BHARATHIAR UNIVERSITY, COIMBATORE – 641 046
MASTER OF COMPUTER APPLICATIONS – (CBCS) University Dept.
(Effective from the academic Year 2015-2016)
& MCA (Lateral Entry) (CBCS)

1. Eligibility for Admission to the Courses

MCA: A pass in any recognized Bachelor's degree of minimum 3 years duration (10 + 2 + 3/4 years pattern) in any discipline with core Mathematics (or) Business Mathematics at Higher Secondary Level or A pass in any recognized Bachelor's degree with 10 + 3 years diploma +3 years pattern with Mathematics at Diploma level or Mathematics or Statistics as one of the subjects at the degree level or A pass in any recognized Bachelor's degree of minimum 3 years duration (10 + 2 + 3 years pattern) in any discipline with Mathematics or Statistics as any one of the subjects. Candidates should have appeared for TANCET/ Bharathiar University MCA Entrance Test.

MCA (Lateral Entry): A pass in Bachelor's degree of minimum 3 years duration in MCA, B.Sc. (Computer Science/ Computer Technology/ Information Technology) or equivalent with Mathematics as a course at Higher Secondary level or Graduate level. The candidate should have appeared for TANCET/ Bharathiar University MCA Entrance Test.

2. Duration of the Courses

These programmes shall be offered on a full-time basis. The MCA programme will consist of five semesters of course work and laboratory work and the sixth semester consists of project. The MCA (Lateral Entry) programme will consist of three semesters of course work and laboratory work and the final semester consists of project. The students admitted in MCA (Lateral Entry) shall follow the third to sixth semester syllabus of MCA programme.

3. Regulation

The general Regulations of the Bharathiar University Choice Based Credit System Programme are applicable to these programmes.

4. The Medium of Instruction and Examination

The medium of instruction and Examination 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.

6. Ranking

A candidate who qualifies for the PG Degree Course passing all the Examinations in the first attempt, within the minimum period prescribed for the Course of Study from the date of admission to the Course and secures 1st and 2nd Class shall be eligible for ranking and such ranking will be confined to 10% of the total number of candidates qualified in that particular subject to a maximum of 10 ranks.

7. Revision of Regulations and Curriculum

The above Regulation and Scheme of Examinations will be in vogue without any change for a minimum period of three years from the date of approval of the Regulations. The University may revise /amend/ change the Regulations and Scheme of Examinations, if found necessary.

Modified Scheme of Examination

Core/Elective/Supportive	Suggested Code	Sem	Title of the Paper	L	T/P	Marks
Com	15CSKAC01	I	Computer Organization and Architecture	4	0	100
Com	15CSKAC02	I	Problem Solving using C	2	4	100
Com	15CSKAC03	I	Mathematical Foundations of Computer Applications	4	0	100
Com	15CSKAC04	I	Data Structures	2	4	100
Com	15CSKAC05	I	Operating Systems	4	0	100
Elective	15CSKAE01	I	Unix and Network Programming	2	4	100
Supportive	15CSKAO01	I	Offered by other Departments		2	50
Com	15CSKAC06	II	Principles of Compiler Design	4	0	100
Com	15CSKAC07	II	Operations Research	4	0	100
Com	15CSKAC08	II	Design and Analysis of Algorithms	2	4	100
Com	15CSKAC09	II	Object Oriented Programming	2	4	100
Com	15CSKAC10	II	Open Source Software	4	0	100
Elective	15CSKAE02	II	Database Management System	2	4	100
Supportive	15CSKAO02	II	Offered by other Departments		2	50
Com	15CSKAC11	III	Java Programming	2	4	100
Com	15CSKAC12	III	Advance Programming in Open Source - PHP	2	4	100
Com	15CSKAC13	III	Computer Networks	2	4	100
Com	15CSKAC14	III	Software Engineering	4	0	100
Soft Skills	15CSKAC15	III	Soft Skills - I	2	4	100
Elective	15CSKAE03	III	Computer Graphics	2	4	100
Supportive		III	Offered by other Departments		2	50
Com	15CSKAC16	IV	Visual Programming	2	4	100
Com	15CSKAC17	IV	Software Project Management	4	0	100
Com	15CSKAC18	IV	Multimedia Systems	2	4	100
Com	15CSKAC19	IV	Computer Security and Cryptography	4	0	100
Soft Skills	15CSKAC20	IV	Soft Skills - II	2	4	100
Elective	15CSKAEXX	IV	Elective - I		4	100
Elective	15CSKAEXX	IV	Elective - II		4	100
Com	15CSKAC21	V	Internet Programming and Web	2	4	100
Com	15CSKAC22	V	Enterprise Java Programming	2	4	100
Com	15CSKAC23	V	Data Mining	2	4	100
Elective	15CSKAEXX	V	Elective - III		4	100
Elective	15CSKAEXX	V	Elective - IV		4	100
Mini Project	15CSKAC24	V	Mini Project and Viva Voce		2	25
Project	15CSKAC25	VI	Project Work And Viva Voce		14	325
			Total		140	3500

ELECTIVE PAPERS.

Suggested Code	Title of the Paper	L	T	Credits	Marks
15CSBAE04	E-Commerce	4		4	100
15CSBAE05	Enterprise Resource Planning	4		4	100
15CSBAE06	Image Processing	3		4	100
15CSBAE07	Soft Computing	4		4	100
15CSBAE08	Data Analysis and Business Intelligence	4		4	100
15CSBAE09	Intelligent Agents	4		4	100
15CSBAE10	Grid and Cloud Computing	4		4	100
15CSBAE11	Information Retrieval	4		4	100
15CSBAE12	Software Testing	3		4	100
15CSBAE13	VB.Net	4		4	100
15CSBAE14	Web Services	4		4	100
15CSBAE15	Programming in C#	2	0	4	100
15CSBAE16	Python Programming	2	0	4	100
15CSBAE17	Android Programming	2	0	4	100

Course Title: COMPUTER ORGANIZATION AND ARCHITECTURE

Course Number: 18CSEACH   **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:

- Understand data representations
- Understand computer arithmetic, register and I/O organization

Contents

UNIT I

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

UNIT II

Register – Shift registers – Binary counters – Register transfer – Bus and memory transfer – Arithmetic micro operation – 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

REFERENCES

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

Course Title: PROBLEM SOLVING USING C

Course Number: 15CSEAC02　　　　　　　　　**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, step wise Refinement - modularity - hierarchy charts-flow charts-algorithms-expressing algorithms-a solution methodology and an overview of algorithms- language- programming paradigm- 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 structure -Storage classes - automatic - register -static -external-type def.

UNIT III

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

UNIT IV

Pointers – array of pointers – pointers to 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 inactive standard library functions(including system functions)-I/O functions (Console, disk port I/O)-I/O subroutine-bit fields –usage of inline assembly.

REFERENCES

1. Yashvant P. Kanetkar, Let Us C", 11th Edition, BPB Publications, 2013.
2. Hughes, J.K. and McIltoon J.I. 'A Structured approach programming' Prentice Hall, 1987
3. E. Balaguruswamy, 'Programming in ANSI C', 6th Edition, Tata McGraw Hill, 2012
4. Byron. C.Gottfried, 'Programming with C, Schaums" outline series, 2nd edition, Tata McGraw Hill,2010.
5. Robert A. Radcliffe, 'Encyclopedia C' BPB Publications, 1992.
6. Brain W. Kernighan, Dennis M.R. Chin, 'The C Programming Language', 2nd Edition, Prentice Hall, 1990.
7. Gottfried, B. 'Theory and Problems of Programming with C', McGraw Hill, 2nd Edition, 1990.
8. www.spoken-tutorial.org

Course Title: MATHEMATICAL FOUNDATIONS OF COMPUTER APPLICATIONS
Course Number: 15CSEACO   **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.

Contents

UNIT I
Set Theory: Basic set operations, relations and functions, relation matrices, transitive closure relation, 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, Bayar's theorem, independence of events.

UNIT III
Introduction to Automata Theory: Finite State Automata – Deterministic and Non-Deterministic, NDFSA with ε-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, Automata Theorem Proving.

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

REFERENCES

1. Abhijit Dasgupta, "Set Theory: With an Introduction to Real Point Sets", Birkhauser, 2013 edition.
2. Alexandr Borovkov, "Probability Theory", Springer, 2013 edition.
3. Peeterslohar, "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

Course Title: DATA STRUCTURES

Course Number: 15CSEAC04   **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.

Objectives

On successful completion of the course the students should have:

- Understand the various Data Structures-Algorithms-representation-structures and searching.

Contents

UNIT I

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

UNIT II

Stack& 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.

REFERENCES

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 &Sartajhahni "Fundamentals of Data Structures", Computer Science press, 1983.
5. Anton Spraul, "Think Like a Programmer: An Introduction to Creative Thinking", No Starch Press, 2012.

Course Title: OPERATING SYSTEMS

Course Number: 15CSEAC05   **Number of Credits: 4**

Subject Description

This course presents the Introduction about operating system, 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 System– 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 – Algorithm – Allocation Algorithms – Thrashing.

UNIT IV

Secondary Storage Management: Physical Characteristics – Disk Scheduling – Disk Scheduling Algorithm – Sector Queuing, File System: 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 Silberschatz, "Operating System Concepts", Addison Wesley, 1985.
2. Harvey M.Deitel, "An Introduction to Operating System", Addison Wesley, 1994.
3. Andrew S. Tenenbaum, "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 System", Prentice-Hall, 2004.
6. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "operating system", wiley Dec 2012

Course Title: UNIX and Network Programming

Course Number: 15CSEAB1   **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.
- Learnt shell programming, system & network programming in UNIX

Contents

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

Inter process Communication – Introduction – pipes – FIFO – message queues – semaphores – Shared Memory.

UNIT V

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

REFERENCES

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. 2003.
4. www.spoken-tutorial.org

Course Title: PRINCIPLES OF COMPILER DESIGN

Course Number: 15CSCACS6   **Number of Credits: 4**

Subject Description

　This course presents the introduction to compilers, syntax analysis, code generation and optimization.

Goal

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

Objectives

　On successful completion of the course the students should have:
- To understand lexical analyzer, parser, code generation schemes and optimization of codes and environments.

Contents

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 – Run time 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.

REFERENCES
1. Alfred Aho, Ravi Sethi, Jeffrey D Ullman, "Compiler Principles, Techniques and Tools", Pearson Education Asia, 2003.
2. A. Puntambekar, "Compiler Design", Technical Publications, 2010.

Course Title: OPERATIONS RESEARCH

Course Number: 15CSEAC07   **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

Contents

UNIT I

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

UNIT II

Transportation and its variants: Definition, Transportation Algorithm and Solution, Assignment Model, Hungarian Method, Traveling Salesman Problem, The Transshipment Model – Queuing 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, and 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: anyone Case Study from Routing of goods, electricity and digital data

REFERENCES

1. Hanly A Taha, "Operations Research- An Introduction", Macmillan Publishing Co., 7th Edition (2006).
2. Sharma J K, "Operations Research - Theory and Application", Mac Millan India, 2003.
3. Srinivasan, G.K., Shenoy, G.V., and Sharma, S.C. (2009): Quantitative Techniques for Managerial Decision, 2nd, 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)

Course Title: DESIGN AND ANALYSIS OF ALGORITHMS

Course Number: 15CSEAC08   **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.

Objectives

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 expression, First order Linear recurrence.

REFERENCES

1. Ellis Horowitz, SartajSahni, SanguthevarRajasekaran, "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 VanGelder, "Computer Algorithms", Pearson education 2009.
4. Mark Allen Weiss "Data Structures and Algorithm Analysis", Benjamin/Cummings Pub. Co., 2007.

Course Title: OBJECT ORIENTED PROGRAMMING

Course Number: 15CSEAC09   **Number of Credits: 4**

Subject Description

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

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:

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

OOAnalysis, Design and Development – Software Life Cycle, Cost of Error correction, Change management, Reusable components , Fountain flow model Object-oriented intuition, 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.

REFERENCES

1. Stroustrup, "The C++ Programming Language", Addison Wesley,3rd Edition, 2008.
2. K.R. Venugopal T. Ravishankar, Rajjumar, "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

Course Title: OPEN SOURCE SOFTWARE

Course Number: 15 CSEAC10   **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:
- Understand the overview of open source software.
- Understood the basic of PHP and Perl programming

Contents

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 -OpenSource/InStream.

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 B 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 Server – 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 and Operators.

Arrays:- Using Arrays, Manipulating Arrays, Associative Arrays, Chop, Length and Substring, Slashes, 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-Session-cookies and HTTP.

REFERENCES

1. Joseph Feller, Brain Fitzgerald, Eric S. Raymond, "Understanding Open Source Software Development", Addison-Wesley Professional, 1st Edition, 2001.
2. Bernard Golden, "OpenSource in the Enterprise', O'Reilly Media, 2009.
3. Robert David Stock, Bernard Bloom, "The Open-Source Everything Manifesto: Transparency, Truth, and Trust ', Evolver Editions, 2012.
4. Perl Cook Book –Tom Christiansen & Nathan Torkington ,O'Reilly, SPD Pvt ltd, 2006 Edition.
5. PHP 5 and MySQL Bible Wiley Dream tech IndiaPvt.ltd 2006 Edition.
6. www.spokentutorial.org

Course Title: DATABASE MANAGEMENT SYSTEM

Course Number: 15CSEAE02   **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 database concepts.

Goal

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

Objectives

    On successful completion of the course the students should have:
- Understood the basic principles of database management systems, parallel & distributed database.
- Gained knowledge over various database models, schemes and SQL comments.

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 Database – Functional Dependency – Lossless Join and Dependency – Preserving Decomposition – Third Normal Form – BoyceCodd Normal Form – Multivalued Dependency – Fourth Normal Form – Join Dependency – Project Join Normal Form – Domain Key Normal FormsSQL: 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 Database – 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-Applications of DBMS in Marketing
(ForUnit V, students are expected to do acareerpanel studyand submita report)

REFERENCES

1. Abraham Silberschatz, Henry K.Forth, SudharsHan, "Database system Concepts" – (6th edition), McGraw Hill, 2010.
2. Elisa Bertino, "Object Oriented Databases", Addison Wesley, 1993.
3. RamezElmasri, ShamkarthNavathe, " Fundamentals of Database Systems ", 3rd Edition, AddisonWesley-2000.
4. Maley k. Pakhira, "Database Management System", Phi Learning Pvt. Ltd., 2012
5. www.spoken-tutorial.org

Course Title: JAVA PROGRAMMING

Course Number: 15CSEAC11   **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 student 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 Expression – 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.

REFERENCES

1. Herbert Schildt, " The Complete Reference Java", Tata McGraw-Hill Edition, 2009.
2. BijjuramaSreyas, SThanumoochi, 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

Course Title: ADVANCED PROGRAMMING IN OPEN SOURCE – PHP

Course Number: 15CSEAC12   **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.

Objectives
On successful completion of the course the students should have:
- Understood the concepts of using MySQL, AJAX, Smarty with PHP
- Understood the concepts of PHP SOAP and CMS(Joomla)

Contents

UNIT I
PHP and MySQL, Part II: SQL tutorial - PHP/MySQL function- Displaying Queries in Tables-
Building forms from Queries.

UNIT II
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
rewrites, Problems and Challenges, Benefits of AJAX, How and when to use AJAX, Selecting the
right tools and framework for Ajax.

UNIT III
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 Plugin's, Troubleshooting Smarty/PHPerrors, Tips & Tricks, Resources, BUGS.

UNIT IV
PHP and SOAP: Introduction to Web Services SOAP, Creating and Consuming Web Services With
PHP, XML-RPC, Creating an XML-RPC Webservice, Consuming an XML-RPC Web service,
NuSOAP and PHP, Creating a NuSOAP Client using PHP, Creating a NuSOAP Webservice,
Creating a NuSOAP Webservice Client, REST, Consuming an XML Webservice using REST.

UNIT V
PHP and CMS (Joomla): Types of CMS – Open source web CMS packages, All Inclusive web
CMS's, More CMS, Other Helpful Resources.

REFERENCES
1. PHP 5 and MySQL Bible Wiley Dreamtech India Pvt.ltd 2004 Edition.
2. Professional LAMP Linux, Apache, MySQL and PHP5 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, 2011.
9. www.phpfreaks.com - Smarty
10. www.w3schools.com - AJAX
11. www.php.net/manual/en - PHP series

Course Title: COMPUTER NETWORKS

Course Number: 15CSEAC13   **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 student should have:
- Understood the functionality of networks protocols and layers
- Understood network simulation usingNS2

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–protocolstack–radiolayer– basebandlayer–L2CAPlayer–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 inInternet: Architecture–IPprotocol-IPAddress–IPv6.

UNIT IV

TRANSPORT PROTOCOLS:Transportservice–Transportprotocols- Transportprotocolsin Internet: TCPand UDP

UNIT–V

APPLICATIONLAYERISSUES– Domain NameSystem – Electronicmail-Networksecurity. Network Simulator: Basics of Computer Network Simulation –Introduction to Network Simulator2 (NS2) – BasicArchitecture–Installation– DirectoriesandConvention– Running NS2 Simulation–Simulation Example.

REFERENCES

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 Stallugs, "Data and Computer Communication", 7th Edition, Pearson Education, 2007
4. TeerawatIssariyakul, EkramHossain, Introduction to Network Simulator NS2, Springer, 2009

Course Title: SOFTWARE ENGINEERING

Course Number: 1FCSEAC14   **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. Whitebox testing: basispathtesting and control structure testing-blackbox testing-Software Testing Strategies: Astrategic approach to softwaretesting –unittesting-integration testing-validation testing-systemtesting.

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 SEinMarketing (ForUnitV,studentsareexpectedtodoasurvey and studyand submita report)

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

Course Title: SOFT SKILLS - I

Course Number: 15CSEAC1I   **Number of Credits: 4**

Subject Description

This course presents an introduction to communication skills, soft skills, technical programming skills and quantitative aptitude.

Goal

To enable the students to learn the basics of communication skills, soft skills, technical programming skills and quantitative aptitude.

Objectives

On successful completion of the course the student should have:

- Understood the basics of communication skills and soft skills
- Acquired knowledge in technical programming and quantitative aptitude

Contents

UNIT I

Introduction to Communication – Importance – Basics of Communication – Purpose and Audience – Language As a Tool of Communication – Communicative Skills – Modes of Communication – Active Listening-Introduction – Traits of a Good Listener – Listening Modes –Effective Speaking: Achieving Confidence, Clarity and Fluency – Paralinguistic Features – Types of Speaking

UNIT II

Personality Development: A Must for Leadership and Career Growth – Swami Vivekananda's Concept of Personality Development – Interpersonal Skills –Soft Skills: Introduction to Soft Skills – Classification of Soft Skills-Case study: Resume writing-Email letter Writing-Self Introduction.

UNIT III

Technical programming skill: Variables and keywords – Operators in C – Decision Making – Looping - Branching Statements –Array – Functions – Pointers.

UNIT IV

Quantitative Aptitude1: Number series –Powers and Roots -Ratio, Proportion and Partnership – Problems on Ages –Percentage-Discount- Average - Profit and Loss – Data Interpretation

UNIT V

Quantitative Aptitude2: Simple Interest – Compound Interest – Time and Work – Time and Distance – Boat and Stream –Clock and Calendar – Permutation and Combinations

REFERENCES

1. Raman Sharma,"Technical Communication", 2ndEdition,Oxford University Press 2011.
2. Barun K. Mitra"Personality Development and Soft Skills", Oxford University Press 2011.
3. Dr. Balagurusamy, "Programming in C", Tata Mcgraw – HillEdition, 2008.
4. S. Chand and AshishAggarwal, "Quick Arithmetic" Sixth Revised Edition

Course Title: COMPUTER GRAPHICS

Course Number: 15CSEA03   **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

Contents

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 Algorithm – Properties of Circles and Ellipse – Pixel Addressing - Two Dimensional Geometric Transformations: Basic Transformation - 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 Surface– Curved Lines and Surfaces – Quadric Surfaces– Super Quadric –BleBby 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 –Projection– Clipping.

UNIT V

Visible – Surface Detection Methods: Classification of Visible Surface Detection Algorithm – 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.

REFERENCES

1. DonaldHearn&M.Pauline Baker, "Computer Graphics", Second Edition, PHI/ Pearson Education.
2. H.M.Neimannand R.F.Sproul, "Principles of Interactive computer Graphics", Second Edition, McGraw Hill.
3. Steven Harington, "Computer Graphics – A Programming Approach", McGraw Hill, 1983.
4. Shalini avtil, "Principles of Interactive Computer Graphics", Pai, 2005, Springer.
5. John F. Hughes, Andries vanDam, 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).

Course Title: VISUAL PROGRAMMING

Course Number: 15CSEAC16   **Number of Credits: 4**

Subject Description

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

Goal

To enable the students to learn the basic function, 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 – Rectangle, regions and Clipping – Keyboard Basics – Keyboard Messages and Character Sets – Caret – Menus: 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

REFERENCES

1. CharlsPetzold, "Programming Windows", Microsoft Press, Fifth Edition, 1998.
2. JeffProsise, "Programming Windows with MFC", Microsoft Press, Second Edition, 1999.
3. Mickey Williams, David Bennett, "VisualC++ 6 Unleashed", Sams Publications, 2000.
4. IvorHorton, "Beginning Visual C++ 2012", John Wiley & Sons, 2012.
5. www.spoken-tutorial.org

Course Title: SOFTWARE PROJECT MANAGEMENT

Course Number: 15CSRAC17   **Number of Credits: 4**

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 function, principles and concepts of Software project management.

Objectives

On successful completion of the course the student 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 Enterprise–Application of SPM in Marketing

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

REFERENCES

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. RamanGopalasAmy, "Managing Global Software Projects", 2005.
4. S. A. Kelkar, "Software Project Management: A Concise Study", PHI Learning Pvt. Ltd., Dec-2012
5. PMBOK, Project management body of knowledge www.pmi.org

Course Title: MULTIMEDIA SYSTEMS

Course Number: 15CSEAC18　　　　　　　　**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:
　　　• Understand the Multimedia orientation 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 System.

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 Function – WAVE , MIDI
file procesing. Animation : Color Palette – Events – ROPs.

UNIT V
Imaging Special Visual Effects : Bitmap – Brushes – Directive –Heeper Editor – Scrolling. Media
Control Interface : Simple Commands – API functions – CD Player – Video Capturing – Form – AVI
Play Form.

REFERENCES
1. Kaliyaperumal,Karthikeyan,"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. PamgReraldasand Gerald Medioni,"Multimedia Systems", Cengage Learning, 2011
4. S. K. Bansal,"Multimedia System",Aph Publishing Corporation, 2011
5. www.spoken-tutorial.org

Course Title: COMPUTER SECURITY AND CRYPTOGRAPHY

Course Number: 15CSEAC19   **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

Contents

UNIT I

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 Scheme Digital Signature Scheme –Digital Signature Standard – Kerberos.

UNIT III

System Security Intruders-Intruder detection – Password management- Viruses- virus counter measures-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 inComputing", Prentice Hall, 4th edition. 2003.

Course Title: SOFT SKILLS – II

Course Number: 15CSEAC20

Number of Credits: 4

Subject Description

This course presents an introduction to verbal and non-verbal reasoning, technical programming skills using C++, soft skills, and interview based topics in DBMS & Computer Networks.

Goal

To enable the students to learn the basics of verbal and non-verbal reasoning, technical programming skills using C++, soft skills, and interview based topics in DBMS and Computer Networks.

Objectives:

On successful completion of the course the students should have:

- Understood the basics of verbal and non-verbal reasoning, technical programming skills using C++,
- Acquired knowledge of using soft skills and the interview based topics in DBMS and Computer Networks.

Contents

UNIT I

Verbal Reasoning: General Mental Ability-Coding-Decoding-Blood Relation-Logical Venn Diagram - Mathematical Operations - Arithmetical Reasoning- Data sufficiency - Truth statement - Logical Deduction-Statement-Conclusions-Deriving Conclusion from Passages - Eligibility Test

UNIT II

Non-Verbal Reasoning-Series-Choosing the Missing Figure in a Series-Detecting the Incorrect Order-Detecting the Wrong figure-Analytical Reasoning-Rule Detection-Cubes and Dice-Painting of a Cube-Construction of Boxes-problems on Dice-Figure Formation and Analysis –Formation of a Figure from Parts-Formation of a Figure Segmentation-Identical Figure-Pattern Rearrangement

UNIT III

Technical skill: Concepts of OOPS-Object and Classes – Inheritance – Polymorphism – Data Hiding – Virtual Function - Operator Overloading – Function Overloading

UNIT IV

Interviews, Group Discussion, Presentation Skills, Conversation: Effective Presentation Strategies-Planning-Nuances of Delivery- Controlling Nervousness and Stage Fright-Visual Aids in Presentations- Job Interview-Media Interviews- Communication-Group Discussion–GD as Part of a Selection Process

UNIT V

Theoretical Concepts – DBMS: Keys-Normalization-RDBMS-Concurrency Control-Transaction-Reliability- Software Engineering: Models-Design Strategies-Testing-Planning and Maintenance-Operating System: Process-Memory Management-Paging-Dead Lock-Virtual Memory-Computer Networks-OSI-TCP/IP-Communication Modes-N/W Devices-N/W Metrics-Algorithm: Time Complexity and Space, Types of Algorithm

REFERENCES

1. Dr. R. S. Aggarwal and S. Chand "A Modern Approach to Verbal & Non-Verbal Reasoning" Revised Edition
2. Dr. Balaguruamy "Object Oriented Programming with C++" Tata McGraw-Hill Edition, 2008
3. Raman Sharma, "Technical Communication-Principles and Practises", Second Edition

Course Title: INTERNET PROGRAMING AND WEB DESIGNING
Course Number: 15CSEAC21   **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.

Contents

UNIT I

Internet Basics: Introduction – Getting Connection – Services – Mail – News Groups – FTP – Telnet – WAIS – Archie – 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 collection – Event model - Filters and Transitions - ActiveX controls. XML: Need for XML – Documentation – Elements and Attributes – Valid Document – 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 – using personal web server and internet information server – active server page objects – an example – server side actors 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

REFERENCES

1. Peter Kent, "10 Minute Guide to the Internet", Prentice Hall of India, 1996.
2. Kogent Learning Solutions, "HTML 5Black Book", Dream TechPublishers, 2011.
3. DeitelⅅDeitel, "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. IstianSpaanjaars, "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.

Course Title: ENTERPRISE JAVA PROGRAMMING

Course Number: 15CSEAC22   **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 – Client and Client Tier – Web Tier – EJB Tier – EIS Tier – J2EE best practices - Enterprise Application 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 – Result Set – 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 Serialization 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 –Script lets – Directives – Declarations - Working with JSP- JSP and JDBC.

UNIT V

JQuery: Introduction – Adding JQuery to Web pages- JQuery Editor – JQuery Selectors and Elements – Animation and Events handling in JQuery. **AJAX:** Overview- AJAX and JQuery. **Java ME:** Java for Mobile Devices.

REFERENCES

1. Jim Keogh," The Complete Reference J2EE", Tata McGrawHill Publishing Company Ltd, 2010.
2. Jamie Jarworski,"Java 2 Platform Unleashed", Techmedia SAMS, IV edition, 2000.
3. Phil Hanna," The Complete Reference JSP 2.0", Tata McGrawHill Publishing Company Ltd, 2003.
4. David Sawyer McFarland, "JavaScript and jQuery – The missing Manual", O'Reilly Publication, 2nd Edition, 2011.
5. http://www.oracle.com/us/technologies/java/mobile/resource/index.html
6. www.spoken-tutorial.org

Course Title: DATA MINING

Course Number: 15CSEAC23　　　　　　　　**Number of Credits: 6**

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 usage.

Goal

To enable the students to learn the basic function, 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- Pincure 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- Medoid algorithm - CLARA- CLARANS -Hierarchical DBSCAN- BIRCH- CURE-Categorical clustering algorithm- 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.

REFERENCES

1. Jaiwei Han and MichelineKamber,"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, 2000.
3. Pieter Adriaans, DolfZantinge, "Data Mining", Addison Wesley, 2008.
4. Krzysztof J. Cios, WitoldPedrycz, "Data Mining: A Knowledge Discovery Approach", Springer, 2010.
5. ArijayChaudhry, Dr. P. S Deshpande, "Multidimensional Data Analysis and Data Mining", Dreamtech press, 2009.
6. http://www.cedis.paris-sorbonne.fr/amauroy/papers/miisa/tama/InteractiveDataMining.pdf

Course Title: ELECTIVE -E-COMMERCE

Course Number: 15 CSEA204   **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 E-Commerce framework

Contents

UNIT I

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

UNIT II

Network Infrastructure: Local Area Network-Ethernet-Wide Area Network-Internet-TCP/IP Reference 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-CGI Multimedia 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 System: 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 Advertising- Agents in Electronic Commerce-Needs and Types of Agents-Agent Technologies-Agents Standards and Protocols-Agents Applications-Case Study.

REFERENCES

1. Bharat Bhaskar, " 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)

Course Title: ELECTIVE - ENTERPRISE RESOURCE PLANNING

Course Number: 15CSEAB05   **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-BOM Closed Loop MRP-Data Management -Benefits of PDM-Make to order-Assemble-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 RAPh-Convergence onWindows 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", 1999.
3. K.Nagappan, "Digital Computers and Data Processing ", 1994.
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.

Course Title: ELECTIVE: IMAGE PROCESSING

Course Number: 15CSEAE06   **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:

- Understand 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 definition – 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 – Algebraic 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 compression – 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

REFERENCES

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, NewYork, Third edition, 2008.
3. Maher A. Sid-Ahmed, "Image Processing – Theory, Algorithms and Architectures", McGraw Hill, Inc, Newyork, 1995.
4. Moeslund Thomas B, "Introduction to Video and Image Processing", Springer, 2012.

Course Title: ELECTIVE -SOFT COMPUTING

Course Number: 1FCSEAB07   **Number of Credits: 4**

Subject Description
This course presents the introduction, the basic neuron, kohonen 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 Basic Neuron: Introduction – Modelling the single neuron – Learning in simple neuron – The perceptron: a vertical perceptive – The perception learning rules – Proof – Limitations of perceptron

UNIT III
Kohonen Self-organizing Network: Introduction – the Kohonen 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.

REFERENCES
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 Edition, 1994.
3. R. Beale, T. Jackson and Adam Hilger, "Neural Computing: An introduction", Addison Wesley, 1990.
4. Simon Heykin, "Neural Networks And Learning Machines", 3 Edition, Prentice-Hall, 2010.

Course Title: ELECTIVE - DATA ANALYSIS AND BUSINESS INTELLIGENCE

Course Number: 15CSEAE08   **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.

Contents

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: paired sample t-test, Two Independent t-test, One sample t-test – Non Parametric Test: The wilcoxon rank sum test and mannwhitney 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.

REFERENCES

1. Ralph Kimball, Joe Caserta, "The Data Warehouse ETL Toolkit: Practical Techniques for Extracting, Cleaning", Willy Inc, 2004.
2. CindiHowson "Successful Business Intelligence: Secrets to Making BI a Killer App" , Tata McgrawHill, 2007.
3. GalitShmueli, Nitin R. Patel and Peter C., Bruce, "Data Mining for Business Intelligence: Concepts, Techniques, and Aoolications inMicrosoft 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. BoomaTharaja, "Data Warehousing", Oxford University Press, 2009.
7. www.sas.com/technologies/bi/
8. www.keyed.co.in/
9. www.dataminingbook.com/
10. www.honeywellvideo.com/products/iacfa/index.html

Course Title: ELECTIVE-INTELLIGENT AGENTS

Course Number: 15CSEAE09   **Number of Credits: 4**

Subject Description

This course presents a detailed view on intelligent 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

Contents

UNIT I

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

UNIT II

Multi-agent 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 – Un trusted Agent – Black Box Security – Authentication for agents – Security issues for Aglets.

UNIT IV

Natural to Artificial Systems – Biological Inspiration 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. Walula, " Biologically Inspired Optimization Methods", MIT Press, 2008.
6. Christian Blum, Daniel Merkle (Eds.), "Swarm Intelligence – Introduction and Applications", Springer, 2008.

Course Title: ELECTIVE-GRID AND CLOUD COMPUTING
Course Number: 15CSE4E20   Number of Credits: 4

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 System 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 – OGSA/WSRF- 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 Solution – 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.

REFERENCES
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. RajkumarBuyya, Christian Vecchiola, S.ThamaraiSelvi, "Mastering Cloud Computing", Tata McGraw Hill Publishers, 2013.

Course Title: ELECTIVE: INFORMATION RETRIEVAL

Course Number: (ISCSEAE1)   **Number of Credits: 4**

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 inter section via skip pointers-Positional postings and phase 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 type of indexes- Scoring, term weighting and the vector space model: Parametric and zone indexes- Term frequency and weighting-The vector space model for scoring- Variant 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 feed backand query expansion: Relevance feedback and provide 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 representation 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 - Page Rank - Hubs and authorities

REFERENCES

1. Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze, „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", CSLIPublication 2003.
4. C. J. Van Rijsbergen, „Information Retrieval", Information Retrieval Group, University of Glasgow, 1979.
5. David A. Grossman, OphirFrieder, „ 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.

Course Title: SOFTWARE TESTING

Course Number: 13CSEA322　　　　　　　　**Number of Credits: 4**

Subject Description

　　This course provides principles of Software Testing and about tools.

Goal

　　To enable the students to learn about the principle and tools of Software testing.

Objectives

　　On successful completion of the course the students must have

- Understood the concepts of Software testing
- Got the skill of software testing
- Been exposed to software testing tools.

Contents

UNIT I

Purpose of Software testing – Some Dichotomies – a model for testing – Playing pool and consulting oracles – Is complete testing possible – The Consequence of bugs – Taxonomy of Bugs.

UNIT II

Software testing Fundamentals – Test case Design – Introduction of Black Box Testing and White Box testing – Flow Graphs and Path testing – Path testing Basics – Predicates, Path Predicates and Achievable Paths – Path Sensitizing – Path Instrumentation – Implementation and Application of Path Testing.

UNIT III

Transaction Flow testing – Transaction Flows – techniques – Implementation Comments – Data Flow Testing – Basics – Strategies – Application, Tools and effectiveness – Syntax Testing – Why, What, How – Grammar for formats – Implementation – Tips.

UNIT IV

Logic Based Testing – Motivational Overview – Decision tables – Path Expressions – KV Charts – Specifications – States, State Graphs and transition Testing – State Graphs – Good & bad states – state testing Metrics and Complexity.

UNIT V

Testing GUIs – Testing Client – Server Architecture – Testing for Real-time System – A Strategic Approach to Software testing – issues – unit testing – Integration Testing – Validation testing – System testing – The art of Debugging.

REFERENCES

1. Boris Beizer, Software testing techniques, Dreamtech Press, Second Edition – 2003.
2. Myers and Glenford J., The Art of Software Testing, John-Wiley & Sons,1979.
3. Roger.S.Pressman, Software Engineering – A Practitioner's Approach ,Mc-Graw Hill, 5th edition, 2001.
4. Marnie L. Hutcheson, Software Testing Fundamentals, Wiley-India,2007.

Course Title: VB .NET

Course Number: 15CSEAE13　　　　　**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 Structures – Control Flow – Error Handling: Basics, Classes.

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

UNIT III
Files and Directries: Directory and File Classes, Directory Info and File In for 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 Form 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.

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

Course Title: WEB SERVICES

Course Number: 15CSEAE14   **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:
   • Understand 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 enterprise-web services standards organisation-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-
definition-bindings-services-Using SOAP and WSDL-UDDI: About UDDI- UDDI registry-
Specification- Core data structure-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-Intdo-design patterns-QoS
enabled web services-QoS enabled applications. Web services management-web services standards
and future trends.

REFERENCE

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

Course Title: ELECTIVE –PROGRAMMING IN C#

Course Number: 15CSE4115   **Number of Credits: 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 – Name spaces- 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– SystemObject – EmployeeClass– Implementing Inheritance- Overriding Inherited Behavior- The new Modifier- Abstract Classes –Sealed Classes-Construction 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 – Hash table Collection – Queue Collection-Stack Collection-Specialized Collections – LINQ: Introduction to LINQ: C# Extension-LINQ Essentials-LINQ to Objects–Examples of LINQ to Object us–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 Object –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 –Structuredexceptionhandling– System.Exception–Boundedexception-Unhandledexception-Managing Exception in visual studio-Meta-data and reflection.

REFERENCES

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

Course Title: ELECTIVE - PYTHON PROGRAMMING

Course Number: 15CSEAE16   **Number of Credits: 4**

Subject Description

    This course presents the Python Programming techniques.

Goal

    To enable the students to learn the basic functions, principles and concepts of Python Programming.

Objectives

    On successful completion of the course the students should have:

- Understood the Python programming techniques

Contents

UNIT I

Data Types and Data Structures: Introduction to Python – using the Python interpreter, Overview of programming in Python, Python built-in types, Arithmetic in Python, Program input and Program output, Variables and assignment, Strings and string operations, List basics, List operations, Dictionaries, Dictionary basics and Tuples.

UNIT II

Control Structures: Control Statements-if statements, while statement, for statements, functions, formal arguments, variable-length arguments, Exceptions, detecting and handling exceptions.

UNIT III

Classes ,files and modules: Introduction to Classes and Objects--classes, class attributes, instances, instance attributes, binding and method invocation, inheritance, polymorphism, Built-in functions for classes and instances.

UNIT IV

Files and input-output, reading and writing files, methods of file objects, using standard library functions, dates and times

UNIT V

Database and web programming – Python database application programmer's interface (DB–API), connection and cursor objects, Type objects and constructors, python database adapters. Creating simple web clients, introduction to CGI, CGI module, building CGI applications, python web application frameworks: django.

REFERENCES

1. Core Python Programming by Wesley J. Chun, 2nd Edition , Pearson Education
2. An Introduction to Python by Guido Van Rossum, Fred L.Drake, Network Theory Limited.
3. Beginning Python: From Novice To Professional By Magnus Lie Hetland, Second Edition.
4. Programming in Python 3 by Mark Summerfield, Pearson Education
5. Online version of An introduction To Python
6. http://www.network-theory.co.uk/docs/pytut
7. http://docs.python.org/tutorial/
8. www.spoken-tutorial.org

Course Title: ELECTIVE - ANDROID PROGRAMMING

Course Number: 15CSEAE7

Number of Credits: 4

Subject Description This course presents the theory and practice for Android Mobile Application Development

Goal This course aims to provide the students with a detailed knowledge on Android platform. This course covers Android programming from fundamentals to building mobile applications for smart gadgets. **Objectives** On successful completion of the course, the students should have:

- A good understanding on the Mobile Environment
- Acquired mobile application development skills with Android.

Contents

UNIT I

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UNIT V

Publishing and Internationalizing mobile applications - Live mobile application development: Game, Clock, Calendar, Converter, Phone book. **App Deployment and Testing:** Doodle app – Tip calculator app – Weather viewer app.

REFERENCES

1. Barry Burd, "Android Application Development – All-in-one for Dummies", 2nd Edition, Wiley India, 2016.

2. Lauren Darcey, Shane Conder, "Sams Teach Yourself Android Application Development in 24 hours", 2nd edition, Pearson Education, 2013.

3. Paul Deitel, Harvey Deitel, Alexander Wald, " Android 6 for Programmers – An App-driven Approach", 3rd edition, Pearson education, 2016.

4. Jerome (J. F) DiMarzio, "Android – A Programmer's Guide", McGraw Hill Education, 8th reprint, 2015.

5. http://www.developer.android.com