

Course Outcomes:

Upon successful completion of this course, students should be able to:

CO1: Describe the fundamental elements of relational database management systems

CO2: Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.

CO3: Design ER-models to represent simple database application scenarios

CO4: Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.

Course Content

Unit-I

Distributed DBMS features and needs, Reference Architecture, Levels of Distribution Transparency, Replication, Distributed database design – Fragmentation, allocation criteria, Storage mechanisms, Translation of Global Queries / Global Query Optimisation, Query Execution and access plan.

Unit-II

Concurrency control – 2 phase locks, distributed deadlocks, time based and quorum based protocols, comparison reliability – non-blocking commitment protocols, Partitioned networks, Check points and Cold starts.

Unit-III

Management of Distributed Transactions – 2 phase unit protocols, Architectural aspects, Node and link failure recoveries, Distributed data dictionary management, Distributed database administration.

Unit-IV

Heterogeneous database-federated database, reference architecture, loosely and tightly coupled, Alternative architectures, Development tasks, operation – global task management,

Unit-V

Client server databases – SQL server, Open database connectivity, Constructing an Application.

Reference Books:

1. S. Ceri, G. Pelagatti, "*Distributed Database: Principles and Systems*", McGraw Hill, New York, 1985.
2. Lin Wujuan, Veeravalli Bhardwaj, "*Object Management is distributed database systems*", Kluwer Academic Publishes, UK, 2003.
3. V. K. Jain, "*Advanced DBMS*", Cyber Tech Publications, 2001.
4. Mario Piattini, "*Advanced Database* Technology and Design", Artech House, UK, 2000.

Object Oriented System Design Lab.

CSCA 651	**Cr**	**L**	**T**	**P**
	2	**0**	**0**	**4**

Practical will be based on following Paper:

Object Oriented Software Engineering and other electives subjects with, which lab can be associated

1. SRS (System Requirement Specification)
2. DFD (Data Flow Diagram)
3. ERD (E-R Diagram)
4. LOC (Line of Code)
5. Test Plan & Test Cases

Elective II
Compiler Design

CSCA 607A	Cr	L	T	P
	4	3	1	0

Course Objective
To learn about different types of grammars used in Compilers and Different Phases of Compiler

Course Outcomes
At the end of the course students will be able to :
CO1: Describe the lexical structure of grammars
CO2: Design the compilers of High Level Languages
CO3: Implement LEX and YACC for designing Syntax Analyzers and Lexical Analyzers
CO4: Construct Parsing Tables from Grammars like CFG
CO5: Evaluate the code blocks and optimize them

Course Content
Unit-I

Introduction To Compilers Formal Language and Regular Expressions: Languages, Definition Languages regular expressions, Finite Automata – DFA, NFA. Conversion of regular expression to NFA, NFA to DFA. Applications of Finite Automata to Compiler

Construction- lexical analysis, Construction of lexical analyze using LEX tool. Phases of Compilation and A simple One-Pass Compiler.

Unit-II

Context Free grammars and parsing: Context free grammars, derivation, parse trees, ambiguity, Application CFG in compilation-Preprocessing steps in Parsing, LL(1) parsing. Bottom up parsing handle pruning LR Grammar Parsing, LALR parsing, parsing ambiguous grammars, YACC programming specification.

Syntax Analysis: Role of parsers, context free grammars, definition of parsing. **Parsing Technique:** Shift- reduce parsing, operator precedence parsing, top down parsing, predictive parsing. **LR parsers, SLR, LALR and Canonical LR parser.**

Unit-III

Syntax Directed Translations: Syntax directed definition, construction of syntax trees, syntax directed translation scheme, implementation of syntax directed translation, three address code, quadruples and triples.

Unit-IV

Symbol Table & Error Detection And Recovery: Symbol tables, its contents and data structure for symbol tables; trees, arrays, linked lists, hash tables. Errors, lexical phase error, syntactic phase error, semantic error.

Unit-V

Code Optimization & Code Generation: Code generation, forms of objects code, machine dependent code, optimization, register allocation for temporary and user defined variables.

Reference Books:

1. *Compilers Principle, Techniques & Tools* - Alfread V. AHO, Ravi Sethi & J.D. Ullman; - 1998Addison Wesley.
2. *Compiler Design* by O.G. Kakde, 1995, Laxmi Publ.
3. *Theory and Practice of Compiler Writing*, Tremblay & Sorenson, 1985, Mc. Graw Hill.
4. *System Software* by Dhamdae, 1986, MGH.
5. *Principles of Compiler Design*, Narosa Publication

Introduction to E-Commerce &ERP

CSCA 607B

Cr	L	T	P
4	3	1	0

Course Objectives

This course provides an introduction to information systems for business and management. It is designed to familiarize students with organizational and managerial foundations of systems, the technical foundation for understanding information systems

Course Outcomes

Understand the E-Commerce and E- business infrastructure and trends

CO1: Analyze different types of portal technologies and deployment methodologies commonly used in the industry.

CO2: Analyze the effectiveness of network computing and cloud computing policies in a multi-location organization.
CO3: Analyze real business cases regarding their e-business strategies and transformation processes and choices.
CO4: Integrate theoretical frameworks with business strategies.

Course Content

Unit-1

Introduction and Concepts: Networks and commercial transactions – Internet and other novelties; networks and electronic transactions today, Model for commercial transactions; Internet environment – internet advantage, worlds wide web and other internet sales venues; Online commerce solutions. **U**pdating traditional transactions; secure online transaction models; Online commercial environments; digital currencies and payment systems; Offline secure processing; private data networks. Security protocols.

Unit-II

Electronic Payment Methods: Electronic Payment Systems: Digital payment systems; First virtual internet payment system; cyber cash model. On-line Commerce Environments: Servers and commercial environments; Ecommerce servers. **Digital Currencies:** Operational process of Digicash, Ecash Trail; Using Ecash; Smart cards; Electronic Data Interchange: basics, EDI versus Internet and EDI over Internet. Strategies, Techniques and Tools, Shopping techniques and online selling techniques.

Unit-III

ERP- An Enterprise Perspective: Production Finance, Personnel disciplines and their relationship, Transiting environment, MIS Integration for disciplines, Information/Workflow, Network Structure, Client Server Integrator System, Virtual Enterprise.

Unit-IV

ERP – Resource Management Perspective: Functional and Process of Resource. Management, Introduction to basic Modules of ERP System: HRD, Personnel Management, Training and Development, Skill Inventory, Material Planning and Control, Inventory, Forecasting, Manufacturing, Production Planning, Production Scheduling, Production Control, Sales and Distribution, Finance, Resource Management in global scenario.

Unit-V

ERP - Information System perspective: Introduction to OLAP (Online Analysis and Processing), TP, OAS, KBS, MRP, BPR,. SCM, REP, CRM, Information Communication Technology. **ERP-Key Managerial issues:** Concept Selling, IT Infrastructure, Implication, of ERP Systems on Business Organization, Critical success factors in ERP System, ERP Culture Implementation Issues, Resistance to change, ERP Selection issues, Return on Investment, Pre and Post Implementation Issues.

Reference Books:

1. "*Frontiers of Electronics Commerce*" Ravi lalakota, Andrew Whinston ,1996, Addision Wesley,
2. *Enterprise Resource Planning-Concepts and Practice,* V.K. Garg and N.K. Venkita Krishna, 1998, PHI.
3. *The SAP/3 Handbook*, John Antonio, Fernandz, TMH.
4. "*The E-Business Revolution*" Denial amor Addision Wesley
5. "*E Commerce*" Greenstein and Feinman TMH
6. "*E Commerce*" Excel, Diwan, Sharma

7. "*E Commerce: The Cutting Edge of Business*" Bajan And Nag TMH
8. *E-Commerces*- Jaffrey F. Rayport , Bernard J. Jaworski, 2002, T.M.H

Security of Information System

CSCA 607C	**Cr**	**L**	**T**	**P**
	4	**3**	**1**	**0**

Course Objectives

To understand Encryption and De-encryption, De-encryption cryptosystems, Cipher, Encryption Algorithms and their implementation to solve security issues.

Course Outcomes

CO1: To describe encryption, decryption and cryptosystem

CO2: To understand Key Management Protocols

CO3: To understand Operating System, Database and Program Security

Course Content
Unit-I

Information Security Context and CBK: Introduction, Growing IT Security Importance and New Opportunities, Increasing Demand by Government and Private Industry; Becoming an IS specialist; Multidisciplinary Approach; contextualizing Information Security; IS Expertise & Business Systems. Security Management Practices: Security Architecture and Models; BCP; LAW, Investigations and Ethics, Physical Security; Operation Security; ACM Systems and Methodology; Cryptography; Telecommunications, Network and Internet Security; and Application Development Security.

Unit-II
Information Security Principles: Absolute Security; Three Security Goals; DID as Strategy;When Left on Their Own; Security Requirements; Security Through Obscurity Is Not an Answer; Security = Risk Management; Three Types of Security Controls; Complexity Is the Enemy of Security; Fear, Uncertainty, and Doubt; People, process and Technology; and OpenDisclosure of Vulnerabilities.

Unit-III
Applied Cryptography, Protocols and Practice: Key Management Protocols:Solving Key Distribution Problem, Diffie-Hellman Algorithm, Key Exchange with Public Key Cryptography.
Public Key Infrastructure (PKI): Concept of Digital Certificate, Certificate Authorities and it's roles, X509 Structure of Digital Certificate, Types of Public Key Infrastructures.
Legal Issues: Copyrights, Patents, Trade Secrets, Computer Crime, Cryptography and the Law.

Unit-IV
Operating System, Database and Program Security: Operating Systems Security:Security Policies, Models of Security, Security Features of Ordinary Operating System, Security Features of Trusted Operating System.
Database Security: Security Requirements of Databases, Reliability and Integrity, Protection of Sensitive Data, Inference Problem: Direct and Indirect Attacks
Program Security: Kinds of Malicious Code, How Viruses Attach and Gain Control, Homes for Viruses, Virus Signatures, Preventing Virus Infection, Trapdoors, Convert Channels, Control Against Program Threats, Java mobile codes.

Unit-V
Network Security: Network Security Issues such as Impersonation, Message Confidentiality, Message Integrity, Code Integrity, Denial of Service, Secure Communication Mechanisms such as IPSec, PKI based Authentication and Kerberos Authentication, Biometrics Authentication Mechanisms, Access Control Mechanisms, Firewalls
Web Security: Solving Privacy Problems, Solving Authentication Problems, Secure Socket Layer (SSL) Protocol, Secure Electronic Transaction (SET) Protocol , Safe Guarding Web Servers.
Secure Electronic Mail: Privacy Enhanced Email (PEM), Pretty Good Privacy (PGP), Public Key Cryptography Standards-PKCS#7, Secure/Multipurpose Internet Mail Extensions (S/MIME)

Reference Books:

1. "*Security in Computing* (Second Edition)", Charles P. Pfleeger, 1996, Prentic-Hall International, Inc.,
2. "*Applied Cryptography* Protocols, *Algorithms, and Source Code in C* (Second edition)", Bruce Schneier, 1995, John
3. "*Security Technologies* for *the World Wide Web*", Rolf Oppliger, Artech House, Inc.

4. "*Digital Certificates* Applied *Internet Security*", Jalal Feghhi, Jalli Feghhi and Peter Williams, Addison Wesley Longman,
5. "*The World Wide Web Security FAQ*", Lincoln D. Stein, World Wide Web Consortium, [Online] Available at http://www.w3.org/Security/Faq/www-security-faq.html
6. Cryptographic Message Syntax Standard, Public-Key Cryptography Standards, RSA Laboratories, [Online] Available at http://www.rsasecurity.com/rsalabs/pkcs/pkcs-7/index.html

Web Engineering

CSCA 607D

Cr	L	T	P
4	3	1	0

Course Objectives

1.Present web Engineering applications.
2.Grasp thebasic aspects of HTTP.
3.IdentifyMarkup languages: HTML and XML.

Course Outcomes:

CO1: Grasping the basic concepts of Web Engineering.
CO2: Acquaintance with the basic phases needed for implementing Web applications.
CO3: Grasping the basic Web development tools.

Couse Content

Unit-I

Information Architecture: The role of the Information Architect, Collaboration and Communication, Organizing Information, Organizational Challenges, Organizing Web sites and Intranets, Creating Cohesive Organization Systems

Unit-II

Designing Navigation Systems, Types of Navigation systems, Integrated Navigation Elements, Remote Navigation Elements, Designing Elegant Navigation Systems, Searching Systems, Searching your Web Site, Designing the Search Interface, Indexing the Right Stuff, To search or

Not To Search, Grouping Content, Conceptual Design, High-Level Architecture Blueprints, Architectural Page Mockups, Design Sketches.

Unit-III

Dynamic HTML and Web Designing: HTML Basic Concepts, Good Web Design, Process of Web Publishing, Phases of Web Site development, Structure of HTML documents, HTML Elements-Core attributes, Language attributes, Core Events, Block Level Events, Text Level Events, Linking Basics, Linking in HTML, Images and Anchors, Anchor Attributes, Image maps, Semantic Linking Meta Information, Image Preliminaries, Image Download Issues, Image as Buttons, Introduction to Layout: Backgrounds, Colors and Text, Fonts, Layout with Tables. Advanced Layout: Frames and Layers, HTML and other media types.

Unit-IV

Audio Support in Browsers, Video Support, Other binary Formats. Style Sheets, Positioning with Style sheets. Basic Interactivity and HTML: FORMS, Form Control, New and emerging Form elements.

Unit-V

Java Server Pages and Active Server Pages: Basics, Integrating Script, JSP/ASP Objects and Components, configuring and troubleshooting,: Request and response objects, Retrieving the contents of a an HTML form, Retrieving a Query String, Cookies, Creating and Reading Cookies. Using application Objects and Events.

Reference Books:

1. *HTML The Complete Reference*, TMH
2. *CGI Programming with Perl 2/e*, Scott Guelich, Shishir Gundavaram, Gunther Birzniek; O'Reilly
3. Doug Tidwell, James Snell, Pavel Kulchenko; *Programming Web Services with SOAP*, O' Reilly
4. Pardi, XML in Action, *Web Technology*, PHI

Elective III

Management Information System

CSCA 609A	**Cr**	**L**	**T**	**P**
	4	**3**	**1**	**0**

Course Objective
This course will provide a managerial perspective of information systems and what role they play in an organization. Student learn about the modern technologies and how organizations can use these technologies for their growth

Course Outcomes
CO1: Student understand the roles of Information Systems in contemporary organizations.
CO2: Students learn various types of information systems at various levels of the organizations.
CO3: Student learn how to analyze and design an information system based on user requirements.
CO4: Students understand the strategic role of information systems and information technology in organizations.

Course Content
Unit-I

Foundation of Information System: Introduction to Information System and MIS, Decision support and decision making systems, systems approach, the systems view of business, MIS organization within company, Management information and the systems approach.

Unit-II

Information Technology: A manager's overview, managerial overviews, Computer hardware & software, DBMS, RDBMS and Telecommunication.

Unit-III

Conceptual system design: Define the problems, set systems objective, establish system constraints, determine information needs determine information sources, develop alternative conceptual design and select one document the system concept, prepare the conceptual design report.

Unit-IV

Detailed system design: Inform and involve the organization, aim of detailed design, project management of MIS detailed design , identify dominant and trade of criteria, define the sub systems, sketch the detailed operating sub systems and information flow, determine the degree of automation of each operation, inform and involve the organization again, inputs outputs and processing, early system testing, software, hardware and tools propose an organization to operate the system, document the detailed design revisit the manager user.

Unit-V

Implementation evaluation and maintenance of the MIS: Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train the operating personnel, computer related acquisitions, develop forms for data collection and information dissemination, develop the files test the system, cut-over, document the system, evaluate the MIS control and maintain the system. Pitfalls in MIS development.

Advanced Concepts in Information Systems: Enterprise Resources Management (ERP), **S**upply Chain Management, C R M, Procurement Management System.

Reference Books:

1. *Management Information System* by W. S. Jawadekar, 2002, Tata McGraw Hill.
2. *Information System for Modern Management* (3rd edition) - Robert G. Murdick, Loel E. Ross & James R. Claggett. PHI
3. *Management Information System*; O Brian; TMH
4. *Management Information System* by Davis Olson Mac Graw Hill
5. *Management Information System* by Stasllings,(Maxwell Mc Millman Publishers)
6. *Information System; a Management Perspective*; Alter Addison Wesley
7. *Introduction to Information System*; McGraw Hill

Neural Networks

CSCA 609B	Cr	L	T	P
	4	3	1	0

Course Objective
The objective of the course is to understand the concepts of fuzzy logic, ANN and genetic algorithms.

Course Outcomes
At the end of the course **Students will able to:**
CO 1To familiarize with soft computing concepts.
CO2. To introduce the fuzzy logic concepts, fuzzy principles and relations
CO3. To Basics of ANN and Learning Algorithms
CO4. Ann as function approximation
CO5. Genetic Algorithm and its applications to soft computing
CO6. Hybrid system usage, application and optimization

Course Content
Unit-I
Biological, Analogy, Architecture classification, Neural Models, Learning Paradigm and Rule, single unit mapping and the perception.

Unit-II
Feed forward networks – Review of optimization methods, back propagation, variation on back propagation, FFANN mapping capability, Mathematical properties of FFANN's Generalization, Bios & variance Dilemma, Radial Basis Function networks.

Unit-III
Recurrent Networks – Symmetric Hopfield networks and associative memory, Boltzmann machine, Adaptive Resonance Networks

Unit-IV
PCA, SOM, LVQ, Hopfield Networks, Associative Memories, RBF Networks, Applications of Artificial Neural Networks to Function Approximation,

Unit-V
Regression, Classification, Blind Source Separation, Time Series and Forecasting.

Reference Books:

1. Haykin S., "*Neural Networks-A Comprehensive Foundations*", Prentice-Hall International, New Jersey, 1999.
2. Anderson J.A., "*An Introduction to Neural Networks*", PHI, 1999.
3. Hertz J, Krogh A, R.G. Palmer, "*Introduction to the Theory of Neural Computation*", Addison-Wesley, California, 1991.
4. Freeman J.A., D.M. Skapura, "*Neural Networks: Algorithms, Applications and Programming Techniques*", Addison-Wesley, Reading, Mass, 1992.
5. Patterson D.W., "*Artificial Neural Networks: Theory and Applications*", Prentice Hall, Singapore, 1995.
6. J. M. Zurada, "*Artificial Neural Systems*", Jaico Pub., 2000.

Logic & Functional Programming

CSCA 609C

Cr	L	T	P
4	3	1	0

Course Objective
1. Students should get practical experience using most widely used functional and logic programming languages: F# and Prolog
2. Students will understand different programming paradigms and the relationship between programming paradigm and underlying mathematical computational model
3. Students will understand different approaches to solving problems: functional decomposition and declarative programming

Course Outcomes
CO1: Understand different approaches to solving problems: functional decomposition and declarative programming.
CO2: Get practical experience using most widely used functional and logic programming languages: F# and Prolog
CO3: Understand different programming paradigms and the relationship between programming paradigm and underlying mathematical computational model

Course Content

Unit-I
Procedural and non-procedural lang., prolog vs LISP, Applications of LISP & PROLOG in designing expert system.

Unit-II
Syntax of PROLOG, Lists, Operators, Arithmetic, Structures, Controlling Back Tracking.

Unit-III
Input and Output, built-in predicates, Operation on Data Structures, Advanced Tree Representation.

Unit-IV
Prolog in Artificial Intelligence: writing programs for search techniques, Constraint logic programming, Knowledge representation and expert system, Expert System Shell.

Unit-V
Planning, Machine Learning, Inductive Logic Programming, Qualitative Reasoning, Language Processing, Game Playing, Meta Programming.

Reference Books:

1. Prolog *Programming for Artificial Intelligence* by Ivan Bratko, 2001, Pearson Edu.
2. *Symbolic Computing with Lisp & PROLOG* - by Mueller, JW, 1998
3. *Programming in turbo PROLOG* by Lee Teft - PHI.

Operational Research

CSCA 609D

Cr	L	T	P
4	3	1	0

Course Objectives
1. To impart knowledge in concepts and tools of Operations Research
2. To understand mathematical models used in Operations Research
3. To apply these techniques constructively to make effective business decisions

Course Outcomes
CO1: Identify and develop operational research models from the verbal description of the real system.
CO2: Understand the mathematical tools that are needed to solve optimisation problems.
CO3: Use mathematical software to solve the proposed models.
CO4: Develop a report that describes the model and the solving technique, analyse the results and propose recommendations in language understandable to the decision-making processes in Management Engineering.

Course Content
Unit-I

Linear Programming: Linear Programming Formulations, Graphical Method for Solving Linear Programming with 2 variables, Simplex Methods, Duality Theory in Linear Programming and Applications, Transportation Problem (Modified Distribution Method, Stepping Stone Method), Assignment Problem (Hugarian Method).

Unit-II

Network Analysis: Shortest-route Problem, Dijkstras Algorithm, Application of Shortest route Problems, Max Flow Problem, Flow Network, Labelling Routine, Labelling Algorithm for the Max Flow Problem, Min-cut and Max-flow min-cut theorem.

Unit-III

Project Scheduling by PERT/CPM: Project Management Origin and use of PERT and use of CPM, Applications of PERT and CPM, Project Network, Diagram representation, Critical path Calculations by Network Analysis and Critical Path Method, Determination of Floats, Construction of Time Chart and Resource Leveling, Project Cost Curve and Crashing in Project Management, Program Evaluation and Review Technique (PERT).

Unit-IV

Sequencing Models: Sequencing Problem, Johnson's Algorithm for Processing and Jobs through 2 Machines, Johnson's Algorithm for Processing and Jobs through 3 Machines, Processing m Jobs through n Machines, Processing 2 Jobs through n Machines; Graphical Solution, Dynamic Programming, Characteristics of Dynamic Programming Problem, Bellman's Optimality Principles, Dynamic Programming Under Certainty, Shortest Route Problem, Single Additive Constraint, Multiplicative Separable Return.

Unit-V

Queuing and Inventory Models: Queuing Models, The M/M/1 System, The M/M/C System, The M/M/ ~System, The M/EK/1 System, Inventory Models, Introduction to the Inventory Problem, Deterministic Models, The Classical EOQ (Economic Order Quantity) Model, The EOQ with Shortages Allowed.

Reference Books:

1. Hamdy A. Taha, "*Operations Research: An Introduction*", 7th Ed., Pearson, 2000.
2. Sharma J. K., "*Operations Research: Theory and Applications*", Macmillan India, 1997.
3. Gross Donald, "*Fundamentals of Queuing Theory*", 3rd Ed., John Wiley, 1998.
4. Mokhtar S. Bazaraa, "*Linear Programming and Network Flows*", 2nd Ed., John Wiley, 2000
5. Hiller Lieberman, "*Introduction to Operations Research*", 6th Ed., TMH, 1994.

.Net Framework

CSCA 609E	**Cr**	**L**	**T**	**P**
	4	**3**	**1**	**0**

Course Objective

The student will use Visual Basic.Net to build Windows applications using structured and object-based programming techniques

Course Outcomes

At the end of the course students will be able to

CO1: Learn about MS.NET framework developed by Microsoft.

CO2: You will be able to using XML in C#.NET specifically ADO.NET and SQL server

CO3: Be able to understand use of C# basics, Objects and Types, Inheritance

CO4: To develop, implement and creating Applications with C#.

CO5:To develop, implement, and demonstrate Component Services, Threading, Remoting, Windows services, web

CO6: To understand and be able to explain Security in the .NET framework and Deployment in the .NET.

CO7: To develop Assemblies and Deployment in .NET, Mobile Application Development.

Course Content

Unit-I

NET Framework Introduction, What is the .NET framework? What is it comprised of?The Common Language Runtime (CLR), The Framework Class Library (FCL), MSIL and the JITers, C# First Steps and Some Environment Tools. Introduction to Visual Studio .NET: Creating the first C# program, introducing the ILDASM tool, Basic IO operations. The Type System: The Common Type System (CTS), everything is an object, Value Types vs. Reference Types: Boxing and Unboxing Conversions, Class Definition Basics Class Definition: Access modifiers. Different class members overview: Fields, methods, properties, Indexers, Field Definitions Field types: instance, static, const and read only.

Unit-II

Methods definition: General, Static methods Constructors definition:General, Static constructors, Parameters types: ref, out and params. Memory and Resource Management: The .NET Garbage Collection algorithm, Resource management within the .NET framework. Arrays and Strings Single and Multi-dimensional arrays, System.Array Base Class. Manipulating Strings: System. String class, Using the StringBuilder class.

Unit-III

Inheritance and Polymorphism , Sealed classes, Virtual Methods and Overriding Hiding methods, using new Abstract Classes, Down-cast: The is and as operators ,User-defined Value-Types: Structs Nullable Types Enumerators Properties and Indexers. Exception Handling:Throwing and Handling exceptions ,The .NET pre-defined exception classes, User-defined exception classes, Resource Management in an EH environment:The checked and unchecked keywords Interfaces: The Interface concept, Interfaces definition and implementation The .NET system interfaces: IComparable, Ienumerable, Ienumerator and Iformattable.

Unit-IV

Advanced Class Constructs: Operator overloading, Rules, syntax, the implicit provided operators, User defined conversions, Delegates and Events: Introduction, Declaration, Method, Instantiation, Implementation, Metadata and Reflection What is metadata? What is it used for? Querying Metadata using reflection.

Unit-V

Attributes in Brief: The concept of Attributes, .Net pre-defined attributes, Querying attributes Generics: Generic Types, Generic Methods, Generics and Runtime Generics and Reflection Generic Collections Introduction to the .NET Framework Generic Collections Assemblies.

Reference Books:

1. E. Balagurusamy, *Programming in C#*, Tata McGraw-Hill, Second Edition 2008.
2. Tom Archer, *Inside C#*, Microsoft Press, 2nd Edition, 2002.
3. Microsoft Corporation, *C# Language Specifications*, Microsoft Press, 2001
4. Burton Harvey, Simon Robinson, Julian Templeman, Karli Watson, *C# Programming with the Public Beta*, Wrox Press, 2000.

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