

**NIRMA UNIVERSITY
INSTITUTE OF TECHNOLOGY**

M.C.A. (MASTER OF COMPUTER APPLICATIONS)



BOOKLET OF TEACHING , EXAMINATION SCHEME AND SYLLABUS

FOR

THE STUDENTS ADMITTED IN ACADEMIC YEAR 2012-13

NIRMA UNIVERSITY
INSTITUTE OF TECHNOLOGY
M.C.A. (MASTER OF COMPUTER APPLICATIONS)
Effective from 2012– 2013 and onwards
Teaching & Examination Scheme
Semester - I

| Sr. No. | Sub. Code | Subject Title | Teaching Scheme | | | | Examination Scheme | | | |
|---------|-----------|---|-----------------|----------|-----------|-----------|--------------------|---------------------|-----|-----|
| | | | | | | | Hours | Component Weightage | | |
| | | | L | T | P | Credit | SEE | C. E. | LPW | SEE |
| 1 | 3CA1101 | Programming Language – I | 3 | - | 4 | 5 | 3 | 0.4 | 0.2 | 0.4 |
| 2 | 3CA1107 | Mathematical Foundation | 3 | 1 | - | 4 | 3 | 0.6 | - | 0.4 |
| 3 | 3CA1103 | Fundamentals of Computer Organization | 4 | - | 2 | 5 | 3 | 0.4 | 0.2 | 0.4 |
| 4 | 3CA1104 | Accounts & Financial Management | 3 | 1 | - | 4 | 3 | 0.6 | - | 0.4 |
| 5 | 3CA1105 | Basic Microcomputer Applications | - | - | 4 | 2 | - | - | 1.0 | - |
| 6 | 3CA1108 | Database Management System – I | 3 | - | 2 | 4 | 3 | 0.4 | 0.2 | 0.4 |
| 7 | 3SP1102 | Communication Skills for Computer Professionals | - | 2 | - | - | - | 1.0 | - | - |
| | | | 16 | 4 | 12 | 24 | | | | |

Semester - II

| Sr. No. | Sub. Code | Subject Title | Teaching Scheme | | | | Examination Scheme | | | |
|---------|-----------|--|-----------------|----------|-----------|-----------|--------------------|---------------------|-----|-----|
| | | | | | | | Hours | Component Weightage | | |
| | | | L | T | P | Credit | SEE | C. E. | LPW | SEE |
| 1 | 3CA1201 | Introduction to Microprocessor & Assembly Language Programming | 3 | - | 2 | 4 | 3 | 0.4 | 0.2 | 0.4 |
| 2 | 3CA1202 | Data And File Structure | 4 | - | 2 | 5 | 3 | 0.4 | 0.2 | 0.4 |
| 3 | 3CA1203 | Programming Language – II | 3 | - | 2 | 4 | 3 | 0.4 | 0.2 | 0.4 |
| 4 | 3CA1204 | Computer Oriented Numerical Methods | 4 | - | 2 | 5 | 3 | 0.4 | 0.2 | 0.4 |
| 5 | 3CA1207 | Database Management Systems – II | 3 | - | 2 | 4 | 3 | 0.4 | 0.2 | 0.4 |
| 6 | 3CA1206 | Software Project Lab | - | - | 2 | 1 | - | - | 1.0 | - |
| | | | 17 | - | 12 | 23 | | | | |

MCA SEMESTER - I

3CA1101: Programming Language - I [3 0 4 5]

Objective:

The main objective of this course is to introduce the basics of the structured programming fundamentals through C language. It also includes features on pointers, dynamic memory allocation & file handling and concepts.

Syllabus:

1. Introductory concepts: Introduction to computers, computer characteristics, modes of operation, Programming, types of programming languages, introduction to c, desirable program, characteristics. Data representation, Flow charts, Algorithms / Pseudo Code.
2. Program structure: Constants, Variables, Basic Instructions for declaring, assigning variables, Data Types, Storage classes, Main() function, Printf(), Scanf(), Header files, Operators, Program compilation, Debugging, Running.
3. Decision control statements: if, if-else, statement blocks, nested ifs.
4. Control structures: While loop-for loop-nesting loops-break, continue, do-while statement, Case structure, Goto statement.
5. Functions: Definition, Scope, Call, Prototypes, Parameterized function, Call by value, Call reference.
6. Pointers: Introduction, Declaration, types of pointers, Pointer handling.
7. Arrays: Definition, Declaration, Initialization, bound check, multidimensional, passing array to function, Pointers and arrays.
8. Strings: strlen(), strcpy(), strcat(), strcmp(), pointer to string.
9. Structures: Definition, Declaration, Accessing structures, array of structures.
10. File handling: File opening, closing, modes, formatted inputs, output to file, structures and file error handling, argc, argv and main function.

11. Preprocessor directives.

Practical and Term work:

The Practical and Term work will be based on the topics covered in the syllabus.

Minimum 20 experiments should be carried out.

Text Book:

1. Programming in C by Balaguruswamy:
2. Let us C by Yasvant Kanitkar (4th edition)
3. Programming in C by M.T. Savalia

Reference:

1. Spirit of C by Cooper
2. The C Programming & Language by Kernigham & Ritchie 2nd edition Pearson / PHI

3CA1107 Mathematical Foundation [3 1 0 4]

Objective:

The main objective of this course is to introduce most of the basic abstract topics used in the advanced courses in computer science coupled with certain applications. This would enable a student to understand abstract ideas and will have sufficient confidence in applying these ideas to solve practical problems. The subjects will be useful to learn Data and File Structure as well as Compiler Constructer.

Syllabus:

1. Lattices: Relations and ordering, partially, ordered sets, lattices as posets, properties of lattices, lattices as algebraic systems, sublattices, complemented lattices distributive lattices complete lattices.
2. Boolean algebra: Introduction, definition and important properties, subboolean algebra, direct product and homomorphism, atoms, antiatoms, stone's representation theorem, Boolean expressions and their equivalence, minterms and maxterms, free Boolean algebra, values of Boolean expressions, canonical forms, Boolean functions, symmetric Boolean expressions.

3. Fuzzy Sets: Definitions, basic operations on fuzzy sets, image and inverse image, i-v fuzzy sets, fuzzy relations.
4. Linear equations and matrices : Brief review of the theory of matrices, elementary row and column operations, rank of matrix, inverse of a matrix, solution of system of linear equations, Cramer's rule, Cayley- hamilton theorem. Linear-transformation, orthogonal transformation, reduction to diagonal form, bilinear forms, quadratic forms.
5. Vector space :Definitions and examples of vector spaces, linear combinations, linear dependence and linear independence, bases, subspaces, calculus of subspaces, dimension of a subspace.

Term work: Term work will be based on the topics covered in the syllabus.

Text Books:

1. Discrete Mathematical Structures with Applications to Computer Science, Tremblay J. P., Manohar R., Publisher: Tata McGraw-Hill.
2. Introduction to Linear Algebra by Krishnamurthy V.Publisher: EWS, Delhi

Reference books:

1. Fuzzy sets and Fuzzy logic: Theory and Applications, Klir G.J.,Yuan B, Publisher: Pearson / PHI
2. Foundations of Discrete Mathematics, Joshi K. D., Publisher: New Age International Ltd.
3. Elementary Linear Algebra with Applications, By H. Anton, Publisher: Wiley India – 9th Edition – 2008

3CA1103: Fundamental of Computer Organization [4 0 2 5]

Objective:

Student will learn the fundamentals of the basics of the organization of the computer

system, and architecture and various peripherals devices.

Syllabus:

1. Computer Operation: Electronic Digital Computers, Some Different Types of Computer System, Computers in Computer Systems, Basic Components of a Digital Computer, Programming Overview.
2. Number Systems: Decimal System, Bistable Devices, Counting in the Binary System, Binary Arithmetic Operation, Converting Decimal Number to Binary, Negative Numbers and its Representation, Octal and Hexadecimal and Floating Point Number Systems.
3. Boolean Algebra and Gate Networks: Fundamental Concept of Boolean Algebra AND Gates and OR Gates, Complementation and Inverters ,Evaluation and Derivation Of Boolean Expression ,Basic Laws Of Boolean Algebra, De Morgan's Theorem, Interconnecting Gates, Sum of Products and Products of Sums, Derivation of A Three Input Variable Expression, NAND Gates and NOR Gates, Map Method for Simplifying Expression, Sub cubes and Covering, Product of Sums Expression-Don't –Cares, Design using NAND and NOR gates, NAND to "AND" and NOR-to-OR Gate Networks, Wired OR and Wired AND Gates, PLAs and PALs
4. Logic Design: Flip-Flop and Designs, Clocks, Registers and Counters
5. The Arithmetic and Logic Unit: Construction of the ALU and Integer Representation, Adder and its Design , Addition and Subtractions in a Parallel Arithmetic Element and BCD Numbers, Shift, logical, and Basic operations.
6. The Memory Devices: Types of Memories: RAM AND DRAM, Read Only, Magnetic Disk, Memory Organization and Decoders, Storage Systems, Virtual and Cache Memories.
7. Buses, Interfaces and Control Unit: Buses, Bus Formats and Operation, Standard Buses, Interfaces, I/O Addressing Techniques.

8. Control Unit: Instruction Cycle and Execution Cycle Organization of Control Registers, Controlling Arithmetic Operations, Sequences of Operation, Branch, Skip or Jump Instructions, shift Instruction, Register Transfer Language, and Microprogramming.
9. Computer Organization: Instruction Format and Representation ,Addressing Techniques ,8 bit 16 bit and 32 bit Microprocessor
10. I/O Devices: keyboard , VDU, Floppy and Hard Disks, Printers :Dot Matrix, Ink Jet, Laser, Line Printers , Function of Mother Board, Study of various types of controllers: Hard Disk Controller, Floppy Disk Controller, serial and parallel I / O controller, CD, DVD, USB.

Practical And Term Work: The Practical and Term work will be based on the topics covered in the syllabus.

Minimum 15 experiments should be carried out.

Text Books:

1. Digital Electronics by Morris Mano (Pearson / PHI)
2. IBM PC and Clones - B Govindrajau (TMH)

Reference:

1. Digital Fundamental of Computer of Organization by Thomas C. Bartee (TMH)
2. Computer System Architecture by Morris Mano (Pearson / PHI)
3. Computer Peripherals by Cook and White (Edward Arnold)

3CA1104 Accounting and Financial Management [3 1 0 4]

Objective:

Students are coming from different discipline; this subject will provide an awareness regarding financial, accounting, costing and management knowledge. It will help to develop computersied system where accounting concept are needed.

Syllabus:

1. Introduction of Accounting: As an Information System, Branches of Accounting (Financial, Cost & Management), Book-Keeping and Accounting (Recording, Classifying, Summarising & Interpreting), Objective and uses of Accounting, Vocabulary
2. Financial Accounting: Accounting System, Accounting Principles (Rules of Debit & Credit), Traditional Approach, Balance-Sheet Approach, Accounting Concepts and Standards, Preparation of Journal, Ledgers and Trial Balance, Preparation of Financial Statements (Company Account)
3. Interpreting Financial Statement: Ratio Analysis, Fund Flow Analysis, Cash Flow Analysis
4. Cost Accounting: Elements of Cost, Cost Classification and Cost Sheet, Inventory Valuation (FIFO & LIFO)
5. Management Accounting: Marginal Costing and Break – Even Analysis, Budgets and Budgetary Control, Project Management (Capital Budgeting)
6. Financial Management: Cost of Capital, Leverages, Working Capital Management
7. Case study of Financial Accounting Software Package.

Term Work:

Term work will be based on the topics covered in the syllabus.

Reference Books:

1. Financial Accounting: Ashok Sehgal, Deepak Sehgal, Taxman’s Allied Service (p) Ltd.
2. Financial Accounting: S.N. Maheshwary, SultanChand & Co.
3. Cost & Management Accounting: Ravi M. Kishore, Taxman’s Allied Service (p) Ltd.
4. Cost & Management Accounting: S.N. Maheshwary, SultanChand & Co.
5. Accounting & Financial Management: D.R Patel, Atul Prakashan

3CA1105 Basic Microcomputer Applications [0 0 4 2]

Most of today's businesses are widely using the basic microcomputer application packages for performing their business activities. The industry and academia has widely accepted the MS office as a personal assistant to prepare documents and process their business functions by using it. Thus learning of DOS and Windows, spreadsheet programs and database management systems is very necessary in today's industry scenario.

Syllabus:

1. Disk Operation System: Basic Operations of OS, Process of Booting, Types of Booting, Disk Organization.
2. Dos Shell: Introduction to File System, Manipulation of Files And Directories, Running Application Programs
3. Batch Files: Building and Running, Using Sub-Commands In Batch Files, Chaining And Linking
4. Commands Interface: Internal and External Commands
5. Commands: Append, Attrib, Backup, Break, Chdir, Chkdsk, Cls, Copy, Date, Defrag, Del, Deltree, Dir, Diskcopy, Doskey, Dosshell, Echo, Edit, Fdisk, Find, Format, If, Label, Mem, Mkdir, Mode, More, Move, Path, Print, Prompt, Rem, Rename, Restore, Rmdir, Sort, Sys, Time, Tree, Type, Undelete, Unformat, Ver, Xcopy Config.Sys, Autoexec.Bat, Command.Com, Input, Output, Redirection, Wildcard Characters
6. Windows: Advantages of Windows Over Dos, Windows Architecture, Concept Of GUI, Elements of GUI – Menu Bar, Dialog Box, Check Box, Radio Buttons Create, Store, Print A File In Windows, Customizing & Configuring The Task Bar And Start Menu, Managing Disk Resources & Utilities, Disk Defragmenter, Scan Disk, Control Panel And Windows Explorer, OLE
7. Basic Operations of MS-Word and Power Point.
8. Ms Excel: Worksheets And Workbooks, Introduction To Spreadsheet, Moving, Copying, Inserting And Deleting Worksheets, Renaming A Worksheet,

- Cell Reference And Range Names To Navigate, Customizing The Worksheet Window, Advanced Worksheet Formatting, Cell Formatting, Aligning, Wrapping And Rotating Text, Using Conditional Formatting, Using Autoformat, Using Formula And Functions, Entering And Editing Formula, Using Range Names And Labels In Formula, Manipulating Data With Worksheet Functions, Using Goal Seek, What if analysis using. Creating And Editing Charts, Anatomy Of An Excel Chart, Using Chart Wizard, selecting And Customizing A Chart Type ,Editing And Formatting Chart Elements, Working With Lists, Creation Of A List , Automatic Filling, Sorting And Filtering Data, Importing And Exporting Data ,Using Excel In A Workgroup, Protecting A Worksheet, Sharing A Workbook , Storing Multiple Scenario, Creation Of Custom Views, Using Pivot Tables And Pivot Charts, Creating A Pivot Table, Editing And Updating A Pivot Table , Creating And Editing Pivot Charts, Formatting Pivot Tables, Restricting And Validating Data Entry For A Cell Or Range, Macros
9. Ms Access: Definition Of DBMS, Components Of A DBMS, Database Constraints, Access Essentials, Planning An Access Database, Working With Database Objects, Using Wizards To Create Databases And Objects, Exporting And Importing Data, Using Expressions In Database Objects, Creating And Customizing Tables, Access Table Essentials, Creating A New Table, Changing A Table's Structure, Restricting Data Entry, Working In Datasheet View, Linking Multiple Tables, Defining Relationship Between Tables, Splitting A Table To Avoid Data Duplication, Changing Joins, Using Queries To Find And Filter Data, Understanding Queries, Creating And Modifying Queries, Creating And Applying Filters, Designing And Using Forms, Using Forms To View And Enter Data, Creating A New Form, Displaying Or Entering Data With A

Form, Changing A Form's Design, Switchboards , Presenting Data With Reports, Creating Reports From Access Data, Modifying A Report, Macros.

10. Financial Accounting Software.
11. Introduction to LINUX: Basic Operations in LINUX OS, Process of Booting, Disk Organization, Manipulation of Files and Applications, Comparison with Windows OS

Practical and term work:

The Practical and Term work will be based on the topics covered in the syllabus.

Minimum 20 experiments should be carried out.

Text Books:

1. Using office 2000, special edition by Woody Leonhard, PHI

Reference Books:

1. Woody Leonhard teaches Microsoft office 2000, PHI
2. DOS: Peter Norton's DOS guide updated to cover 6.2, PHI Publication
3. Mastering Linux Premium edition by Arman Danesh , BPB
4. Red Hat Linux 9 Unleashed By Bill Ball & Hayt Duff , Pearson Education

3CA1108 Database Management System – I [3 0 2 4]

Objective:

The subject is extremely useful as per the software industry's requirement. This subject conceptually increases the students understanding for the use of database design, which is one of the important phases of any Database application development. The subject broadly & systematically covers the Database concepts, Design and Implementation concepts and Advance Database Concepts. At least one Case study will be discussed during the course. Practical would be based upon SQL.

Syllabus:

1. Database Concepts: File Systems and Databases, Introducing the database, The Historical Roots of the Database

files and file systems, Database Systems, Database Models, and Evolution of Data Models. The Relational Database Model, Logical view of Data, keys, Integrity Rules. Relational Database Operators, The Data Dictionary and system Catalog, Relationships within the relational Database.

2. Design and Implementation concepts: Entity Relationship Modeling: Basic modeling concepts, Data Models: Degrees of Abstraction, The Entity Relationship model, the Challenge of database Design, Normalization of database tables: Database Tables and Normalization, Normalization and Database Design, Higher Level Normal Forms, De-normalization.
3. Structured Query Language: Data Definition Commands, Data Manipulation Commands, Queries, Advanced Data Management commands, More complex Queries and SQL Functions, Updateable Views, Converting an E-R Model into a Database Structure, General Rules Governing Relationships Among Tables.
4. Advance Database Concepts: Security authorization, Encryptions and authentication, Transaction Management and Concurrency Control: DBMS transaction, Concurrency Control, Concurrency Control with locking methods, Concurrency control with optimistic Methods, Database Recovery Management.

Practical and Term work:

The Practical and Term work will be based on the topics covered in the syllabus. Practice on SQL queries should be carried out. It should include Subquery, correlated query, queries on views, query based on joins.

Text Books:

1. Database Systems Design, Implementation & management (Vth Edition) by Rob& Coronel (Thomson)
2. Mastering SQL by Martin Gruber (B.P.B)

3. Database System Concepts by Silberschatz, Korth & Sudarshan (Tata Mc-Graw hill)
4. An introduction to database systems by C.J date 7th Edition (Addison Welsley)
5. Special Edition Using SQL by Colbcerm, PHI

3SP1102: Communication Skills for Computer Professionals [0 2 0 0]

Syllabus:

1. Communication Skills in English; Meaning, Process, Types, Flow of communication.
2. Non-verbal Communication: Components, Barriers to Communication.
3. Listening Skills: Types, Process, Barriers to Effective Listening, Tips of Listening Effectively
4. Speaking Skills: Presentations, Group Discussion, Personal Interview.
5. Reading Skills: Skimming, Scanning, Analytical, Extensive, Intensive.
6. Writing Skills: Technical Instructions, Report Writing, Memo Writing, Job Application and Resume, Business Correspondence.
7. Vocabulary Enrichment: Words often confused and misused, One-word substitutes, Idiomatic Expressions.

Suggested Reading Books:

1. Technical Communication (Principals & Practice) by Meenakshi Raman (Oxford)
2. English for Technical Communication by K.R. Laxminarayanan Scitech publication India Ltd..

MCA SEMESTER - II

3CA1201: Introduction to Microprocessor & Assembly Language Programming [3 0 2 4]

Objective:

Microprocessors are destined to play an increasingly important role in revolutionizing various industries and influencing our day to day life more strongly. The wide range of

application areas in which microprocessors are used includes single board microcomputer, Terminals, Personal computer, Super minis and CAD machines, Instrumentation and Control etc.

Syllabus:

1. Intel 8086/ 88 Architecture: CPU Architecture, Internal operation, Machine Language instructions, Addressing modes, instructions format, instruction execution, timing.
2. Assembly language programming: Assembler instruction format. Data transfer. Arithmetic, Branch, loop NOP, HALT Flag manipulation. Logical shift and Rotate instructions, Directives and operators, Assembly process, Translation of assembly instructions.
3. Modular Programming: Linking & relocation, Stacks, Procedures, Interrupts routine, Macros, Program design, program design example.
4. Byte and String manipulations: String Instructions, REP prefix, Text Editor example, Table translation, number format conversion.
5. Introduction to 16-bit microprocessors, 8086 architecture, segments, flags Instruction set assembly language programming on 8086 using assembler, interrupts, writing interrupt services routines, debugging programs.
6. Study of contemporary microprocessor, Pentium.
7. RISC, CISC Architecture & its implications, Special purpose processor as DSP, microcontroller

Text Book:

1. Microprocessor & Interfacing (2nd Edition) - Douglas Hall (TMH)
2. The 8086/8088 family by Yu-cheng Liu (PHI)

3CA1202 : Data And File Structure [4 0 2 5]

Objective :

To introduce basic concepts of data structures, to introduce concepts and techniques of structuring data on bulk

storage's. Analysis of file organization techniques.

Syllabus :

1. Introduction to Data Structures: Data Management concepts, Data types – primitive and compound, Array as building block: Mapping of elements, Special types of arrays – triangular and sparse.
2. Data Structures: Simple, Linear and non Linear, File Structures, Program development process, program testing, Development and verification of algorithms, time and space analysis.
3. Types of Data Structures and Algorithms: Stack, Stack operations, Applications of stack, Recursion, Polish notations, Evaluation of postfix expression, Algorithms of stack application.
4. Queue: Algorithms & Implementation of simple Queue, Circular Queue, Applications of Queue
5. Linked Lists: Algorithms and implementation of Singly linked list, Doubly linked lists, Circular linked list and its applications
6. Trees & Graphs: Definitions of graphs, Creation of Simple Binary tree, Conversion of General Tree in to Binary tree, Threaded representation of tree, Hashing, Binary and m-way search trees-trees, B* - trees, B+ - trees and tries, Graph structure, Mapping and traversal of trees and Graphs, Applications of graph.
7. Sorting and Searching : Insertion sort, Selection Sort, Shell sort, Quick sort ,Heap sort, Bubble sort ,Merge Sort, Radix Sort, Linear Search, Binary Search, Height Balance Trees, Weight Balance Trees, 2-3 Trees, Tree Structures.
8. File Structures: Concepts of fields, Records and files, Sequential, Indexed and Relative/Random File Organization, Indexing structure for index files, hashing for direct files, Multi-Key file organization and access methods

Practical and Term work:

The Practical and Term work will be based on the topics covered in the syllabus.

Minimum 12 experiments should be carried out.

Text Books:

1. An Introduction to data Structures with application, Trembley & Sorenson McGraw Hill 1984
2. Data Management and File processing II Edition by Mary Loomis PHI

Reference Book :

1. Data Structures using C and C++, Tanebaum, Prentice Hall of India, II edition
2. Data Structures using C and C++, Langsam II Edition Pearson / PHI

3CA1203 : Programming language – II [3 0 2 4]

Objective :

To introduce basic concepts of Object oriented programming through C++ language. It also includes file handling, pointers, Virtual base class.

Syllabus :

1. Principles of object oriented Programming,
2. Introduction to object oriented programming: Basic concepts, Benefits of OOPS, Applications.
3. Introduction to C++ : Compilation, Linking, Basic statements, Tokens, Expressions, Control structures.
4. Functions: Introduction, Prototyping, Inline functions, Arguments, Function overloading, Friend, Virtual functions.
5. Classes and objects: Introduction, Definition, Member functions, data members, scope, Array of objects.
6. Constructors and Destructors: Introduction, Declaration, Parameterized constructors, Arguments, Dynamic, overloading, Destructors.
7. Operator overloading and type conversions: Overloading revisited, Operators, Unary, binary, Overloading

- through friend, member functions, Rules, Type conversions.
8. Inheritance: Derived classes, types, single, visibility, multilevel, multiple, hybrid inheritance,
 9. Virtual base class, constructors in inheritance.
 10. Pointers: Pointers to objects, this, derived classes, virtual functions, pure virtual functions.
 11. File handling: Classes for file handling, basic operations like opening, closing, eof, modes, pointers, Storing objects etc.
 12. Templates: Class templates, parameters, function templates.
 13. Exception Handling

Practical and Term work :

The Practical and Term work will be based on the topics covered in the syllabus.

Minimum 12 experiments should be carried out.

Text Book :

1. Object oriented programming with C++ by E. Balaguruswamy II Edition, Tata Mcgraw Hill

Reference Book:

1. C++ and Object oriented Programming paradigm by Jana, PHI

3CA1204 : Computer Oriented Numerical Methods [4 0 2 5]

Objectives:

Student will learn to solve linear and nonlinear equations. Perform operations of calculus, fit curves and solve differential equations using a computer. To appreciate problems due to rounding errors and convergence. Laboratory should be an integral part of the course in which students should write programs for realistic numerical problems, student should become familiar with numerical program libraries such as IMSL.

Syllabus:

1. Computer Arithmetic, Floating point representation of numbers, Arithmetic operations with normalized floating

- point numbers and their consequences. Absolute, relative and round off errors Error propagation.
2. Solution of Non linear Equation by iterative methods, Bisection, false position, fixed point iteration, Newton Raphson and secant methods, Solution of Non linear systems of equations for two variables by Newton – Raphson method. Discussion of convergence.
 3. Roots of polynomial Equations, Synthetic division, Birge – vieta method, Descartes' rule of sign and Budan's theorem, Graeffe's root squaring method, Lin Bairstow's method for complex roots.
 4. Interpolation by polynomial approximations, Polynomial interpolation, Difference tables and calculus of differences, Interpolation formulae with error analysis, Cubic Splines, inverse interpolation, linear and non linear regression using least square approximations, Approximation of function by Taylor's series and chebyshev polynomials.
 5. Numerical Differentiation and Integration, Numerical differentiation, Newton-cotes Integration formulae, Trapezoidal, Simpson's rule, Gaussian quadrature, Romberg integration.
 6. Solution of system of linear equations, Matrix inversion method, Jordan's method, The LU and Cholesky factorization, Pivoting and constructing an algorithm based on Gaussian elimination method. ILL conditioned system, Solution of equations by iterative methods (Jacobi's method, Gauss – seidel method, Relaxation method).
 7. Algebraic Eigen value problem, Properties of Eigen values and Eigen vectors, Power method, Inverse power method, Jacobi's method.
 8. Numerical solution of ordinary differential equations:
 9. Single step methods, Euler's Taylor series and Runge – kutta methods, Multi step methods – Milne simpson methods, Error analysis.

Practical and Term Work:

The Practical and Term work will be based on the topics covered in the syllabus. Minimum 15 experiments should be carried out.

Text Books:

1. Introduction to Numerical Analysis by S. Sastry Thomson, Publisher: PHI, New Delhi.
2. Numerical methods for Engineers with programming and software applications, By S.C. Chapra and R.P. Canale, Publisher: McGraw-Hill – Newyork – 1998

Reference Books:

1. Numerical Method for Mathematics Science and Engineering by Mathews John H (1992), 2nd Edition, Publisher: PHI, New Delhi.
2. Numerical Methods for Engineers by Griffiths and Smith I.M. (1991), Pub. CRC Press, London.
3. Applied Numerical Method for Engineers by Schilling R and Harries S (2000).
4. Introduction to Numerical Analysis by C. E. Froberg:, Addition, Pub: Wesley Pub. Co., Sixth Edition, 1981.

3CA1207 Database Management Systems – II [3 0 2 4]**Objective:**

Objective of this Course is to teach students PL/SQL Language which is important for implementing Database side business logic in form of Stored Procedures, functions, cursors and triggers. In addition, it shows the students the Role of DBA by teaching them the Database Physical & logical Architecture, Database tuning, which is important for maintaining the database and improving the performance of database applications. The subject also covers advanced DBMS topic, related to DDBMS and OODBMS.

Syllabus:

1. Basic Concepts of PL/SQL, Types of PL/SQL, PL/SQL Control Structures, PL/SQL Records.

2. SQL within PL/SQL, Built in SQL Functions, Stored Procedures.
3. Cursors, Cursors Variables, Error Handling, Collections, Creating Procedures, Functions, and Packages.
4. Database Triggers, Oracle Physical and Logical Architecture.
5. Database Architecture: Oracle Architecture, Databases and Instances, Creating Databases.
6. Background Processes: Internal Database Structure: Tables, Columns and Data type. Constraints, Schema, Indexes, Clusters, Hash Clusters, Views, Segments, Extents and Rollback Segments, Context Area, Program Global Area, Backup Recovery Capabilities, Security Capabilities.
7. Planning and Managing Tablespaces: The System Tablespace, Logically Managed Tablespaces.
8. Managing the Development process: Cultural Processes, Management Processes, Technology: CASE Tools, Managing Package Development, Managed Environment.
9. Managing Transactions, Database Tuning and Performance: Rollback Segments, space usage within rollback Segments, Monitoring Rollback Segment Usage.
10. Database Tuning: Tuning Application, Tuning SQL, Tuning Memory Usage, Tuning Data Storage, Tuning Data Manipulation, Tuning Physical Storage, Tuning Logical Storage.
11. Distributed Database Management Systems: Evolution of Distributed Database Management Systems, Distributes Processing and distributed databases, DDBMS components, Levels of Data and process distribution, Distributed database transparency features, Distribution Transparency, Transaction Transparency, Performance Transparency and Query Optimization, Distributed Database Design, Data Fragmentation, Data Replication, Data Allocation.
12. Object Oriented Databases: Object Orientation and its benefits, The Evolution of Object Oriented Concepts,

Object Oriented Concepts, Characteristics of an Object – Oriented Data Model, OODM and previous Data Models: Similarities and differences, Object oriented Database Management System, OODBMS advantages and disadvantages. How OO concepts have influenced the relational model, The next generation of Database Management System.

Practical and Term work:

1. Practical are based on PL/SQL. Minimum 12 practical should be conducted.

Text Books:

1. Oracle 9i : PL/SQL Programming : Scott Urman (Oracle press)
2. Oracle 9i DBA by Kevin Loney, McGraw Hill

3. Oracle 9i High Performance Tuning with STATPACK by Donald Burkson McGraw Hill
4. Oracle 9i Complete reference by Kevin Loney, George Koch McGraw Hill
5. Database Systems Design, Implementation & Management (Vth Edition) by Rob & Coronel (Thomson)

3CA1206: Software Project Lab [0 0 2 1]

Objective:

Students have to use the knowledge of data and file structure. Programming language C and C++ for developing software projects. During the whole semester, student will develop the software project in the laboratory hours, which is two hours in a week.

NIRMA UNIVERSITY
INSTITUTE OF TECHNOLOGY
M.C.A. (MASTER OF COMPUTER APPLICATIONS)
Effective from 2013 – 2014 and onwards
Course Structure
Semester - III

| Sr. No. | Sub. Code | Subject Title | Teaching Scheme | | | | Examination Scheme | | | |
|---------|-----------|--|-----------------|----------|-----------|-----------|--------------------|---------------------|-----|-----|
| | | | L | T | P | Credit | Hours | Component Weightage | | |
| | | | | | | | SEE | C. E. | LPW | SEE |
| 1 | 3CA1404 | System Analysis & Design | 3 | 1 | - | 4 | 3 | 0.6 | - | 0.4 |
| 2 | 3CA1302 | Operating System | 4 | - | 2 | 5 | 3 | 0.4 | 0.2 | 0.4 |
| 3 | 3CA1303 | Data Communications & Networking – I | 3 | - | 2 | 4 | 3 | 0.4 | 0.2 | 0.4 |
| 4 | 3CA1304 | Computer Based Management System | 3 | 1 | - | 4 | 3 | 0.6 | - | 0.4 |
| 5 | 3CA1308 | Client Server Architecture & Application - I | 3 | - | 4 | 5 | 3 | 0.4 | 0.2 | 0.4 |
| 6 | 3CA1307 | Java Programming | - | - | 2 | 1 | - | - | 1.0 | - |
| 7 | 3SP1201 | Career Orientation | - | 1 | - | - | - | 1.0 | - | - |
| | | | 16 | 3 | 10 | 23 | | | | |

Semester - IV

| Sr. No. | Sub. Code | Subject Title | Teaching Scheme | | | | Examination Scheme | | | |
|---------|-----------|---|-----------------|----------|-----------|-----------|--------------------|---------------------|-----|-----|
| | | | L | T | P | Credit | Hours | Component Weightage | | |
| | | | | | | | SEE | C.E. | LPW | SEE |
| 1 | 3CA1501 | Software Engineering | 3 | 1 | - | 4 | 3 | 0.6 | - | 0.4 |
| 2 | 3CA1402 | Computer Graphics | 4 | - | 2 | 5 | 3 | 0.4 | 0.2 | 0.4 |
| 3 | 3CA1403 | Data Communication & Networking – II | 4 | - | 2 | 5 | 3 | 0.4 | 0.2 | 0.4 |
| 4 | 3CA1301 | System Software | 3 | - | 2 | 4 | 3 | 0.4 | 0.2 | 0.4 |
| 5 | 3CA14E5 | Elective – I | 4 | - | 2 | 5 | 3 | 0.4 | 0.2 | 0.4 |
| 6 | 3CA1407 | Client Server Architecture & Application - II | 3 | - | 2 | 4 | 3 | 0.4 | 0.2 | 0.4 |
| | | | 21 | 1 | 10 | 27 | | | | |

Elective - I

3CA1415 Parallel Processing
3CA1425 Artificial Intelligence
3CA1435 Compiler construction

MCA SEMESTER –III

3CA1404: System Analysis And Design [3 1 0 4]

Objective:

The subject is extremely useful for development of software application, it cover systematically approach from analysis phase, designing phase, Software development phase and implementing phase.

After completion of the course students will acquire knowledge regarding the development. Case study will be carrying out during the course.

Syllabus:

1. System Analysis Fundamentals: Assuming the Role of the System Analyst, Understanding Organizational Style and its impact on Information System, Determining Feasibility and Managing Analysis and Design activities.
2. Information Requirements Analysis: Sampling and Investing Hard Data, Interviewing, Using Questionnaires, Observing Decision-Maker Behavior and the Office Environment, Prototyping and Rapid Application Development.
3. The Analysis Process: Using Data Flow Diagrams, Analyzing Systems Using Data Dictionaries, Describing Process Specifications and Structured Decisions.
4. Analyzing Semi structured Decision Support Systems, Preparing the System Proposal., Writing the Presenting the System Proposal.
5. The Essentials of Design: Designing Effective Output, Designing Effective Input Designing Effective Databases, Designing User Interfaces, Designing Accurate Data-Entry Procedures.
6. Software Implementation: Quality Assurance through Software Engineering, Successfully Implementing the Information System.
7. Object-Oriented System Analysis and Design and UML.

Tutorial:

This shall consist of minimum 12 assignments based on above course.

Text/References:

1. System Analysis and Design by Kenneth E. Kendall & Julie E. Kendall Pearson / PHI
2. Analysis and Design of Information system by James Senn, Mc Graw Hill
3. System Analysis and Design Methods by Whitten and Bentley, Tata Mc Graw Hill
4. Software Engineering by Roger Pressman, Mc Graw Hill
5. Introduction to Computer data processing and System Analysis by V.K. Kapoor Chapter 11 and 12.

3CA1302 Operating System [4 0 2 5]

Objective :

To make students aware about functionality of various modules of operating systems besides concepts, giving them multi programming, communication interrupt handling aspects, students will also perform case studies of various operating systems.

Syllabus:

1. Computer System Overview: Basic Elements, Processor registers, Instruction Execution, Interrupts, Memory Hierarchy, Cache Memory, I/O Communication techniques.
2. Operating System Overview: Objectives, Functions, Evolution, Major Achievements of OS, Characteristics of Modern operating System.
3. Process Description and Control: Process States Process description, Process Control, UNIX SVR4 Process Management, Uniprocessor Scheduling, Multiprocessor and Real-Time Scheduling
4. Threads : Processes And Threads , Symmetric Multiprocessing, Microkernels
5. Concurrency: Mutual Exclusion and Synchronization, Deadlock And Starvation.
6. Memory Management and Virtual Memory

7. Memory Management Requirements, Partitioning, Paging, Segmentation , Virtual Memory , Case Study For Memory Management
8. I/O and File Management: I/O Devices , Organization Of I/O Functions , OS Design Issues , I/O Buffering , Disk Scheduling, Disk Cache , File Organizations, Directories , File Sharing , Record Blocking , Secondary Storage Management
9. Case Study : UNIX, LINUX ,Windows 2000 operating systems whichever is most appropriate for the topic

Laboratory work:

Minimum 12 Shell Scripts are to be implemented along with the study of basic commands, filters and UNIX system architecture and other practical based on syllabus

Text/References:

1. Operating Systems, William Stallings , Pearson / PHI
2. Operating System, Silberschiltz and Galvin
3. Shell Programming, Yashvant Kanetkar
4. Operating Systems By Milan Kovic.
5. Operating System Concepts By Peterson.
6. Modern operating system By A. Tanenbaum, Pearson / PHI
7. The Unix Programming Environment By Kernighan, Pearson / PHI
8. Windows- NT Reference
9. Unix System V.4, Concepts And Application, Sumitabh
10. Unix Shell Programming By Forouzen Gilberg

3CA1303: Data Communications & Networking – I [3 0 2 4]

Objective :

The aim of the subject is to make them aware about the Communication Fundamentals, which includes Analog & Digital Communication, Modulation, and Serial Communication, and give the knowledge of the Telephone System (The Physical Layer), Networks Error Detection & Correction and

Flow Control (The Data Link Layer) and Routing Algorithms (The Network Layer).

Syllabus:

1. Introduction to Computer Networks: Use Of Networks, Network Hardware and Software, OSI Model, Example Networks, Network Standardization
2. Communications Channel Characteristics: Communications Channel, EM Waves, Frequency and Wavelength and EM Spectrum, Bandwidth, Bandwidth and Channel Capacity, Bandwidth and Distance.
3. Modulation: Modulation and Demodulation, Types of Modulation. Analog Communications and Multiplexing: Analog Communication systems in Today's world, Multiplexing, Types of multiplexing.
4. Digital Communications: Description and Advantages of Digital Communications, Sampling, A/D Conversion, Encoding of Digital Signals, Multiplexing of Digital Signals
5. The Physical Layer : Transmission Media, Circuit Switching and The Telephone System
6. Data Link Layer: Data Link Layer Design Issues, Elementary data link protocols, Sliding window protocols, Protocols specifications of verification, Error Detection and Correction
7. Medium Access Sub-layer : Channel Allocation, Multiple access protocols, ALOHA, CSMA, IEEE 802.3 & Ethernet, Bridges
8. Network Layer: Design Issues, Routing Algorithms, Optimality principles, Shortest Path routing, Flooding, Link state routing, Congestion control algorithm, Internetworking

Practical and Term work:

Minimum 12 Practical has to be carried out from the prescribed syllabus.

Text/References:

1. Data Communications and Networking by B.A. Forouzan
2. Computer networks by A. S. Tanenbaum (Pearson)

3. Data Communication by Schweber W.L
4. Electronics Communication by Roody coolan

3CA1304 Computer Based Management System [3 1 0 4]

Objective:

Objective of the course is to make aware to the students about the Systems, Management and Organization i.e. different systems like Information System, Financial Accounting System, Inventory Control and Management System, Payroll System. As far as the management is concerned, it is to make aware the concept of Strategic Planning, Managing Information Resources, Management Science and different models etc. It also refers to Business Organization, Organization Behavior, and different approaches to Management..

The growth of the Internet, globalization of trade and the rise of information economies, have recast the role of information systems in business and management. The Internet is becoming the foundation for new business models, new business processes, and new ways of distributing knowledge. In digital firms, information to support business decisions is available any time and anywhere in the organization. So the objective is to introduce the students to MIS- Information System for Decision-making, Strategic and Project Planning, Implementation, Evaluation, and Maintenance of the MIS in the digital firm.

Syllabus :

1. Meaning and role of MIS. Introduction of MIS and System Approach, Systems view of Business, MIS org. within the company.
2. Management, Organization and the Networked Enterprise: Information System in Global Business Today,
3. E-Business: How Business Use Information Systems, Information Systems, Organizations, and Strategy, Ethical and Social Issues in Information Systems
4. Infrastructure: Information Technology Infrastructure and Emerging

Technologies, Foundations of Business Intelligence.

5. Managing Database and Information Management, Telecommunication, the Internet, and Wireless Technology, Securing Information Systems.
6. Management and Organizational Support Systems for the Digital Firm: Achieving Operational Excellence and Customer Intimacy: Enterprise Applications.
7. E-Commerce: Digital Markets, Digital Goods, Managing Knowledge and Collaboration, Enhancing Decision Making.
8. Building and Management Systems: Building information system, Managing Projects, Managing global systems.
9. Introduction to Economics for Managers: Demand, Determinants of demand and Sales Forecast, Production and Production function, Determinants of cost and price concepts, Banks and its instrument, Inflation-its causes and consequences, International Trade: Trade of Business cycles- their causes and consequences, controlling business cycles, Capital market- its structure, importance and stock exchanges.

Tutorial:

This shall consist of minimum 15 assignments based on above course.

Text/References:

1. Management Information Systems By Kenneth C. Laudon and Jane P. Laudon. Pearson.
2. Managerial Economics – Kote and Gupta
3. Management by Robbins Pearson Publications
4. Management by Koontz.
5. Managerial Economics by Dominick Salvatore TMH
6. Financial Management by Prasanna Chandra TMH
7. Management by Daft (Thomson Learning)

3CA1308: Client Server Architecture & Application – I [3 0 4 5]

Objective:

The subject is useful in developing the two-tier Client Server systems. It covers the introduction to Client Server architecture. Students would get exposure to technologies like VB.NET Technology for developing windows base Applications. Also they get exposure to HTML, XHTML and CSS.

1. Client Server Architecture: Introduction to Client-Server Architecture, Distributed Processing, File Server versus Client/Server Database, Two tier versus Three tier C/S model, Introduction to the Component object model, service model, C/S deployment using components. Introduction.
2. Getting started with Microsoft visual basic: Exploring the visual studio IDE, Writing your first programme, working with toolbox control, working with Menus, Toolbar & dialog boxes.
3. Programming Fundamentals: Visual basic variables and formulas and the .NET framework, Using Decision structures, Using loops and Timers, Debugging visual basic programs, Trapping errors by using structured error handling, Creating modules and procedures, Using arrays to manage numeric and string data, working with collections and the system collections, Exploring text files and string processing.
4. Designing the user Interface: Managing windows and control menus at runtime, adding graphics and animation effects, inheriting forms and creating base classes, working with printers.
5. Database and Web Programming: Getting started with ADO.NET, Data presentation using the DataGrid View control, Creating web sites and web pages by using visual web developer.
6. Introduction to web Technologies: HTML: HTML introduction, HTML elements, HTML attributes, HTML Headings, HTML paragraphs, HTML formatting, HTML styles, HTML links, HTML images, HTML Tables, HTML

Lists, HTML forms, HTML colors, HTML layout, HTML frames.

XHTML: XHTML introduction, XHTML why, XHTML vs HTML, XHTML syntax, XHTML how t, XHTML validation, XHTML modules.

CSS: CSS Introduction, CSS Syntax, CSS how to, CSS background, CSS text, CSS font, CSS box model, CSS outline, CSS margin, CSS list, CSS table.

Practical and Term work:

Minimum 10 experiments should be carried out.

The Practical and Term work will be based on the Client server programming using VB.NET, HTML, XHTML and CSS.

Text Books:

1. Mastering in Visual Basic .NET by Evangelos Petroustos
2. Microsoft Visual Basic by Michael Halvorson, PHI
3. Microsoft ADO.NET step by step, Microsoft Press
4. Introduction Microsoft .NET by David S. Platt
5. Internet and World Wide Web: How To Program : 2nd Edition, Deitel Deitel Nieto
6. World Wide Web , 4th edition, Robert W. Sebesta

3CA1307 Java Programming [0 0 2 1]

Objective:

The practical aspects of several subjects of higher semester are based on java language. Thus this language is taught as a prerequisite subject for several higher semester subjects. The syllabus is focused to introduce basic concepts of Object oriented programming through java language. Mainly the Programming Constructs of the java Language would be covered.

1. Introduction To OOPS : Characteristics of OOP, Advantages of OOPs, OOPs Vs Structured Programming
2. Introduction To Java Programming with Grammar of Java: Java Features, Java

- Tokens, Data Types, Variables, Operators, Type Conversion, Type Casting
3. Control Structure: Selection Statement, Nested if-else Statement, Ternary if-else Operator, Switch Statement Iterative Statement (While, Do-While and For loop) , Nested Loops, The Break Statement GOTO Statement , Continue Statement
 4. Arrays, Strings & Vectors: Single-Dimensional Array, Array Initialization, Two Dimensional Arrays, Multidimensional Arrays, Variable Size Arrays, Strings (String and StringBuffer Class), Vector, Wrapper Classes
 5. Classes & Objects: Classes, Method Overloading, Constructors and Garbage Collector, The this Keyword Objects as Parameters, Static Class Members, Recursion, Nested and Inner Classes
 6. Inheritance, Interfaces and Dynamic Binding: Inheritance, Method Overriding, Multilevel Inheritance, Access Specifiers, Dynamic Binding, Abstract Classes and Methods , The final Keyword, Interfaces, Extending Interfaces, Grouping Interfaces
 7. Packages: Java's Built-In Packages, Miscellaneous Java Packages, Creating User-Defined Packages, Importing Packages, CLASSPATH, Ambiguities in Importing Packages
 8. Exception Handling: The Exception Class, Common Exceptions, Exception Handling Fundamentals, Multiple Catch Handlers, Nested Try and Catch Blocks, Throwing an Exception-throw keyword, User-Defined Exceptions
 9. Multithreading: Threaded Basics, Creating and Running a Thread, Thread Control Methods, Life Cycle of a Thread, Thread Priorities, Thread Exceptions, Synchronizations, Inter Thread Communication
 10. Files and Streams: Java Streams, Byte Streams , Character Streams , File Stream, The High-Level Stream Classes, Predefined Streams, Reading Console Inputs, Reading data form Command Line

11. AWT, Layout Managers, Event Handling, Applets

Practical and Term work:

Minimum 12 practical has to be conducted based on the above syllabus

Text Books

1. Java 2 Complete Reference
2. Java 2 by balaguruswami
3. Core Java Vol I&II, Addison Wesley
4. Unleashed Java 2 Platform, Sams Techmedia

3SP1201 Career Orientation [0 1 0 0]

The objective of the supplementary course of Career Orientation is to sensitize each student about one's own potential, and this in turn will enable one to be self driven so as to improve one's performance and achieve one's life goals.

The topics covered are: Self start, dedication, confidence, motivation, discipline, study, progress, evaluation, appreciation, criticism, improvement reliance, control, respect, satisfaction, awareness, fulfillment and realization, inwardly directed towards oneself.

MCA SEMESTER –IV

3CA1501: Software Engineering [3 1 0 4]

Objective:

Software Industry is a fast growing Industry, which constantly deals with the project requirements laid by the clients and its easy, prompt and appropriate solutions. This requires maturity on the part of Software companies, to see the probable solutions (with respect to required time, manpower, required tools etc.) of the queries and projects laid down by the clients. For a software company, the concept of reaching a maturity level requires the implementation of certain defined principles on the Software Development Life Cycle (SDLC). SDLC covers the important aspects of a project from its inception to the delivery of a product and its maintenance. In this Program we are aiming to cover all the important aspects of

SDLC, which includes, Project Initiation, Requirement Management, Project Planning, Project Design, Configuration Management, Change Request Management, Testing and Maintenance

Syllabus:

1. Introduction: Software products, the software process, Software models: Waterfall Model, Incremental Model, Evolutionary Model, Boehm's spiral model, Process visibility, professional responsibility, computer base system engineering.
2. Requirements & Specification: Requirements engineering; analysis; system model; software prototyping; formal specification; algebraic specification; model based specification.
3. Project Management : Introduction to Project Management; Project Planning; Tools for Project Planning; Project Tracking; Tools Of Project Tracking; Team Integration.
4. Configuration Management : Introduction to Configuration management; versioning of software, software release, software labeling, tools for configuration management, importance of configuration management.
5. Design Concept And Methods: Design process; concept effective modular design; architectural design; object oriented design; function-oriented design; real-time system design; user interface design.
6. Dependable Systems: Software reliability; programming for reliability; software reuse; safety-critical software.
7. Software Quality Assurance: Quality Models; ISO9000 standards, Capability Maturity Models
8. Change Request management: Requirements of software changes, change request management lifecycle, change request form, change request analysis and implementation.
9. Verification and Validation: Verification and validation; Different types of testing methodologies, defect

testing; static verification; function points, benchmarks, technical matrices for software, software metrics and measurement.

10. Case Tool : Computer-aided software engineering; CASE workbenches; integrated CASE environments; Rational Tools, Introduction to Rational Unified process and Rational Tools
11. Maintenance and Evolution: Client/Server software engineering; software maintenance; configuration management; software re-engineering; software reverse-engineering.
12. Introduction to Capability Maturity Model

Tutorial:

This shall consist of minimum 15 assignments based on above course.

Text/References:

1. Software Engineering -By Roger S. Pressman, McGraw-Hill International
2. Software Engineering -By Ian Sommerville, Addison Wesley
3. Fundamentals of Software Engineering -By Rajib Mall, Prentice Hall of India
4. Object Oriented Software Engineering A use case Approach -By Ivar Jacobson
5. Pearson

Websites referred:

1. Software Engineering Institute - Website : www.sei.cmu.edu
2. Quality Insurance of India – Website: www.qaiindia.com
3. Rational - Website: www.rational.com

3CA1402: Computer Graphics [4 0 2 5]

Objective:

The subject provides knowledge for developing a graphics system, suggestions for modifications and extensions of the system, and application problems which make use of the system.

In the due course of the syllabus both hardware and software components of graphics system are discussed as well as various applications of computer graphics.

Also algorithms will be explored for creating and manipulating graphics displays.

Syllabus :

1. Overview of Graphics Systems: Introducing application areas of computer Graphics, Various Display Devices, Input Devices, Logical classification of Input devices, User dialogue
2. Graphics Primitives: Points and Lines, Line drawing algorithms, Circle drawing algorithms, Polygon Drawings, Filled Area Primitives, Attributes of output primitives & Antialiasing
3. Two Dimensional Transformation: Basic Transformations, Composite Transformation, Other Transformation, Transformation between Coordinate Systems.
4. Windowing And Clipping (2D): Two Dimensional Viewing , Point & Line Clipping, Polygon Clipping.
5. Structures and Hierarchical Modeling: Structure Concepts, Editing Structure, Basic Modeling Concepts, Hierarchical Modeling.
6. Three Dimensions: Three Dimensional Display Methods, 3D Object Representation, Spline Representation, Cubic Spline Interpolation Methods, Bezier Curves and Surfaces, 3D Geometric and Modeling Transformation, 3D Viewing

Laboratory work:

Minimum 12 – 15 experiments can be given covering major algorithms.

Text/Reference:

1. Computer Graphics, Donald Hearn & M. Pauline Baker, Pearson / PHI
2. Computer Graphics: A programming approach, Steven Harrington, McGraw Hill
3. Interactive Computer Graphics, Foley and Vandem
4. Computer Graphics for Scientists and engineers, R. G. S Asthana and N. K Sinha, New Age International Pvt. Ltd.

5. Procedural Elements of Computer Graphics, Roy A. Plastok, Gordon Kalley, McGraw hill.

3CA1403: Data Communication & Networking – II [4 0 2 5]

Objective:

The subject highly emphasizes on TCP/IP protocol stack. It introduces to the protocols TCP/IP in detail. Besides, Application Layer protocols like DNS, DHCP, SMTP, FTP, and TELNET are focused. Data Link protocol includes ARP, RARP, ICMP.

Along with that Latest Technologies like VoIP, Mobile IP, IPv6, RTP and VPN are also as a part of the Syllabus.

Syllabus:

1. Network Security : Types of Network Security, Implementation Algorithms
2. Data Link Layer protocols: ARP requirement and functioning, RARP requirement and functioning
3. 4 Network Layer Protocols, Understanding IP addresses and various classes, Broadcast, Multicast, Loopback Address, IP protocol, Datagram Approach, Routing IP Datagrams , ICMP error messages, ICMP Error Delivery and Format, Reporting ICMP error messages, ICMP at Network Layer, IP Subnetting and Supernetting, Internet Security and Firewall, Firewall Design Issues, Implementation of a Firewall, Future of TCP/IP, Why change existing TCP/IP, Ipv6 and various issues , IP NAT, IP Sec, Mobile IP, VoIP, VPN
4. Transport Layer Protocols : Introduction to TCP/IP model , Connection-less V/S. Connection oriented protocols , User Datagram Protocol, UDP Header, UDP multiplexing, Transmission Control Protocol, Connection Establishment and, Disconnection, TCP Header, Flow Control under TCP, TCP , Performance & Limitations
5. Application Layer Protocols : BOOTP and DHCP- comparison, Functioning and Performance, BOOTP/DHCP message format, DHCP Configuration,

DNS – Configuration and Structure, DNS resource records, DNS name resolution, File Transport Protocol, – Applications and Functions, TFTP and NFS - Applications and Functions, SMTP - Applications and Functions, TELNET - Applications and Functions

6. Socket Programming: Introduction to Client Server Model, Web Concepts, Socket for Client, Socket for Servers, UDP Datagrams and Socket.

Laboratory work:

Minimum 12 Practical has to be carried out from the prescribed syllabus.

Text/References:

1. TCP/IP Protocol suite by B.A. Forouzan (TMH)
2. Computer Networks by A. S. Tanenbaum (Pearson / PHI)
3. Internetworking with TCP/IP, Douglas Comer (Pearson / PHI)
4. Java Network Programming by Elliott Rusty Harold (Oreilly)
5. TCP/IP Guide by Charles M. Kozierok (SPD)

3CA1301: System Software [3 0 2 4]

Objective:

The main objective of the subject is to cover the study of system software components, such as language processor, assembler, loader, and linker. With the knowledge of system software student will have exposure of designing of system software.

Syllabus:

1. Language Processor: Fundamentals of Language Processing and language, Specification, Grammar and Types of Grammar, Toy Compiler, Introduction to Data structures: Heap and heap allocation, sorting methods.
2. Scanning and Parsing: Scanning: Finite Automata: DFA and NFA, Conversion of NFA into DFA, Top Down Parsing, Bottom up Parsing, Introduction to LEX and YACC tools.
3. Assemblers: Elements of Assembly Language, Programming, A Simple

Assembly Language Scheme Pass Structure of Assembler, Design Of Two Pass Assembler

4. Macro Processors: Macro Definition And Call, Macro Expansion, Nested Macro Calls, Advanced Macro Preprocessor , Design of Macro Preprocessor: Single Pass Algorithm, Two Pass Algorithm and Macro Calls within Macro Calls
5. Loader and Linkers: Relocation And Linking Concept, Design Of A Linker, and Various schemes of Loader.
6. Introduction to Compilers: Aspects Of Compilation, Memory Allocation, and Compilation Of Expression Compilation Of Structure, Code Optimization, and Interpreters.
7. Editors and Debuggers: Various types of Editors and Debuggers and its design.
8. Device Drivers: Introduction to the Device Driver, Requirements Of Device Driver, Types of Device Driver

Laboratory work:

1. Minimum 10 practicals, which should cover following aspects: Simple Scanner Design
2. Implementation of one of the parsing method
3. Design aspects of Assemblers (PASS-1 and PASS-2)
4. Design aspects of Micro Processor (PASS-1 and PASS-2)
5. Simple Editor design

Text/References:

1. Introduction to System Software By Dhamdhare, MC Graw Hill
2. Compilers, Principles, Techniques and Tools By Aho. A.V. Sethi R. and Ulman J.D. (Pearson)
3. Assemblers and Loaders By Barron D.W. (New York, Elsevier)
4. System Programming by John Donovan, TMH

Elective - I

3CA1415: Parallel Processing [4 0 2 5]

Objective:

There are many CPU intensive applications in areas such as molecular biology, computer

graphics, numerical analysis, simulation problems, weather forecasting, etc. Even the best supercomputer available today will take many years of uninterrupted run to yield reasonable results for these tasks. The solution is to use the power of multiple machines to solve these problems. But then, you have problems controlling and coordinating these different machines efficiently. Parallel processing is a broad interdisciplinary area covering architectures to support such parallelism, tools and languages to exploit parallelism in applications, database management students to the technology of parallel processing. The course also covers concepts regarding Message passing Model.

1. Introduction to Parallel Computing, Scope of Parallel computing, Applications in Engineering & Design, Parallel programming Platforms: Implicit Parallelism, Limitation of Memory System Performance, Dichotomy of parallel computing platforms, Communication Model of Parallel Platforms Shared Memory Multiprocessing – Distributed Shared Memory – Message Passing Parallel Computers – Using Parallelism – Utilizing Temporal Parallelism – Utilizing Data Parallelism – Comparison Of Temporal And Data Parallel Processing – Data Parallel Processing With Specialized Processors, Physical Organization of Parallel platforms, Communication Costs in Parallel Machines, Routing Mechanism for Interconnection Networks. Programmability Issues. Operating System Support , Types Of Operating Systems
2. Principles of Parallel Algorithm Design : Preliminaries, Decomposition Techniques, Characteristics of Tasks and Interactions, Mapping Techniques for Load Balancing, Methods for containing Interaction Overheads, Parallel Algorithm Models
3. Basic Communication Operations: Broadcast, Reduction, Scatter, Gather for different types of Interconnection Network.
4. Analytical Modeling of Parallel Programs : Sources of Overhead in Parallel Programs, Speed up and Efficiency, Performance Metrics for Parallel Systems: The Effect of Granularity on Performance, Scalability of Parallel System, Amdahl'Law, Limitation of Amdahl'Law, The Isoefficiency Metric , Other Scalability Metrics : Gustafson-Barsis's Law, Serial Fraction Component analysis, The Karp-Flatt Metric Law.
5. Programming Using The Message Passing Paradigm/Distributed Computing: Message Passing Model, General Model, Programming Model MPI: Communicators, Sending & Receiving Messages : Blocking & Non Blocking, Collective Communication and Computation Operations, Introduction to PVM
6. Programming Shared Address Space Platforms: Processes & Shared Memory Programming, Processes, Shared Memory Programming, General Model Of Shared Memory Programming, Forking-Creating Processes, Joining Processes, Process Model Under UNIX.
7. Parallel Programming Techniques: Loop Splitting – Ideal Speedup – Spin-Locks, Contention And Self-Scheduling, Barriers And Race Conditions: The Barrier Calls, Expression Splitting
8. Introduction to scheduling – Nested Loops, Variation on Loop Splitting, Variation on self scheduling, Indirect scheduling-Summary.
9. Overcoming data dependencies: Introduction-Induction variable-Forward dependencies-block scheduling-backward dependencies-break out of loop
10. Thread-Based Implementation: Thread Management, Example With Threads, Attributes Of Threads, Mutual Exclusion With Threads, Mutex Usage Of Threads, Thread Implementation, Events And Condition Variables, Deviation Computation With Threads.

11. Issues in Sorting on Parallel Computers, sorting Network, Bubble Sort & Its Variants, Parallelizing Quicksort, Parallel Formulation for Practical Architectures.

Laboratory work:

The Practical and Term work will be based on the topics covered in the syllabus. Minimum 18 experiments should be carried out.

Text/References:

1. Introduction To Parallel Programming - By Ananth Grama, Anshul Gupta, George Karypis.
2. Introduction To Parallel Processing – By M.Sasikumar, Dinesh Shikhare And P. Ravi Prakash
3. Parallel Computers – Architecture And Programming – By V. Rajaraman And C. Siva Ram Murthy
4. Introduction To Parallel Processing – By Steven Brawer.
5. Parallel Programming in C with MPI and OpenMPI by Micheal J. Quinn

Referred Websites:

Designing and Building Parallel Programs, by *Ian Foster*

1. <http://www-unix.mcs.anl.gov/dbpp/> (Online Book by Ian Foster)
2. <http://www.anl.gov> -Argonne National Laboratory
3. <http://www.teragrid.org/>

Elective - I

3CA1425 Artificial Intelligence [4 0 2 5]

Objective:

The Technical Community of the world fears that if there is any technology that can overpower human being in the future, then it is the machines made up with the use of Artificial Intelligence & Expert Systems. Learning AI empowers students to understand, to learn the technique used to design the future intelligent machines.

Under the subject AI&ES student will learn various techniques related to AI Knowledge Representation, search strategies, Natural Language Processing, Intelligent Game Playing, Expert Systems etc. The main

objective is to prepare students so that they can develop intelligent programs, which can simulate human behavior.

Syllabus:

1. Introduction to Prolog Programming language
2. Problems and State Space Search: The AI Problems, The Underlying Assumption, What Is An AI Techniques.
3. Problems, Problem Spaces And Search: Defining the Problems as A State Space Search,, Production Characteristics and Issues in the Design of Search Programs, Additional Problems.
4. Heuristic Search Techniques: Generate-And-Test, Hill Climbing, Best-First Search, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis.
5. Knowledge Representation Issues: Representations and Mappings, Approaches to Knowledge Representation.
6. Using Predicate Logic: Representation Simple Facts in Logic, Representing Instance and Isa Relationships, Computable Functions and Predicates, Resolution.
7. Representing Knowledge Using Rules: Procedural versus Declarative Knowledge, Logic Programming, Forward versus Backward Reasoning.
8. Symbolic Reasoning Under Uncertainty: Introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic Reasoning.
9. Statistical Reasoning: Probability and Bays' Theorem, Certainty Factors and Rule-Base Systems, Bayesian Networks, Dempster-Shafer Theory.
10. Fuzzy Logic: Subset hood, Superset hood, Cardinality of Fuzzy Set
11. Weak Slot-And-Filler Structure: Semantic Nets, Frames.
12. Natural Language Processing: Introduction, Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing.
13. Expert systems. An Introduction to Expert system component of expert system,Explanation Facilities, Expert

system, Developments process, Knowledge Acquisition.

14. Connectionist Models: Introduction: Hopfield Network, Learning In Neural Network, Application Of Neural Networks, SOM, Neocognitron, Supervised & Unsupervised Learning, ART, ART1, Maxnet, Competitive Learning, Recurrent Networks, Distributed Representations, Connectionist AI And Symbolic AI.

Laboratory work:

The practical and Term work will be based on the topics covered in the syllabus.

Minimum 15 experiments should be carried out using PROLOG.

Text/References:

1. Artificial Intelligence-By Elaine Rich and Kevin Knight Tata McGraw-Hill
2. Artificial Intelligence and expert systems -By D.W.Patterson
3. Artificial Neural Network- By Mehrotra. Publication (Penram International.)
4. Artificial Intelligence and expert system, development-By D.W.Rolston McGraw-Hill
5. Turbo PROLOG by Townsend
6. PROLOG Programming for Artificial Intelligence-By Ivan Bratko(Addison-Wesley)
7. Programming with PROLOG” –by Klocksins and Mellish.

Elective - I

3CA1435: Compiler Construction [4 0 2 5]

Objective:

This subject emphasis on solving problems universally encountered in designing a language translator, regardless of the source or target machine. User can build or even maintain a compiler for a major programming language, can profitably apply the ideas and techniques. The concepts from this subject are useful in text editors, information retrieval systems, and pattern recognition programs.

Syllabus:

1. Overview of The Translation Process, Lexical analysis : Hard Coding And Automatic Generation Lexical Analyzers
2. Parsing Theory : Top Down And Bottom Up Parsing Algorithms, Automatic Generation Of Parsers
3. Error Recovery : Error Detection & Recovery, Ad-Hoc And Systematic Methods
4. Intermediate Code Generation: Different Intermediate Forms, Syntax Directed Translation Mechanisms and Attributed Mechanisms and Attributed Definition.
5. Run Time Memory Management: Static Memory Allocation And Stack Memory Allocation Schemes, Symbol Table Management.
6. Code Generation: Machine Model, Order Of Evaluation, Register Allocation And Code Selection.
7. Code Optimization: Global Data Flow Analysis, A Few Selected Optimizations like Command Sub Expression Removal, Loop Invariant Code Motion, Strength Reduction Etc.

Laboratory work:

The Practical and Term work will be based on the topics covered in the syllabus.

Minimum 8 experiments should be carried out.

Text/References:

1. Compiler Tools Techniques by A.V.Aho, Ravi Sethi, J.D.Ullman,, Addison Wesley
2. Compiler Construction-Principles And Practices by D. M. Dhamdhare,– Mcmillian
3. The Theory And Practice Of Compiler Writing by Trembley J.P. And Sorenson, P.G., McGraw-Hill
4. Compiler Construction by Waite W.N. And Goos G., Springer Verlag

3CA1407 Client Server Architecture & Application – II [3 0 2 4]

Objective:

The subject is useful in developing the three-tier Client Server systems. It covers the introduction to Client Server architecture. Students would get exposure to technologies like ASP.NET Technology for developing web base Client - Server Applications. Also they get exposure to J2EE architecture.

1. Fundamentals: Introduction to three-tier Client Server systems Web Application basic, ASP.NET fundamentals, the page rendering model, custom rendered controls, Composite controls, and control potpourri.
2. ASP.NET Server control and client-side scripts:Applying Styles to Server Controls, HTML Server Controls, Manipulating Pages and Server Controls with JavaScript, Client-Side Callback.
3. Advanced Features:Web parts, a consistent look and feel, configuration, logging in, Data binding, web site navigation, personalization.
4. Caching and State Management:Session state, application data caching, caching output.
5. Diagnostics and plumbing:Diagnostics debugging, the Http Application class and HTTP modules, custom handlers.
6. Working with XML: Overview, The Basics of XML, XMLReader and

XMLWriter, XMLDocument and XMLPath Document, DataSets, the XMLDataSource Control, Databases and XML.

7. Services, AJAX, Deployment and Silver light: ASP.NET web services, windows communication foundation, AJAX, ASP.NET and WPF content, how web application types affect deployment.
8. Case Study: Introduction to J2EE Architecture

Practical and Term work:

Minimum 10 experiments should be carried out.

The Practical and Term work will be based on the Client server programming using ASP.NET.

Text Books:

1. Programming Microsoft ASP.NET by Dino Esposito
2. ASP.NET Bible by Mridula Parhihar
3. Microsoft ASP.NET step by step by Shepherd, PHI
4. Professional ASP.NET by bill Evjenet, Wrox
5. J2EE Architecture –An Illustrative Gateway to Enterprise Solutions concepts to Application Design & Development by B.V.Kumar & S.Sangeetha

NIRMA UNIVERSITY
INSTITUTE OF TECHNOLOGY
M.C.A. (MASTER OF COMPUTER APPLICATIONS)
Effective from 2014 – 2015
Course Structure
Semester - V

| Sr. No. | Sub. Code | Subject Title | Teaching Scheme | | | | Examination Scheme | | | |
|---------|-----------|-------------------------------------|-----------------|----------|-----------|-----------|--------------------|---------------------|-----|-----|
| | | | | | | | Hours | Component Weightage | | |
| | | | L | T | P | Credit | SEE | C.E. | LPW | SEE |
| 1 | 3CA1401 | Computer Based Optimization Methods | 4 | - | 2 | 5 | 3 | 0.4 | 0.2 | 0.4 |
| 2 | 3CA1507 | Object Oriented Analysis & Design | 3 | - | 2 | 4 | 3 | 0.4 | 0.2 | 0.4 |
| 3 | 3CA15E3 | Elective – II | 4 | - | 2 | 5 | 3 | 0.4 | 0.2 | 0.4 |
| 4 | 3CA15E4 | Elective – III | 4 | - | 2 | 5 | 3 | 0.4 | 0.2 | 0.4 |
| 5 | 3CA1505 | Seminar | - | - | 2 | 1 | - | - | 1.0 | - |
| 6 | 3CA1506 | Minor Project | - | - | 6 | 3 | - | - | 1.0 | - |
| | | | 15 | 0 | 16 | 23 | | | | |

Elective - II

3CA1513 Data Warehousing & Data Mining
3CA1523 Data Encryption & Security
3CA1533 Distributed System
3CA1543 Enterprise Application Development Technologies.

Elective - III

3CA1514 - Mobile Computing and Wireless Networking
3CA1524 - Multimedia System
3CA1534 - Image Processing
3CA1544 - Computer Animation

Semester - VI

| Sr. No | Sub. Code | Subject Title | Teaching Scheme | | | | Examination Scheme | | | |
|--------|-----------|---------------|-----------------|---|---|-----------|--------------------|---------------------|-----|-----|
| | | | | | | | Hours | Component Weightage | | |
| | | | L | T | P | Credit | SEE | C.E. | LPW | SEE |
| 1 | 3CA1601 | Major Project | - | - | - | 15 | - | - | 1.0 | - |
| | | | - | - | - | 15 | | - | - | - |

MCA - SEMESTER – V

3CA1401: Computer Based Optimization Methods [4 0 2 5]

Objective:

To Introduce and exercise a range of analytical modeling techniques useful in decision making in the design environment. The course deals with mathematical programming algorithms and applications rather than theory.

There are four aspects of the course:

1. Study of model formulation and discussion of documented real world applications.
2. Study of mathematical programming algorithms.
3. Consideration of the problems involved in implementing mathematical programming algorithms on a computer and use of a computer software package to study the behavior of larger models than can be solved by hand.

Syllabus:

Introduction to Operation Research: Operation Research approach, scientific methods, Introduction to models and modeling techniques, General methods for Operation Research models, methodology and advantages of Operation Research History of Operation Research.

1. Linear Programming (LP): Introduction to LP and Formulation of Linear programming
2. problems, Graphical solution method, Alternative or multiple optimal solutions, Unbounded solutions, Infeasible solutions, Maximization – Simplex Algorithm, Minimization – Simplex Algorithm using Big-M method, Two phase method, Duality.
3. Transportation & Assignment Problems: Introduction to Transportation problems, VAM method,

N-W corner method, Least cost method, Variations in transportation problem, Introduction to assignment problems, Variations to assignment problems.

4. Integer Programming: Cutting Plane method, Branch & Bound Method, Zero – one Integer programming.
5. Sequencing: Introduction, Processing N jobs through two Machines, Processing N jobs through three Machines, Processing N jobs through m Machines,
6. Network Analysis: Network Definition and Network diagram, Probability in PERT analysis , Project time Cost Trade off , Introduction to resource smoothing and allocation
7. Queuing Models: Concepts relating to Queuing systems, Basic elements of Queuing Model, Role of Poison & Exponential Distribution, Concepts of Birth and Death process
8. Inventory Model: Introduction to Inventory Control, Deterministic Inventory model, EOQ Model with quantity discount.
9. Simulation: Introduction & steps of Simulation method, Distribution functions and Random number generation.

Laboratory work:

The Practical and Term work will be based on the topics covered in the syllabus.

Minimum 12 experiments should be carried out.

Text/References:

1. Quantitative Techniques in management, N.D Vora, Tata McGraw-Hill.
2. Operation research , R Panneerselvam PHI
3. Operations Research : By An Introduction by Handy A. Taha (Pearson / PHI)
4. Operations Research, theory and applications, J.K Sharma, Macmillan India Limited

3CA1507 : Object Oriented Analysis & Design [3 0 2 4]

Objective:

The subject is extremely useful as per the industry's requirement. As Software Industry emphasis more upon Modeling of the system and has adopted the object oriented approach for system design and development. Thus this subject conceptually increases the students understanding for the use of modeling the system, which is one of the important phases of any Software development life cycle. Also the subject broadly & systematically covers the Object Modeling & Design Concepts. Unified Modeling Language and use of Modeling Tool as well as gives them practical exposure to object oriented technologies.

Syllabus:

1. Introduction to Object Modeling Technique, UML, Conceptual Model of UML, Architecture, Software development life cycle
2. Basic Structural Modeling: Terms & Concepts and common modeling technique for Modeling classes, relationships, common mechanisms, Diagrams, class Diagrams
3. Advanced Structural Modeling: Terms & Concepts and common modeling technique for modeling Advanced Classes & Relationships, Interfaces-Types and Roles, Packages, Instances, Object Diagrams.
4. Basic Behavioral Modeling: Terms & Concepts and common modeling technique for Modeling Interactions, Use Cases, Use Case Diagram, Interaction Diagram, Activity Diagram
5. Advanced Behavioral Modeling: Terms & Concepts and Common Modeling technique for modeling Events, Signals, State Machines and StateChart Diagrams
6. Architectural Modeling: Terms & Concepts and Common Modeling technique for Modeling Components, Deployment, Component Diagrams and Deployment Diagrams.

7. Design Patterns: Introduction of GRASP and GoF, GRASP: More Objects with Responsibilities: Polymorphism, Pure Fabrication, Indirection, Protected Variations , Applying GoF Design Patterns: Creation Patterns : Factory, Singleton ; Structural Patterns: Adapter, Façade, Proxy; Behavioral Patterns: Observer, State, Mediator

Laboratory work:

Minimum 12 experiments can be given from object oriented technologies and UML (Rational Rose).

Text/References:

1. The Unified Modeling Language User Guide By Grady Booch, James Rumbaugh, PHI
2. Design Patterns – Element of Reusable object- Oriented Software by Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides , Pearson Education
3. Applying UML and Patterns by Craig Larman, Pearson Education

Elective - II

3CA1513: Data Warehousing And Data Mining [4 0 2 5]

Objective:

Data warehousing has become one of the most dynamic, interesting, and fast-growing segments of the information technology industry. A data warehouse is often used as the basis for a decision-support system. It is designed to overcome some of the problems encountered when an organization attempts to perform strategic analysis using the same database that is used to perform online transaction processing.

Data warehouses provide following benefits to analytical users:

1. Data is organized to facilitate analytical queries rather than transaction processing.
2. Differences among data structures across multiple heterogeneous databases can be resolved.

3. Data transformation rules can be applied to validate and consolidate data when data is moved from the OLTP database into the data warehouse.
4. Security and performance issues can be resolved without requiring changes in the production systems.

Data mining, the extraction of hidden predictive information from large databases, is a powerful new technology with great potential to help companies focus on the most important information in their data warehouses. Data mining tools predict future trends and behaviors, allowing businesses to make proactive, knowledge-driven decisions. The automated, prospective analyses offered by data mining move beyond the analyses of past events provided by retrospective tools typical of decision support systems. Data mining tools can answer business questions that traditionally were too time consuming to resolve. They scour databases for hidden patterns, finding predictive information that experts may miss because it lies outside their expectations.

The course is aimed at giving a detailed study of data warehousing and data mining .

Syllabus:

Data Warehousing

1. Introduction : Data Warehousing
2. Delivery process
3. Data Warehouse Architecture : System Process : Extract and load, Clean and transform, Backup and archive, Query management. Process architecture
4. Design : Database schema : Starflake schema, fetch and dimension, Partitioning strategy : Horizontal and vertical Aggregation, Data Marting : Meta Data, Data transformation and load, Data management : Query generation, Metadata and tools System and data warehouse process manager : System managers, Data warehouse process manager, Load manager Warehouse manager, Query manager

5. Hardware and operational design : Physical layout, Security, Backup and recovery
6. Capacity planning, tuning and testing of Data Warehouse
7. Methodology
8. Case Study

Data Mining

1. Introduction : Data Mining
2. Data mining and the data warehouse
3. The knowledge discovery process : What is learning? : Data selection, cleaning, enrichment, coding, Data mining : Data Mining : Query tools, statistical techniques, visualization, online analytical process (OLAP), k-nearest neighbor, decision trees, association rules, neural networks, genetic algorithms, Reporting
4. Setting the Knowledge Discovery in Database (KDD) environment Getting started, Data selection, cleaning, enrichment, coding Data mining : Reporting, KDD environment, Ten golden rules.
5. Some formal aspects of learning algorithm : Learning as compression of data sets, The information content of a message, Noise and redundancy, The significance of noise, Fuzzy databases, The traditional theory of relational database, From relational to tables, From keys to statistical dependencies, Demoralization, Data mining primitives
6. Case study

Laboratory work:

Minimum 12 – 15 experiments can be given from the prescribed syllabus.

Text/References:

1. Data Warehousing in the Real World: A practical Guide for Building Decision Support System By: Sam Anaory & Dennis Murray Publication: Addison-Wesley
2. Data Mining By: Pieter Adriaans & Doff Zantinge Publication: Addison-Wesley

Elective - II

3CA1523: Data Encryption & Data Security [4 0 2 5]

Objective:

In this age of Internet computing, there is indeed no place or time at which security does not matter. Protecting vital data from various attacks is always an important part in data systems. This course provides introduction to both theory and practice of data security. The theory part includes conventional crypto-algorithms, public-key crypto-algorithms, hash functions and digital signatures. The practice part covers important data security tools and applications: Kerberos, SSH, X.509, IP Security, SSL/TLS, and possibly others. This course is self-contained: basic mathematical foundations, e.g., basics of number theory, are covered in the course.

Syllabus:

1. Introduction : conventional Encryption: Classical Techniques, Modern Techniques. Algorithms, Confidentiality Using Conventional Encryption.
2. Public-key cryptography : Public-key encryption and hash functions.
3. Message authentication and hash functions : Hash and Mac algorithms.
4. Digital signatures : Introduction and authentication protocols.
5. Authentication Applications: Electronic Mail Security, IP Security, Web Security. Network security practice.
6. System Security: Intruders, Viruses, and Worms, Firewalls.

Text/References:

Cryptography and Network Security : Principles & Practice , by William Stallings, Pearson Education
Network Security Essentials : by William Stallings , Pearson Education
Hand book of applied Cryptography CRC Press

Elective - II

3CA1533: Distributed Systems [4 0 2 5]

Objective :

In order to exploit computing systems more effectively, organizations are connecting them that forms Computer Network. A distributed system is collection of networked computing systems that appears to its users as a single coherent system. So the objective of this subject is to study goals of distributed systems and issues that should be considered to achieve these goals.

Syllabus:

1. Introduction: Definition of a distributed system, goals, hardware concepts, software concepts, the client-server model.
2. Communication: Layered protocols [middleware protocols], remote procedure call, remote object invocation, message-oriented communication, stream-oriented communication.
3. Processes: Threads, clients, servers, code migration, software agents.
4. Naming: Naming entities, locating mobile entities, removing unreferenced entities.
5. Synchronization: clock synchronization, logical clocks, global state, election algorithms, mutual exclusion, distributed transaction.
6. Consistency and replication: Introduction, Data-centric consistency models, client-centric consistency models, distribution protocols, consistency protocols.
7. Fault tolerance: Introduction to fault tolerance, process resilience, reliable client-server communication, reliable group communication, distributed commit, recovery.
8. Security: Introduction to Security [Security threats, policies and mechanisms, design issues], secure channels [Secure group communication], access control.
9. Distributed object-based system: CORBA, distributed COM, GLOBE [overview of Globe].
10. Distributed file systems: SUN network file system, the CODA file system

[overview of Coda], other distributed file systems.

11. Distributed document-based systems: the World Wide Web [overview of WWW], Lotus Notes [overview of Lotus Notes].
12. Distributed coordination-based systems: introduction to coordination models, TIB/Rendezvous [overview of TIB/Rendezvous], JINI [overview of Jini].

Laboratory work:

Minimum 12 – 15 experiments can be given from the prescribed syllabus.

Text/References:

1. Distributed Systems – Principals and Paradigms By Andrew S. Tanenbaum and Marten van Steen, Pearson / PHI
2. Distributed Systems – Concepts and Design, By George Coulouris, Jean Dollimore and Tim Kindberg, Addison-Wesley
3. Distributed Operating Systems – Concepts and Design By Pradeep K. Sinha, Prentice Hall of India Pvt. Ltd.
4. Distributed Operating Systems By Andrew S. Tanenbaum, Pearson / PHI
5. Programming with Java and Corba by Robert

Elective - II

3CA1543 Enterprise Application Development Technologies [4 0 2 5]

Objective:

In present Scenerio Large number of Business applications are developed in JAVA. Thus this course is designed to prepare the students with the technologies which are used to developed 'n' tier client Server Applications based on Web Model. and applications based on Service Oriented Architecture. The Knowledge of Java Programming is a essential to study this course.

Syllabus:

1. Introduction : What is an Enterprise, needs of growing Enterprise, Enterprise

Architectures, Enterprise Solutions and J2EE, J2EE Architecture

2. Client Tier : Importance of Client Tier, Components of client Tier HTML clients, Applet Clients, Midlet Clients, Java App clients , Web Services Clients and containers of Client Tier
3. Presentation Tier : Importance of Web Tier, Web Container, Web Components: Servlets , Filters, JSP. MVC Architecture and Web tier, Design Patterns in Web Tier.
4. Business Tier: Importance of Business Tier, Business Components : Session Beans, Entity Beans, Message Driven Beans MVC Architecture and Business tier, Design Patterns in Business Tier.
5. EIS Integration Tier : ES Systems , EIS Integration Schemes : using JDBC API's , JMS, J2EE Connector Architecture.
6. Services: Transaction, Transactions, JTS, JTA, Transactions in Business Tier. Security
7. Persistence Mechanism: Hibernate , Introduction and comparison with alternate Techniques. Frameworks: Spring.
8. Service Oriented Computing : Challenges and Benefits, Service Oriented Architecture, Web Services and J2EE , SOAP , WSDL, Web Service Registries : UDDI, eb XML. WS standards and specification, Web Services Security. Web Service Interoperability, SOA BPEL.

Term Work and Practical :

Term Work and Practical will be based on the above mentioned topics. Minimum 08 Practicals and one Project needs to be carried out

Text Books:

1. J2EE Architecture –An Illustrative Gateway to Enterprise Solutions concepts to Application Design & Development by B.V.Kumar & S.Sangeetha

2. Java Server Programming for Professionals – Ivan Bayross – SPD Publication
3. Service Oriented Architecture with Java: Using SOA and Web Services to Build Powerful Java Applications / by C. A. Binildas, Malhar Barai and Vincenzo Caselli - SPD
4. Java Server Programming EE6 Black Book – Kogent- Dreamtech
5. Web Services Security and E-Business / by G. Radhamani and G. S.V. Radha Krishna Rao (Idea Group publishing)

Elective – III

3CA1514: Mobile Computing And Wireless Networking [4 0 2 5]

1. Introduction: Applications, History, Issues, Reference model
2. Wireless Transmission: Frequency for radio transmission, Signals, Antennas, Signal propagation, Multiplexing, Modulation, Spread spectrum, Cellular Systems
3. Medium Access Control: Reasons for specialized MAC, SDMA, FDMA, TDMA, CDMA, Comparison of S/T/F/CDMA
4. Telecommunications systems: GSM, HSCSD, GPRS
5. Satellite systems: History, Applications, GEO, LEO, MEO, Routing, Localization, Handover
6. Wireless LAN: Infra red vs radio transmission, Infrastructure and ad-hoc network, IEEE 802.11, Bluetooth
7. Mobile network layer: Mobile IP, DHCP, Mobile ad-hoc networks
8. Mobile transport layer: Traditional TCP Congestion control, Slow start, Fast retransmit/fast recovery and implications of them on mobility, TCP improvements for mobility, TCP over 2.5/3G wireless networks, Performance enhancing proxies
9. Support for mobility: File systems, World wide web, Wireless application protocol

Reference books:

1. Mobile Communications Second Edition By Jochen Schiller
2. Wireless Communications and Networks By William Stallings
3. J2ME in a Nutshell A Desktop Quick Reference by kim topley
4. WAP and WML Programming in Easy Steps by Mike Mcgrath

Note: Practicals will cover WML, WMLScript, Wireless network setup and J2ME

Elective – III

3CA1524 : Multimedia Systems [4 0 2 5]

Objective :

The aim of this subject is to study fundamental concept of Multimedia Systems. The subject will be helpful in understanding basic characteristics of various media's like audio and video. It will extensively cover all aspect of Multimedia Application development like audio/video compression, animation and user interface development.

Syllabus :

1. Multimedia Systems Design: An Introduction : Multimedia Elements, Multimedia Systems Architecture, Evolving Technologies for Multimedia, Defining Objects for Multimedia Systems, Multimedia Data Interface Standards, The need for compression, Multimedia Databases
2. Compression and Decompression : Types of Compression, Binary Image compression Schemes, Color Gray Scale and Still-video Image Compression, Video Image Compression, Audio Compression, Fractal Compression
3. Data and File Format Standards : Rich-Text Format, TIFF File Format, Resource Interchange File Format, MIDI file format, JPEG DIB File Format for still and Motion Images, AVI Indeo File Format, MPEG Standards, TWAIN Specification

4. Multimedia Input/Output Technologies: Key Technology Issues, Pen Input, Video and Image Display Systems, Print Output Technologies, Image Scanners, Digital Voice and Audio, Digital Camera, Video Images and Animation, Full-Motion Video
5. Storage and Retrieval Technologies : Magnetic Media Technology, Optical Media, Hierarchical Storage Management, Cache Management for Storage Systems
6. Architectural and Telecommunication Considerations : Specialized Computational Processors, Memory Systems, Multimedia Board Solutions, LAN/WAN Connectivity, Distributed Object Models
7. Multimedia Application Design : Multimedia Application Classes, Types of Multimedia Systems, Virtual Reality Design, Components of Multimedia Systems, Organizing of Multimedia Databases, Application Work Flow Design Issues, Distributed Application Design Issues
8. Multimedia Authoring and User Interfaces: Multimedia Authoring Systems, Hypermedia Application Design Considerations, User Interface Design, Information Access, Object Display/Playback Issues
9. Hypermedia Messaging : Mobile Messaging, Hypermedia Message Components, Hypermedia Linking and Embedding, Creating Multimedia Messages, Integrated Multimedia Message Standards, Integrated Multimedia Message Standards, Integrated Document Management
10. Distributed Multimedia Systems : Components of a Distributed Multimedia System, Distributed Client-Server Operation, Multimedia Object Servers, Multiserver Network Topologies, Distributed Multimedia Databases, Managing Distributed Objects
11. System Design: Methodology and Considerations : Fundamental Design Issues, Determining Enterprise

Requirements, Examining current Architecture and Feasibility, Designing for Performance, Multimedia Systems Design, System Extensibility

12. Multimedia Systems Design Example : Determining Enterprise Requirements, Business Model for IFC, Business Information Model for IFC, Architectural Recommendation and Technology Feasibility, Modeling the Objects, Analyzing performance Requirements, Design Considerations, Designing Storage Distribution, Optimizing Network Transportation

Laboratory work:

Minimum 12 – 15 experiments can be given from the prescribed syllabus.

Text/References:

1. Multimedia Systems Design By Prabhat K. Andleigh, Kiran Thakrar (Prentice-Hall India)
2. Multimedia: Computing, Communications and Applications By Ralf Steinmetz and Klara Nahrshedt (Person Education):
3. Digital Multimedia By Nigel Chapman & Jeny Chapman
4. Multimedia Systems By John F. Koegel Buford (Pearson Education)
5. Multimedia Magic by S. Gokul

Elective – III

3CA1534: Image Processing [4 0 2 5]

Objective:

The subject introduces fundamentals of Image processing, mathematical models used in this field, various image-processing techniques, & application of Image processing in real-world.

Syllabus:

1. Introduction : Background, Digital Image Representation, Fundamental Steps In Image Processing, Elements Of Digital Image Signal Processing Systems
2. Digital Image Fundamentals : Elements Of Visual Perception , Image Signal

- Representation, Imaging System Specification, Building Image Quality, Role Of Computers
3. Image Transforms : DFT , Properties Of 2-Dimensional Fourier Transform , FFT, Walsh Transform, Hadamard Transform ,DCT , Harr Transform, The Slant Transform
 4. Image Enhancement : Enhancement By Point Processing, Spatial Filtering, Enhancement In Frequency Domain, Color Image Processing
 5. Image Restoration : Degradation Model , Circulate And Block Circulate Matrices, Algebraic Approach To Restoration, Inverse Filtering
 6. Image Segmentation : Detection Of Discontinuities, Edge Linking And Boundary Detection, Region Oriented Segmentation, Use Of Motion In Segmentation
 7. Image Compression : Fundamentals, Image Compression Models, Error Free Compression, Lossy Compression, Image Compression Standards
 8. Representation : Representation Schemes, Boundary Descriptors, Regional Descriptors, File Formats
 9. Recognition : Elements Of Image Analysis, Patterns And Pattern Classes , Decision Theoretic Methods, Structural Methods

Laboratory work:

At least 12 practical should be done through out the semester, which should be based on various concepts covered in the syllabus.

Text/References:

1. Digital Image *Processing* By Rafael C. Gonzalez and Richard E. Woods, Addison Wesley
2. Fundamentals of Digital Image Processing By Anil K. Jain, Pearson / PHI.
3. Computer Vision and Image Processing By Scott E. Umbaugh, Prentice Hall
4. Mastering Matlab 5 by Duane Hanselman And Bruce Littlefield, Prentice Hall.

5. Pattern Classification and Scene Analysis By Richard O. Duda and Peter E. Hart, John Wiley and Sons
6. Digital Image Processing, Third Edition By Bernd Jahne, Springer-Verlag.
7. Pattern Recognition Engineering by Morton Nadler and Eric P. Smith, John Wiley and Sons
8. Clustering and Classification by P. Arabie, L.J. Hubert, and G. De Soete, World Scientific.
9. Digital Image Processing and Computer Vision by Robert J. Schalkoff, John Wiley and Sons

3CA1544: Computer Animation [4 0 2 5]

Objective:

The Computer animation has become a dominant force in Computer Industry today. The subject provides knowledge for developing, editing and animating various objects using 2D and 3D Animation.

Syllabus:

1. Learning Animation: Working with files, workspace, setting the stage, using template, exploring drawing modes, working with drawing tools, adding filters
2. Objects and text: Moving, copying, deleting and editing objects, transforming objects, working with text field, frames and key frames, layers and layer folders
3. Advance Effects in Animation: Tween animation, motion tweens, editing the motion path of a motion tween, frame by frame animation, Bones, animating an armature and 3D animation
4. Symbols, instances, library, Action Script: Types of symbols, creating and modifying symbols, instances and library panel, working with sound and video, actions panel overview, resizing the actions tool box or script pane, Publishing and exporting the files.
5. 3DAnimation: Workflow of 3D content development, main features of 3D Animation tool, Exploring user

Interface of 3D Animation tool,
Working with Projects and Scenes

6. Objects, Polygonal Modeling in 3D Animation tool: Exploring types of Objects in 3D Animation tool, Creating objects using interactive creation mode, Reflection, Transforming objects, describing the components of polygon mesh, creating and modifying polygon mesh
7. NURBS Modeling: Components of NURBS, creating and editing NURBS curve and surface
8. Animating Objects, Shading, Lighting and Texturing in 3D Animation tool: Types of animation, exploring animation controls, key frames, animation layers, sound in animation
9. Rendering Scene in 3D Animation tool: Rendering methods, render able camera, nodes, layers

Laboratory work:

The term work and the practical work will be based on the topics covered in the syllabus. Minimum 10 experiments can be given covering major aspects of computer animation.

The Theory Teaching may be conducted in the Computer laboratory for increasing the effectiveness of teaching this course.

Text Books:

1. Introducing Maya 2011 by Dariush Derakhshani, Sybex Wiley Higher Education
2. Flash CS5 The missing manual by Chris Grover, Oreilly Media/ Pogue Press
3. 3DS Max 2010 Bible by Kelly L Murdock
4. Adobe Flash Professional CS5 Classroom in a book by Adobe Creative team, Adobe Press.
5. Maya 2009 in Simple Steps by Kogent Learning Solutions, Dreamtech Press
6. 3Ds Max 2009 simple steps by Kogent Learning Solutions.
7. Flash CS4 in Simple Steps by Kogent Learning Solutions, Dreamtech Press

3CA1505 : Seminar

[0 0 2 1]

Objectives:

The objective of seminar is to develop the communication skill and deliver the seminar to their guide along with the students. Seminar can be selected from subject covered in the syllabus or from the advance topics.

3CA1506 : Minor Project

[0 0 6 3]

Objectives:

To provide the students with experience in analyzing, designing, implementing and evaluating information systems. It is part time project in 5th semester. Students are assigned one or more system development projects. The project Development involves part or all the system development life cycle.

MCA SEMESTER – VI

3CA1601: Major Project

[0 0 0 15]

Objective:

The VIth semester Major Project should be modeled on the lines of a post-graduate (M.Tech. dissertation project). The subject area of the project should be related to the current or future status of Computer Applications. The scope extended in the Academic / Laboratory / Applications content should be commensurate with a meaning full and effective engagement for a full semester (14 weeks) project of the VIth semester of Master.

Major component of the project should include Identified the system, deciding the aims and objectives to be achieved, modules to be studied, analysis, innovations / research, laboratory / applications studies and final evaluation in terms of result achieved. The report should follow the style of P.G. Dissertation report. The institution should devise a detailed scheme of periodical evaluation of the project and its progress.