BHARATHIAR UNIVERSITY, COIMBATORE – 641 046
MASTER OF COMPUTER APPLICATIONS – MCA *(CBCS)*
UNIVERSITY DEPARTMENT
(Effective from the academic Year 2014-2015)

1. Eligibility for Admission to the Course

Candidates for admission to the first year programme leading to the Degree of Master of Computer Applications (M.C.A.) will be required to possess the following: a) The candidates should have passed any recognized bachelors degree of minimum 3 years duration in any discipline with Maths at +2 school level (or) with Maths/ Statistics as one of the subjects in degree level b) The candidates should have completed 10+2+3 years for study before being admitted to the MCA degree course and c) Candidates seeking admission to MCA degree course are required to appear for Tamil Nadu Common Entrance Test conducted by Anna University, Chennai.

2. Duration of the Course

The programme shall be offered on a full-time basis. The programme will consist of five semesters of course work and laboratory work and the sixth semester consists of project.

3 The Medium of Instruction and Examinations

The medium of instruction and Examinations shall be in English.

5. Submission of Record Notebooks for Practical Examinations & Project Viva-Voce.

Candidates taking the Practical Examinations should submit bonafide Record Note Books prescribed for the Examinations. Otherwise the candidates will not be permitted to take the Practical Examinations. Candidates taking the Project Viva Examination should submit Project Report prescribed for the Examinations. Otherwise the candidates will not be permitted to take the Project Viva-voce Examination.

SCHEME OF EXAMINATIONS

Core/ Elective/ Supportive/ Project	Suggested Code	Sem	Title of the Paper	L	P	Credits	Marks
Core	14CSEAC01	I	Computer Organization and Architecture	4	0	4	100
Core	14CSEAC02	I	Problem Solving using C	2	4	4	100
Core	14CSEAC03	I	Mathematical Foundations of Computer Applications	4	0	4	100
Core	14CSEAC04	I	Data Structures	2	4	4	100
Elective	14CSEAE01	I	Unix and Network Programming	2	4	4	100
	14CSEGSXX	I	English for Professional Communication	2	4	4	100
Supportive	14CSEGSXX	I	General Supportive			2	50
Core	14CSEAC05	II	Principles of Compiler Design	3	2	4	100
Core	14CSEAC06	II	Operating Systems	4	0	4	100
Core	14CSEAC07	II	Design And Analysis of Algorithms	3	2	4	100
Core	14CSEAC08	II	Object Oriented Programming	2	4	4	100
Core	14CSEAC09	II	Open Source Software	4	0	4	100
Elective	14CSEAE02	II	Database Management System	2	4	4	100
Supportive	14CSEGSXX	II	General Supportive			2	50
Core	14CSEAC10	III	Java Programming	2	4	4	100
Core	14CSEAC11	III	Advance Programming in Open Source – PHP	2	4	4	100
Core	14CSEAC12	III	Computer Networks	2	4	4	100
Core	14CSEAC13	III	Software Engineering	4	0	4	100
Core	14CSEAC14	III	Operations Research	4	0	4	100
Elective	14CSEAE03	III	Computer Graphics	2	4	4	100
Supportive	14CSEGSXX	III	General Supportive			2	50
Core	14CSEAC15	IV	Visual Programming	2	4	4	100
Core	14CSEAC16	IV	Software Project Management	4	0	4	100
Core	14CSEAC17	IV	Multimedia Systems	2	4	4	100
Core	14CSEAC18	IV	Computer Security and Cryptography	4	0	4	100
Elective	14CSEAEXX	IV	Elective – I			4	100
Elective	14CSEAEXX	IV	Elective – II			4	100
Supportive	14CSEGSXX	IV	Supportive			2	50
Core	14CSEAC19	V	Internet Programming and Web	2	4	4	100
Core	14CSEAC20	V	Enterprise Java Programming	2	4	4	100
Core	14CSEAC21	V	Data Mining	3	2	4	100
Elective	14CSEAEXX	V	Elective – III			4	100
Elective	14CSEAEXX	V	Elective – IV			4	100
Mini Project	14CSEAC22	V	Mini Project and Viva Voce			1	25
Project	14CSEAC23	VI	Project Work and Viva Voce			15	375
			Total			140	3500

Electives for MCA (CBCS)

Suggested Code	Title of the Paper	L	P	Credits	Marks
14CSEAE04	E-Commerce	4	0	4	100
14CSEAE05	Enterprise Resource Planning	4	0	4	100
14CSEAE06	Image Processing	2	4	4	100
14CSEAE07	Soft Computing	4	0	4	100
14CSEAE08	Data Analysis and Business Intelligence	3	2	4	100
14CSEAE09	Intelligent Agents	4	0	4	100
14CSEAE10	Grid and Cloud Computing	4	0	4	100
14CSEAE11	Information Retrieval	4	0	4	100
14CSEAE12	Management Concepts and Communications	4	0	4	100
14CSEAE13	Software Testing	2	4	4	100
14CSEAE14	VB .Net	2	4	4	100
14CSEAE15	Natural Language Processing	4	0	4	100
14CSEAE16	Web Services	4	0	4	100
14CSEAE17	Client Server and Middleware	4	0	4	100
14CSEAE18	Programming in C#	2	4	4	100
14CSEAE19	Python Programming	2	4	4	100

Subject Title: COMPUTER ORGANIZATION AND ARCHITECTURE

Course Number: 14CSEAC01 Number of Credits: 4

Subject Description:

This course presents the architecture and organization of computers.

Goal:

To enable the students to learn the basic functions, principles and concepts of Computer architecture.

Objectives:

On successful completion of the course the students should have:

- Understood data representation
- Understood computer arithmetic, register and I/O organization

Contents:

Unit I

Data representation: Data types – Complements – Fixed-point representation – Floating-point representation - Logic gates - Combinational circuits- Flip-flops – Multiplexers – Decoders

Unit II

Registers – Shift registers – Binary counters – Register transfer – Bus and memory transfers – Arithmetic micro operations- Logic and shift micro operations- Arithmetic logic shift unit

Unit III

CPU: Register and stack organization – Instruction formats – Addressing modes – Data transfer and manipulation – Program control – RISC

Unit IV

Computer arithmetic: Addition, subtraction, multiplication and division of signed-magnitude data Parallel processing: Pipelining – Arithmetic and instruction pipeline – RISC pipeline – Array Processors

Unit V

Input-output organization: Peripheral devices – I/O interface – Asynchronous data transfer
Memory organization: Memory hierarchy – Main memory – Auxiliary memory – Associative memory – Cache memory – Virtual memory

REFERENCE BOOKS

1.M. Morris Mano,, “Computer System Architecture” , 3rd Edition , Pearson Education (2007)
2.John P Hayes, „Computer Architecture and Organization“, 4th Edition, McGraw-Hill Book Company, 2003
3.M Morris Mano, „Digital Logic and Computer Design“, 1st Edition, Pearson Education (2004)
4.Malvino A. P. and Donald P. Leach, “Digital Principles and Applications”, 7th Edition, McGraw Hill Publications, 2002
5. William Stallings, ‘Computer Organization and Architecture’, Prentice Hall; 9 edition, 2012

Subject Title: PROBLEM SOLVING USING C

Course Number: 14CSEAC02 Number of Credits : 4

Subject Description:

This course presents the Programming techniques in C, explains data types, arrays, pointers, files.

Goal:

To enable the students to learn the basic functions, principles and concepts of programming in C fundamentals.

Objectives:

On successful completion of the course the students should have:

- Understood the Programming in C language

Contents:

UNIT I

Introduction to computers - problem solving - structured approach - top-down design, stepwise refinement - modularity - hierarchy charts - flow charts - algorithms - expressing algorithms - a solution methodology and an overview of algorithmic language - programming paradigms - program structure - implementation ideas.

UNIT II

An overview of C - data types and sizes - declarations - variables - constants - arithmetic operators - relational and logical operators - hierarchy of operators - C expressions - precedence and order of evaluation - program control structure - the loop control structures. – Storage classes – automatic - register – static – external - typedef.

UNIT III

Arrays - strings – Functions - scope rules of functions - function arguments - function prototypes - recursion - variable number of arguments - structures - array of structures – additional features of structures - difference between array and structures - structure in functions - self referential structures - unions – difference between structure and union.

UNIT IV

Pointers – array of pointers – pointers to an array – pointer to pointers – pointers to functions – function returning pointers - pointers to structure - problems with pointers.

UNIT V

Streams and files - command line arguments - C preprocessor - conditional computation directives - defining macros - standard library functions (including system functions) – I/O functions (Console, disk port I/O) – I/O redirection – bit fields - usage of inline assembly.

REFERENCE BOOK

1. Yashvant P. Kanetkar, Let Us C", 13th Edition, BPB Publications, 2013.
2. Hughes, J.K. and Michtom J.I. 'A Structured approach programming' Prentice Hall, 1987
3. E. Balagurusamy, 'Programming in ANSI C', 6th Edition, Tata McGraw Hill, 2012
4. Byron C Gottried, Programming with C, Schuams" outline series, 3nd edition, Tata McGraw Hill,2010.
5. Robert A. Radcliffe, 'Encyclopedia C' BPB Publications, 1992.
6. Brain W. Kernighan, Dennis M.R. Chie, 'The C Programming Language', 2nd Edition, Prentice Hall, 1990.
7. Gottfried, B. 'Theory and Problems of Programming with C', McGraw Hill, 2nd Edition, 1990.
9. www.spoken-tutorial.org

Subject Title: MATHEMATICAL FOUNDATIONS OF COMPUTER APPLICATIONS
Course Number: 14CSEAC03 Number of Credits: 4
Subject Description:
This course presents the set theory, Introduction to Probability Theory, Automata Theory, Mathematical Logic, and Numerical Methods.
Goal:
To enable the students to learn the basic functions, principles and concepts of mathematical foundations of computer science.
Objectives:
On successful completion of the course the students should have:
 Understood the set theory and Probability Theory
 Understood the Automata Theory, Mathematical Logic and Numerical Methods.

UNIT I
Set Theory: Basic set operations, relations and functions, relation matrices, transitive closurerelation, principal of mathematical induction. Matrices: Properties of determinants, inverse of a matrix, Eigen values and Cayley Hamilton theorem.

UNIT II
Introduction to Probability Theory: Sample space and events, axioms of probability, conditional probability, Bayer's theorem, independence of events.

UNIT III
Introduction to Automata Theory: Finite State Automata – Deterministic and Non-Deterministic, NDFSA with E- Transitions, Equivalence of These without Proofs, Regular Expressions.

UNIT IV
Mathematical Logic: Connectives – NAND And NOR Connectives, Functionally Complete Set Of Connectives, Logical Networks, Principle Conjunctive And Disjunctive Normal Forms, Equivalence Of Statements, Formulae Derivations – Conditional Proof, Indirect Method Of Proof, Automatic Theorem Proving.

UNIT V
Numerical Methods: Finding Roots, Bisection, Regula-Falsi, Newton Raphson Methods, Solutions of Simultaneous Linear Equations, Gaussian Elimination, Gauss-Siedal Methods.

REFERENCE BOOKS

1. AbhijitDasgupta, "Set Theory: With an Introduction to Real Point Sets", Birkhauser; 2013 edition.
2. AlexandrBorovkov, "Probability Theory", Springer; 2013 edition.
3. Puntambekar, "Formal Languages and Automata Theory", Technical Publications; II edition,2013
4. Elliott Mendelson, "Introduction to Mathematical Logic", Chapman and Hall/CRC; 5 edition, 2013
5. Chapra, "Numerical Methods for Engineers"Tata McGraw-Hill Publishing Company; 6 edition, 2012

Subject Title: DATA STRUCTURES

Course Number: 14CSEAC04 Number of Credits :4

Subject Description:

This course gives an introduction of algorithms- linked lists- Searching Techniques - symbol tables with case study.

Goal:

To enable the students to learn the data structure fundamentals- principles and concepts.

O**bjectives:**

On successful completion of the course the students should have:

- Understood the various Data Structures- Algorithms for representation of structures and searching.

Contents:

UNIT I

Introduction to Problem Solving: Problem Analysis- Flowcharts- Pseudocodes & Algorithms- Program design- Structured Programming. Data Structures: Arrays - Representation of arrays- Sparse matrices- Multi - dimensional Arrays.

UNIT II

Stacks & Recursion: Stacks- Introduction to Recursion- Principles of Recursion - Polish Notation - Evaluation of Polish Expression - Translation from Infix form to Polish form. Queues: Definitions- Implementations of Queues- Circular queues- Application of Queues- Linked Queues- Polynomial Arithmetic.

UNIT III

Linked Lists: Pointers and Linked Allocation - Single Linked List - Circular Linked List - Doubly Linked list. Applications of Lists : Polynomial Manipulation .Binary Trees – Representation of Binary Tree – Binary Tree Traversal – Applications.

UNIT IV

Search Trees & Graphs: Binary Search Trees- Building a Binary Search Tree- Height Balance: AVL Trees- B-Trees. Graphs: Definitions- Undirected & Directed Graphs- Traversal- Topological Sorting- Shortest Paths.

UNIT V

Tables & Information Retrieval- File Structures: Tables & Information Retrieval - Introduction- Rectangular Arrays- Tables of various shapes- Abstract Tables- Radix sort- Hashing. File Structures: Concept of Fields- Records & Files- Sequential File Organization- Variable Length Records & Text Files.

REFERENCE BOOKS

1. Robert L Kruse- ‘‘Data Structures & Program Design’’- 2nd edition2001- Pearson education
2. Dromey- ‘‘Problem Solving & Algorithm Design”, Pearson Education India, 2008
3. How to Solve It by Computer (Prentice-Hall International Series in Computer Science) by R. G. Dromey (Jul 1982)
4.Ellis Horowitz & Sartaj Sahni- ‘‘Fundamentals of Data Structures”, Computer Science press, 1983.
5. Anton Spraul, “Think Like a Programmer: An Introduction to Creative Thinking”, No Starch Press, 2012.

Subject Title: UNIX and Network Programming

Course Number: 14CSEAE01 **Number of Credits: 4**

Subject Description:

This course presents the introduction, inter process communication, classical IPC problems, shell programming and socket programming in UNIX.

Goal:

To enable the students to learn the basic fundamentals of UNIX and network programming

Objectives:

On successful completion of the course the students should have:

- Understood the UNIX file system.
- Learn shell programming, system & network programming in UNIX

Unit I

UNIX – Introduction – Basic commands – processes – pipes – redirection – filters -vi editor. Shell programming – Shell Syntax : Variables – conditions – control structures – functions – command execution – simple programs

Unit II

File I/O – File Descriptors – File sharing - Files and directories – File types - File access permissions – File systems – Symbolic links - Standard I/O library – Streams and file objects – Buffering.

Unit III

UNIX process – Process termination – command line arguments - Process control – Process identifiers - Process relationships terminal logins – Signals -threads.

Unit IV

Interprocess Communication – Introduction- pipes – FIFO – message queues – semaphores – Shared Memory.

Unit V

Sockets - introduction - TCP sockets -TCP echo client server – UDP sockets - UDP echo client server - Socket options.

REFERENCE BOOKS

1. Peter Dyson, Stan Kelly – Bootle, John Heilborn, "UNIX Complete", BPB Publications, 1999
2. W.Richard Stevens, Stephen A. Rago, Advanced programming in the UNIX environment, Second edition, Addison Wesley, 2012.
3. W. Richard Stevens, Bill Fenner, Andrew Rudoff, "UNIX Network Programming", Volume The Sockets Networking API,3rd Edition, Pearson education, Nov. 2005.
4. www.spoken-tutorial.org

Subject Title: ENGLISH FOR PROFESSIONAL COMMUNICATION

Course Number: 10CSEGSXX Number of Credits: 4

Subject Description:

This course presents the effective speaking and writing skills in English

Goal:

To enable the students to learn the speaking and writing skills in English for professional communication.

Objectives:

On successful completion of the course the students should have:

□□ Understood the basics of spoken English

□ □ Understood the skills for effective writing in English

Spoken English: Basics like English Sounds, Stress, Rhythm and Intonation.

Meeting your English: Common Errors in Speaking and Writing – Grammar and Usage

Effective Writing Skills: Pre-Writing Techniques – Paragraph Writing – Different Types – Essay Writing

Work Place Correspondence: Memos – Circulars – Letters – Job Applications with Resume – Different Kinds of Reports including Self-Appraisal – Research Papers

Lab:

Comprehension: Listening – Reading – Audio Visuals

Speaking: Self-Introduction – Face-to-face conversations – Telephone Conversations – Interviews – Group Discussions – Short Speeches – Debates – Role Plays – Presentations – Public Speaking

TEXT BOOKS/ REFERENCES

1. Strunk & White, „Elements of Style", 4th Edition, Longman, 2008.
2. Murphy, Raymond, „Murpy"s English Grammar", III Ed. New Delhi, Brihbasi Art Press Ltd., 2004
3. Huckin N., Thomas ND, Leslie A. Olsen, „Technical Writing and Professional Communicatin", 2nd Edition, Singapore, McGraw Hill International Edition, 1991.
4. Garside, Barbara and Tony Garside, „Essential Telephoning in English", U.K.: CUP, 2002.
5. Michael Swan, „Practical English Usage", 4th Impression, International Students edition OUP.2000.

Subject Title: PRINCIPLES OF COMPILER DESIGN

Course Number: 14CSEAC05 **Number of Credits: 4**

Subject Description:
This course presents the introduction to compilers, syntax analysis, code generations and optimization.

Goal:
To enable the students to learn the basic functions, principles and concepts of system programming and compiler design.

OBJECTIVES

- To understand lexical analyzer, parser, code generation schemes and optimization of codes and environments.

Unit I

Introduction to compilers: Compilers – Analysis of source program – The Phases of compilers – Cousins of Compilers – The grouping of phases – compiler construction tools.
Lexical analysis – Incorporating a symbol table – The role of lexical analyzer – Finite Automata – From a regular expression to an NFA – Design of a Lexical Analyzer Generator – Optimization of DFA

Unit II

Syntax Analysis: The role of a parser – Context Free Grammar – Top-down parsing – Recursive Descent parsing – predictive parsing – Bottom up parsing - shift reduce parsing - Operator Precedence parsing – LR parsing.

Unit III
Syntax- directed Translation: Syntax – directed definitions – Construction of Syntax trees – Bottom-up evaluation of S-attributed definitions – Top-down translation – Recursive evaluators – Type checking – Type system – Specification of a simple Type Checker – Type conversions – An algorithm for unification.
Intermediate languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – Procedure calls.

Unit IV
Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – A simple Code generator – DAG representation of Basic Blocks – Peephole Optimization.

Unit V
Introduction– Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing.

REFERENCE BOOKS

1. Alfred Aho, Ravi Sethi, Jeffrey D Ullman, ‘‘Compilers Principles, Techniques and Tools”, Pearson Education Asia, 2003.

2. A. Puntambekar, “Compiler Design”, Technical Publications, 2010.

Subject Title: OPERATING SYSTEMS

Course Number: 14CSEAC06 **Number of Credits: 4**

Subject Description:

This course presents the Introduction about operating systems, process management, CPU scheduling, memory management, secondary storage management.

Goal:

To enable the students to learn the basic functions, principles and concepts operating system.

Objectives:

On successful completion of the course the students should have:

- Understood the operating system principles
- Understood the Principles of Deadlock, processor scheduling and memory management.
- Learnt case studies in different OS

Contents:

UNIT I

Introduction: Early Operating Systems – Buffering and Spooling – Multiprogramming – time-sharing – Protection – Operating – System Structures. Process Management: Process Concept – Hierarchy of Process – Critical Section Problem – Semaphores – Process Co-ordination Problems – Inter Process Communication.

UNIT II

CPU Scheduling: Scheduling Concepts – Scheduling Algorithms – Algorithm Evaluation – Multiple Processor Scheduling. Deadlock: Deadlock Problem – Characterization - Prevention – Avoidance – detection – Recovery – Combined Approach to Deadlock Handling.

UNIT III

Memory Management: Introduction – Multiple Partition – Paging – Segmentation – Paged Segmentation – Virtual Memory Concept – Overlays – Demand Paging and Performance – Page Replacement – Algorithms – Allocation Algorithms – Thrashing.

UNIT IV

Secondary Storage Management: Physical Characteristics – Disk Scheduling – Disk Scheduling Algorithm – Sector Queuing. File Systems: File Operations – Access Methods – Allocation Methods – directory Systems – File Protection – Implementation Issues.

UNIT V

Comparative study – Introduction to DOS, UNIX/LINUX, Windows 9X, Windows NT.

REFERENCE BOOK

1. James L.Peterson, Abraham Silberchatz, ‘‘Operating System Concepts”, Addison Wesley, 1985.
2. Harvey M.Deitel, ‘‘An Introduction to Operating System”, Addison Wesley, 1984.
3. Andrew S. Tanenbaum, ‘‘Operating Systems – Design and Implementation”, Prentice Hall, 1987.
4. Silberschatz A., Galvin P. and Gagne G., ‘‘Operating System Concepts”, John Wiley, 2002.
5. William Stallings, “Operating Systems”, Prentice-Hall, 2004.
6. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "operating system", wiley Dec 2012

Subject Title: DESIGN AND ANALYSIS OF ALGORITHMS

Course Number: 14CSEAC07 Number of Credits :4

Subject Description:

This course presents the Introduction to algorithms, greedy method, dynamic programming, basic search and parallel models.

Goal:

To enable the students to learn the algorithm fundamentals, principles and concepts.

O**bjectives:**

On successful completion of the course the students should have:

- Understood the various algorithms for sorting and searching, dynamic programming and parallel models.

Contents:

UNIT I

Introduction: Introduction to algorithms, Analyzing algorithms.

Divide and Conquer: General Method, Binary Search, Finding the maximum and minimum, Merge sort, Quick sort, Selection sort, Strassen's matrix multiplication.

UNIT II

The Greedy Method: General method, Optimal storage on tapes, Knapsack problem, Job sequencing with deadlines, Optimal merge patterns, Minimum spanning trees, Single source shortest paths.

UNIT III

Dynamic Programming: General method, Multistage graphs, All pairs shortest paths, Optimal binary search trees, 0/1 Knapsack, Travelling salesperson problem, Flow-shop Scheduling.

UNIT IV

Basic Search and Traversal Techniques: Techniques, Code optimization, AND/OR graphs, Game trees.

Back Tracking: General method, 8-queens problem, Sum of subsets, Graph coloring, Hamiltonian cycles, Knapsack problem. Branch and Bound: General method, Travelling salesperson problem.

UNIT V

Parallel models: Basic concepts – Performance measure parallel algorithms – Parallel complexity – Analysis of parallel addition – Parallel multiplication and division, Parallel Evaluation of general arithmetic expressions, First order Linear recurrence.

REFERENCE BOOK

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms", Galgotia Publications, 2011.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, " Introduction to Algorithms", Massachusetts Institute of Technology, MIT Press, III Edition, 2009.
3. Sara Baase, Allen Van Gelder, 'Computer Algorithms', Pearson education, 2008.
4. Mark Allen Weiss "Data Structures and Algorithm Analysis", Benjamin/Cummings Pub. Co, 2007.

Subject Title: OBJECT ORIENTED PROGRAMMING

Course Number: 14CSEAC08 Number of Credits :4

Subject Description:

This course presents the features of object oriented programming structure, overloading, files, exception handling, OO analysis.

Goal:

To enable the students to learn the basic functions, principles and concepts of Object oriented programming.

Objectives:

On successful completion of the course the students should have:

- Understood the Object model and relationship among objects
- Gain knowledge in C++ programming

Contents:

(NOTE: Programming examples are to be given in C++)

UNIT – I

Drawback of structured programming – object oriented language characteristics and fundamentals – programming basics – loops, decisions, structures and functions – objects and classes.

UNIT – II

Overloading – Inheritance – Polymorphism.

UNIT – III

Files - Streams - Templates.

UNIT – IV

Exception Handling – Introduction, Error Handling, Handling model, Handling constructs , List of Exceptions, catch all exceptions, Exceptions in constructors and destructors, Handling Uncaught Exceptions, Operator overloaded functions, Inheritance tree, Class templates , Fault tolerant Design techniques, Memory allocation failure exception, Ten rules for handling exceptions.

UNIT – V

OO Analysis, Design and Development – Software Life Cycle , Cost of Error correction, Change management, Reusable components , Fountain flow model Object-oriented notations, Object-oriented methodologies, coad and Yourdon Object-oriented analysis, Booch"s Object-oriented design, Class design, How to build reliable code, OO software performance tuning.

REFERENCE BOOK

1. Stroustrup, ''The C++ Programming Language'', Addison Wesley,3rd Edition, 2008.
2. K.R. Venugopal T. Ravishankar, Rajmumar ,"Mastering C++'', Tata McGraw-Hill Publishing Company Limited, 2011.
3. Robert Lafore, ''Object Oriented Programming in Turbo C++'', Galgotia publications Ltd, 4th Edition, 2001.
4. Stanley B Lippman, Josee Lajoie, ''The C++ Primer", Addison Wesley,5th Edition, 2012.
5. www.spoken-tutorial.org

Subject Title: OPEN SOURCE SOFTWARE

CourseNumber: 14CSEAC09 Number of Credits:4

Subject Description:

This course presents the basics of open source software, introduction to PHP and perl programming.

Goal:

To enable the students to learn the basics of open source software, PHP and perl programming.

Objectives:

On successful completion of the course the students should have:

- Understood the overview of open source software.
- Understood the basics of PHP and perl programming

Unit I

Overview of Free/ Open Source Software: The Open Source Definition - Examples of OSD Compliant Licenses - Examples of Open Source Software Product – The Open Source Software Development Process – A History of Open Source software: The Berkeley Software Distribution – The Free Software Foundation – Linux – Apache – Mozilla – Open Source Software.

Unit II

Qualification: Defining Open Source Software – Categorizing Defining Open Source Software – Specific Characteristics of Open Source Software Transformation: The OSS Development Process – Taboos and Norms in OSS Development – The OSS Development Life Cycle – Deriving a Framework for Analyzing OSS – Zachman"s Framework for IS Architecture – CATWOE and Soft System Method – Deriving the Analytical Framework for OSS.

Unit III

Environment: The ''where'' of OSS – the ''when'' of OSS – World View: A Framework for classifying OSS Motivations.

Open Source Server Applications: Infrastructure Services – Web Services – Database Servers – Mail Servers – Systems Management – Open Source Desktop Applications: Introduction – Graphical Desktops – Web Browsers – The Office Suite – Mail and Calendar Clients – Personal Software – Cost of OSS: Total Cost of Ownership – Types of Costs Licensing: Types of Licenses – Licenses in Use – Mixing Open and Close Code – Dual Licensing.

Unit IV

Perl Programming

Perl - Introduction, Perl Basics: - Syntax, Variables, Strings, Numbers, Operators, Arrays: - Using Arrays, Manipulating Arrays, Associative Arrays, Chop, Length, and Sub string. Hashes, Arguments, Logic, Looping, Files, Pattern Matching, Environment Variables, Using cgilib for Forms.

File Management PERL: - File Handling, Reading From Files, Appending Files, Writing to Files, File Checking, Reading Directories.

Databases PERL: - DBI Module, DBI Connect, DBI Query, MySQL Module, MySQL Connect, MySQL SelectDB, MySQL Query.

Unit V

PHP Programming Basics

PHP - Introduction, PHP Basics: - Syntax- Variables- Controls and functions - Strings. Arrays: - Using Arrays, Manipulating Arrays, Associative Arrays-OOP with PHP –Advanced Array functions-Sessions-cookies and HTTP.

REFERENCE BOOKS

1. Joseph Feller, Brain Fitzgerald, Eric S. Raymond, ‘‘Understanding Open Source Software Development”, Addison-Wesley Professional, 1st Edition, 2001.
2. Bernard Golden, ‘Open Source in the Enterprise’, O’Reilly Media, 2009.
3. Robert David Steele, Howard Bloom, ‘The Open-Source Everything Manifesto: Transparency, Truth, and Trust ‘, Evolver Editions, 2012.
4. Perl CookBook –Tom Christinasen & Nathan Torkington , O‟Relliy ,SPD Pvt ltd,2006 Edition.
5. PHP 5 and MySQL Bible Wiley Dream teck India Pvt.ltd 2006 Edition.
6. www.spoken-tutorial.org

Subject Title: DATABASE MANAGEMENT SYSTEM

Course Number: 14CSEAE02 Number of Credits :4

Subject Description:

This course presents the introduction of database management systems , explains ER model, structure of relational database, indexing and advance data base concepts.

Goal:

To enable the students to learn the basic functions, principles and concepts of database management systems.

Objectives:

On successful completion of the course the students should have:

- Understood the basic principles of database management systems, parallel & distributed databases.
- Gained knowledge over various database models, schemas and SQL statements.

Contents:

UNIT I

Introduction – purpose of database system- data models – database languages-Transaction management – Storage management - DBA – database users-system structure.

E-R model.

UNIT II

Relational Database Design: Anomalies in a Database – Functional Dependency – Lossless Join and Dependency-Preserving Decomposition – Third Normal Form – Boyce Codd Normal Form – Multivalued Dependency – Fourth Normal Form – Join Dependency – Project Join Normal Form – Domain Key Normal Form.

SQL: Data Definition – Data Manipulation – Integrity Constraints – Views – PL/SQL.

UNIT III

Indexing and Hashing – Query Processing – Transaction Processing - Concurrency Control and Recovery.

UNIT IV

Advanced Database Concepts and Emerging Applications: Distributed Databases-Object Oriented Databases-Object Relational Databases- Data mining and Data Warehousing.

UNIT V

DBMS Case Studies : Application of DB concepts in Hospitals or any small and medium scale Industry – DBMS in Hospital management System, Small and Medium Scale Enterprises – Application of DBMS in Marketing

(For Unit V, students are expected to do a survey and study and submit a report)

REFERENCE BOOKS

1. Abraham Silberchatz, Henry K.Forth, Sudharshan, ‘‘Database system Concepts” – (6th edition), McGraw Hill, 2010.

2. Elisa Bertino, ‘‘Object Oriented Databases’’, Addison Wesley. 1993.

3. Ramez Elmasri, Shamkant B.Navathe, " Fundamentals of Database Systems ", 3rd Edition, Addison Wesley-2000.

4. Malay k. Pakhira, “Database Management System”, Phi Learning Pvt. Ltd., 2012

5. www.spoken-tutorial.org

Subject Title: JAVA PROGRAMMING

Course Number: 14CSEAC10 **Number of Credits : 4**

Subject Description:

This course presents the basic concepts of object oriented programming, data types, class and objects, packages, overview of Java GUI.

Goal:

To enable the students to learn the basic functions, principles and concepts of java programming.

Objectives:

On successful completion of the course the students should have:

- Gained Java programming skills.

Contents:

UNIT-I

JAVA evolution: Java features – Java and C – Java and C++ - Overview of JAVA language: Introduction- implementation of java program – creating, compiling, running the program. JVM . Data Types – operators and Expressions – Branching: Decision making with if statement, if…else statement, nesting if…else statements, the else if ladder, switch statement. Looping: The while statement, do statement, for statement- additional features of for loop: nesting of for loops; jumps in loops – jumping out of a loop; skipping a part of loop; labeled loops

UNIT – II

Classes and Objects: Introduction; adding variables, creating and adding methods, constructors, overloading; Inheritance – defining a subclass, multilevel inheritance, hierarchical inheritance, overriding methods, visibility control.

UNIT – III

Packages & Interfaces – Multithreaded Programming: creating threads, extending the thread class-implementing the run() method, starting new thread, stopping and blocking a thread- life cycle of a thread – thread states- using thread methods, thread exceptions, thread priority-Exception Handling.

UNIT - IV

Applet Programming: Local and remote applets; differences of applet and application programs. Designing a web page – comment, body, head section. Applet tag, adding applet to HTML file.
Event Handling: Mechanisms-Event classes-Sources-Event Interfaces.

UNIT –V

Introduction to AWT: Window fundamentals-AWT classes-Working with windows-Working with Graphics-Working with Color- Working with Fonts- Fundamentals of AWT controls.

REFERENCE BOOKS

1. Herbert Schildt, " The Complete Reference Java" , Tata McGraw-Hill Edition, 2009.
2. Rajkumar Buyya, S Thamaraiselvi, Xingchen Chu, " Object Oriented Programming with JAVA" , Tata McGraw-Hill Edition, 2009.
3. Jamie Jaworski, "JAVA 2 Platform Unleashed", Techmedia SAMS publishing, 2008.
4. www.spoken-tutorial.org

Subject Title: ADVANCED PROGRAMMING IN OPEN SOURCE – PHP

Course Number: 14CSEAC11 **Number of Credits: 4**
Subject Description : This Course presents Advanced programming in Open Source
Goals : To enable the students to learn the basics of PHP, MySQL, AJAX, Smarty, SOAP, CMS(Joomla)
Objectives : On successful completion of the course the students should have:

- Understood the concepts of using MySQL with PHP
- Understood the concepts of using AJAX with PHP
- Understood the concepts of using Smarty with PHP
- Understood the concepts of PHP SOAP
- Understood the concept of PHP and CMS(Joomla)

Contents

Unit 1: PHP and MySQL Part II: SQL tutorial - PHP/MySQL function – Displaying Queries in Tables- Building forms from Queries.

Unit 2: PHP and AJAX: AJAX Introduction, History of AJAX, How does AJAX work, IE memory leaks, XML HTTP Request - GET or POST?, XML Http Request in IE FireFox, callback URL and URL rewriters, Problems and Challenges, Benefits of AJAX, How and when to use AJAX, Selecting the right tools and framework for Ajax.

Unit 3: PHP and Smarty: What is Smarty?, Basic Syntax, Variables, Variable Modifiers, Combining Modifiers, Built-in Functions, Custom Functions, Config Files, Debugging Console, Constants, Smarty Class Variables, Smarty Class Methods, Caching, Advanced Features, Extending Smarty With Plugins, Troubleshooting: Smarty/PHP errors, Tips & Tricks, Resources, BUGS.

Unit 4: PHP and SOAP: Introduction to Web Services SOAP, Creating and Consuming Web Services With PHP, XML-RPC, Creating an XML-RPC Web service, Consuming an XML-RPC Web service, NuSOAP and PHP, Creating a NuSOAP Client using PHP, Creating a NuSOAP Web service, Creating a NuSOAP Web Service Client, REST, Consuming an XML Web service using REST.

Unit 5: PHP and CMS(Joomla): Types of CMS – Open source web CMS packages, All Inclusive web CMS"s, Micro CMS, Other Helpful Resources.

Reference Books

1. PHP 5 and MySQL Bible Wiley Dream teck India Pvt.ltd 2006 Edition.
2. Professional LAMP Linux, Apache ,MySQL and PHPs Web Development –Wiley dream Tech 2006 Edition.
3. Beginning Ajax with PHP: From Novice to Professional, Apress, 2007 Edition
4. PHP Ajax Cookbook, Packt Publishing, 2011.
5. Smarty- PHP Template Programming and Applications, PACKT Publishing 2006 Edition.
6. SOAP Version 1.2 Part 1: Messaging Framework (Second Edition) http://www.w3.org/TR/soap12-part1/
7. Professional Joomla, Wiley Publication, 2007.
8. The Official Joomla {book}, Pearson Education, 2013.
9. www.phpfreaks.com - Smarty
10. www.w3schools.com - AJAX
11. www.php.net/manual/en - PHP notes
12. www.spoken-tutorial.org

Subject Title: COMPUTER NETWORKS

Course Number: 14CSEAC12 **Number of Credits: 4**

Subject Description:

This course presents the introduction to networks and communication media, data transfer, network layer protocols, transport protocols and presentation layer.

Goal

To enable the students to learn the basic functions, principles and concepts of computer networks.

Objectives: On successful completion of the course the students should have:

- Understood the functionality of networks protocols and layers
- Understood network simulation using NS2

Contents

UNIT-I

INTRODUCTION TO NETWORKS & COMMUNICATION MEDIA: Uses – Network hardware – Network software – Reference Models –Example Networks: Internet – X.25 -ATM - Transmission media – Wireless Transmission – Telephone system – ISDN, ATM communication – satellite communication.

UNIT–II

DATA TRANSFER & ACCESS PROTOCOLS: Error detection and correction methods – Elementary protocols – Sliding window protocols - IEEE 802.2 Logical Link Control – Bluetooth: architecture – protocol stack – radio layer – baseband layer – L2CAP layer – frame structure.

UNIT–III

NETWORK LAYER PROTOCOLS: Routing algorithms – Congestion control: Principles – policies –Congestion control in VC subnets – congestion control in datagram subnets - Network layer in Internet: Architecture – IP protocol- IP Address – IPv6.

Unit–IV

TRANSPORT PROTOCOLS: Transport service – Transport protocols – Transport protocols in Internet : TCP and UDP

UNIT–V

APPLICATION LAYER ISSUES:-Domain Name System – Electronic mail - Network security. Network Simulator: Basics of Computer Network Simulation – Introduction to Network Simulator 2 (NS2) – Basic Architecture – Installation – Directories and Convention – Running NS2 Simulation – Simulation Examples

REFERENCE BOOKS

1. Andrew S. Tanenbaum, ‘‘Computer Networks”, PHI, 5th Edition, 2013
2. Behrouz A. Forouzan, ‘‘Data communication and Networking’’, Tata McGraw-Hill, 4th Edition, 2006
3. William Stallings, ‘‘Data and Computer Communication”, 7th Edition, Pearson Education, 2007
4. Teerawat Ussaruyakul, Ekram Hossain, Introduction to Network Simulator NS2, Springer, 2009

Subject Title: SOFTWARE ENGINEERING

Course Number: 14CSEAC13 **Number of Credits: 4**

Subject Description:

This course presents the role of software, system analysis, design concepts, methods, testing methods and strategies

Goal:

To enable the students to learn the basic functions, principles and concepts of software engineering.

Objectives: On successful completion of the course the students should have:

- Understood the role of software engineering
- Understood the design concepts, testing methods and strategies

Contents:

UNIT I

Introduction: Evolving role of software - Software characteristics, components and its applications - Generic view of software engineering - Software process models.

System Analysis: Requirements analysis - Analysis principles - Prototyping - Software requirement specification - Data modeling, functional modeling and behavioral modeling.

UNIT II

Design concepts: Design and software quality. Design concepts: Abstraction, refinement, modularity, and software architecture control hierarchy, structural partitioning and information hiding. Effective modular design: functional independence, cohesion and coupling - design documentation

UNIT III

Design Methods: Data design - Architectural design process: transform mapping and transaction mapping - interface design - procedural design.

UNIT IV

Software Testing Methods: Software testing fundamentals. White box testing: basis path testing and control structure testing - black box testing - Software Testing Strategies: A strategic approach to software testing - unit testing - integration testing - validation testing - system testing

UNIT V

Software Engineering Case Studies : Application of SE concepts in Hospitals or any small and medium scale Industry – SE in Hospital management System, Small and Medium Scale Enterprises – Application of SE in Marketing (For Unit V, students are expected to do a survey and study and submit a report)

REFERENCE BOOK

1. R. S. Pressman, ‘‘Software Engineering’’, (7th edition), Tata McGraw Hill, 2009, ISBN-10: 0073375977
2. R. S. Pressman, ‘‘Software Engineering”, (5th edition), Tata McGraw Hill, 1997.
3. Pankaj Jalote, “An Integrated Approach to Software Engineering”, Third Edition, Narosa Publishing House, 2005.
4. Richard F Schmidt, “Software Engineering: Architecture-driven Software Development”, 2013

Subject Title: OPERATIONS RESEARCH

Course Number: 14CSEAC14 **Number of Credits: 4**

Subject Description:

This course presents the various principles and applications of operations research and trains the students on solving problems using Operations research methods and EXCEL.

Goal:

To enable the students to learn the various principles and applications of operations research

Objectives: On successful completion of the course the students should have:

- Understood linear programming methods
- Understood network analysis methods

Unit-I

Linear Programming: Introduction, Mathematical Formulations, Solutions , Graphical Method, Simplex Method, Artificial variables, Big M, Two phase methods, Variants in Simplex Method, Duality Theory and Problems , Dual Simplex Method.

Unit-II

Transportation and its variants: Definition, Transportation Algorithms and Solutions, Assignment Model, Hungarian Method, Traveling Salesman Problem, The Transshipment Model - Queueing Theory:- Characteristic of Queueing System, Steady State M/M/I Model Finite.

Unit-III

Inventory Theory: Cost Involved in Inventory Problems, Single Item Deterministic Models, Economic Size Model with and without Shortages having Production Rate Infinite and Finite.

Unit-IV

PERT and CPM: Arrow Networks, Time Estimates, Various Expected Times, Critical Path, Critical Path Computations, Various Floats of Activities, Updating Projects Operation Time Cost.

Unit-V

Operations Research Models using Spreadsheets – Linear Programming Models :–A Manufacturing Example - Computational Considerations - Terminology - Solution Characteristics - **Network Flow Programming Models :-** Classical Models - Extensions of the Basic Models - Minimum Cost Flow Problem - Distribution and Networks :- any one Case Study from **Routing** of goods, electricity and digital data

REFERENCES:

1. Handy A Taha, ‘‘Operations Research- An Introduction”, Macmillan Publishing Co., 7th Edition(2004).
2. Sharma J K, ‘‘Operations Research - Theory and Application”, Mac Millan India: 2003.
3. Srivastava, U.K., Shenoy, G.V., and Sharma, S.C. (2009). Quantitative Techniques for Managerial Decision, 2/e; New Delhi: New Age International
4. Paul A. Jensen and Jonathan F. Bard**,**Operations Research Models and Methods, John Wiley Inc., 2003 http://www.me.utexas.edu/~jensen/ORMM, (for Unit V)

Subject Title: COMPUTER GRAPHICS

Course Number: 14CSEAE03 **Number of Credits: 4**

Subject Description: This course presents the origin of computer graphics, vector generating techniques, transformations, interactive graphics and raster graphics.

Goal:

To enable the students to learn basic transformations, algorithms and concepts of Computer Graphics.

Objectives: On successful completion of the course the students should have:

- Understood the Computer Graphics and the various graphic algorithms.
- Understood the 2D and 3D transformations, models and generation techniques

UNIT I

The origin of computer graphics – Interactive graphics display new display devices. General-purpose software display of solid objects.

UNIT II

Output Primitives: Points and Lines, DDA, Bresenham"s Algorithms - Properties of Circles and Ellipse – Pixel Addressing - Two Dimensional Geometric Transformations: Basic Transformations – Matrix Representations - Composite Transformations. Two Dimensional Viewing:- Line Clipping – Polygon Clipping – Curve Clipping – Text Clipping.

UNIT III

Three-Dimensional Concepts - Three Dimensional object Representations: Polygon Surfaces – Curved Lines and Surfaces – Quadric Surfaces – Super Quadric - Blobby Objects – Spline Representations – Cubic Spline Interpolation - B-Spline Curves and Surfaces – Fractal Geometry Methods – Classification – Dimension – Uniform B-Spline.

UNIT IV

Three Dimensional Geometric and Modeling Transformations: Translation – Rotation – Scaling. Three Dimensional Viewing: Viewing Pipeline – Viewing Co-ordinates – Projections – Clipping.

UNIT V

Visible–Surface Detection Methods: Classification of Visible Surface Detection Algorithms – Back Face Detection - Depth-Buffer Method - A-Buffer Method. Illumination Models and Surface-Rendering Methods: Basic Illumination Models – Polygon Rendering Methods. Color Models and Color Applications: RGB – YIQ – CMY – HSV.

REFERENCE BOOKS

1. Donald Hearn & M.Pauline Baker, ‘‘Computer Graphics”, Second Edition, PHI/ Pearson Education,
2. H.M.Neumann and R.F.Sproul, ‘‘Principles of Interactive computer Graphics”, Second Edition, McGraw Hill,
3. Steven Harrington, “Computer Graphics – A Programming Approach’’, McGraw Hill, 1983.
4. Shalini Govil, ‘‘Principles of Interactive Computer Graphics’’, Pai, 2005, Springer.
5. John F. Hughes, Andries van Dam, Morgan McGuire, David F. Sklar, James D. Foley, Steven K. Feiner, Kurt Akeley, ‘Computer Graphics: Principles and Practice’, Addison-Wesley Professional; 3 edition (July 20, 2013)

Subject Title: VISUAL PROGRAMMING

Course Number: 14CSEAC15 Number of Credits :4 L= 2 P=4

Subject Description:

This course presents the Windows programming and Visual C++ programming techniques.

Goal:

To enable the students to learn the basic functions, principles and concepts of Windows and VC++ programming

Objectives:

On successful completion of the course the students should have:

- Understood the Windows programming and Visual C++ programming techniques

Contents:

UNIT I

Windows Programming: Windows and Messages – Basic Drawing: Introduction to GDI – Device Context – GDI Mapping Mode – Rectangles, regions and Clipping – Keyboard: Basics – Keyboard Messages and Character Sets – Caret – Mouse: Basics – Client- Area Messages – Non-Client Area Messages – Timer: Basics – Using the Timer

UNIT II

Child Window Controls – Button Class – Controls and Colors – Static Class – Edit Class – Listbox Class – Menus and other Resources: Icons, Cursors, Strings and Custom Resources – Menus – Keyboard Accelerators – Dialog Boxes: Modal Dialog Boxes – Modeless Dialog Boxes – Common Dialog Boxes – Bitmaps and Bitblts: Basics – GDI Bitmap Object – Text and Fonts

UNIT III

Fundamentals of MFC – MFC Class Hierarchy – Various MFC Classes: CObject, CWinApp, CWnd, CGDIObject, CDialog, CString, CEdit, CButton, CListBox, CComboBox, CScrollbar, CStatic – File I/O and Serialization: CFile Class – Serialization and CArchive Class

UNIT IV

Document/ View Architecture: Document/ View Fundamentals – Single Document Interface – Multiple Documents and Multiple Views: Multiple Document Interface – Toolbars – StatusBars – Threads and Synchronization: Threads – Thread Synchronization – Classes: CThread – CSemaphore – CMutex and CEvent

UNIT V

DAO & ODBC – Data access methods & MFC Data Controls for Database Applications – MFC and Component Object Model – The Clipboard and OLE Drag-and-Drop – ActiveX Controls: Basics – Building ActiveX Controls – using ActiveX controls in MFC applications

REFERENCE BOOKS

1. Charle Petzold, "Programming Windows'', Microsoft Press, Fifth Edition, 1998.
2. Jeff Prosise, "Programming Windows with MFC", Microsoft Press, Second Edition, 1999.
3. Mickey Williams, David Bennett, "Visual C++ 6 Unleashed", Sams Publications, 2000.
4. Ivor Horton, "Beginning Visual C++ 2012", John Wiley & Sons, 2012.
5. www.spoken-tutorial.org

Subject Title: SOFTWARE PROJECT MANAGEMENT

Course Number: 14CSEAC16 **Number of Credits : 4** **L= 4 P= 0**

Subject Description:

This course presents the introduction to software projects, activity planning, risk management , software configuration management.

Goal:

To enable the students to learn the basic functions, principles and concepts of Software project management.

Objectives:

On successful completion of the course the students should have:

- Understood the Software configuration management
- Understood the Activity Planning , Risk Management using case studies

Contents:

UNIT I

Introduction to Software Projects – An Overview of Project Planning – Project Evaluation – Selection of an appropriate Project approach – Software effort Estimation.

UNIT II

Activity Planning – Project Schedules – Sequencing and Scheduling Projects – Network Planning Model – forward and backward pass-Identifying the Critical path-Activity float-Shortening Project Duration – Identifying Critical Activities-precedence networks.

UNIT III

Risk Management – Resource Allocation – Monitoring and Control – Managing People and Organizing Teams – Planning for Small Projects.

UNIT IV

Software Configuration Management – Basic Functions – Responsibilities – Standards – Configuration Management – Prototyping – Models of Prototyping.

UNIT V

Case Studies - Application of SPM concepts in Hospital information systems or information systems of any small and medium scale Industry – SPM in Hospital information management System, Small and Medium Scale Enterprises – Application of SPM in Marketing

(For Unit V, students are expected to do a survey and study and submit a report)

REFERENCE BOOKS

1. Mike Cotterell, Bob Hughes, ‘‘Software Project Management”, Inclination/Thomas Computer Press, 1995.
2. Darrel Ince, H.Sharp and M.Woodman, ‘‘Introduction to Software Project Management and Quality Assurance’’, Tata McGraw Hill, 1995.
3. Ramesh Gopalasamy, “Managing Global Software Projects”, 2005.
4. S. A. Kelkar, “Software Project Management: A Concise Study”, PHI Learning Pvt. Ltd., Dec-2012

WEB SITES

PMBOK, Project management body of knowledge www.pmi.org

Subject Title: MULTIMEDIA SYSTEMS

Course Number: 14CSEAC17 **Number of Credits :4**

Subject Description

This course presents the Introduction to Multimedia, Images & Animation.

Goals

To enable the students to learn the concepts of Multimedia.

Objectives

On Successful completion of the course the students should have:

 Understood the Multimedia animation and Desktop Computing.

Contents:

Unit I

Introduction : Introduction to Multimedia PCs – Components of Multimedia – Multimedia Tools Sound and Graphics : Digital Sound – Editing and Mixing sound files – MIDI creation – Tracking Procedure – Interactive and Non Interactive Graphics – High Resolution Graphics – Difference between TV and Computer Display.

Unit II

Video and Animation : Digital Image concepts – Video Capturing – Scanning Images – Digital Filters Morphing and Warping – Two Dimensional and Three dimensional animation – Animation Tools – Layering technique – Blue Screen technique – Latest movie technologies – Motion Tracking System – Motion Capturing Syatem.

Unit III

Creating Presentation : Script Writing and creating interactive and non interactive presentation – Linear and Non Linear Editing – Authoring Tools – File Formates SOUND, VIDEO, ANIMATION, Presentation Images. Multimedia Programming : Text Links – Hyper Text system – Form Creation – File storing - Error Traping.

Unit IV

Sound Links: Multimedia interfaces – MCI- API- High Level Multimedia Functions – WAVE , MIDI file processing. Animation : Color Palette – Events – ROPs.

Unit V

Imaging Special Visual Effects : Bitmap – Brushes – Dissolve –Hotspot Editor – Scorlling. Media Control Interface : Simple Commands – API functions – CD Player – Video Capturing – Form – AVI Play Form.

REFERENCE BOOKS

1. KaliyaperumalKarthikeyan,“Introduction to Multimedia System”,LAP Lambert Academic Publishing, 2011
2. TayVaughan,“Multimedia Making It Work Eighth Edition”,Tata McGraw-Hill Publishing Company; 8 edition, 2011
3. ParagHavaldarand Gerald Medioni,“Multimedia Systems”, Cengage Learning, 2011
4. S. K. Bansal,“Multimedia Systems”,Aph Publishing Corporation, 2011
5. www.spoken-tutorial.org

Subject Title: COMPUTER SECURITY AND CRYPTOGRAPHY

Course Number: 14CSEAC18 Number of Credits :4

Subject Description:

This course presents the introduction to encryption, cryptography, system security, database security and ethical issues in computer security.

Goal:

To enable the students to learn the basic concepts in cryptography, security mechanisms and ethical issues in computer security.

Objectives:

On successful completion of the course the students should have:

- Understood the concepts in encryption, cryptography
- Understood the concepts of system security and database security
- Understood the ethical issues in computer security

Unit-I Introduction

Introduction to security attacks - services and mechanism - introduction to cryptography - Classical Encryption Techniques -substitution ciphers and transposition ciphers – cryptanalysis – steganography - stream and blockciphers - Block ciphers -Data Encryption Standard(DES) - strength of DES - differential and linearcrypt analysis of DES - block cipher modes of operations - triple DES.

Unit-II Public Key Cryptography

Number Theory concepts – Primality – Modular Arithmetic – Fermat & Euler Theorem – Euclid Algorithm – RSA Algorithm – Elliptic Curve Cryptography – Diffie Hellman Key Exchange - Cryptographic hash functions - Cipher Block Chaining - Secure Hash Algorithm - Digital Signature: Schnorr Digital Signature Scheme -Digital Signature Standard - Kerberos

Unit-III System Security

Intruders-Intruder detection-Password management- Viruses- virus countermeasures-worms-DOS attack- Firewalls.Transport -Level Security: Secure Socket Layer and Transport Layer Security - Wireless Transport Layer Security

Unit-IV Operating System and Database Security

Security methods of OS- Access Control – File Protection mechanism- User authentication- Security policies – Models of Security- Concepts of a Database- Security Requirements- Multilevel database.

Unit-V Ethical and Legal Issues in Computer Security

Cybercrime- Computer crime-Copyrights-patents-Information and law- computer crime-Ethical issues-case studies.

References:

1.William Stallings, “Cryptography & Network Security”, Pearson Education, 5th edition.New Delhi 2005.

2. Charles P. Pfleeger, Shari L. Pfleeger, “Security in Computing”, Prentice Hall, 4th edition. 2003.

Subject Title: INTERNET PROGRAMING AND WEB DESIGNING

Course Number: 14CSEAC19 Number of Credits :4

Subject Description:

This course presents the Internet basics, XML, Java script, ASP, ASP.NET and Web Services concepts.

Goal:

To enable the students to learn the principles of Internet programming.

Objectives:

On successful completion of the course the students should have:

- Gained knowledge in Internet basics, XML and Web Services
- Understood Java Script , ASP and ASP.NET programming.

UNIT I

Internet Basics: Introduction – Getting Connection – Services - Mail – News Groups – FTP – Telnet – WAIS – Archive – Gopher – Veronica – HTML: Traditional text and formatting – Using tables, images, frames, links and forms – Merging multimedia and plug-Ins – Cookies – Creating dynamic HTML pages

UNIT II

SCRIPTING LANGUAGE- Scripting basics - Java Script programming - validation process - Cascading style sheets - Object model and collections - Event model - Filters and Transitions - ActiveX controls

XML: Need for XML – Documentation – Elements and Attributes – Valid Documents – Viewing – Processing – XML Document – Object Model Using Meta Data – Rendering XML with XSL

UNIT III

Active server pages: Introduction – client side scripting versus server side scripting – usin g personal web server and internet information server – active server page objects – an example – server side activex components – file system objects – session tracing and cookies – databases - SQL, Microsoft UDA and ADO – accessing a database from an active server page

UNIT IV

ASP.NET: Introduction to .NET Framework – .NET Languages – ASP.NET Applications - .NET Data Services: ADO.NET – Data Binding – Using XML – ASP.NET AJAX

UNIT V

Service Oriented Architecture: Fundamentals – Web Services and SOA: Web Services Framework – WSDL – SOAP - .NET Web Services

REFERENCE BOOKS

1. Peter Kent, “10 Minute Guide to the Internet“, Prentice Hall of India, 1996.
2. Kogent Learning Solutions, “HTML 5Black Book”, Dream Tech Publishers, 2011.
3. Deitel & Deitel, “Java How to program”, Prentice Hall 1999.
4. Scott Mitchell and James Atkinson, “Teach Yourself XML in 21 days”, Sams Publishing, 1999.
5. Nicholas Chase, “ASP 3.0 from Scratch”, Prentice Hall India Ltd, 2000.
6. Matthew MacDonald, “ASP.NET: The Complete Reference”, Tata McGraw Hill, 2002.
7. Imaar Spaanjaars, “Beginning ASP.NET 4.5 in C# and VB”, Wrox Publications, John Wiley & Sons, 2013.
8. Thomas Erl (Editor), “SOA with .NET”, Prentice Hall Publications, First Edition, 2010.
9. Alex Ferrara and Matthew MacDonald, “Programming with .Net Web Services”, O’Reilly & Associates Inc., First Edition, 2002.
10. www.spoken-tutorial.org

Subject Title: ENTERPRISE JAVA PROGRAMMING

Course Number: 14CSEAC20 Number of Credits: 4

Subject Description:

This course presents a detailed study on the Multi-tier Enterprise Architecture of Java, Database Connectivity in Java, Remote Method Invocation in Java, Java Servlets, Java Server Pages and an overview on JQuery, AJAX and Java ME.

Goal:

To enable the students learn the advanced concepts of Java programming and to design web based as well as distributed applications in Java.

Objectives:

On successful completion of the course the students should have:

- Gained knowledge in web page designing, component designing and designing distributed applications using Java.

Contents:

Unit I

Introduction to Enterprise Java Programming: Distributive Systems – Multi-Tier Architecture of J2EE – Clients and Client Tier – Web Tier – EJB Tier – EIS Tier – J2EE best practices - Enterprise Applications Strategy - Session Management.

Unit II

Database Programming in Java: Overview of the JDBC Process - JDBC Concepts - JDBC Driver types – Database Connection- JDBC/ODBC Bridge – Statement Objects – The Connection Interface - ResultSet – Interacting with the database - Transaction Processing.

Unit III

Java Remote Method Invocation (RMI): Distributed Application Architecture – Client proxy and Server Proxy – Remote Interface and Passing Objects – RMI process - Defining and using Remote objects - Remote Object Activation - Object Serialisation and RMI.

Unit IV

Java Servlets: Basics – Benefits of Servlets - Initialization – Deployment – Reading Client Data – Reading HTTP Request Headers – Cookies - Session Tracking – Database Connections.

Java Server Pages (JSP) - Overview - JSP tags - Components of a JSP page - Expressions – Scriptlets – Directives – Declarations - Working with JSP- JSP and JDBC.

Unit V

JQuery: Introduction – Adding JQuery to Webpages- JQuery Editor – JQuery Selectors and Elements – Animations and Events handling in JQuery.

AJAX: Overview- AJAX and JQuery- **Java ME-** Java for Mobile Devices.

REFERENCE BOOKS

1. Jim Keogh," The Complete Reference J2EE", Tata McGrawHill Publishing Company Ltd, 2010.
2. Jamie Jaworskie,"Java 2 Platform Unleashed", Techmedia SAMS, IV edition, 2008.
3. Phil Kanna," The Complete Reference JSP 2.0", Tata McGrawHill Publishing Company Ltd, 2003.
4. David Sawyer McFarland, "JavaScript and jQuery - The missing Manual", O'Reilly Publications, 2nd Edition, 2011.
5. http://www.oracle.com/us/technologies/java/mobile/resources/index.html
6. www.spoken-tutorial.org

Subject Title: DATA MINING

Course Number: 14CSEAC21 **Number of Credits: 4 (3+1)**

Subject Description:

This course presents on depth of to data mining techniques; association rule, clustering, classification, web mining, temporal and sequential data mining and provide a practical exposure using data mining tool orange.

Goal:

To enable the students to learn the basic functions, principles and concepts of Data Mining

Objectives:

On successful completion of the course the students should have:

- Understand the data mining techniques, classification and web mining.

Contents:

UNIT I

Data mining: Introduction – Data as a Subject - Definitions- KDD vs. Data mining- DM techniques- Association Rules: Concepts- Methods to discover Association rules- A priori algorithm – Partition algorithm- Pioneer search algorithm –Dynamic Item set Counting algorithm-FP-tree growth algorithm-Incremental algorithm-Border algorithm-Generalized association rule. Analysis of association rule using orange.

UNIT II

Clustering techniques: Clustering paradigms – Partition algorithm-K- Medeoid algorithms – CLARA- CLARANS –Hierarchical DBSCAN- BIRCH- CURE-Categorical clustering algorithms-STIRR-ROCK-CACTUS-Other techniques: Implementation of Clustering techniques using orange tool. Introduction to neural network - learning in NN- Genetic algorithm-Case studies.

UNIT III

Classification Technique: Introduction – Decision Trees: Tree Construction Principle - Decision Tree construction Algorithm – CART – ID3 - RainForest - CLOUDS - BOAT, Pruning Technique. Implementation of Classification techniques using orange tool.

UNIT IV

Web mining: Basic concepts – Web content mining – Web structure mining – Web usage mining – text mining – text clustering

UNIT V

Temporal and Sequential Data mining: Temporal Association rules – Sequence Mining – The GSP algorithm – SPADE – SPIRIT – WUM – Spatial mining – Spatial mining tasks – Spatial clustering – Spatial trends

REFERENCE BOOKS

1. Jaiwei Han and Micheline Kamber,"Data Mining Concepts and Techniques", Morgan Kaufmann Publishers, 2011, 3rd Edition.
2. Arun K. Pujari, "Data mining Techniques", Third Edition, Universities Press (India) Limited, Hyderabad, 2009.
3. Pieter Adriaans, Dolf Zantinge, "Data Mining", Addison Wesley, 2008.
4. Krzyszlof J Cios, Witold Pedrycz, "Data Mining: A Knowledge Discovery Approach", Springer, 2010.
5. Arijay Chaudhry, Dr. P .S Deshpande, "Multidimensional Data Analysis and Data Mining", Dreamtech press, 2009.

WEB LINKS

1. http://www.celta.paris-sorbonne.fr/anasem/papers/miscelanea/InteractiveDataMining.pdf

Subject Title: ELECTIVE - E-COMMERCE

Course Number: 14CSEAE04 Number of Credits :4

Subject Description:

This course presents the introduction to E-Commerce, Network Infrastructure, Information publishing technology, Securing network transaction, search engines.

Goal:

To enable the students to learn the basic functions, principles and concepts of E-Commerce.

Objectives:

On successful completion of the course the students should have:

- Understood the ECommerce framework

Contents:

UNIT I

Introduction to E-Commerce : Benefits-Impacts-Classification and Application of ECommerce-Business Model-Architectural Frame Work

UNIT II

Network Infrastructure: Local Area Network-Ethernet-Wide Area Network-Internet-TCP/IPReference Model-Domain Name System-Internet Industry structure-Information Distribution and Messaging: FTP Application-Electronic Mail-World Wide Web Server-HTTP-Web Server Implementations

UNIT III

Information Publishing Technology: Information publishing-Web Browsers-HTML-CGIMultimedia Content - Other Multimedia Objects-VRML- Securing the Business on Internet-Why Information on Internet is vulnerable?-Security Policy-Procedures and Practices-Site Security-Protecting the Network-Firewalls-Securing the Web Service

UNIT IV

Securing Network Transaction-Electronic Payment Systems: Introduction –Online Payment Systems-Pre-paid Electronic Payment System- Post-paid Electronic Payment System- Requirement Metrics of a Payment System

UNIT V

Search Engines and Directory Services : Information Directories –Search Engines –Internet Adverting- Agents in Electronic Commerce : Needs and Types of Agents-Agent Technologies-Agents Standards and Protocols-Agents Applications-Case Study.

REFERENCE BOOK

1.Bharat Bhasker, " Electronic Commerce : Framework, Technologies and Applications ", Tata Mcgraw Hill Education Private Limited, 2003.

2. Kenneth Laudon, Carol Guercio Traver, 'E-commerce 2013' , Prentice Hall; 9 edition (November 30, 2012)

Subject Title: ELECTIVE - ENTERPRISE RESOURCE PLANNING

Course Number: 14CSEAE05 Number of Credits :4

Subject Description:

This course presents the introduction to ERP, ERP and related technologies, ERP Market, Vendors

Goal:

To enable the students to learn the basic functions, principles and concepts of Enterprise Resource Planning.

Objectives:

On successful completion of the course the students should have:

· Understood the Enterprise Resource Planning and related technologies

Contents:

UNIT I

Introduction to ERP : Evolution of ERP-ERP-Reason for the growth of the ERP market-Advantage-Enterprise-An overview: Integrated Management Information-Business modeling-integrated Data Model

UNIT II

ERP and Related Technologies: Business Process Reengineering-Management Information System-Decision Support System-Executive Information Data ware housing-data mining- OLAP-Supply Chain Management-A Manufacturing Perspective: CAD/CAM-MRP-BOMClosed Loop MRP-Data Management –Benefits of PDM-Make to order-Assembler-Engineer to order-Configure-ERP Modules.

UNIT III

ERP Market- Implementation LifeCycle: Introduction-Pre-Evaluation Screening-Package Evaluation-Project Planning Phase-Gap Analysis-Reengineering-Configuration- Implementation Team Training -Testing –End User Training-Post -Implementation

UNIT IV

Vendors, Consultant and Users- Future Directions in ERP: New Markets-New Channels- Faster Implementation Methodologies-Business Models and BAPIs-Convergence on Windows NT-New Business Segments-More Features-Web Enabling Markets -Snapshot

UNIT V

ERP Case Studies: SAP R/3 ,Oracle, People soft

REFERENCE BOOKS

1. Alexis Leon, “Enterprise Resource Planning”, Tata McGRAW-Hill Edition,2005
2. Michael Hammer, “Enterprise Resource Planning”, 1998.
3. K.Nagappan, “Digital Computers and Data Processing “, 1996.
4. J.A.Hernandez, “SAP R/3 Handbook”, 3rd Edition, McGraw-Hill , 2005.
5. Ellen Monk, Bret Wagner, ‘Concepts in Enterprise Resource Planning’, Cengage Learning; 4 edition, 2012.

Elective: IMAGE PROCESSING

Course Number: 14CSEAE06 **Number of Credits :4**

Subject Description:

This course presents the Introduction, image enhancement, image filtering and restoration, image data compression and image segmentation.

Goal:

To enable the students to learn the basic functions, principles and concepts of Image processing.

Objectives:

On successful completion of the course the students should have:

- Understood the Image processing.
- Understood the image enhancement, image filtering and restoration

Contents:

UNIT I

Introduction: Fundamental Steps in Image processing – Elements – Digital Image Fundamentals – Image representation – Modeling – Image enhancement – Image restoration – Image analysis – Image reconstruction from projections – Image data compression – Two-Dimensional Systems and Mathematical Preliminaries: Notation and definitions – Discrete and Fast Fourier Transform

UNIT II

Image Enhancement: Point operations – Enhancement by point processing – Histogram modeling – Spatial operations – Enhancement in Frequency Domain – Transform operations – Multispectral Image Enhancement – Color Image Enhancement

UNIT III

Image Filtering and Restoration: Degradation model – Diagonalization of circulant and block circulant matrices - Algebriac approach to restoration – Inverse and Wiener filtering – Finite impulse response Wiener filters – Other Fourier Transform Filters – Smoothing splines and Interpolation – Least square filters – Recursive and semirecursive filtering – Maximum entropy restoration – Bayesian methods – Coordinate transformation and Geometric correction – Blind deconvolution – Extrapolation of band-limited signals

UNIT IV

Image Data compression: Fundamentals – Image compression models – Elements of information theory – Pixel coding – Predictive techniques – Transform coding theory – Transform coding of images – Hybrid coding and vector DPCM – Inter frame coding – Image coding in the presence of channel errors – Coding of two tone images – color and multi-spectral Image coding – Lossless and lossy compressions - standards

UNIT V

Image Segmentation – Representation and Description – Recognition – Interpretation – Image analysis and Computer vision – Image reconstruction from Projections – Artificial Neural networks for color classification - Realization for real time processing – Three-dimensional Filters

REFERENCE BOOKS

1. Anil K. Jain, “Fundamentals of Digital Image Processing”, Second Edition, Prentice-Hall of India Private Limited, New Delhi, 1995.
2. Rafael C. Gonzalez and Richard E. Woods, “Digital Image Processing”, Addison-Wesley Publishing Company, Newyark, Third edition, 2008.
3. Maher A. Sid-Ahmed, “Image Processing – Theory, Algorithms and Architectures”, McGraw Hill, Inc, Newyark, 1995.
4. Moeslund Thomas B, “Introduction to Video and Image Processing”, Springer, 2012.

Subject Title: ELECTIVE - SOFT COMPUTING

Course Number: 14CSEAE07 **Number of Credits :4**

Subject Description:

This course presents the introduction, the basic neuron, kohenen self- organizing network, hop field networks, associative memory.

Goal:

To enable the students to learn the basic functions, principles and concepts of Neural Networks.

Objectives:

On successful completion of the course the students should have:

- Understood the pattern classification in Neural Networks
- Understood the Self-organizing Network and Hopfield Networks

Contents:

UNIT I

Introduction: Humans and Computers – The structure of brain – Learning in machines – The differences - Pattern Recognition: Introduction – Pattern recognition in perspective – Pattern recognition – a definition – Feature vectors and feature space – Discriminant functions – Classification techniques – Linear classifiers – Statistical techniques – Pattern recognition: a summary

UNIT II

The Basis Neuron: Introduction – Modelling the single neuron – Learning in simple neurons – The perceptron: a vertical perceptive – The perceptron learning rules – Proof – Limitations of perceptron

UNIT III

Kohenen Self-organizing Network: Introduction – the Kohenen algorithm – Weight training – Neighbourhoods – Reducing the neighbourhood – Learning vector quantization – The phonetic type writer

UNIT IV

Hopfield Networks: The Hopfield model – The energy landscape – The boltzman machine – Constraint satisfaction – Adaptive resonance memory: Adaptive resonance theory – Architecture and operations - ART algorithm – Training the ART network – Clarification – Conclusion – Summary of ART

UNIT V

Associative Memory: Standard computer memory – Implementing associative memory – Implementation in RAMs, FAMs & n-tupling – Willshaw's associative networks

REFERENCE BOOKS

1. P.D. Wasserman, "Neural Computing: Theory and Practice", Van Nostran Reinhold, New York, 1991.
2. Limin Fu, "Neural Network in Computer Intelligence", McGraw Hill International Editions, 1994.
3. R. Beale, T. Jackson and Adam Hilger, "Neural Computing: An introduction", Addison Wesley, 1990.
4. Simon Haykin. "Neural Networks And Learning Machines", 3 Edition, Prentice-Hall, 2010.

SUBJECT TITLE: ELECTIVE - DATA ANALYSIS AND BUSINESS INTELLIGENCE

Course Number: 14CSEAE08 Number of Credit: 4 (3+1)

Subject Description:

This course presents on depth of to data analytics and application of data analytic tools for decision making. The course also provides with an overview of techniques used in data analytics through practical exercise.

Goal:

To enable the students to learn and understand the basic concepts of data analytics and its tools for decision making in business data.

Objectives:

On successful completion of the course the students should have:

- Understand the Data Analytic concepts, tools and analysis of data using the tools.

UNIT I

Data warehousing: Introduction – Definition – Multidimensional data model – OLAP operations – Warehouse schema – Data warehousing architecture – Warehouse server – Meta data – OLAP Engine – Data warehouse backend process – Cloud data warehousing - Other features

UNIT II

Data analytics : Statistical data analysis – Fact based decision making using statistical data analysis – Descriptive model – Predictive model - Analyze and predict results based on historical patterns- Apply statistical methods to economic data, problems and trends

UNIT III

Statistics for Data Engineers: Mean, Median, Variance, Standard Deviation –Regression- Correlation Test: Chi square, Spearman Rank correlation, Pearson correlation coefficient – Parametric Test: period sample t-test, Two Independent t-test, One sample t-test – Non Parametric Test: The wilcoxon rank sum text and mann whileny test, wilcoxon signed-ranked test

UNIT IV

Business Intelligence: Introduction – Need for BI – Related Areas - Data Preprocessing – Visualization - Variable reduction, Principle components, Course of Dimensionality – Business Intelligence model - Design Business Intelligence model and conducting the analysis

UNIT V

Tools for BI: (Any one tool in depth) Tools Overview – Tools: Cognos, Business Object, Intelligent Miner, Siebel, BI Tool, Oracle Miner, SAS.

Reference Books

1. Ralph Kimball, Joe Casertra, "The Data Warehouse ETL Toolkit: Practical Techniques for Extracting, Cleaning" , Willy Inc, 2004.
2. Cindi Howson "Successful Business Intelligence: Secrets to Making BI a Killer App" **,** Tata McgrawHill, 2007.
3. Galit Shmueli, Nitin R. Patel and Peter C., Bruce, "Data Mining for Business Intelligence: Concepts, Techniques, and Applications in Microsoft Office Excel with XLMiner", Wiley, 2007.
4. Jesse Russell, Ronald Cohn, "Business Intelligence Development Studio",Book on Demand, 2012
5. Andy Field & Jeremy, "Discovering Statistics using SAS" SAGE, 2010.
6. Reema Thareja, "Data Warehousing", Oxford University Press, 2009.

Web links

1. www.sas.com/technologies/bi/
2. www.keysoft.co.in/
3. www.dataminingbook.com/
4. www.honeywellvideo.com/products/ias/da/index.html

Subject Title: ELECTIVE - INTELLIGENT AGENTS

Course Number: 14CSEAE09 Number of Credits :4

Subject Description:

This course presents a detailed view on intelligent software agents and biological inspirations for developing agents

Goals:

To enable the student to be familiar with current trends of agent based computing techniques

Objectives:

On successful completion of the course the student should have:

- Understood the concepts of intelligent agent
- Gained knowledge upon the problem solving techniques developed from biological inspiration

UNIT I

Overview of Intelligent Agents – Software Agent Programming Paradigms – Agent Vs Object – Aglet – Mobile Agents – Agent Frameworks – Agent Reasoning - Applications of Intelligent software agents-Practical design of intelligent agent systems.

UNIT II

Multiagent Systems: Interaction between agents – Reactive Agents – Cognitive Agents – Interaction protocols – Agent coordination – Agent negotiation – Agent Cooperation – Agent Organization – Self-Interested agents in Electronic Commerce Applications.

UNIT III

Agents and Security: Agent Security Issues – Mobile Agents Security – Protecting Agents against Malicious Hosts – Untrusted Agent – Black Box Security – Authentication for agents – Security issues for Aglets.

UNIT IV

Natural to Artificial Systems – Biological Inspirations in problem solving – Behavior of Social Insects: Foraging - Division of Labor - Task Allocation– Cemetery Organization and Brood Sorting – Nest Building- Cooperative transport.

UNIT V

Natural Computing – Introduction - Evolutionary Computation and Computational Intelligence Swarm Intelligence: Biological foundations of Swarm Intelligence – Swarm Intelligence in Optimization – Ant Colony Optimization.

REFERENCES:

1. Jeffrey M Bradshaw, “Software Agents”, AAAI Press / MIT Press, 2000.
2. Richard Murch, Tony Johnson, "Intelligent Software Agents", Prentice Hall, 2000.
3. Gerhard Weiss, “Multi Agent Systems – A Modern Approach to Distributed Artificial Intelligence”, MIT Press, 2000.
4. Marco Dorigo, Thomas Stutzle, “Ant Colony Optimization”, MIT Press, 2006.
5. M. Wahde, “ Biologically Inspired Optimization Methods”, WIT Press, 2008.
6. Christian Blum, Daniel Merkle (Eds.), “ Swarm Intelligence – Introduction and Applications”, Springer, 2008.

Subject Title: ELECTIVE – GRID AND CLOUD COMPUTING

Course Number: 14CSEAE10 Number of Credits :4 L= 4 P= 0

Subject Description:

This course presents a detailed overview of grid and cloud systems, design considerations, system models and databases.

Goal:

To enable the students to learn the basic functions, principles and concepts of Grid and cloud Systems.

Objectives:

On Successful completion of the course the students should have:

- Understood the Grid and Cloud Systems Design, architecture, data and resource management.

Contents:

UNIT I

Introduction to Parallel and Distributed Computing - Cluster Computing - Grid Computing- Cloud Computing - Anatomy and Physiology of Grid- Web and Grid Services - Grid Standards - OGSAWSRF
- Resource sharing - Trends, Challenges and Applications.

UNIT II

Open Grid Services Architecture (OGSA)-OGSI-OGSA use cases: Commercial data center (CDC), National Fusion collaboratory (NFS), Online media and entertainment – OGSA platform components - OGSA basic services - Policy Architecture- Security Architecture

UNIT III

Resource management on the Grid - Grid resource management systems- Work management- Layers of Grid computing.

Globus GT3 Toolkit: GT3 Software Architecture model- Resource allocation- Resource management and Data management services.

UNIT IV

Cloud Architecture and Model: Technologies for Network-Based System – System Models for Distributed and Cloud Computing. Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand – Security in cloud.

UNIT V

Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim.

REFERENCE BOOKS

1. Joshy Joseph, Craig Fellenstein, "Grid Computing", IBM Press, Pearson Education, Indian Reprint, 2009.
2. Ian Foster, Carl Kesselman, "The Grid 2: Blueprint for a New Computing Infrastructure", Morgan Kaufmann Publishers (Elsevier), II Edition, 2004.
3. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
4. Rajkumar Buyya, Christian Vecchiola, S.Thamarai Selvi, 'Mastering Cloud Computing", Tata McGraw Hill Publishers, 2013.

Subject Title : Elective : INFORMATION RETRIEVAL

Course Number : 14CSEAE11 Number of Credits : **4 L= 4 P= 0**

Subject Description: This course presents the information retrieval techniques.

Goal: To enable the students to learn the basics of information retrieval techniques, classification techniques and web search

Objectives: On successful completion of the course the students should have:

- Understood the information retrieval techniques

CONTENTS:

Unit I

Boolean Retrieval : An example information retrieval problem - A First take at building an inverted index - Processing Boolean queries - The extended Boolean Model versus ranked retrieval - **The term vocabulary and postings lists -** Document delineation and character sequence decoding - Determining the vocabulary of terms - Faster postings list intersection via skip pointers - Positional postings and phrase queries - **Search Structures for dictionaries :** Wild Card queries-Spelling Correction-Phonetic correction

Unit II

Index construction : Hardware basics-Blocked sort-based indexing-Single pass in memory indexing-Distributed indexing-Dynamic indexing-Other typer of indexes - **Scoring, term weighting and the vector space model :** Parametric and zone indexes - Term frequency and weighting - The vector space model for scoring - Varient tf-idf functions - **Computing scores in a complete search system :** Efficient scoring and ranking - Components of an information retrieval system - Vector space scoring and query operator interaction

Unit III

Relevance feedback and query expansion : Relevance feedback and pseudo relevance feedback - Global methods for query reformulation - **XML retrieval :** Basic XML concepts - Challenges in XML retrieval - A vector space model for XML retrieval - Evaluation of XML retrieval - Text-centric versus data-centric XML retrieval - **Probabilistic information retrieval:** Review of basic Probabilistic theory - The Probabilistic ranking principle - The binary independence model - An appraisal and some extensions - References and further reading

Unit IV

Text classification and Naïve Bayes : The text classification problem – Naïve Bayes text classification – The Bernoulli model – Properties of Naïve Bayes – Feature selection – Evaluation of text classification – **Vector space classification :** Document representations and measures of relatedness in vector spaces – k nearest neighbor – Linear versus nonlinear classifiers – Classification with more than two classes – The bias – variance tradeoff

UNIT V

Web search basics: Background and history - Web characteristics - Advertising as the economic model - The search user experience - Index size and estimation - Near-duplicates and shingling References and further reading - **Web crawling and indexes:** Overview – Crawling - Distributing indexes - Connectivity servers - References and further reading - **Link analysis:** The Web as a graph – PageRank - Hubs and authorities

TEXT BOOKS / REFERENCES

1. Christopher D. Manning, Prabhakar Raghavan and Hinrich Schutze, „Introduction to Information Retrieval", Cambridge University Press, 2008.
2. Baeza-Yates, Ricardo and Berthier Ribeiro-Neto, „Modern Information Retrieval", Addison-Wesley 1999.
3. Beesley, Kenneth R. and Lauri Karttunen, "Finite State Morphology", CSLI Publications. 2003,
4. C. J. Van Rijsbergen, „Information Retrieval", Information Retrieval Group, University of Glasgow, 1979.
5. David A. Grossman, Ophir Frieder, „Information Retrieval: Algorithms and Heuristics, Springer, 2nd Edition, 2004.
6. Marcia J. Bates, "Understanding Information Retrieval Systems: Management, Types, a Standards", CRC Press, 2012
7. Gerald Kowalski, "Information Retrieval Architecture and Algorithms", Springer, 2010.

Subject Title: MANAGEMENT CONCEPTS AND COMMUNICATIONS

Course Number: 14CSEAE12 Number of Credits :4

Subject Description:

This course presents the management, organizing, directing, communication and written communication.

Goal:

To enable the students to learn the basic functions, principles and concepts of management concepts and communication.

Objectives:

On successful completion of the course the students should have:

· Understood the meaning and functions of management

· Understood organizing, directing, communication and written communication.

Contents:

Unit I

Management - Meaning and Functions- Management and Administration - management as an art, Science and Profession – Management Hierarchy – Management process: POSDCORB – Planning- Steps – Types – Premises –Forecasting – Objectives - M.B.O.

Unit II

Organising - Structure – Departmentation - Span of Management - Authority and Responsibility – Delegation of Authority and Decentralisation – Making Effective Delegation – Line and Staff relationship – Formal and Informal Organisation.

Unit III

Directing: -Meaning- Procedure – Principles, Leadership: Styles – Qualities of Leader – Motivation: Theories of Maslow, Herzberg, Mcgregor, Vroom and Mcieland - Incentives. Controlling Types - Budgetary and Non-budgetary Control Techniques – Staffing: Selection and Recruitment – Training and Development – Performance Appraisal.

Unit IV

Communication- Meaning and importance – Principles objectives – Process of communication – Types: Formal Vs Informal; Written Vs Oral; Downward Vs Upward; Horizontal Vs Vertical; Grapevine – Communication Media. Barriers to Communication -

Overcoming barriers.

Unit V

Written Communication - Effective Drafting - Business letters- Layouts of business letter – Drafting letters for Sales and Collection. Oral Communication: Interviews – Telephone Conversation - Instruction – Dictation – Non Verbal Communication – Body Language – Conducting Meetings: Notice , Agenda , Minutes.

REFERENCE BOOKS

1. Koontz and Werich, " Management", McGraw-Hill Kogakusha, 1980.
2. Asha Kual, "Effective Business Communication" P H I, 2000
3. Tripathy and Reddy, "Principles of Management" Tata Mcgraw Hill, 2008.
4. L.M. Prasad-"Principles of Practice of Management, Sultan chand and Sons, 2007.
5. Penny Barratt, Julie Border, Helen Joy, Alison Parkinson, Mo Potter, George Thomas, "Developing Pupils Social Communication Skills: Practical Resources", Routledge, 2013
6. Krishna Mohan and Meera Banejee, "Developing Communication Skills", Mcmillan India, 2000.
7. Koontz, "Essentials Of Management 8E", Tata McGraw-Hill Education, 2010

Subject Title: VB .NET

Course Number: 14CSEAE14 **Number of Credits :4**

Subject Description:

This course presents the introduction to VB and .NET, functions, monitoring mouse activity, overview of .NET, .NET framework.

Goal:

To enable the students to learn the basic VB.NET and concepts of arrays

Objectives:

On successful completion of the course the students should have:

- Understood VB.net programming

Contents:

Unit I

Software Development and VB.NET – VB.NET and the .NET Framework – The VB.NET Development Environment – Modules and Namespaces – data Types – Assignments and Operators – Types, Structures and Enumeration – Control SDtructures – Control Flow – Error Handling: Basics, Classes

Unit II

Object Oriented Programming – Class Fundamentals: Fields, Methods, Properties, Contructors, Events, Shared Members – Inheritance: Basics, Overriding, Sealed and Virtual Classes – Interfaces – Delegates – Attributes – Lists, Collections, and Other Data Structures.

Unit III

Files and Directries: Directory and File Classes, DirectoryInfo and FileInfor Classes, Path Class – Streams: Stream class, stream operations, stream readers and writers, reading and writing text files, reading and writing binary files, reading – object serialization – regular expression

Threading: Fundamentals, Thread Synchronization – Components and Assemblies – Reflection – Windows Forms: Basics – Windows Forms Controls: Text Boxes, Labels, Buttons, Checkboxes, Radio Buttons, List Boxes, Combo Boxes

Unit IV

Picture Boxes, Scroll Bars, Timers, Menus, Built-in Dialog Boxes, Tree and List Views, Tool bars, Status bars, Progress bars – Web Forms: HTML Server Controls, Web Forms Controls, Validation Controls

Unit V

Data Access with ADO.NET – Binding controls to database- Handling Database in Code-XML and ADO.NET – Windows services: Creation and Installation, Service Controller Component – ASP.NET Applications- Web services: Introduction and Creation of web services - .NET Remoting.

REFERENCE BOOKS

1. The Complete Reference – Visual Basi .NET, Jefrey R.Shapiro, Tata McGraw-Hill, 2002
2. Visual Basic .Net Programming Black Book, Stevem Holzner, Dreamtech Press, Reprint 2011
3. Programming Microsoft Visual Basic .NET, Francesco Balena , Microsoft press 2003
4. www.spoken-tutorial.org

Subject Title: NATURAL LANGUAGE PROCESSING

Course Number: 14CSEAE15 **Number of Credits :4**

Subject Description:

This course presents the introduction to natural language understanding, grammar for natural language, linking syntax and semantics, knowledge representation and conversational agent.

Goal:

To enable the students to learn the basic functions, principles and concepts of Natural Language Processing.

Objectives:

On successful completion of the course the students should have:

 Understood the Natural Language Processing, grammars, syntax and semantics, knowledge representation etc.,.

Contents:

Unit I

Introduction to Natural language understanding – Linguistic background – Grammars and Parsing – Features and Augmented grammars

Unit II

Grammars for Natural Languages – Towards Efficient Parsing – Ambiguity Resolution Statistical Methods – Semantics and Logical forms

Unit III

Linking Syntax and Semantics – Resolution – Strategies for Semantic Interpretation – Scoping and interpretation of noun phrases

Unit IV

Knowledge Representation and Reasoning – Local Discourse Context and Reference – World Knowledge – Discourse Structure

Unit V

Conversational Agent – Logic and Natural Language – Model – Theoretic Semantics – Semantics of Set Theoretic Models

REFERENCE BOOKS:

1. " Natural Language Understanding", James Allen, Second Edition, Pearson Education, 2003
2. James Pustejovsky, Amber Stubbs, "Natural language Annotation for Machine Learning", 2012 by O'Reilly Media.

Subject Title: WEB SERVICES

Course Number: 14CSEAE16 **Number of Credits:4**

Subject Description:

This course presents an Overview of Distributed Computing, XML, web services

Goals:

To enable the student to be familiar with distributed services, XML and web services

Objectives:

On successful completion of the course the student should have:

- Understood the concepts of web services

Contents:

Unit - I

Introduction to web services – Overview of Distributed Computing- Evolution and importance of web services-Industry standards, Technologies and concepts underlying web services-Web services and enterprises-web services standards organization-web services platforms.

Unit - II

XML Fundamentals – XML documents - XML Namespaces- XML Schema –Processing XML

Unit - III

SOAP: The SOAP model- SOAP messages-SOAP encoding- WSDL: WSDL structure-interface-definitions-bindings-services-Using SOAP and WSDL-UDDI: About UDDI- UDDI registry-Specification- Core data structures-Accessing UDDI

Unit - IV

Advanced web services technologies and standards: Conversations overview-web services conversation language-WSCL interface components.
Workflow: business process management-workflows and workflow management systems
Security: Basics-data handling and forwarding-data storage-errors-Web services security issues.

Unit - V

Quality of Service: Importance of QoS for web services-QoS metrics-holes-design patterns-QoS enabled web services-QoS enabled applications.
Web services management-web services standards and future trends.

REFERENCE BOOKS:

1. Sandeep Chatterjee, James Webber, 'Developing Enterprise Web Services : An Architects Guide', Prentice Hall,2004.

Subject Title: CLIENT/ SERVER AND MIDDLEWARE

Course Number: 14CSEAE17 Number of Credits : 4

Subject Description:
This course presents the overview of client/server computing, client/server hardware and software requirements, application development and production environments.

Goal:
To enable the students to learn the concept of client/server computing
Objectives:
On successful completion of the course the studentsshould have:

- Understood the client/server computing techniques
- Understood the client/server application development and production environments

Contents:

UNIT I
Overview of Client/Server computing: What is Client/Server Computing-Benefits of Client/Server Computing-Evolution of Client/server Computing: Hardware and Software Trends-Overview of Client /Server Applications: Components of Client/Server Application-Classes of client/server application-Categories of Client/Server Applications-Understanding
Client /Server Computing: Obstacles-Open systems and standards-Factor for success

UNIT II
The Client Hardware and Software : Client Components-Client operating systems-GUI-X Windows versus Windowing–Database access-Application logical-Client Software Products: GUI Environment-Database access tools Client Requirements-The Server- Categories –Features of Server Machines-Classes of Server Machines-Server Environment.

UNIT III
Server Requirements-Server Data Management and Access Tools-Data Manager Features- Data Management Software-Database Gateways-Overviewof Networking-LAN Hardware and Software: LAN Hardware-Network Operating Sytems

UNIT IV
Applications Development Environments-Managing the Production Environment-Distributed Transaction Management-Integrating Multivendor Environments

UNIT V
Production Requirements: System Management-Network Management-Runtime Specifications-Distributing Software Updates-Hardware and Software Trends

REFERENCE BOOKS

1. DevendraKumar,"Client Server Computing", Global Vision Publishing House, 2011
2. Joe Salemi, "Client/Server Databases", Ziff-Davis Press; 2 Sub edition, 1995
3. Patrick Smith et al., "Client/Server Computing", Sams Publishing; 2 Sub edition, 1994.
4. Larry I.Vaughn, "Client/Server System Design and Implementation", McGraw-Hill Inc., 1994.
5. Dawna Travis Dewire, " Client Computing", Tata McGRAW-Hill Edition, 2003

Subject Title : ELECTIVE - PROGRAMMING IN C#

Course Number : 14CSEAE18 Number of Credits : 4 L= 2 P= 4

Subject Description: This course presents the Visual C# programming techniques.
Goal: To enable the students to learn the basic functions, principles and concepts of Visual C# programming
Objectives: On successful completion of the course the students should have:

- Understood the Visual C# programming techniques

CONTENTS:

Unit I:

Introduction to Microsoft Visual C# Programming : A demonstration of Visual C# 2008 – Sample C# Program – Sample LINQ Program – Common Elements in Visual C# 2008 – Nmaespaces – Main Entry Point – Local Variables – Nullable Types – Expressions – Selection Statements – Iterative Statements – C# Core Language Features – Symbols and Tokens – Identifiers – Keywords. **Types:** Classes – Class Members – Member Functions – Structures – Enumerations – Bitwise Enumeration – Equivalence versus Identity – Class Refinement.

Unit II:

Inheritance : Inheritance Example – System.Object - Employee Class – Implementing Inheritance – Overriding Inherited Behavior – The new Modifier – Abstract Classes – Sealed Classes – Constructors and Destructors – Interfaces – Polymorphism – Casting – Attribute Inheritance – Visual Studio 2008.

Unit III:

Arrays and Collections : Array Elements – Multidimensional Arrays – Jagged Arrays – System.Array – System.Array Properties – params keyword – Array Conversion Collections: Array List Collection – Bit Array Collection – Hashtable Collection – Queue Collection – Stack Collection – Specialized Collections – LINQ. **Introduction to LINQ :** C# Extension - LINQ Essentials – LINQ to Objects – Examples of LINQ to Objectas – LINQ Operators .

Unit IV:

Generics. Generic Types – Type Parameters – Type Arguments – Constructed Types – Overloaded Methods – Generic Methods – Constraints – Derivation Constraints – Interface Constraints – Value Type Constraints – Reference Type Constraints – Default Constructor Constraints – Casting – Inheritance – Overriding Generic Methods – Nested Types – Static Members – Enumerators. **Enumerators:** Enumerable Objects – Generic Enumerators – Iterators

Unit V:

Operator Overloading: Mathematical and Logical Operators – Conversion Operators – A Practical Example – Operator Overloading Internals – Delegates and Events. **Exception Handling :** An exception handling example – A standard exception model – Structured exception handling – System.Exception – Remote Exception –Unhandled exception – Managing Exception in visual studio - Meta data and reflection.

Reference Book :

1. Donis Marshall, " Programming Visual C# 2008 : The Language ", Microsoft Press Publication, 2008
2. Jason Price, Mike Gunderloy, " Mastering Visual C# .Net ", John Wiley & Sons Publication,
3. Christian Nagel, Bill Evjen, Morgan Skinner, Jay Glynn, Karli Watson, 'Professional C# 2012 and .NET 4.5 ', Wiley India, 2012.
4. www.spoken-tutorial.org