

SCHEME OF EXAMINATION :

OVERALL CREDIT TOTAL = 140

ANNEXURE

Course Component	Subject Name
Elective - I	1. Information Security. 2. Software Project Management 3. Network Security & Cryptography
Elective - II	1. Marketing Analytics 2. Decision Management Systems 3. E-Commerce
Elective - III	1. Cloud Computing 2. Mobile Computing 3. Parallel Computing

Under Part IV of the course, students are required to register separately for two Non-Major Elective papers, choosing preferably papers offered by other departments during the First and Second semester. The marks obtained under Part IV would not be included for classification of the candidate although a pass is mandatory. Students should have obtained the minimum credit under Part V to be eligible to receive the degree.

B.Sc. (Information Technology)

SYLLABUS

CORE - I

PROGRAMMING IN C & LINUX

Unit 1: Fundamental character set – Identifier and keywords – data types – Constants – variables – Declarations – Expressions – Statements – Arithmetic, Unary, Relational and logical, Assignment and conditional Operators – Bitwise Operators - Library Functions - Data input output functions – Simple C programs.

Unit-2 : Flow of control – if, if-else, while, do-while, for loop, Nested control structures – Switch, Break and continue, go to statements – Comma operator- Arrays – defining and Processing - Multi-Dimensional Arrays.

Unit-3: Functions – Definition – Proto-types – Passing arguments – Recursions – storage Classes – Automatic, External, Static, Register Variable – Structure – Union-File Creating, Processing, Opening and Closing a data file.

Unit-4: Introduction to Linux – Linux Components – Linux Files – File Attributes and Permission – Standard I/O – Redirection –Grep and Stream Editor

Unit-5 : Shell Programming – Shell Variables – Export, Read, Exit Commands – Control Structures – Arithmetic in Shell Programming – Structure of an AWK Script – AWK Control Structures – Executing AWK Scripts with the Shell.

Recommended Texts

1. E. Balaguruswamy, 2009, “Programming in ANSI C”, TMH publishing Company LTD
2. M.G. Venkateshmurthy, 2005, Introduction to Uinux & Shell Programming, Pearson Education India, Delhi.

Reference Books

1. N. Kanthane, 2005, Programming with ANSI and Turbo C, Pearson Education,

CORE – II

PRACTICAL – PROGRAMMING IN C & LINUX LAB

C Programs:

1. Determining a given number is prime or not.
2. Pascal's triangle
3. String Manipulation
4. Matrix multiplication
5. Finding determinant of a Matrix
6. Checking for tautologies and Contradictions.
7. Euclidean's Algorithm for finding GCD (Towers of Honai).
8. Creating database for telephone numbers and related operations. Use file concepts.

Linux Programs:

1. Check whether the given number is Armstrong / prime / perfect or not.
2. Accepts any number of arguments and prints them in the reverse order.
3. Write a script that does the following:
 - a. display the name of the script being executed.
 - b. Display the first, third and tenth argument given to the script.
 - c. Display the total number of arguments passed to the script.
 - d. If there were more than three positional parameters, use shift to move all the values 3 places to the left.
 - e. Print all the values of the remaining arguments.
 - f. Print the number of arguments .

Note: test with zero, one, three and over ten arguments.
4. Design a menu driven program for rename, remove and copy commands.
5. Check whether the given user has logged in or not.
6. To check file permissions (read/write/execute/exit) and file types (file / directory /size zero)
7. Write a program to get two user inputs (filename and whether to download or upload the file).

ALLIED - I

MATHEMATICAL APPROACH TO BIG DATA

Unit 1 : Mathematical Logic: Statement Calculus – Connectives – normal forms – Predicate Calculus - Theory of inference

Unit 2 : Algebraic Equations : Gauss elimination method - Inverse of a matrix - Gauss - Jordan method- Gauss-Seidel method.

Unit 3: Roots of Equations: Graphical Method – Bisection Method – False-Position Method – Fixed-Point Iteration – Newton-Raphson Method – Secant Method.

Unit 4: Algebraic Systems : Basic concepts – Semigroups, Monoids, Groups, Subgroups, Normal Subgroup, Semigroup Homomorphism

Unit 5: - Trapezoidal Rule - Simpson's $1/3$ rule and $3/8$ rule - Applications - Weddle's rule.

Recommended Texts

1. J.P. Tremblay and R. Manohar, 1975, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw-Hill, New Delhi.
2. P.R.Vittal and V.Malini, Statistical and Numerical Methods, Margham Publications, Chennai.

NME - COMPUTING SKILLS – Practical

Unit 1 : *Introduction to Computers* – Classification of computers; Role of Computers in society; Inside Computers – Hardware (processing, memory, i/o, storage), Software(systems, application), CPU, OS (DOS, Windows, Unix, Linux), Storage devices; Programming – Overview, need for languages, skills; Networking Basics; Virus; Hacking

Unit 2 : *Word Processing* – Open, Save and close word document; Editing text- tools, formatting, bullets; Spell Checker; Navigating in word – keyword, Mouse; document formatting- paragraph alignment, indentation, headers and footers, numbering; printing-preview, options

Unit 3 : *File Management* - Understanding the importance file management, backing of files, Navigating thru My Computer and Windows Explorer; Files and Folders – editing, retrieving, deleting, renaming , subfolders – manipulate windows – maximize, minimize; Power point basics – terminology, templates, viewing.

Unit 4 : *Spreadsheets* – MS Excel – opening, entering text and data, formatting, navigating; Formulas – entering, handling and copying; Charts –creating, formatting and printing, header and footer, centering data, printing

Unit 5 : *Networks* – Internet Explorer- components; www – working, browsing, searching, saving – Bookmark – favorite, create, delete – Printing a web page; email-creating, receiving, reading and sending messages

Note : *Unit II to Unit V needs exposure thru Practicals*

Recommended Texts:

1. Introduction to Computers – Peter Norton, Tata McGraw Hill
2. Microsoft 2003 – Jennifer Ackerman Kettell, Guy Hat-Davis, Curt Simmons, Tata McGraw Hill

CORE - III

PROGRAMMING IN JAVA

Unit 1: Introduction to Java – Features of Java – Object Oriented Concepts – Lexical Issues – Data Types – Variables – Arrays – Operators – Control Statements.

Unit-2:– Classes – Objects – Constructors – Overloading method – Static and fixed methods – Inner Classes – String Class – Inheritance – Overriding methods – Using super – Abstract class.

Unit-3:– Packages – Access Protection – Importing packages – Exception Handling – Throw and Throws – Thread – Synchronizing – Messaging – Runnable Interface – Inner thread Communication – Deadlock – Suspending, Resuming and stopping threads – Multithreading

Unit-4: I/O streams – File Streams – Applets-String Buffer-Char Array-Java Utilities-Code Documentation.

Unit-5 : AWT - Working with windows using AWT Classes-AWT Controls-Layout Managers and Menus

Recommended Texts

1. E. Balaguruswamy, 2009, “Programming in ANSI C”, TMH publishing Company LTD
2. M.G. Venkateshmurthy, 2005, Introduction to Uinux & Shell Programming, Pearson Education India, Delhi.

Reference Books

1. K.Arnold and J.Gosling- The Java Programming Language – Second Edition,Addison Wesley,2002.
2. P.Naughton and H.Schildt –Java2 (The Complete References)-Seventh Edition,TMH 2004.

CORE - IV

PRACTICAL - PROGRAMMING IN JAVA LAB

1. Finding area and Perimeter of a circle. Use Buffered Reader Class.
2. Substring Removal from a String. Use String Buffer Class
3. Determining the order of numbers generated randomly using Random Class.
4. Implementation of Point Class for Image Manipulation.
5. Usage of Calender Class and manipulation
6. String Manipulation using Char Array.
7. Database Creation for storing e-mail addresses and manipulation
8. Usage of Vector Classes
9. Implementation Thread based applications & Exception Handling.

APPLET

1. Working with Frames and various controls
2. Working with Dialogs and Menus.
3. Working with Panel and Layout.

ALLIED – II

OPERATION RESEARCH

Unit – 1 : Introduction to Operations Research - Linear Programming - Formulation - Graphical Solution - Simplex method.

Unit 2 : Big-M Method – Two-Phase method – Duality Dual-Primal relation – Dual Simplex Method.

Unit – 3 : Transportation Problem -- Assignment Problem.

Unit – 4 : Sequencing problem , n jobs through 2 machines ,n jobs through 3 machines , 2 jobs through m machines , n jobs through m machines.

Game theory : Two person – Zero game with saddle point – without saddle point – Dominance – solving $2 \times n$ game or $m \times 2$ game by graphical method

Unit – 5 : PERT – CPM : Project Network Diagram – Critical Path (Crashing excluded) – PERT computation

Recommended Texts

1. V.Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan – Resource Management Techniques (Operations Research).
2. Introduction to Operations Research, P.R.Vittal
3. Gupta P.K. and HiraD.S.Problems in Operations Research, S.Chand& Co.

Reference Books

1. .KantiSwaroop, Gupta P.K. and Manmohan – Problems in Operations Research, Sultan Chand & Sons.
2. Ravidran A., Philips,D.T. and Solberg J.J.,Operations Research, John Wiley & sons.
3. Taha H.A., Operations Research, Macmillian Publishing company, Newyork.

NME – Practical – HTML Lab

1. A Program to illustrate body and pre tags
2. A Program to illustrate text Font tag
3. A Program to illustrate text formatting tags
4. A Program to illustrate Order List tag
5. A Program to illustrate UnOrder List tag
6. A Program to illustrate Definition List tag
7. A Program to illustrate Img tag
8. A Program to illustrate Hyper Link tag (Anchor tag)
9. Create a HTML page to demonstrate the usage of Frames. Choose the content of the page on your own.
10. A Program to illustrate Table tag

CORE - V

DESIGN AND ANALYSIS OF ALGORITHM

Unit 1: Introduction - Definition of Algorithm – pseudocode conventions – recursive algorithms – time and space complexity –big-“oh” notation – practical complexities .

Unit 2: - Divide and Conquer: General Method - Finding maximum and minimum – merge sort -Quicksort, Strassen's matrix multiplication

Unit 3: Greedy Method: General Method –knapsack problem - Tree vertex splitting - Job sequencing with dead lines – optimal storage on tapes.

Unit 4: Dynamic Programming: General Method - multistage graphs – all pairs shortest paths – single source shortest paths - String Editing – 0/1 knapsack.

Unit 5: Search techniques for graphs – DFS-BFS-connected components – biconnected components Back Tracking: General Method -Sum of subsets Branch and Bound: General Method - Traveling Salesperson problem.

Recommended Texts

1. E. Horowitz, S. Sahni and S. Rajasekaran, 1999, Computer Algorithms, Galgotia, New Delhi.

Reference Books

1. G. Brassard and P. Bratley, 1997, Fundamentals of Algorithms, PHI, New Delhi.

CORE - VI

DATA ANALYSIS USING SPREAD SHEET

Data Analysis using Spread Sheet

Unit – 1: Cell Editing, Usage of Formulae and Bulit-in Functions, File Manipulations, Data Sorting (both number and alphabets), Worksheet Preparation, Drawing Graphs, Usage of Auto Formatting. Inserting Clip arts and Pictures, Frame movements of the above, Insertion of new slides

Unit 2: Uses of Advance Excel Formulas -VLOOKUP, HLOOKUP, SUMIF, SUMIFS, SUMPRODUCT, DSUM, COUNTIF, COUNTIFS, IF, IFERROR, ISERROR, ISNA, ISNUMBER, ISNONTEXT, OR, AND, SEARCH, INDEX, MATCH etc

Unit 3: - Various Methods and Uses of IF Conditions, When should use the "IF" Conditions? , Creation of Multiple IF Conditions in One Cell, Use the IF Conditions with the Other Advance Functions, How to use nested IF statements in Excel with AND, OR Functions.

Unit 4: -Sorting, Data Forms, Adding Data Using the Data Form, Finding Records Using Criteria: Filtering Data, AutoFilter, Totals and Subtotals Total, Row, Various Methods of Filter Creating and Updating Subtotals

Unit 5: -Introduction to VBA, Variables in VBA- Variable Data Types- Message Box and Inputbox functions – Looping in VBA.

Recommended Texts

1. Jordan Goldmeler, “Advanced Excel Essentials” , APress, 2015 edition.

Reference Books

1. John Walkenbach , “Microsoft Excel 2013 Bible” ,Wiley Publications ,2013

CORE - VII

PRACTICAL - DATA ANALYSIS USING SPREAD SHEET LAB

1. Excel Basic Functions
2. Formatting and Proofing
3. Mathematical Functions
4. Text Functions
5. Data and Time Functions
6. Sorting
7. Filtering
8. Logical Functions
9. Data Validation
10. Pivot tables
11. Charts and Slicers
12. VBA Macros

CORE - VIII

OPERATING SYSTEMS

Unit 1: Introduction: Views –Goals –Types of system – OS Structure –Components – Services - System Structures – Layered Approach -Virtual Machines - System Design and Implementation. Process Management: Process - Process Scheduling – Cooperating Process–CPU Scheduling : CPU Schedulers – Scheduling criteria – Scheduling Algorithms

Unit 2 : Process Synchronization: Critical-Section problem - Semaphores – Classic Problems of Synchronization – Critical Region – Monitors. Deadlock : Methods for handling Deadlocks – Prevention, Avoidance, and Detection of Deadlock - Recovery from deadlock.

Unit 3 : Memory Management : Address Binding – Dynamic Loading and Linking – Overlays – Logical and Physical Address Space - Contiguous Allocation – Internal & External Fragmentation . Non Contiguous Allocation: Paging and Segmentation schemes

Unit 4 : Virtual Memory :: Demand Paging – Page Replacement - Page Replacement Algorithms – Thrashing. – File System: Concepts – Access methods – Directory Structure –Protection Consistency Semantics – File System Structures – Allocation methods – Free Space Management.

Unit 5 : I/O Systems: Overview - I/O Hardware – Application I/O Interface – Kernel I/O subsystem – Transforming I/O Requests to Hardware Operations – Performance.

Recommended Texts

1. Silberschatz A., Galvin P.B., Gange., 2002, Operating System Principles ,Sixth Edition, John Wiley & Sons.

Reference Books

1. H.M. Deitel ,1990, An Introduction to Operating System,- Second Edition, Addison Wesley.
2. Andrew S.Tanenbaum, Modern Operating Systems, Pearson Education, II Ed.

ALLIED- III

ESSENTIAL STATISTICS FOR ANALYTICS

Unit 1 : Measures of location – Arithmetic Mean, Median, Mode, Geometric Mean, Harmonic Mean, and their properties, Merits and demerits - Measures of Dispersion -- Range, Mean Deviation, Quartile Deviation, Standard deviation, Coefficient of variation, Skewness and Kurtosis .

Unit 2 : Sample spaces - events - Axiomatic approach to probability - conditional probability - Independent events - Baye's formula - Random Variables : Continuous and Discrete random variables

Unit 3 : Bivariate distribution - conditional and marginal distributions - Discrete distributions - discrete uniform, Binomial poison Distributions - Continuous distributions - Uniform, Normal, Exponential and Gamma distributions.

Unit 4 : Correlation ,Regression – Rank Correlation Coefficient – Curve fitting by the Method of Least Squares.

Unit 5 : Concept of Sampling Distributions – Standard Error – Test of Significance based on t, ChiSquare and F-distributions with respect to Mean and Variance.

Recommended Texts

- 1.P.R.Vittal&V.Malini, Statistical and Numerical methods, Margham Publications.
- 2.Snedecor, G.W., & Cochran, W.G.(1967): Statistical Methods, Oxford and IBH
3. Prentice Hall 4. Statistical Methods - Dr. S.P. Gupta - Sultan Chand & Sons

Reference Books

1. Fundamental of Mathematical Statistics - S.C. Gupta & V.K. Kapoor - Sultan Chand
2. Wilks, S.S.: Elementary Statistical Analysis - Oxford and IBH
3. Mode, E.B.: Elements of Statistics - Prentice Hall

SOFT SKILL III

PERSONALITY ENRICHMENT

Unit 1- Self Disclosure Characteristics of self disclosure – Self disclosure benefits and appropriateness – Self disclosure and self awareness – Self disclosure and feedback.

Exercise:

1. Self Description– Reflect and answer the following questions on a sheet of paper about yourself: Who am I? What am I like? How do others perceive me? What are my strengths as a person? In what areas do I want to develop greater skills?
2. Adjective Checklist – the following exercise is aimed at providing an opportunity for participants to disclose their view of themselves to the other members of their group and to receive feedback on how the other group members perceive them.
3. Self Disclosure and Self Awareness – the purpose of this exercise is to allow participants to focus on the areas as described in the Johari Window.

Unit 2 – Anger, Stress and Managing Feelings (6hrs)

The nature of stress- managing stress through social support systems – the nature of anger – guidelines for managing anger constructively – dealing with an angry person

Exercise:

1. Handling put downs techniques practiced through role plays.
2. changing your feelings discuss how people can make their assumptions more constructively.
3. defusing the Bomb exercise discuss how one can manage provocations.

Unit 3 – Interpersonal Effectiveness (6hrs)

Managing anxiety and fear – Breathing – an antidote to stress – progressive muscle relaxation –

understanding your shyness – building one's self esteem – avoiding self blame – taking risks,

tolerating failure, persisting and celebrating success – self talk.

Exercise:

1. being positive about yourself
2. Understanding your shyness analyze the social situation of shyness and the causes of your shyness.
3. Systematic Muscle Relaxation train one in the procedure for systematic muscle relaxation.
4. Learning how to breathe deeply help one to relax systematically when one is anxious by
5. controlling one's breathing.

Unit 4: Study Skills (6hrs)

Importance of study environment – using VCR3 to increase memory power: visualizing, concentrating, relating, repeating, reviewing- memory hindrances – memory helpers – knowing vs memorizing – memory and studying – the SQ3R method; survey, write questions, read, recite, review – mnemonic devices – rhymes – acronyms – pegging – cooperative learning .

Exercise:

1. Using the techniques of memory enhancers to review your classroom and textbook notes

Unit V: Goal Setting and Managing Time (6hrs)

The basis of effective goals – steps to be followed to obtain optimum results from goal setting – Identifying the reasons for procrastination – guidelines to overcome procrastination – priority management at home and college

Exercise:

1. Steps to prepare one's short term goals and long term goals.
2. Role play activity through reelection of identifying how priority management affect one's ability to live a balanced life.

Recommended Texts

1. Johnson, D.W. (1997). Reaching out – Interpersonal Effectiveness and Self Actualization. 6th ed. Boston: Allyn and Bacon.
2. Sherfield, R. M. ; Montgomery, R.J. and Moody, P, G. (2010). Developing Soft Skills. 4th ed. New Delhi: Pearson.
3. Robbins, S. P. and Hunsaker, Phillip, L. (2009). Training in Interpersonal skills. Tips for managing people at work. 5th ed. New Delhi: PHI Learning.

CORE - IX

PYTHON PROGRAMMING

Unit-1: Introducing the Python Interpreter - Program Execution-Execution Model Variations - Introducing Python Object Types- Python's Core Data Types –Numbers, Strings , Lists –Dictionaries , Tuples , Files. Numeric Type Basics - Numeric Extensions - Shared References

Unit-2 : String Fundamentals : String Basics ,String Literals ,Strings in Action, String Methods, String Formatting Expressions, String Formatting Method Calls, General Type Categories. Lists and Dictionaries: Lists, Dictionaries, Tuples, Files, Built-in Type Gotchas - Assignments, Expressions, and Prints : Assignment Statements - Expression Statements - Print Operations

Unit-3 : if Statements Truth Values and Boolean Tests - if/else Ternary Expression - while and for Loops - while Loops -break, continue, pass, and the Loop else - for Loops- Loop Coding Techniques - Iterations and Comprehensions

Unit-4 : Function Basics - Coding Functions - Scopes - Python Scope Basics-The global Statement- Scopes and Nested Functions -The nonlocal Statement in 3.X - Function Design Concepts – python and OOPS. Advanced Function Topics - Recursive Functions - Function Objects: Attributes and Annotations

Unit-5 :Anonymous Functions: lambda - Functional Programming Tools - Timing Iteration Alternatives - Modules and Packages - Python Program Architecture - Module Coding Basics : Module Creation- Module Usage - Module Namespaces -Reloading Modules – Module design Concepts – Data Hiding in Modules- Exception Basic – Exception Objects .

Recommended Texts

1. Mark Lutz , “Learning Python, Powerful Object-Oriented Programming”, 5th Edition O'Reilly Media

Reference Books

1. Python Programming: Learn Python 5th Edition – Mark Lutz- O'Reilly A Python Book: Beginning Python, Advanced Python, and Python Exercises Paperback – Import, 1 Sep 2011 by Dave Kuhlman Open Source MITLicense

CORE – X

BIG DATA ANALYTICS

Unit-1 : Basic nomenclature - Analytics process model – Analytics model requirements – Job Profiles in Analytics – Types of Data Sources- Sampling – Sampling - Types of Data Elements

Unit-2: Missing Values–Outlier Detection and Treatments– Weight of Evidence Coding. Predictive Analytics basics – Linear Regression-Logistic Regression - Decision Trees

Unit-3 : Descriptive Analytics: Association Rules- Support and Confidence- Applications of Association Rule – Sequence Rules – Segmentation.

Unit-4 : Hierarchical clustering -Social Network Analytics: Social Network Definitions - Social Network Metrics - Social Network Learning -Relational Neighbor Classifier

Unit-5 : Data Quality - Software–Privacy - Model Design and Documentation - Corporate Governance. Example applications: Credit Risk Modeling

Recommended Text:

1. Baesens, 2014, Analytics in a Big Data World: The Essential Guide to Data Science and Its applications, Wiley India Private Limited

CORE - XI

PRACTICAL - PYTHON PROGRAMMING LAB

1. Write sample programs to find the usages of Python interpreter
2. Python Math Modules
3. String operations
4. Usages of Range statement
5. List Operation
6. Usages of Dictionary
7. Simple programs using OPPS concepts in python
8. Sample programs for Exception Handling in python
9. Usages of Tuples in Python.
10. Develop programs using Python packages.

ALLIED – IV

STATISTICAL LEARNING FOR DATA ANALYTICS

Unit- 1: Introduction: Statistics - Definitions; Variables - Quantitative and Qualitative data – Primary and Secondary - Collection of data - Census method - Sampling methods – Precautions while using secondary data.

Unit -2: Classification and Presentation of data - Tabulation - Frequency Distribution – Diagrammatic and Graphical representation of data – Bar diagram – Pie Diagram – Frequency Curve - Ogive Curves – Histogram – Polygon – Lorenz Curve.

Unit -3: Measures of Central Tendency - Mean, Median and Mode, – Measures of Variation – Range, Quartile Deviation, Standard Deviation, Mean Deviation and Coefficients – their characteristics – uses and limitations.

Unit- 4: Skewness – Types and measurement – Karl Pearson – Bowley's.

Unit-5 : Principle of Scientific Experiments – Randomization, Replication and Local Control. Analysis of Variance – One way and Two Way Classification . Time series – components – models – Trend measurement (Graphic and Straight line trend) - Seasonal Index measurement (Simple Average & Moving Average method)

Proportion of theory and problems: 20% and 80%

Recommended Text:

1. Statistical Methods – S.P. Gupta, Sultan 2000.
2. Introduction to Operations Research – Dr. P.R. Vittal, Margham Publications

SOFT SKILL - IV

PRACTICAL - WORDPRESS LAB

1. Wordpress Dashboard
2. Creating Wordpress Site
3. Creating Wordpress Themes
4. Wordpress Post
5. Wordpress Pages
6. Media Settings
7. Design and build your first WordPress theme.
8. Organizing wordpress Content
9. Wordpress text Formatting
10. Creating Menus in Wordpress

EVS

ENVIRONMENTAL STUDIES

Unit-1: Multidisciplinary nature of environmental studies Definition, scope and importance.

Unit-2: Natural Resources : Renewable and non-renewable resources :

Natural resources and associated problems. - Forest resources : Use and over-exploitation, deforestation, case studies. - Timber extraction, mining, dams and their effects on forest and tribal people. - Water resources : Use and over-utilization of surface and ground water - floods, drought, conflicts over water, dams-benefits and problems. - Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies. Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

Unit-3: Ecosystems - Concept of an ecosystem. -Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem. - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem :- . Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit-4: Biodiversity and its conservation

- Introduction – Definition : genetic, species and ecosystem diversity. - Biogeographical classification of India - Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic- and option values - Biodiversity at global, National and local levels. - India as a mega-diversity nation - Hot-spots of biodiversity.

- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.

- Endangered and endemic species of India

- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Unit-5 : Environmental Pollution

Definition

- Cause, effects and control measures of :-

- a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution
- e. Noise pollution f. Thermal pollution g. Nuclear hazards

- Solid waste Management : Causes, effects and control measures of urban and industrial wastes.

- Role of an individual in prevention of pollution.

- Pollution case studies.

- Disaster management : floods, earthquake, cyclone and landslides.

Recommended Texts

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.

Reference Books

1. Cunningham, W.P.Cooper, T.H. Gorhani, E & Hepworth, M.T.2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p.

CORE – XII

DATABASE MANAGEMENT SYSTEMS

Unit-1: Introduction to Database Systems – Record based Data Models - Networking Model, Hierarchical Model and Relational Model — Storage and File Structure – RAID Technology.

Unit-2 : E-R Model – Constraints – E-R- Diagrams Weak Entity Sets – Relational Database Design – Features of Relational Design – ACID Properties – Normalization – 1NF, 2NF, 3NF

Unit-3 :-SQL Datatypes - Table Constraints: – Not Null, Primary Key, Unique, Check, DDL: –Table creation and Manipulation, View creation and Manipulation – Different types views : Simple and Complex views.

Unit-4 : DML : Record Insertion, Updation and Deletion of Records – Select query : Basic Select Query clauses, usage of Group By, Having, Order By clauses, Like

Unit-5 : Transaction Management – Serializability – Recoverability – Concurrency Control – Dead Lock Handling – Recovery System.

Recommended Texts:

1. A. Silberschatz, H.F. Korth and S. Sudharshan, 2006, Database System Concepts, 5th Edition, Tata McGraw Hill, New Delhi.

Reference Books:

1. J. D. Ullman, 1988, Principles of Database Systems, Galgotia Publishers, New Delhi
2. C.J. Date, 1985, An Introduction to Database Systems, Third Edition, Narosa, New Delhi.
3. Elmasri and Navathe, 1999, Fundamentals of Database Systems, Third Edition, Pearson Education, Delhi.
4. C. Ritchie, 2004, Relational Database Principals, 2nd Edition, Thomson, Singapore.

CORE – XIII

DATA SCIENCE USING R

Unit -1 : History and Overview of R -Basic Features of R - Free Software -Design of the R System -Limitations of R -R Resources -Getting Started with R -Installation -Getting started with the R interface --Entering Input- Evaluation -R Objects -Numbers – Attributes-Creating Vectors -Mixing Objects -Explicit coercion -Matrices -Lists -Factors -Missing Values -Data Frames –Names.

Unit -2 : Getting Data In and Out of R -Reading and Writing Data -Reading Data Files with read. table() -Reading in Larger Datasets with read. table -Calculating Memory Requirements for R Objects -Using the read r package -Lines of a Text File

Unit-3: Reading From a URL connection -Subsetting -R Objects -Subsetting a Vector -Subsetting a Matrix -Subsetting Lists -Subsetting Nested Elements of a List -Extracting Multiple Elements of a List -Partial Matching -Removing NA Values -Vectorized Operations -Vectorized Matrix Operations

Unit-4 : Dates and Times -Dates in R -Times in R -Operations on Dates and Times-Managing Data Frames with the dplyr package -Data Frames -The dplyr Package -dplyr Grammar-Installing the dplyr package -select() -filter() -arrange()-rename() -mutate()-group_by()-Control structures -if-else -for Loops -Nested for loops -while Loops -repeat Loops -next, break

Unit -5: Functions -Functions in R -Your First Function -Argument Matching -Lazy Evaluation -The ... Argument-Arguments Coming After the ... Argument-Coding -standards for R -Loop Functions -Looping on the Command Line -lapply() -sapply() -split() -Splitting a Data Frame -tapply -apply() -Col/Row Sums and Means -Other Ways to Apply -mapply()

Recommended Texts

1. R Programming for Data Science – Roger D.Peng, Learn Pub Book,Learn Publishing

Reference Books

1. R for dummies – Andrie de vries and Joris Meys, A John Wiley sons ,Ltd Publication

CORE – XIV

PRACTICAL – R PROGRAMMING LAB

1. Write a program that prints 'Hello World' to the screen.
2. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n
3. Write a program that prints a multiplication table for numbers up to 12.
4. Write a function that returns the largest element in a list.
5. Write a function that computes the running total of a list.
6. Write a function that tests whether a string is a palindrome.
7. Implement linear search.
8. Implement binary search.
9. Implement matrices addition , subtraction and Multiplication
10. Fifteen students were enrolled in a course. Their ages were:
20 20 20 20 20 21 21 21 22 22 22 22 23 23 23
 - (i) Find the median age of all students under 22 years
 - (ii) Find the median age of all students
 - (iii) Find the mean age of all students
 - (iv) Find the modal age for all students
 - (v) Two more students enter the class. Their ages are 23. What is now mean, mode and median ?

ELECTIVE - I

INFORMATION SECURITY

Unit-1 : Introduction: Security- Attacks- Computer criminals- Method of defense
Program Security: Secure programs- Non-malicious program errors- Viruses and other malicious code- Targeted malicious code-Controls against program threats.

Unit-2: Operating System Security: Protected objects and methods of protection- Memory address protection- Control of access to general objects- File protection mechanism- Authentication: Authentication basics- Password- Challenge-response- Biometrics.

Unit-3 : Database Security: Security requirements- Reliability and integrity- Sensitive data- Interface-Multilevel database- Proposals for multilevel security.

Unit-4 : Security in Networks: Threats in networks- Network security control- Firewalls- Intrusion detection systems- Secure e-mail- Networks and cryptography- Example protocols: PEM- SSL- Ipsec.

Unit-5 : Administrating Security: Security planning- Risk analysis- Organizational security policies- Physical security - Legal- Privacy- and Ethical Issues in Computer Security - Protecting programs and data-Information and law- Rights of employees and employers- Software failures- Computer crime- Privacy-Ethical issues in computer society- Case studies of ethics.

Recommended Texts:

1. C.P.Pfleeger, and S.L.Pfleeger, Security in Computing, Pearson Education, 4th Edition, 2003
2. Matt Bishop, Computer Security: Art and Science, Pearson Education, 2003.

Reference Books :

1. Stallings, Cryptography & N/w Security: Principles and practice, 4th Edition, 2006.
2. Kaufman, Perlman, Spincer, Network Security, Prentice Hall, 2nd Edition, 2003
3. Eric Maiwald, Network Security : A Beginners Guide, TMH, 1999
4. Macro Pistoia, Java Network Security, Pearson Education, 2nd Edition, 1999
5. Whitman, Mattord, Principles of Information Security, Thomson, 2nd Edition, 2005

ELECTIVE - I

SOFTWARE PROJECT MANAGEMENT

Unit 1: Introduction to Software Project Management- Software project versus other types of project- problems- management control- Stakeholders- Requirement Specification – Information and control in organizations Introduction to step wise project planning- Select-identify scope and objectives- identify project infrastructure- Analyse project characteristics- products and activities- Estimate effort for each activity- Identify activity risks- Allocate resources- Review/ publicize plan- Execute plan and lower levels of planning. Project evaluation- Introduction – Strategic assessment- technical assessment- cost benefit analysis- cash flow forecasting- cost- benefit evaluation techniques- risk evaluation

Unit 2: Selection of an appropriate project approach- choosing technologies- technical plan contents list- choice of process models- structured methods-rapid application development- waterfall model -process model-spiral model- software prototyping- ways of categorizing prototypes- tools- incremental delivery- selecting process model - Software effort estimation- introduction- where-problems with over and under estimates

Unit 3: basis for software estimating- software effort estimation technique- expert judgement- Albercht function point analysis- Function points Mark II- Object points-procedural code oriented approach- COCOMO -Activity Planning- Objectives- Project schedules- projects and activities- sequencing and scheduling activities- network planning models- formulating a network model- using dummy activities- representing lagged activities- adding time dimension- forward pass- backward pass- identifying the critical path- Activity float- shortening project duration – identifying critical activities- precedence networks.

Unit 4: Risk Management- nature of risk- managing- identification-analysis- reducing-evaluating- z values. Resource allocation- nature of resources- requirements-scheduling-critical paths- counting the cost-resource schedule- cost schedule- scheduling sequence. Monitoring and control- creating the frame work- collecting the data- visualizing the progress- cost monitoring-earned value- prioritizing, monitoring-Change control.

Unit 5: Managing contracts- types of contract- stages in contract placement- terms of a contract-contract management- acceptance. Managing people and organizing teams-organizational behaviour background- selecting the right person for the job- instruction in the best methods-motivation- decision making-leadership-orga nizational structures. Software quality- importance- defining –ISO 9126- practical measures- product versus process quality management- external standards-techniques to help enhance software quality.

1. Recommended Texts

1. B. Hughes and M. Cotterell, 2005, Software Project Management, 4th Edition, Tata McGraw Hill, New Delhi.
2. W. Royce,1998, Software Project Management: A Unified Frame Work, Addison Wesley, Boston
3. G.Reynolds, 2003, Ethics in Information Technology, Thomson Learning, Singapore.

Reference Books

1. K. Heldman, 2005, Project Management Professionals, 3rd Edition, Wiley Dreamtech
2. Bhforooz & Hudson, 2004, Software Engineering, Oxford Press.

ELECTIVE - I

NETWORK SECURITY & CRYPTOGRAPHY

Unit 1 : INTRODUCTION

Types of Physical Medium-Topologies-Wireless Networking: Wireless Protocols. Data Link Layer: Layered Data Link Protocols-SLIP and PPP-MAC and ARP. Network Layer: Routing Risks-Addressing - Fragmentation-Security.

Unit 2 : INTERNET PROTOCOL

IP Addressing – ICMP - Security options. Transport Layer: Common Protocols-Transport Layer Functions-Gateways. TCP: Connection Oriented Protocols-TCP Connections-UDP. Session Layer: Session State Machine-Session and Stacks. SSL: SSL Functionality-Certificates. SSH: SSH and Security-SSH Protocols. STMP: Email Goals-Common servers. HTTP: HTTP Goals-URL.

Unit 3 : CRYPTOGRAPHY

Importance - Threat Models - Concepts-Common Mitigation Methods. Network theory: Standards Bodies-Network Stacks-Multiple Stacks-Layers and Protocols-Common Tools. Cryptography: Securing Information-Necessary Elements-Authentication and Keys-cryptography and Randomness-Hashes-Ciphers-Encryption-Steganography.

Unit 4 : TECHNIQUES

Data Encryption Techniques-Data Encryption Standards-Symmetric ciphers. Public key Cryptosystems-Key Management.

Unit 5 : SECURITY

Authentication - Digital Signatures - E-Mail Security - Web Security – Intrusion - Firewall.

Recommended Texts

1. Neal Krawetz, Introduction Network Security, India Edition, Thomson Delmar Learning. 2007
2. V.K.Pachghare, Cryptography and Information Security, PHI Learning Private Limited 2009.

Reference Books :

1. William Stallings, Cryptography and Network Security, Prentice –Hall of India, 2008

ELECTIVE – II

MARKETING ANALYTICS

Unit-1: MARKETING DATA SUMMARIZATION : Slicing and Dicing Marketing Data with PivotTables - Using Excel Charts to Summarize Marketing Data - Using Excel Functions to Summarize Marketing Data.

Unit-2 : FORECASTING TECHNIQUES : Simple Linear Regression and Correlation - Using Multiple Regression to Forecast Sales - Forecasting in the Presence of Special Events - Modeling Trend and Seasonality - Ratio to Moving Average Forecasting Method - Winter's Method - Using Neural Networks to Forecast Sales.

Unit-3 : CUSTOMER NEEDS : Conjoint Analysis - Logistic Regression - Discrete Choice Analysis – Customer Value - Introduction to Customer value, Benefits. 9 IT2015 SRM(E&T)

Unit-4 : MARKET SEGMENTATION : Cluster Analysis - User-Based Collaborative Filtering - Collaborative Filtering - Using Classification Trees for Segmentation.

Unit-5: RETAILING AND MARKET RESEARCH TOOLS : Retailing - Introduction to retailing, Market Basket Analysis and Lift - Marketing Research Tools - Principal Components Analysis.

Recommended Texts

1. L.Winston, “Marketing Analytics: Data driven techniques with MS-Excel”, Wiley, 1st ed. 2014.

Reference Books

1. Stephan Sorger, “Marketing Analytics: Strategic models and metrics”, CreateSpace Independent Publishing Platform, 1st ed., 2013.

ELECTIVE – II

DECISION MANAGEMENT SYSTEMS

Unit-1: PRINCIPLES OF DMS : Principles of Decision Management Systems - Begin with the Decision in Mind - Be Transparent and Agile - Be Predictive, Not Reactive - Test, Learn, and Continuously Improve.

Unit-2 : BUILDING DECISION MANAGEMENT SYSTEMS: Building Decision Management Systems - Discover and Model Decisions - Characteristics of Suitable Decisions - A Decision Taxonomy - Finding Decisions - Documenting Decisions - Prioritizing Decisions.

Unit-3 : DESIGN AND IMPLEMENT DECISION SERVICES: Design and Implement Decision Services - Build Decision Services - Integrate Decision Services - Best Practices for Decision Services Construction - Monitor and Improve Decisions - What Is Decision Analysis? - Monitor Decisions - Determine the Appropriate Response - Develop New Decision-Making Approaches - Confirm the Impact Is as Expected - Deploy the Change.

Unit-4 : ENABLERS FOR DECISION MANAGEMENT SYSTEMS : Enablers for Decision Management Systems - People Enablers - The Three-Legged Stool - A Decision Management Center of Excellence - Organizational Change - Process Enablers - Managing a Decision Inventory - Adapting the Software Development Lifecycle - Decision Service Integration Patterns - Moving to Fact-Based Decisioning - The OODA Loop - Technology Enablers.

Unit-5: BUSINESS RULES MANAGEMENT SYSTEMS : Business Rules Management Systems - Predictive Analytics Workbenches - Optimization Systems - Pre-Configured Decision Management Systems - Data Infrastructure - A Service-Oriented Platform.

Recommended Texts

1. James Taylor, “Decision Management Systems-A Practical guide to using Business rules and Predictive Analytics”, IBM Press, 2012.
2. Efraim Turban , Jay E. Aronson , Ting-Peng Liang, “Decision Support Systems & Intelligent Systems”, 9th edition, Prentice Hall, 2010.

Reference Books

1. Iberto Cordoba, “Understanding the Predictive Analytics Lifecycle”, Wiley, 2014.
2. Eric Siegel, Thomas H. Davenport, “Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die”, Wiley, 2013.

ELECTIVE – II

ECOMMERCE

Unit-1 : Electronic Commerce and Opportunities : Background The Electronic Commerce Environment – Electronic Marketplace Technologies – Modes of Electronic Commerce: Overview : Electronic Data Interchange.

Unit-2 : Approaches to Safe Electronic Commerce . Overview – Secure Transport Protocols – Secure Transaction – Secure Electronic Payment Protocol (SEPP) – Secure Electronic Transaction (SET)

Unit-3 : Certificates for Authentication – Security on Web Servers – Payment Schemes: Internet Monetary Payment and Security Requirements- Payment and purchase order process – Online electronic cash.

Unit-4 : Internet / Intranet Security Issues and Solutions : The Need for Computer Security – Specific Intruder Approaches – Security Strategies-Security Tools – Encryption – Enterprise Networking and Access to the Internet Antivirus Programs.- Security Teams

Unit-5 : MasterCard/Visa Secure Electronic Transaction : Introduction –Business Requirements – Concepts – payment Processing. E-mail and secure e-mail technologies for Electronic Commerce: Introduction _ The Means of Distribution – A model for Message Handling- MIME, S/MIME, MOSS , MIME and Related Facilities for EDI over the Internet.

Recommended Texts:

1. Daniel Minoli & Emma Minoli, “Web Commerce Technology Handbook”. Tata McGraw Hill – 1999.

Reference Book:

1. K.Bajaj & D Nag , “E-Commerce”, Tata McGraw Hill – 1999.
2. Mamta Bhusry – “E-Commerce”

VALUE EDUCATION

Unit 1: Value education-its purpose and significance in the present world – Value system – The role of culture and civilization-Holistic living – Balancing the outer and inner – Body, Mind and Intellectual level- Duties and responsibilities.

Unit 2 : Salient values for life- Truth, commitment, honesty and integrity, forgiveness and love, empathy and ability to sacrifice, care, unity , and inclusiveness, Self esteem and self confidence, punctuality – Time, task and resource management – Problem solving and decision making skills- Interpersonal and Intra personal relationship – Team work – Positive and creative thinking

Unit 3 : Human Rights – Universal Declaration of Human Rights – Human Rights violations – National Integration – Peace and non-Violence – Dr. A P J Kalam's ten points for enlightened citizenship – Social Values and Welfare of the citizen – The role of media in value building.

Unit 4: Environment and Ecological balance – interdependence of all beings – living and non-living. The binding of man and nature – Environment conservation and enrichment.

Unit 5 : Social Evils – Corruption, Cyber crime, Terrorism – Alcoholism, Drug addiction – Dowry – Domestic violence – untouchability – female infanticide – atrocities against women- How to tackle them

Recommended Texts:

1. M.G.Chitakra: Education and Human Values, A.P.H.Publishing Corporation, New Delhi, 2003

CORE – XV

NoSQL MongoDB

Unit I : Big Databases- SQL – NoSQL Tradeoffs – CAP Theorem – Eventual Consistency - NoSQL – database types – MongoDB- Introduction - MongoDB – Need – MongoDB Vs RDBMS – MongoDBDriver Installation – Configuration – Import and Export – MongoDB Server Configuration

Unit II : Data Extraction Fundamentals - Intro to Tabular Formats - Parsing CSV - Parsing XLS with XLRDParsing XML - Intro to JSONGetting Data into MongoDB - MongoDB- CURD – Database Creation – Update – Read –Delete Using mongoimport - Operators like \$gt, \$lt, \$exists, \$regex -Querying Arrays and using \$in and \$all Operators -Changing entries: \$update, \$set,

Unit III : Data Analysis - Field Queries -Projection Queries- Limiting – Sorting - - Aggregation - Examples of Aggregation Framework -The Aggregation Pipeline - Aggregation Operators: \$match, \$project, \$unwind, \$group –

Unit IV: User Management – MongoDB Data Replication in Servers – Data Sharding – MongoDB Indexes – Create – Find – Drop – Backup – MongoDB – Relationships – Analyzing Queries – MongoDB Objectid

Unit V : Advanced MongoDB: MapReduce – MongoDB - Text Processing - Regular Expression – Case Studies – Text processing of large datasets, Map Reduce using MongoDB

Recommended Texts:

1. MongoDB: The Definitive Guide, 2nd Edition , Powerful and Scalable Data Storage, By Kristina Chodorow, Publisher: O'Reilly Media
2. MongoDB Basics - David Hows, Peter Membrey, Eelco Plugge, Publisher Apress - Ebook(free) <https://it-ebooks.info/book/4527/>

CORE – XVI

SOFTWARE ENGINEERING

Unit-1: The Product – the process – project management concepts – software projects and project metrics.

Unit-2: Software project planning-risk analysis and management-project scheduling and tracking-software quality assurance.

Unit-3: Software configuration management-system engineering-analysis concepts and principles-analysis modeling.

Unit-4: Design concepts and principles- architectural designs-user interface design.

Unit-5: Component level design- software testing techniques- software testing strategies – technical metrics for software.

Recommended Texts

1. Roger S. Pressman – software Engineering a Practitioner's Approach -5th edition, McGraw hill.

Reference Books

1. Ian Sommerville – Software Engineering – 5th Edition –Addison Wesley.

CORE – XVII

UI PROGRAMMING

Unit-1 : Introduction to HTML, Overview of basic HTML , Structure of HTML, Creating and opening HTML file, Singular and paired tags, Text formatting tag, Anchor tag, Lists, Image, Image Map, Table, Frames and Frameset.

Unit-2 : HTML5: Introduction to HTML5, Need of HTML5, DOCTYPE Element, Tags-Section, Article, aside, header, footer, nav, dialog, figure etc. Events in HTML5, Input tag (Type, Auto focus, placeholder, required etc. attributes.) in HTML5, Graphics in HTML5, Media tags in HTML5

Unit-3: Cascading Style Sheet-Introduction, Use of CSS, Types of CSS, Class & ID Selector, CSS Font Properties, CSS Text Properties, CSS Background Properties ,CSS List Properties, CSS Margin Properties, CSS Comments

Unit-4 : Javascript: Introduction, Client side programming, script tag, comments, variables, Document Methods: write and writeln methods, Dialog Boxes-alert, prompt, confirm, Operators: Arithmetic, Assignment, Relational, Logical

Unit-5 :Java Script Control Structure , Conditional Statements, Loops, break and continue. Events Familiarization: onLoad, onClick, onBlur, onSubmit, onChange.

Recommended Texts

1. Jon Duckett, Web Programming with HTML,XHTML, CSS, JavaScript,Wrox Beginning
2. HTML5 Black Book Kogent Learning Solutions Inc Dreamtech.

CORE - XVIII

PRACTICAL - UI PROGRAMMING LAB

1. Write an HTML code to develop a Web page having two frames that divide the Web page into two equal rows and then divide the second row into two equal columns.
2. Write an HTML code to develop a Web page having frames as described in the above question and then fill each frame with a different background colour.
3. Design a home page which will display your information, i.e. Bio data, using Image Link and File Link to upload images and necessary documents.
4. Design a timetable and display it in tabular format.
5. To create a web page that displays college information using various Style sheets.
6. Write a program to Use different font, styles
7. Use CSS to Set a background image for both the page and single elements on the page
8. Write a code to create a scrolling text in a text box
9. Create a program to generate a hit counter
10. Change the Background Color of a web page using Button Events

Elective – III

CLOUD COMPUTING

Unit-1 : Understanding Cloud Computing: Cloud Computing –History of Cloud Computing – Cloud Architecture –Cloud Storage –Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing –Companies in the Cloud Today – Cloud Services.

Unit-2 : Developing Cloud Services: Web-Based Application –Pros and Cons of Cloud Service Development –Types of Cloud Service Development –Software as a Service – Platform as a Service-Infrastructure as a service –Web Services –On-Demand Computing –Discovering Cloud Services Development Services and Tools –Amazon Ec2 –Google App Engine –IBM Clouds.

Unit-3 : Cloud Computing For Everyone: Centralizing Email Communications – Collaborating on Schedules –Collaborating on To-Do Lists –Collaborating Contact Lists –Cloud Computing for the Community –Collaborating on Group Projects and Events – Cloud Computing for the Corporation.

Unit-4 : Using Cloud Services: Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications –Exploring Online Planning and Task Management–Collaborating on Event Management –Collaborating on Contact Management –Collaborating on Project Management –Collaborating on Word Processing –Collaborating on Databases –Storing and Sharing Files.

Unit-5 : Other Ways To Collaborate Online: Collaborating via Web-Based Communication Tools –Evaluating Web Mail Services –Evaluating Web Conference Tools –Collaborating via Social Networks and Groupware –Collaborating via Blogs and Wikis.

Recommended Texts:

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
2. Kumar Saurabh, “Cloud Computing –Insights into New Era Infrastructure”, Wiley Indian Edition, 2011.
3. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

Elective – III

MOBILE COMPUTING

Unit-1 : Introduction - Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing –Wireless Transmissions –Multiplexing – Spread Spectrum and Cellular Systems- Medium Access Control – Comparisons.

Unit-2 : Telecommunication Systems – GSM – Architecture – Sessions – Protocols – Hand Over and Security – UMTS and IMT – 2000 – Satellite Systems.

Unit-3 : Wireless Lan - IEEE 802.11 – Hiper LAN – Bluetooth – Security and Link Management.

Unit-4 : Mobile network layer - Mobile IP – Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies.

Unit-5 : Mobile transport layer - Congestion Control – Implication of TCP Improvement – Mobility – Indirect – Snooping – Mobile – Transaction oriented TCP - TCP over wireless – Performance.

Recommended Texts:

1. J. Schiller, 2003, Mobile Communications, 2nd edition, Pearson Education, Delhi.

Reference Books :

1. Hansmann, Merk, Nicklous, Stober, 2004, Principles of Mobile Computing, 2nd Edition, Springer (India).
2. Pahlavan, Krishnamurthy, 2003(2002), Principle of wireless Networks: A unified Approach, Pearson Education, Delhi.
3. Martyn Mallick, 2004, Mobile and Wireless Design Essentials, Wiley Dreamtech India Pvt. Ltd., NewDelhi.
4. W.Stallings, 2004, Wireless Communications and Networks, 2nd Edition, Pearson Education, Delhi.

Elective – III

PARALLEL COMPUTING

Unit-1 : Introduction To Parallel Computing- History of Parallel Computers - Problem Solving in Parallel - Performance Evaluation - Elementary Concepts -The Need of Parallel Computation - Levels of Parallel Processing - Dataflow Computing - Applications of Parallel Processing.

Unit-2 : Introduction to Classification Of Parallel Computers -Types of Classification - Flynn's Classification -Handler's Classification -Structural Classification - Classification Based on Grain Size.

Unit-3 : Introduction to Interconnection Networks - Network Properties- Design issues of Interconnection Network- Various Interconnection Networks-Concept of Permutation Network -Performance Metrics.

Unit-4 : Introduction to Parallel Computer Architecture - Pipeline Processing - Vector Processing - Array Processing - Superscalar Processors - VLIW Architecture - Multi-threaded Processors. **Introduction to Operating System For Parallel Computer** - Parallel Programming Environment Characteristics- Synchronisation Principles- MultiTasking Environment.

Unit-5 : Introduction Performance Evaluations - Metrics for Performance Evaluation - Factors Causing Parallel Overheads- Laws For Measuring Speedup Performance - Tools For Performance Measurement -Performance Analysis- Performance Instrumentations. **Introduction to Recent Trends In Parallel Computing** - Recent Parallel Programming Models - Parallel Virtual Machine.

Recommended Texts::

1. Rajaraman V. and Siva Ram Murthy C. *Parallel Computers - Architecture and Programming*, Second Edition, Prentice Hall of India, 2002.
2. Selim G.Akl *Parallel Computation, Models and Methods*: Prentice Hall of India.
3. Kai Hwang: *Advanced Computer Architecture: Parallelism, Scalability, Programmability* (2001), Tata McGraw Hill, 2001.

Reference Books :

1. Henessy J. L. and Patterson D. A. *Computer Architecture: A Qualitative Approach*, Morgan Kaufman (1990)
2. Thomas L. Casavant, Pavel Tvrdik, Frantisek Plasil, *Parallel Computers: Theory and Practice*, IEEE