JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

MASTER OF COMPUTER APPLICATIONS (MCA) R17
Effective from Academic Year 2017- 18 admitted batch

COURSE STRUCTURE AND SYLLABUS

I Year – I Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course - I	Mathematical Foundations of Computer Science	25	75	4	--	4
Core Course - II	Computer Organization	25	75	4	--	4
Core Course - III	Computer Programming Using C	25	75	4	--	4
Core Course - IV	Probability and Statistics	25	75	4	--	4
Core Course - V	Accounting and Financial Management	25	75	4	--	4
Laboratory - I	IT Workshop	25	75	--	3	2
Laboratory - II	Computer Programming Using C Lab	25	75	--	3	2
Laboratory - III	Computer Organization Lab	25	75	--	3	2
Total Credits		**200**	**600**	**20**	**9**	**26**

I Year – II Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course - I	Data Structures and Algorithms	25	75	4	--	4
Core Course - II	Object Oriented programming using C++	25	75	4	--	4
Core Course - III	Scripting Languages	25	75	4	--	4
Core Course - IV	Operations Research	25	75	4	--	4
Core Course - V	Software Engineering	25	75	4	--	4
Laboratory - I	Data Structures Lab Using C++	25	75	--	3	2
Laboratory - II	Scripting(Python) Lab	25	75	--	3	2
Laboratory - III	English Language Communication Skills Lab	25	75	--	3	2
Total Credits		**200**	**600**	**20**	**9**	**26**

II Year - I Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course - I	Data Base Management Systems	25	75	4	--	4
Core Course - II	Computer Networks	25	75	4	--	4
Core Course - III	Operating Systems	25	75	4	--	4
Core Course - IV	Object Oriented Analysis and Design using UML	25	75	4	--	4
Core Course - V	Java Programming	25	75	4	--	4
Laboratory - I	Data Base Management Systems Lab	25	75	--	3	2
Laboratory - II	Java Programming Lab	25	75	--	3	2
Total Credits		**175**	**525**	**20**	**6**	**24**

II Year - II Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course - I	Web Technologies	25	75	4	--	4
Core Course - II	Linux Programming	25	75	4	--	4
Core Elective – I	1. Machine Learning 2. Data Warehousing and Data Mining 3. Information Security	25	75	4	--	4
Core Elective – II	1. Distributed Systems 2. Software Process and Project Management 3. Soft Computing	25	75	4	--	4
Open Elective – I	Open Elective	25	75	4	--	4
Laboratory - I	Web Technologies Lab	25	75	--	3	2
Laboratory - II	Linux Programming Lab	25	75	--	3	2
Total Credits		**175**	**525**	**20**	**6**	**24**

III Year - I Semester

Category	Course Title	Int. marks	Ext. marks	L	P	C
Core Course - I	Mobile Application Development	25	75	4	--	4
Core Course - II	Software Testing Methodologies	25	75	4	--	4
Core Elective – III	1. Web Services and SOA 2. Distributed Databases 3. Information Retrieval Systems	25	75	4	--	4
Core Elective – IV	1. Ethical Hacking 2. Multi Media and Rich Internet Applications 3. Semantic web and Social Networks	25	75	4	--	4
Open Elective – II	Open Elective	25	75	4	--	4
Laboratory - I	Mobile Application Development Lab	25	75	--	3	2
Laboratory - II	Software Engineering Methodologies and UML Lab	25	75	--	3	2
Total Credits		**175**	**525**	**20**	**6**	**24**

III Year - II Semester

Course Title	Int. marks	Ext. marks	L	P	C
Comprehensive Viva Voce	--	100	--		4
Project Work Review II	100	--	--	8	4
Project Viva Voce	--	100	--	20	16
Total Credits	**100**	**200**	**--**	**28**	**24**

*For Project Review I, Please refer 7.8 in R17 Academic Regulations.

❖ Basic Computer Programming skills is required for all open electives. Additionally knowledge on the specified area mentioned in prerequisites is required for opting the open elective

❖ Note: A student can register for any open elective subject provided that he has not already registered for the same subject.

S. No.	Open Electives	Prerequisites
1.	'R' Programming	Maths, Statistics
2.	Algorithmics	--
3.	Big Data Analytics	Data Bases , Maths
4.	Bioinformatics	Data Structures
5.	Biometrics	--
6.	Computer Forensics	Maths, Data Structures
7.	Cyber Security	Internet Technologies
8.	Distributed Systems Security	Information Security
9.	E-Commerce	Internet Technologies
10.	Embedded Systems	Digital logic
11.	Intellectual Property Rights	--
12.	Internet of Things	Java
13.	Internet Technologies and Services	Java
14.	Mobile Computing	Java
15.	Mobile Application Security	Mobile Application Development
16.	Open Stack Cloud Computing	Linux Programming
17.	Cryptography and Information Security	Maths
18.	Social Media Intelligence	--
19.	Storage Area Networks	Computer Networks
20.	Web Usability	--
21.	Organizational Structure and Personal Management	

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

MCA - I Year - I SEM

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Course Objectives:
To develop problem-solving techniques and explore topics in a variety of areas of discrete mathematics, including but not limited to logic, graph theory, set theory, recursions, combinatorics, and algorithms. Students will learn to express statements in the language of formal logic and draw conclusions, model situations in terms of graph and set theory, find and interpret recursive definitions for mathematical sequences, use combinatorial methods to approach counting problems.

Course Outcomes:
- Ability to illustrate by examples the basic terminology of functions, relations, and sets and demonstrate knowledge of their associated operations.
- Ability to demonstrate in practical applications the use of basic counting principles of permutations, combinations, inclusion/exclusion principle and the pigeonhole methodology.
- Ability to represent and Apply Graph theory in solving computer science problems.

UNIT - I
Mathematical Logic: Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms. Theory of inference for the statement calculus: Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving. Predicate calculus: Predicative logic, Free and Bound variables, The Universe of Discourse. Inference theory of predicate calculus involving quantifiers.

UNIT - II
Relations: Properties of binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram. Functions: Composition of functions, Inverse Function, Hashing functions, Natural numbers, recursive functions.
Algebraic structures: Algebraic systems, Examples and general properties, Semi groups and monoids, groups and sub groups, homomorphism. Lattice as partially ordered sets, Boolean algebra.

UNIT - III
Elementary Combinatorics: Basics of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial and Multinomial theorems, the principles of Inclusion – Exclusion, Pigeon hole principles and its application.

UNIT - IV
Recurrence Relations: Generating Functions, Function of Sequences, Calculating Coefficients of generating functions, Recurrence relations, Solving recurrence relation by substitution and Generating functions, the method of Characteristic roots, solution of Inhomogeneous Recurrence Relations.

UNIT - V
Graphs: Basic Concepts, Isomorphism and Sub graphs, Trees and their properties, Spanning Trees, Directed trees, Binary trees, Planar Graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

TEXT BOOKS:
1. Discrete Mathematics with Applications to Computer Science, J P Trembley and R Manohar, TMH, 2008. (Units I and II)
2. Discrete Mathematics for Computer Scientists and Mathematicians, second edition, J.L. Mott, A. Kandel, T.P. Baker, PHI

REFERENCE BOOKS:
1. Elements of Discrete Mathematics- A Computer Oriented Approach, C.L.Liu, D.P. Mohapatra, 3rd edition, TMH.
2. Discrete and Combinatorial Mathematics- An Applied Introduction-5th Edition–Ralph. P. Grimaldi, Pearson Education.
3. Discrete Mathematics with applications, Thomas Koshy, Elsevier.
4. Discrete Mathematical Structures, Mallik and Sen, Cengage Learning.
5. Discrete Mathematical Structures, Bernand Kolman, Robert C. Busby, Sharon Cutler Ross, PHI.
6. Discrete Mathematics and its Applications, 6th edition, K.H.Rosen, TMH.
7. Discrete Mathematics, Lovasz, Springer.
8. Logic and Discrete Mathematics, Grass Man and Tremblay, Pearson Education.
9. Discrete Mathematics, S K Chakraborthy and B K Sarkar, Oxford, 2011.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

MCA - I Year - I SEM

COMPUTER ORGANIZATION

Course Objectives:
- To understand how computers are constructed out of a set of functional units.
- To understand how these functional units operate, interact and communicate.
- To understand the factors and trade-offs that affect computer performance.
- To understand concrete representation of data at the machine level.
- To understand how computations are actually performed at the machine level.
- To understand how problems expressed by humans are expressed as binary strings in a machine.
- Understand the system interconnection and the different I/O techniques.
- Explain the functioning and programming of the INTEL-8086.
- Understand the design of processors, the structure, and operation of memory and virtual memory, cache, storage, and pipelining, system integration, and peripherals.
- Identify the different architectural and organizational design issues that can affect the performance of a computer such as Instruction Sets design, Pipelining, RISC architecture, and Superscalar architecture.
- Design an interconnection networks and multiprocessors.

Course Outcomes: After this course students understand in a better way the I/O and memory organization in depth. They should be in a position to write assembly language programs for various applications.

UNIT - I
Number Systems and Computer Arithmetic: Signed and unsigned numbers, Addition and subtraction, multiplication, division, Floating point representation, logical operation, Gray code, BCD codes, Error detecting codes, Boolean algebra, Simplification of Boolean expressions, K-Maps, Combinational and Sequential Circuits- decoders, Encoders, Multiplexers, Half and Full adders, Shift registers, Sequential circuits- flip-flops.

UNIT - II
Memory Organization: Memory hierarchy, Main memory-RAM, ROM chips, Memory address map, memory contention to CPU, Associative Memory-Hardware logic, match, read and write logic, Cache Memory-Associative mapping, Direct mapping, Set-associative mapping, hit and miss ratio.

UNIT - III
Basic CPU Organization: Introduction to CPU, Instruction formats-INTEL-8086 CPU architecture-Addressing modes - generation of physical address- code segment registers, Zero, one, two, and three address instructions. INTEL 8086 Assembly Language Instructions-Data transfer instructions-input- output instructions, address transfer, Flag transfer, arithmetic, logical, shift, and rotate instructions. Conditional and unconditional transfer, iteration control, interrupts, and process control instructions, assembler directives, Programming with assembly language instructions.

UNIT - IV
Input -Output Organization: Peripheral devices, input-output interface-I/O Bus and interface modules, I/O versus Memory bus, isolated versus memory mapped I/O, Modes of transfer-Programmed I/O,

Interrupt-initiated I/O, priority interrupts-Daisy chaining, parallel priority, interrupt cycle, DMA- DMA control, DMA transfer, Input output processor-CPU-IOP communication.

UNIT - V

Pipeline and Vector Processing**:** Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

Multi Processors**:** Characteristics or Multiprocessors, Interconnection Structures, Inter processor Arbitration, Inter Processor Communication and Synchronization, Cache Coherence, Shared Memory Multiprocessors.

TEXT BOOKS:
1. Computer System Architecture, M. Morris Mano, 3rd Edition, Pearson Education, 2008.
2. Microprocessors and Interfacing, Douglas Hall, Tata McGraw-Hill.

REFERENCE BOOKS:
1. Computer Organization, Carl Hamacher, Zvonko Vranesic, Safwat Zaky, 5th Edition, McGraw Hill.
2. Fundamentals of Computer Organization and Design, Sivarama P. Dandamudi, Springer Int. Edition.
3. Computer Organization and Architecture, William Stallings, 8th Edition, Pearson, 2007.
4. Digital Design, M. Morris Mano, Pearson Education.
5. Computer Organization and Design, D. A. Paterson and John L. Hennessy, Elsevier.
6. Computer Architecture and Organization, M. Murdocca and V. Heuring, Wiley India.

COMPUTER PROGRAMMING USING C

Course Objectives:
- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs
- To learn to write programs (using structured programming approach) in C to solve problems.
- To introduce the students to basic data structures such as lists, stacks and queues.
- To make the student understand simple sorting and searching methods.

Course Outcomes:
- Demonstrate the basic knowledge of computer hardware and software.
- Ability to apply solving and logical skills to programming in C language and also in other languages.

UNIT - I
Introduction to Computers: Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development.
Introduction to the C Language: Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators (Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions.

UNIT - II
Statements- Selection Statements(making decisions) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.
Functions: Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Limitations of recursion, example C programs, Preprocessor commands.

UNIT - III
Arrays: Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples.
Pointers: Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.

UNIT - IV
Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.
Enumerated, Structure ,and Union Types– The Type Definition(typedef), Enumerated types,
Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures, structures and functions, Passing structures through pointers, self referential structures, unions, bit fields, C programming examples, command –line arguments.

UNIT - V

Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling)Positioning functions, C program examples.

TEXT BOOKS:
1. A Structured Programming Approach Using C, B.A. Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh, Oxford University Press.

REFERENCE BOOKS:
1. C & Data structures – P. Padmanabham, Third Edition, B. S. Publications.
2. Problem Solving and Program Design in C.J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.
3. Programming in C. Ajay Mittal, Pearson.
4. Programming with C. B. Gottfried, 3rd edition, Schaum's outlines, TMH.
5. Problem solving with C, M.T. Somasekhara, PHI.
6. Programming with C, R.S. Bickar, Universities Press.
7. Computer Programming & Data Structures, E. Balagurusamy, 4th edition, TMH.
8. Programming in C – Stephen G. Kochan, III Edition, Pearson Education.
9. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
10. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press.

PROBABILITY AND STATISTICS

Course Objectives:
- Understand the concepts of Probability, random variables and their distributions.
- Understand the concepts of estimation and hypothesis testing for population averages and percentages.
- Select and produce the appropriate tabular and graphical formulas for displaying bivariate data sets and carry out correlation, regression and chi-square analyses.

UNIT - I
Probability: Sample space and events – Probability – The axioms of probability - Some elementary theorems - Conditional probability – Baye's theorem.

UNIT - II
Random variables – Discrete and continuous – Distribution – Distribution function.
Distribution - Binomial, Poisson and normal distribution – related properties.

UNIT - III
Sampling distribution: Populations and samples - Sampling distributions of mean (known and unknown) proportions, sums and differences.
Estimation: Point estimation – interval estimation - Bayesian estimation.

UNIT - IV
Test of Hypothesis – Means and proportions – Hypothesis concerning one and two means – Type I and Type II errors. One tail, two-tail tests. Tests of significance – Student's t-test, F-test, χ^2 test. Estimation of proportions.

UNIT - V
Curve fitting: The method of least squares – Inferences based on the least squares estimations - Curvilinear regression – multiple regressions – correlation for univariate and bivariate distributions.

TEXT BOOKS:
1. Probability and statistics for engineers (Erwin Miller and John E. Freund), R A Johnson and C.B.Gupta.7th edition, PHI.
2. Introduction to Probability and Statistics, 12th edition, W. Mendenhall, R.J. Beaver and B.M. Beaver, Cengage Learning.

REFERENCE BOOKS:
1. Text book of Probability and Statistics Dr. Shahnaz Bathul, V.G.S. Publishers 2003.
2. Probability and Statistics in Engineering, 4th Edition, William W. Hines, Douglas C. Montgomery, David M. Goldsman, Connie M.Borror, Wiley Student Edition.
3. Probability, Statistics and Queuing Theory, 2nd Edition, Trivedi, John Wiley and Sons
4. Introduction to Probability and Statistics, J.S. Milton, Jesse C. Arnold, 4th edition, TMH.
5. Probability, Statistics and Random Processes, Dr. K. Murugesan, P. Guruswamy, Anuradha Agencies, Deepti Publications.
6. Probability and Statistics for Engineers, G.S.S. Bhisma Rao, Sitech, 2nd edition, 2005.
7. Probability and Statistics for Engineers and Scientists, R. E. Walpole, S.L. Myers, K.Ye, Pearson.

8. Probability, Statistics and Reliability for Engineers and Scientists, B. M. Ayyub, R.H. McCuen, 2nd edition, Chapman & Hall/CRC, Special Indian Edition.

9. Probability and Statistics for Engineers and Scientists, Sheldon M Ross, 4th ed., Elsevier, 2011.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA - I Year - I SEM

ACCOUNTING AND FINANCIAL MANAGEMENT

This course is designed to introduce students to the principles, concepts, and applications of financial accounting and management.

An introduction to accounting emphasizing how general purpose financial statements communicate information about the business corporation's performance and position for users internal and external to management. Approximately one third of the course emphasizes how the accountant processes and presents the information and includes exposure to recording transactions, adjusting balances and preparing financial statements for service and merchandise firms according to established rules and procedures.

This course presents the underlying framework and concepts of Financial Accounting in the context of how accounting fits into the overall business environment of contemporary society. Financial accounting is the basic means of recording and reporting financial information in a business. Students will learn how accounting functions as an information development and communication system that supports economic decision making and provides value to entities and society. Students will discover the uses and limitations of financial statements and related information and apply analytical tools in making both business and financial decisions. Topics examined include those related to corporate financial position, operating results, cash flows, and financial strength. Students will study the basic accounting system and will be shown how the various accounting alternatives for recording financial transactions impact on the usefulness of the information provided for decision-making. During coverage of relevant topics reference will be made to recent lapses in ethical reporting and the resulting impact on the financial markets and society.

In Financial Management students are introduced to concepts and tools that enable them to think critically about the financial opportunities and challenges faced by an organization. In working through the material, they build upon the understanding they already have of accounting, business, and mathematics. They learn how to use financial statements such as balance sheets, income statements, and statements of cash flow. They prepare budgets, analyze investment options, and determine the best means of financing business endeavors. They discover ways of assessing both the return and the risk involved in a firm's financial decisions. The focus of this course is on solving practical business problems similar to those encountered in the workplace.

Course Objectives

- Explain financial accounting terminology and the recording process.
- Discuss and apply the basic principles of accounting, the accounting model, and the accounting cycle.
- Demonstrate and show how items such as assets, liabilities, share capital, etc., are reported in the financial statements.
- Carry out journal entries and adjustments.
- Prepare and analyze a trial balance and financial statements.
- Analyze a cash flow statement.
- Analyze financial statements using ratio analysis.
- Understand the elements, uses, and limitations of each financial statement and the relationships among the statements
- Understand how financial information, primarily that provided by the financial statements, can be used to analyze business operations and make economic decisions
- Identify the basic principles used in safeguarding assets and insuring the accuracy of accounting records

- Appreciate the role accounting software applications play in gathering, recording, reporting and interpreting financial accounting information
- Interpret and create standard financial statements.
- Perform financial statement analysis for the purposes of evaluating and forecasting in financial management.
- Evaluate a firm's working capital position.
- Estimate the components of cost of capital by applying time value of money principles.
- Perform net present value analysis for capital budgeting purposes.
- Evaluate risk in the capital budgeting process.
- Evaluate the cost of debt, preferred stock, and common stock as sources of capital.
- The Most important learning objective is how to do accounts in Computers.

Prerequisites:
Some basic accounting knowledge and mathematics level is recommended.
Ability to understand the knowledge of cost estimation towards the business sceneries.
Ability to analyze market competency in the global village
To become a Master in accounting and financial management.

UNIT - I
Introduction to Accounting: Principles, concepts and conventions, double entry system of accounting, introduction to basic books of accounts, Journal, ledger- Trial Balance - Preparation of Final accounts: Trading Account, Profit and Loss Account and Balance Sheet.

UNIT - II
Financial Management - Meaning and scope, role of Financial Manager, Objectives of time value of money - Goals of Financial Management, Leverages: Operating, Financial Leverage and Combined Leverage Cost of Capital: Cost of Equity, Preference Shares, Bonds- Weighted Average Cost of Capital – Capital Gearing- Overcapitalization and Undercapitalization, Sources of Finance.

UNIT - III
Tools and Techniques for Financial Statement Analysis: Ratio Analysis – Classification of Ratios –Short term solvency and long term solvency – Profitability ratios - Analysis and Interpretation of Financial Statements through ratios of Liquidity, Solvency and Profitability ratios. **Fund Flow Statement** - Meaning, Importance, Statement of changes in working capital and statement of Sources and application of funds. Cash flow Analysis: cash flow Statements: Preparation, Analysis and interpretation.

UNIT - IV
Break-even Analysis: Concept of Break Even Point, Cost-Volume-Profit Analysis, Determination of Break Even Point, Margin of Safety and PV ratio, Impact of changes in Cost or selling price on BEP Practical applications of Break-even Analysis.
Budgeting: Budgeting–cash budget, sales budget – flexible Budgets and master budgets.

UNIT - V
Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital.. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

TEXT BOOKS:
1. Aryasri: Accounting And Financial Management,, TMH, 2009
2. Van Horne, James, C: Financial Management and Policy, Pearson, 2009

REFERENCE BOOKS:

1. Dr. G. Vidyanath G. Lakshmi Accounting and Financial Management.
2. Prasanna Chandra, Financial Management, TMH, 2009
3. S. N. Maheshwari, Financial Accounting, Sultan Chand, 2009.
4. Tulsian, Financial Accounting, S Chand, 2009.
5. Khan and Jain: Financial Management, TMH, 2009
6. Gokul Sinha: Financial Statement Analysis, PHI, 2009
7. Bhat Sundhindra: Financial Management, Excel:2009
8. Jawaharlal: Accounting for Management, Himalaya, 2009
9. Paresh Shah : Basic Financial Accounting for Management, Oxford 2010.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA - I Year - I SEM

IT WORKSHOP

Course Objectives:
The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered.   **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**

Internet & World Wide Web module introduces the different ways of hooking the PC on to the Internet from home and workplace and effective usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools and LaTeX. (**Recommended to   use Microsoft office 2007 in place of MS Office 2003**)

PC Hardware
Task 1 : Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2 : Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3 : Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4 : Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva.

Task 5: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Task 6: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Internet & World Wide Web

Task 1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no Internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the Internet and would be asked to configure their computer to be safe on the Internet. They need to first install antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Task 5: Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

Productivity tools:

LaTeX and Word:

Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Task 1: Using LaTeX and Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Task 2 : Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 3 : Creating a Newsletter : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel:

Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: - Gridlines, Format Cells, Summation, auto fill, Formatting Text.

Task 2 : Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting.

LaTeX and MS/equivalent (FOSS) tool Power Point:
Task1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Task 2: Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

REFERENCE BOOKS:
1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill.
4. Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education.
5. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech.
6. IT Essentials PC Hardware and Software Companion Guide Third Edition, David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
7. PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft).

COMPUTER PROGRAMMING USING C LAB

Course Objectives:
- To write programs in C to solve the problems.
- To implement linear data structures such as lists, stacks, queues.
- To implement simple searching and sorting methods.

Course Outcomes:
- Ability to write programs for different kinds of problems in C.
- Work confidently in compilers like C and others.
- Ability to identify appropriate data type or data structure to given problem.

Recommended Systems/Software Requirements:
- Intel based desktop PC.
- ANSI C Compiler with Supporting Editors.

Exercise-I
a) Write a C program to find the sum of individual digits of a positive integer.
b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Exercise-2
a) Write a C program to calculate the following Sum:
$Sum = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$
b) Write a C program to find the roots of a quadratic equation.

Exercise-3
a) The total distance travelled by vehicle in 't' seconds is given by distance $= ut + 1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement).

Exercise-4
a) Write C programs that use both recursive and non-recursive functions
> i) To find the factorial of a given integer.
> ii) To find the GCD (greatest common divisor) of two given integers.

Exercise-5
a) Write a C program to find the largest integer in a list of integers.
b) Write a C program that uses functions to perform the following:
> i) Addition of Two Matrices.
> ii) Multiplication of Two Matrices.

Exercise-6
a) Write a C program that uses functions to perform the following operations:
       i) To insert a sub-string in to a given main string from a given position.
       ii) To delete n Characters from a given position in a given string.
b) Write a C program to determine if the given string is a palindrome or not.

Exercise-7
a) Write a C program that displays the position or index in the string S where the string T begins, or −1 if S doesn't contain T.
b) Write a C program to count the lines, words and characters in a given text.

Exercise-8
a) Write a C program to generate Pascal's triangle.
b) Write a C program to construct a pyramid of numbers.

Exercise-9
Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:
$1+x+x^2+x^3+\ldots\ldots\ldots.+x^n$
For example: if n is 3 and x is 5, then the program computes 1+5+25+125.
Print x, n, the sum
Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

Exercise-10
a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
b) Write a C program to convert a Roman numeral to its decimal equivalent.

Exercise-11
Write a C program that uses functions to perform the following operations:
       i) Reading a complex number.
       ii) Writing a complex number.
       iii) Addition of two complex numbers.
       iv) Multiplication of two complex numbers.
(Note: represent complex number using a structure.)

Exercise-12
a) Write a C program which copies one file to another.
b) Write a C program to reverse the first n characters in a file.
(Note: The file name and n are specified on the command line.)

Exercise-13
a) Write a C program to display the contents of a file.
b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

Exercise-14
a) Write a C program that uses non recursive function to search for a Key value in a given list of integers using Linear search.

b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using Binary search.

Exercise-15
Write a C program to implement the Lagrange interpolation.

Exercise-16
Write C program to implement the Newton- Gregory forward interpolation.

Exercise-17
Write a C program to implement Trapezoidal method.

Exercise-18
Write a C program to implement Simpson method.

TEXT BOOKS:
1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications.
2. Computer Programming in C, V. Rajaraman, PHI.
3. C Programming, E.Balagurusamy, 3rd edition, TMH.
4. C Programming, M.V.S.S.N.Prasad, ACME Learning Pvt. Ltd.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad, S.Chand.
6. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.

COMPUTER ORGANIZATION LAB

Course Objective:
- To write assembly language programs (8086 processor) for solving problems.

List of Sample Problems:

Write assembly language programs for the following using MASAM:
1. Write assembly language programs to evaluate the expressions:
       i) $a = b + c - d * e$
       ii) $z = x * y + w - v + u / k$
  a. Considering   8-bit, 16 bit and 32 bit binary numbers as b, c, d, e.
  b. Considering 2 digit, 4digit and 8 digit BCD numbers.
    Take the input in consecutive memory locations and results also.
    Display the results by using "int xx" of 8086. Validate program for the
    Boundary conditions.

2. Write an ALP of 8086 to add two exponential numbers which are in IEEE 754
Notation. Display the results by using "int xx" of 8086. Validate program for the boundary Conditions.

3. Write an ALP of 8086 to take N numbers as input. And do the following operations on them.
a) Arrange in ascending and descending order.
b) Find max and minimum
c) Find average
   Considering 8-bit, 16 bit binary numbers and 2 digit, 4digit and 8 digit BCD numbers.
   Display the results by using "int xx" of 8086. Validate program for the boundary conditions.

4. Write an ALP of 8086 to take a string of as input (in 'C' format) and do the Following Operations on it.
a) Find the length .   b) Find it is Palindrome or not.
c) Find whether given string substring or not.
d) Reverse a string.   e) Concatenate by taking another sting.
        Display the results by using "int xx" of 8086.

5. Write the ALP to implement the above operations as procedures and call from the main
procedure.

6. Write an ALP of 8086 to find the factorial of a given number as a Procedure and call
from the main program which display the result.

7. Write an assembly language program to encrypt digits as shown below:
 Input digit: 0 1 2 3 4 5 6 7 8 9
 Encrypted digit: 4 6 9 5 0 3 1 8 7 2
 Your program should accept a string consisting of digits. The encrypted
 String should be displayed using "int xx" of 8086.

8. Write a procedure to locate a character in a given string. The procedure receives a

pointer to a string and character to be located. When the first occurrence of the character is located, its position is returned to main. If no match is found, a negative value is returned. The main procedure requests a character string and a character to be located and displays the result.

9. Write an assembly language program to read a string of characters from the user and
    that prints the vowel count . Display the results by using "int xx" of 8086.

ex.   Input: Advanced Programming in UNIX

Out put:

Vowel	count
a or A	3
e or E	1
i or I	3
o or O	1
u or U	1

10. A computer uses RAM chips of 1024 X 1 capacity.
a) How many chips are needed, and how should their address lines be connected to provide a memory capacity of 1024 bytes?
b) How many chips are needed to provide a memory capacity of 16K bytes?

11. A computer employs RAM chips of 256X8 and ROM chips of 1024 X 8. The computer
    needs 2K bytes of RAM, 4K bytes of ROM, and four interface units, each with four
    registers. A memory-mapped I/O configuration is used. The two highest-order bits of the
    address bus are assigned 00 for RAM, 01 for ROM, 10 for interface registers.
a. How many RAM and ROM chips are needed?
b. Draw a memory-address map for the system.
c. Give the address range in hexadecimal for RAM, ROM and interface.

12. Obtain the complement function for the match logic of one word in an associative
    memory. Draw the logic diagram for it and compare with the actual match logic diagram.

13. A two-way set associative cache memory uses blocks of four words. The cache can
    accommodate a total of 2048 words from main memory. The main memory size is 128K X 32.
a. Formulate all pertinent information required to construct the cache memory.
b. What is the size of the cache memory?

14. A digital computer has a memory unit of 64K X 16 and a cache memory of 1K words.
       The cache uses direct mapping with a block size of four words.
a. How many bits are there in each word of cache, and how are they divided
   into functions? Include a valid bit.
       b. How many bits are there in the tag, index, block, and word fields of the
   address format?
       c. How many blocks can the cache accommodate?

15. An address space is specified by 24 bits and the corresponding memory space by 16 bits.
a. How many words are there in the address space?
b. How many words are there in the memory space?
c. If a page consists of 2K words, how many pages and blocks are there in the system.

16. A virtual memory has a page size of 1K words. There are eight pages and four blocks.
    The associative memory page table contains the following entries. Make a list of all virtual addresses (in decimal) that will cause a page fault.

Page	Block
0	3
1	1
4	2
6	0

TEXT BOOKS:
1. IBM PC Assembly Language and Programming, P. Abel, 5th Edition, PHI.
2. Introduction to Assembly Language Programming, Sivarama P. Dandamudi, Springer Int. Edition, 2003.
3. The 8088 and 8086 Microprocessors: Programming, Interfacing, Software, Hardware and Application, 4th edition, W. A. Triebel, A. Singh, N. K. Srinath, Pearson Education.

Data Structures & Algorithms

Prerequisites
- A course on "Computer Programming & Data Structures"

Course Objectives:
- Introduces the notations for analysis of the performance of algorithms
- Introduces a variety of data structures such as hash tables, disjoint sets and Priority Queue
- Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic programming and greedy) and mention problems for which each technique is appropriate;
- Introduces sorting, searching and pattern matching algorithms

Course Outcomes:
- Ability to analyze the performance of algorithms
- Ability to select the data structures that efficiently model the information in a problem
- Ability to choose appropriate data structures and algorithm design methods for a specified application
- Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs
- Design programs using a variety of data structures, including hash tables, disjoint sets, trees and graphs
- Implement and know the application of algorithms for sorting and pattern matching

UNIT - I
Introduction: Algorithm, Psuedo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notations, Substitution method, Master's theorem
Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication

UNIT - II
Disjoint Sets: Disjoint set operations, union and find algorithms
Greedy method: General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.
Priority Queues – Definition, Realizing a Priority Queue using Heaps, operations of priority queue

UNIT – III
Dynamic Programming: General method, applications- Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.
Backtracking: General method, applications-n-queens problem, sum of subsets problem, graph coloring.

UNIT – IV
Review of basic data structures: The list, Stack, Queue
linear list representation, skip list representation, operations - insertion, deletion and searching.
Hash table representation: hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing, comparison of hashing and skip lists.
Searching: Linear Search and Binary Search
Sortings: Bubble sort, Selection sort, Insertion sort, Radix sort, Heap sort

UNIT – V

Trees: Definition, Definition, Types of trees, Binary Trees, Binary Tree Traversal Methods, Binary search tree operations, operations of AVL tree, B-Tree, Red-Black tree, Splay tree

Graphs: Definition, Representation of graphs, Graphs Traversal Methods.

String Matching algorithms: Brute Force algorithm, Boyer Moore algorithm, Knuth- Morris-Pratt algorithm

TEXT BOOKS:
1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Universities Press.
2. Fundamentals of Data Structures, Ellis Horowitz, Satraj Sahni and Rajasekharam, Universities Press.

REFERENCES:
1. Introduction to Algorithms, second edition, T. H. Cormen, C. E. Leiserson, R. L. Rivest and C.Stein,PHI Pvt. Ltd./ Pearson Education.
2. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
3. Data structures: A Pseudocode Approach with C, 2 nd edition, R. F. Gilberg and B.A. Forouzan, Cengage Learning.

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OBJECT ORIENTED PROGRAMMING THROUGH C++

UNIT - I
C++ Basics: Structure of a C++ program, Data types, Declaration of variables, Expressions, Operators, Operator Precedence, Evaluation of expressions, Type conversions, Pointers, Arrays, Pointers and Arrays, Strings, Structures, References.
Flow control statement- if, switch, while, for, do, break, continue, goto statements.
Functions - Scope of variables, Parameter passing, Default arguments, inline functions, Recursive functions, Pointers to functions.
Dynamic memory allocation and deallocation operators-new and delete, Preprocessor directives.

UNIT - II
Different paradigms for problem solving, need for OOP, differences between OOP and Procedure oriented programming, Abstraction, Overview of OOP principles, Encapsulation, Inheritance and Polymorphism.
C++ Classes And Data Abstraction: Class definition, Class structure, Class objects, Class scope, this pointer, Friends to a class, Static class members, Constant member functions, Constructors and Destructors, Dynamic creation and destruction of objects, Data abstraction, ADT and information hiding.

UNIT- III
Inheritance: Defining a class hierarchy, Different forms of inheritance, Defining the Base and Derived classes, Access to the base class members, Base and Derived class construction, Destructors, Virtual base class.
Virtual Functions And Polymorphism: Static and Dynamic bindings, Base and Derived class virtual functions, Dynamic binding through virtual functions, Virtual function call mechanism, Pure virtual functions, Abstract classes, Implications of polymorphic use of classes, Virtual destructors.

UNIT - IV
C++ I/O: I/O using C functions, Stream classes hierarchy, Stream I/O, File streams and String streams, Overloading << and >> operators, Error handling during file operations, Formatted I/O.

UNIT - V
Exception Handling: Benefits of exception handling, Throwing an exception, The try block, Catching an exception, Exception objects, Exception specifications, Stack unwinding, Rethrowing an exception, Catching all exceptions, Design issues in exception handling.

Text Books:
1. Problem solving with C++: The Object of Programming, 4th Edition, Walter Savitch, Pearson Education.
2. C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.

REFERENCES:
1. C++ Primer, 3rd Edition, S. B. Lippman and J. Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B. Stroutstrup, Pearson Education.
3. OOP in C++, 3rd Edition, T. Gaddis, J. Walters and G. Muganda, Wiley DreamTech Press.
4. Object Oriented Programming in C++, 3rd Edition, R. Lafore, Galigotia Publications pvt ltd.
5. Computer Science, a Structured Programming Approach Using C++, B. A. Forouzan and R. F. Gilberg, Thomson.

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SCRIPTING LANGUAGES

Prerequisites:
- A course on "Computer Programming and Data Structures"
- A course on "Object Oriented Programming Concepts"

Course Objectives:
- This course provides an introduction to the script programming paradigm
- Introduces scripting languages such as Perl, PHP and Python.
- Learning TCL

Course Outcomes:
- Comprehend the differences between typical scripting languages and typical system and application programming languages.
- Gain knowledge of the strengths and weakness of Perl, PHP TCL and Python; and select an appropriate language for solving a given problem

UNIT – I
Introduction to PERL and Scripting, Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT – II Advanced perl,
Finer points of looping, pack and unpack, filesystem, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Isses.

UNIT – III PHP Basics
Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Datatypes, Variables, Constants, expressions, string interpolation, control structures . Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.
PHP and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World.

UNIT - IV TCL
TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures , strings , patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.
Tk
Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

UNIT – V Python
Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling.
Integrated Web Applications in Python – Building Small, Efficient Python Web Systems ,Web Application Framework.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL , 3rd Edition , Jason Gilmore, Apress Publications (Dream tech.).

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J. Lee and B. Ware (Addison Wesley) Pearson Education.
2. Programming Python,M.Lutz,SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1,I. Bayross and S. Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.
6. Guide to Programming with Python, M. Dawson, Cengage Learning.
7. Perl by Example, E. Quigley, Pearson Education.
8. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.
9. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
10. PHP and MySQL by Example, E. Quigley, Prentice Hall (Pearson).
11. Perl Power, J.P. Flynt, Cengage Learning.
12. PHP Programming solutions, V. Vaswani, TMH.

OPERATIONS RESEARCH

Prerequisites
- A course on "Mathematics"

Course Objectives
- This course explains various Real time problems and Operation Research Techniques to address those problems.
- To study Linear Programming, dynamic programming Operation Research Techniques etc.
- To understand Theory of games.

Course Outcomes
- Gain the knowledge of Operation Research Techniques
- Get the skill to apply Operation Research Techniques to address the real time problems .

UNIT - I
DEVELOPMENT DEFINITION: Characteristics and phases scientific Method, Types of models, General methods for solving. Operations Research models.
ALLOCATION: Introduction, Linear programming Formulation, Graphical solution, Simplex method, artificial variable technique, Duality principle.
TRANSPORTATION PROBLEM: Formulation, optimal solution, un-balanced transportation problem, Degeneracy. Assignment problem: formulation optimal solution, variations. 1.a non-square (mxn) Matrix, Restrictions.

UNIT - II
EEQUE CEING: Introduction, optimal solution for processing each of n-jobs through three machines, travelling salesman problem i.e., shortest acyclic route models.
REPLACEMENT: Introduction, replacement of items that deteriorate when money value is not counted and counted, replacement items that fail completely i.e., group replacements.

UNIT - III
WAITING LINES: Introduction, single channel, poisson arrivals, exponential service times, unrestricted queue, with infinite population and finite population models, single channel, poisson arrivals, exponential service times with infinite population and restricted queue, multi channel, poisson arrivals, exponential service times with infinite population and unrestricted queue.

UNIT - IV
INVENTORY: Introduction, single item deterministic models, production is instantaneous or at a constant rate, shortages are allowed or not allowed and withdrawals from stock is continuous, purchase inventory model with one price break, shortages are not allowed, Instantaneous production demand, production or purchase cost is relevant, stochastic models, demand may be discrete or variable or instantaneous production, instantaneous demand and no setup cost.

UNIT - V
THEORY OF GAMES: Introduction, Minimax (maximum) criterion and optimal strategy, solution of games with saddle points, rectangular games without saddle points.
DYNAMIC PROGRAMMING: Introduction, Billman's Principal of optimality, solution of problems with finite number of stages.

TEXT BOOKS:

1. S. D. Sharma   : Operations Research
                                             kedar Nath Ramnath,1972

2. P. K. Gupta & D. S. Hira   : Operations Research

3. R. D. Asrhedkar & R. V. Kulkarni   : Operations Research.

SOFTWARE ENGINEERING

Prerequisites
- A course on "Computer Programming and Data Structures"
- A course on "Object Oriented Programming Through Java"

Course Objectives
- The aim of the course is to provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.
- Topics include process models, software requirements, software design, software testing, software process/product metrics, risk management, quality management and UML diagrams

Course Outcomes
- Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
- Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
- Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

UNIT - I:
Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths.
A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models.
Process models: The waterfall model, incremental process models, evolutionary process models, the unified process.

UNIT- II:
Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.
Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.
System models: Context models, behavioral models, data models, object models, structured methods.

UNIT- III:
Design Engineering: Design process and design quality, design concepts, the design model.
Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

UNIT- IV:
Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.

Product metrics: Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.

UNIT - V:
Metrics for Process and Products: Software measurement, metrics for software quality.
Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.
Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

TEXT BOOKS:
1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc Graw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

REFERENCES:
1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
2. Software Engineering principles and practice - Waman S Jawadekar, The Mc Graw-Hill Companies.
3. Fundamentals of object oriented design using UML Meiler page-Jones: Pearson Education.

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Data Structures Lab Using C++

Prerequisites
- A course on "Computer Programming & Data Structures" and "Advanced Data Base Engineering".

Course Objectives
- To get practical exposure on Advanced Data Structures like AVL Trees, Red-Black trees etc.,
- implementation of data structures such as trees and graphs,
- Programming of sorting and pattern matching algorithms

Course Outcomes
- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations or combinations.
- Implement and know the application of algorithms for sorting and pattern matching.
- Design programs using tree structures, including Optimal binary search tree, All pairs shortest path problem, AVL tree, Red-Black trees.

1. Write a program to implement the following sorting techniques
   a. Merge sort
   b. Quick sort
   c. Bubble sort
   d. Selection sort
   e. Insertion sort
   f. Radix sort
   g. Heap sort
2. Write a program to implement the single source shortest path problem
3. Write a program to implement the Optimal binary search tree
4. Write a program to implement the All pairs shortest path problem
5. Write a program to implement the n-queens problem
6. Write a program to implement the following searching techniques
   a. Linear Search
   b. Binary Search
7. Write a program to implement the operations of Binary search tree
8. Write a program to implement the tree traversal methods
9. Write a program to implement the graph traversal methods
10. Write a program to implement the operations of AVL tree
11. Write a program to implement the operations of Red-Black tree
12. Write a program to implement the following Pattern matching algorithms
    a. Brute Force algorithm
    b. Boyer Moore algorithm
    c. Knuth- Morris-Pratt algorithm

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SCRIPTING (PYTHON) PROGRAMMING LAB

Course Objectives:
- To be able to introduce core programming basics and program design with functions using Python programming language.
- To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
- To understand the high-performance programs designed to strengthen the practical expertise.

Course Outcomes:
1. Student should be able to understand the basic concepts scripting and the contributions of scripting language
2. Ability to explore python especially the object-oriented concepts, and the built-in objects of Python.
3. Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete-event simulations

Prerequisites:
- Students should install Python on Linux platform.

List of Programs:
1. Write a program to demonstrate different number data types in Python.
2. Write a program to perform different Arithmetic Operations on numbers in Python.
3. Write a program to create, concatenate and print a string and accessing sub-string from a given string.
4. Write a python script to print the current date in the following format "Sun May 29 02:26:23 IST 2017"
5. Write a program to create, append, and remove lists in python.
6. Write a program to demonstrate working with tuples in python.
7. Write a program to demonstrate working with dictionaries in python.
8. Write a python program to find largest of three numbers.
9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula : c/5 = f-32/9]
10. Write a Python program to construct the following pattern, using a nested for loop

```
        *
    *                                                                           *
    *                                       *                                   *
    *                       *                       *                           *
    *               *               *               *                           *
    *                       *                       *                           *
    *                                       *                                   *
    *                                                                           *
    *
```

11. Write a Python script that prints prime numbers less than 20.
12. Write a python program to find factorial of a number using Recursion.
13. Write a program that accepts the lengths of three sides of a triangle as inputs. The program output should indicate whether or not the triangle is a right triangle (Recall from the

Pythagorean Theorem that in a right triangle, the square of one side equals the sum of the squares of the other two sides).
14. Write a python program to define a module to find Fibonacci Numbers and import the module to another program.
15. Write a python program to define a module and import a specific function in that module to another program.
16. Write a script named **copyfile.py**. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.
17. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.
18. Write a Python class to convert an integer to a roman numeral.
19. Write a Python class to implement pow(x, n)
20. Write a Python class to reverse a string word by word.

English Language Communication Skills Lab

Prerequisite: NIL

Course Objectives
- To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for interviews, group discussion and public speaking

Learning Outcomes
- Better Understanding of nuances of language through audio- visual experience and group activities
- Neutralization of accent for intelligibility
- Speaking with clarity and confidence thereby enhancing employability skills of the students

Syllabus: English Language Communication Skills Lab shall have two parts:
   a. **Computer Assisted Language Learning (CALL) Lab**
   b. **Interactive Communication Skills (ICS) Lab**
The following course content is prescribed for the **English Language Communication Skills Lab**
Exercise – I
CALL Lab: Introduction to Phonetics – Speech Sounds – Vowels and Consonants
ICS Lab: Ice-Breaking activity and JAM session
Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

Exercise – II
CALL Lab: Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.
ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.
Concord (Subject in agreement with verb) and Words often misspelt- confused/misused

Exercise - III
CALL Lab: Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.
ICS Lab: Descriptions- Narrations- Giving Directions and guidelines.
Sequence of Tenses, Question Tags and One word substitutes.

Exercise – IV
CALL Lab: Intonation and Common errors in Pronunciation.
ICS Lab: Extempore- Public Speaking
Active and Passive Voice, –Common Errors in English, Idioms and Phrases

Exercise – V
CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice
ICS Lab: Information Transfer- Oral Presentation Skills
Reading Comprehension and Job Application with Resume preparation.

Minimum Requirement of infrastructural facilities for ELCS Lab:
1. Computer Assisted Language Learning (CALL) Lab:
The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):
Computer network with Lan with minimum 60 multimedia systems with the following specifications:
    i)   P – IV Processor
        a) Speed – 2.8 GHZ
        b) RAM – 512 MB Minimum
        c) Hard Disk – 80 GB
    ii)   Headphones of High quality

2. Interactive Communication Skills (ICS) Lab :
The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

Suggested Software:
1. **Cambridge Advanced Learners' English Dictionary with CD.**
2. **Grammar Made Easy by Darling Kindersley**
3. **Punctuation Made Easy by Darling Kindersley**
4. Clarity Pronunciation Power – Part I
5. Clarity Pronunciation Power – part II
6. **Oxford Advanced Learner's Compass, 8th Edition**
7. ***DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.***
8. Lingua TOEFL CBT Insider, by Dreamtech
9. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
10. **English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge**
11. **English Pronunciation in Use** (Elementary, Intermediate, Advanced) Cambridge University Press
12. Raman, M & Sharma, S. 2011. Technical Communication, OUP
13. Sanjay Kumar & Pushp Lata. 2011. Communication Skills, OUP

SUGGESTED READING:
1. Rama Krishna Rao, A. *et al. English Language Communication Skills – A Reader cum Lab Manual Course Content and Practice.* Chennai: Anuradha Publishers
2. Suresh Kumar, E. & Sreehari, P. 2009. *A Handbook for English Language Laboratories.* New Delhi: Foundation
3. *Speaking English Effectively* 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
4. Sasi Kumar, V & Dhamija, P.V. *How to Prepare for Group Discussion and Interviews.* Tata McGraw Hill
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. *English Pronunciation in Use. (Elementary, Intermediate & Advance).* Cambridge: CUP

7. Chris Redston, Gillie Cunningham, Jan Bell. *Face to Face* (2nd Edition). Cambridge University Press
8. Nambiar, K.C. 2011. *Speaking Accurately. A Course in International Communication.* New Delhi : Foundation
9. Soundararaj, Francis. 2012. *Basics of Communication in English. New Delhi: Macmillan*
10. A textbook of English Phonetics for Indian Students by T. Balasubramanian (Macmillan)

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Examination:
1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 30 sessional marks and 70 semester-end Examination marks. Of the 30 marks, 20 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

* * * * *

DATABASE MANAGEMENT SYSTEMS

Prerequisites
- A course on "Advanced Data Structures"

Course Objectives
- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- Topics include data models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

Course Outcomes
- Gain knowledge of fundamentals of DBMS, database design and normal forms
- Master the basics of SQL for retrieval and management of data.
- Be acquainted with the basics of transaction processing and concurrency control.
- Familiarity with database storage structures and access techniques

UNIT - I:
Database System Applications: database system Vs. file system, view of data, data abstraction, instances and schemas, data models, the ER model, relational model, other models, database languages, DDL, DML, database access for application programs, database users and administrator, transaction management, database system structure, storage manager, the query processor, history of data base systems, data base design and ER diagrams, beyond ER design entities, attributes and entity sets, relationships and relationship sets, additional features of ER model, concept design with the ER Model, conceptual design for large enterprises.

UNIT - II:
Introduction to the Relational Model: integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/altering tables and views, form of basic SQL query, examples of basic SQL queries, introduction to nested queries, correlated nested queries, set comparison operators, aggregation operators, NULL values, comparison using null values, logical connectivity's, AND, OR and NOT, impact on SQL constructs, outer joins, disallowing NULL values, complex integrity constraints in SQL, triggers and active data bases, Oracle, SQL Server, DB2.

UNIT - III:
Relational Algebra: Selection and projection, set operations, renaming, Joins, Division, Examples of Algebra overviews, Relational calculus, Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus.
Schema refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, dependency preserving decomposition, schema refinement in database design, multi valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT - IV:
Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity.

Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions, Buffer Management, Failure with loss of nonvolatile storage, Advance Recovery systems, Remote Backup systems.

UNIT - V:
Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:
1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3rd Edition
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition.

REFERENCES:
1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C. J. Date Pearson Education
4. Oracle for Professionals, The X Team, S. Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MASTER OF COMPUTER APPLICATIONS II Year I Semester

COMPUTER NETWORKS

Prerequisites
- A course on "Computer Programming and Data Structures"
- A course on "Design and Analysis of Algorithms"

Course Objectives
- The objective of the course is to equip the students with a general overview of the concepts and fundamentals of computer networks.
- Familiarize the students with the standard models for the layered approach to communication between machines in a network and the protocols of the various layers.
- The following topics are included: Reference models, the physical layer (transmission media); the data link layer (error detection and correction, point-to-point protocols); the medium access layer protocols; the network layer (routing algorithms, congestion control); internetworking (addressing, internetwork routing and protocols, quality of service); the transport layer (connection-oriented transport layer services and protocols); application layer protocols

Course Outcomes
- Gain the knowledge of the basic computer network technology.
- Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
- Obtain the skills of subnetting and routing mechanisms.
- Familiarity with the essential protocols of computer networks, and how they can be appled in network design and implementation.

UNIT- I
Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet.
Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, Wireless transmission.

UNIT - II
Data link layer: Design issues, framing, Error detection and correction.
Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for noisy channel.
Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, Example data link protocols.
Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching.

UNIT- III
Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internetworking, The Network layer in the internet.

UNIT – IV
Transport Layer: Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols.

UNIT – V

Application Layer –Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video.

TEXT BOOK:

1. Computer Networks -- Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education
2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MASTER OF COMPUTER APPLICATIONS II Year I Semester

OPERATING SYSTEMS

Prerequisites:
- A course on "Computer Programming and Data Structures"
- A course on "Computer Organization and Architecture"

Course Objectives:
- Provide an introduction to operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
- Introduce the issues to be considered in the design and development of operating system
- Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix

Course Outcomes:
- Will be able to control access to a computer and the files that may be shared
- Demonstrate the knowledge of the components of computer and their respective roles in computing.
- Ability to recognize and resolve user problems with standard operating environments.
- Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

UNIT - I:
Operating System Introduction, Structures - Simple Batch, Multiprogrammed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls, Virtual Machines, System Design and Implementation.
UNIX/LINUX Utilities - Introduction to Unix file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, text processing utilities and backup utilities.

UNIT - II:
Process and CPU Scheduling - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads, and Interposes Communication, Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling, Real-Time Scheduling.
System call interface for process management-fork, exit, wait, waitpid, exec
Deadlocks - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

UNIT – III:
Process Management and Synchronization - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors.
Interprocess Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory, semaphores.

UNIT - IV
Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Performance of Demanding Paging, Page Replacement, Page Replacement Algorithms, Allocation of Frames, Thrashing.

UNIT - V:

File System Interface and Implementation -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management, Directory Management, Directory Implementation, Efficiency, and Performance.

Unix/LINUX Files: File structure, directories, files and devices, System calls, library functions, low level file access, usage of open, create, read, write, close, lseek, stat, ioctl.

TEXT BOOKS:
1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the Unix environment, W. R. Stevens, Pearson education.

REFERENCE BOOKS:
1. Operating Systems – Internals and Design Principles Stallings, Fifth Edition–2005, Pearson Education/PHI
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 2nd edition, Pearson/PHI
4. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
5. Unix Internals The New Frontiers, U. Vahalia, Pearson Education.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MASTER OF COMPUTER APPLICATIONS II Year I Semester

OBJECT ORIENTED ANALYSIS AND DESIGN USING UML

Prerequisites:
- Software Engineering

Course Objectives:
- To train students on object modeling
- To apply unified process phases
- To apply unified modeling language for software design of any applications
- To study case studies for OOAD

Course Outcomes:
- Will be able to use UML notations
- Can apply unified process in software development
- Will be able to perform analysis and design using object modeling

UNIT - I
Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT - II
Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.
Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.
Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object   Diagrams.

UNIT - III
Basic Behavioral Modeling-I: Interactions, Interaction diagrams.
Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.

UNIT - IV
Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.
Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

UNIT - V
Patterns and Frameworks, Artifact Diagrams. Case Study: The Unified Library application

TEXT BOOKS:
1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education 2nd Edition
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

REFERENCE BOOKS:
1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML,TMH.

5. Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
6. Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.
7. UML and C++,R. C. Lee, and W. M. Tepfenhart, PHI.
8. Object Oriented Analysis, Design and Implementation, B. Dathan, S. Ramnath, Universities Press.
9. OODesign with UML and Java, K. Barclay, J. Savage, Elsevier.
10. Learning UML 2.0, Russ Miles and Kim Hamilton, O'riley, SPD.

JAVA PROGRAMMING

Prerequisites
- A course on "Computer Programming & Data Structures"

Course Objectives
- Introduces object oriented programming concepts using the Java language.
- Introduces the principles of inheritance and polymorphism; and demonstrates how they relate to the design of abstract classes
- Introduces the implementation of packages and interfaces
- Introduces exception handling, event handling and multithreading
- Introduces the design of Graphical User Interface using applets and swings

Course Outcomes
- Develop applications for a range of problems using object-oriented programming techniques
- Design simple Graphical User Interface applications

UNIT - I :
Object oriented thinking and Java Basics- Need for oop paradigm, summary of oop concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods, History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, method binding, inheritance, overriding and exceptions, parameter passing, recursion, nested and inner classes, exploring string class.

UNIT - II :
Inheritance, Packages and Interfaces – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class.
Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.
Exploring java.io.

UNIT - III
Exception handling and Multithreading-- Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.
String handling,Exploring java.util.Differences between multi threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, interthread communication, thread groups, daemon threads.
Enumerations, autoboxing, annotations, generics.

UNIT - IV :
Event Handling : Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

UNIT - V:
Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.
Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

TEXT BOOKS:
1. Java the complete reference, 7th edition, Herbert Schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson Education.

REFERENCES:
1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons.
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. An introduction to Java programming and object oriented application development, R.A. Johnson- Thomson.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MASTER OF COMPUTER APPLICATIONS II Year I Semester

DATABASE MANAGEMENT SYSTEMS LAB

Pre-requisites:
- Co-requisite of course "Database Management Systems"

Course Objectives:
- Introduce ER data model, database design and normalization
- Learn SQL basics for data definition and data manipulation

Course Outcomes:
- Design database schema for a given application and apply normalization
- Acquire skills in using SQL commands for data definition and data manipulation.
- Develop solutions for database applications using procedures, cursors and triggers

List of Experiments:-
1) Concept design with E-R Model
2) Relational Model
3) Normalization
4) Practicing DDL commands
5) Practicing DML commands
6) Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
7) Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8) Triggers (Creation of insert trigger, delete trigger, update trigger)
9) Procedures
10) Usage of Cursors

TEXT BOOKS:
1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3rd Edition
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition.

REFERENCES:
1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C. J. Date Pearson Education
4. Oracle for Professionals, The X Team, S. Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MASTER OF COMPUTER APPLICATIONS II Year I Semester

JAVA PROGRAMMING LAB

Prerequisites
- A course on "Computer Programming & Data Structures"

Co-requisite
- A Course on "Object-Oriented Programming Through Java"

Course Objectives
- Introduces object oriented programming concepts using the Java language.
- Introduces the principles of inheritance and polymorphism; and demonstrates how they relate to the design of abstract classes
- Introduces the implementation of packages and interfaces
- Introduces exception handling, event handling and multithreading
- Introduces the design of Graphical User Interface using applets and swings

Course Outcomes
- Develop applications for a range of problems using object-oriented programming techniques
- Design simple Graphical User Interface applications

Use Eclipse or Netbean platform and get acquainted with the various menus. Create a test project, add a test class and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

1) Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box. [Use JOption Pane – Input dialog, Message dialog]

2) Write a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea () that prints the area of the given shape.

3) Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.

4) Write a Java program that connects to a database using JDBC and does add, delete, modify and retrieve operations.

5) Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in selected color. Initially, there is no message shown.

6) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero

7) a) Develop an applet in Java that displays a simple message.
   b) Develop an applet in Java that receives an integer in one text field, and computes its factorial value and returns it in another text field, when the button named "Compute" is clicked.

8) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a Java program to display the table using Labels in Grid Layout.

9) Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).

10) Implement the above program with the database instead of a text file.

11) Write a Java program that prints the meta-data of a given table

TEXT BOOK:
1. Java Fundamentals – A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

REFERENCES:
1. Java for Programmers, P. J. Deitel and H. M. Deitel, Pearson education (OR) Java: How to Program P. J. Deitel and H. M. Deitel, PHI.
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.

WEB TECHNOLOGIES

Course Objectives:
- To introduce PHP language for server side scripting
- To introduce XML and processing of XML Data with Java
- To introduce Server side programming with Java Servlets and JSP
- To introduce Client side scripting with Javascript and AJAX.

Course Outcomes: The Student is expected to
- gain knowledge of client side scripting, validation of forms and AJAX programming
- have understanding of server side scripting with PHP language
- have understanding of what is XML and how to parse and use XML Data with Java
- To introduce Server side programming with Java Servlets and JSP

UNIT- I
Introduction to PHP: Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads, Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies
File Handling in PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories

UNIT- II
XML: Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemas, Document Object Model, XHTML
Parsing XML Data - DOM and SAX Parsers in java.

UNIT- III
Introduction to Servlets: Common Gateway Interface (CGI), Lifecycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC.

UNIT- IV
Introduction to JSP: The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

UNIT- V
Client side Scripting: Introduction to Javascript: Javascript language - declaring variables, scope of variables, functions, event handlers (onclick, onsubmit etc.), Document Object Model, Form validation. Simple AJAX application.

TEXT BOOKS:
1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

REFERENCES:
1. Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dreamtech
2. Java Server Pages –Hans Bergsten, SPD O'Reilly

3. Java Script, D. Flanagan, O'Reilly, SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming World Wide Web, R. W. Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MASTER OF COMPUTER APPLICATIONS II Year II Semester

Linux Programming

UNIT – I
Problem solving approaches in UNIX:
Using single commands, using compound Commands, shell scripts, C programs, building own command library of programs. **Working with the Bourne shell:** Introduction, shell responsibilities, pipes and input Redirection, output redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.

UNIT - II
Unix Files: File Concept, File Structure, File System Layout, File types, The standard I/O (fopen, fclose, fflush, fseek, fgetc, getc, getchar, fputc, putc, putchar, fgets, gets etc.), formatted I/O, stream errors, kernel support for files, System calls, library functions, file descriptors, low level file access - usage of open, creat, read, write, close, lseek, stat family, umask, dup, dup2, fcntl. file and directory management - chmod, chown, links(soft links & hard links - unlink, link, symlink), mkdir, rmdir, chdir, getcwd, opendir, readdir, closedir, rewinddir, seekdir, telldir functions.
Basics of Perl - Scalars and their operations, assignment statements and simple I/O, control statements, arrays, hashes, references, functions, pattern matching, file I/O, example programs.

UNIT - III
Unix Process – Process concept, Kernel support for process, process attributes, process hierarchy, process creation, waiting for a process, process termination, process control, zombie process, **system call interface for process management**-fork, vfork, exit, wait, waitpid, exec family, system.
Unix Signals – Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions.

UNIT – IV
Interprocess Communication Overview: Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, file and record locking, other unix locking techniques, pipes, FIFOs, namespaces, introduction to three types of IPC(system-V)-message queues, semaphores and shared memory.
Message Queues-Unix system-V messages, unix kernel support for messages, unix APIs for messages, client/server example.

UNIT - V:
Semaphores-Unix system-V semaphores, unix kernel support for semaphores, unix APIs for semaphores, file locking with semaphores.
Shared Memory-Unix system-V shared memory, unix kernel support for shared memory, unix APIs for shared memory, semaphore and shared memory example.
Sockets: Berkeley sockets, socket system calls for connection oriented protocol and connectionless protocol, example-client/server programs.

TEXT BOOKS:
1. Unix Network Programming, W. R. Stevens, Pearson/PHI.
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.
3. Unix system programming using C++, T. Chan, PHI.

REFERENCE BOOKS:

1. Linux System Programming, Robert Love, O'Reilly, SPD.
2. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education.
3. Advanced Programming in the Unix environment, 2nd Edition, W. R. Stevens & S. A. Rago, Pearson Education.
4. Learning Perl, R. L. Schwartz, T. Phoenix, B.D. Foy, O'Reilly, SPD.
5. Unix Programming, Kumar Saurabh, 1st Edition, Wiley India Pvt Ltd.

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Machine Learning (Core Elective – I)

Prerequisites:
- Students are expected to have knowledge in linear signals and systems, Fourier Transform, basic linear algebra, basic probability theory and basic programming techniques; knowledge of Digital Signal Processing is desirable.
- A course on "Computational Mathematics"
- A course on "Computer Oriented Statistical Methods"

Course Objectives:
- This course introduces fundamental concepts, theories, and algorithms for pattern recognition and machine learning.
- Topics include: Pattern Representation, Nearest Neighbour Based Classifier, Bayes Classifier, Hidden Markov Models, Decision Trees, Support Vector Machines, Clustering, and an application of hand-written digit recognition.

Course Outcomes:
- Understand the theory, benefits, inadequacies and possible applications of various machine learning and pattern recognition algorithms
- Identify and employ suitable machine learning techniques in classification, pattern recognition, clustering and decision problems.

UNIT - I
Introduction - Well-posed learning problems, designing a learning system Perspectives and issues in machine learning
Concept learning and the general to specific ordering – Introduction, A concept learning task, concept learning as search, Find-S: Finding a Maximally Specific Hypothesis, Version Spaces and the Candidate Elimination algorithm, Remarks on Version Spaces and Candidate Elimination, Inductive Bias.
Decision Tree Learning – Introduction, Decision Tree Representation, Appropriate Problems for Decision Tree Learning, The Basic Decision Tree Learning Algorithm Hypothesis Space Search in Decision Tree Learning, Inductive Bias in Decision Tree Learning, Issues in Decision Tree Learning.

UNIT - II
Artificial Neural Networks Introduction, Neural Network Representation, Appropriate Problems for Neural Network Learning, Perceptions, Multilayer Networks and the Back propagation Algorithm. Discussion on the Back Propagation Algorithm, An illustrative Example: Face Recognition
Evaluation Hypotheses – Motivation, Estimation Hypothesis Accuracy, Basics of Sampling Theory, A General Approach for Deriving Confidence Intervals, Difference in Error of Two Hypotheses, Comparing Learning Algorithms.

UNIT - III
Bayesian learning - Introduction, Bayes Theorem, Bayes Theorem and Concept Learning Maximum Likelihood and Least Squared Error Hypotheses, Maximum Likelihood Hypotheses for Predicting Probabilities, Minimum Description Length Principle , Bayes Optimal Classifier, Gibs Algorithm, Naïve Bayes Classifier, An Example: Learning to Classify Text, Bayesian Belief Networks, EM Algorithm.
Computational Learning Theory – Introduction, Probably Learning an Approximately Correct Hypothesis, Sample Complexity for Finite Hypothesis Space, Sample Complexity for Infinite Hypothesis Spaces, The Mistake Bound Model of Learning.

Instance-Based Learning – Introduction, k-Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning.

UNIT - IV
Pattern Comparison Techniques, Temporal patterns, Dynamic Time Warping Methods, Clustering, Codebook Generation, Vector Quantization
Pattern Classification: Introduction to HMMS, Training and Testing of Discrete Hidden Markov Models and Continuous Hidden Markov Models, Viterbi Algorithm, Different Case Studies in Speech recognition and Image Processing

UNIT - V
Analytical Learning – Introduction, Learning with Perfect Domain Theories: PROLOG-EBG Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control Knowledge, Using Prior Knowledge to Alter the Search Objective, Using Prior Knowledge to Augment Search Operations.
Combining Inductive and Analytical Learning – Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis.

TEXT BOOKS:
1. Machine Learning – Tom M. Mitchell, MGH
2. Fundamentals of Speech Recognition By Lawrence Rabiner and Biing – Hwang Juang.

REFERENCE BOOKS:
1. Machine Learning : An Algorithmic Perspective, Stephen Marsland, Taylor & Francis

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DATA WAREHOUSING AND DATAMINING (Core Elective – I)

Prerequisites:
- A course on "Database Management Systems"
- Knowledge of probability and statistics

Course Objectives:
- This course presents the techniques for preprocessing data before mining, and describes the concepts related to data warehousing, On-Line Analytical Processing (OLAP), and data generalization.
- It also presents methods for mining frequent patterns, associations, and correlations.
- It then describes methods for data classification and prediction, and data-clustering approaches.

Course Outcomes:
- Examine the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system.
- Apply preprocessing statistical methods for any given raw data.
- Devise efficient and cost effective methods for designing and maintaining data warehouses.
- Extract interesting patterns from large amounts of data that can be used for further analysis, for example in machine learning and prediction.
- Discover the role played by data mining in various fields.
- Choose and employ suitable data mining algorithms to build analytical applications
- Evaluate the accuracy of supervised and unsupervised models and algorithms.

UNIT- I
DATA MINING
Data-Types of Data-, Data Mining Functionalities- Interestingness Patterns-Classification of Data Mining systems- Data mining Task primitives -Integration of Data mining system with a Data warehouse-Major issues in Data Mining-Data Preprocessing.

UNIT - II
DATA WAREHOUSE AND BUSINESS ANALYSIS
Data Warehouse-Data Warehouse Architecture- Multidimensional Data Model-Data cube and OLAP Technology-Data Warehouse Implementation -DBMS schemas for Decision support - Efficient methods for Data cube computation.

UNIT- III
ASSOCIATION RULE MINING AND CLASSIFICATION
Mining Frequent Patterns-Associations and correlations- Mining Methods- Mining Various kinds of Association Rules- Correlation Analysis- Constraint based Association mining.-Classification and Prediction- Basic concepts-Decision tree induction-Bayesian classification, Rule-based classification - classification by Back propagation,-Support vector machines-.Associative Classification, Lazy learners-Other classification methods – Prediction.

UNIT- IV
CLUSTERING AND APPLICATIONS
Cluster analysis-Types of Data in Cluster Analysis-Categorization of Major Clustering Methods- Partitioning Methods,-Hierarchical Methods- Density-Based Methods,-Grid-Based Methods,-Model-

Based Clustering Methods- Clustering high dimensional data-Constraint- Based cluster analysis-Outlier Analysis

UNIT - V
MINING DATA STREAMS, TIME-SERIES AND SEQUENCE DATA
Basic concepts- Mining data streams-Mining Time-series data--Mining sequence patterns in Transactional databases-.Mining   Object- Spatial- Multimedia-Text and Web data- Spatial Data mining- Multimedia Data mining--Text Mining- Mining the World Wide Web.

TEXT BOOKS:
1. Data Mining – Concepts and Techniques - JIAWEI HAN & MICHELINE KAMBER, Elsevier.
2. Data Warehousing, Data Mining &OLAP- Alex Berson and Stephen J. Smith- Tata McGraw-Hill Edition, Tenth reprint 2007

REFERENCES:
1. Building the Data Warehouse- W. H. Inmon, Wiley Dreamtech India Pvt. Ltd.
2. Data Mining Introductory and Advanced topics –MARGARET H DUNHAM, PEA.

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MASTER OF COMPUTER APPLICATIONS II Year II Semester

INFORMATION SECURITY (Core Elective – I)

Prerequisites
- A Course on "Computer Networks, Mathematics

Course Objectives
- Understand information security's importance in our increasingly computer-driven world..
- Master the key concepts of information security and how they "work."
- To understand the fundamentals of Cryptography
- To understand the various key distribution and management schemes
- To understand how to deploy encryption techniques to secure data in transit across data networks
- To apply algorithms used for secure transactions in real world applications

Course Outcomes
- Ability to demonstrate the knowledge of cryptography and network security concepts and applications.
- Apply security principles in system design.
- Ability to identify and investigate vulnerabilities and security threats and mechanisms to counter them.

UNIT - I
Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security.
Classical Encryption Techniques, DES, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles and Modes of operation, Blowfish, Placement of Encryption Function, Traffic Confidentiality, key Distribution, Random Number Generation.

UNIT - II
Public key Cryptography Principles, RSA algorithm, Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Cryptography.
Message authentication and Hash Functions, Authentication Requirements and Functions, Message Authentication, Hash Functions and MACs Hash and MAC Algorithms SHA-512, HMAC.

UNIT - III
Digital Signatures, Authentication Protocols, Digital signature Standard, Authentication Applications, Kerberos, X.509 Directory Authentication Service.
Email Security: Pretty Good Privacy (PGP) and S/MIME.

UNIT - IV
IP Security:
Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.
Web Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT V

Intruders, Viruses and Worms Intruders, Viruses and related threats Firewalls: Firewall Design Principles, Trusted Systems, Intrusion Detection Systems.

TEXT BOOKS:

1. Cryptography and Network Security (principles and approaches) by William Stallings Pearson Education, 4th Edition.

REFERENCE BOOKS:

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Principles of Information Security, Whitman, Thomson.

DISTRIBUTED SYSTEMS (CORE ELECTIVE - II)

Prerequisites:
- A course on " Operating Systems"

Course Objectives:
- This course provides an insight into Distributed systems.
- Topics include- Peer to Peer Systems, Transactions and Concurrency control, Security and Distributed shared memory

Course Outcomes:
- Ability to understand Transactions and Concurrency control.
- Ability to understand Security issues.
- Understanding Distributed shared memory.

UNIT - I
Characterization of Distributed Systems-Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models-Introduction, Architectural and Fundamental models, Networking and Internetworking, Interprocess Communication,
Distributed objects and Remote Invocation-Introduction, Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI.

UNIT - II
Operating System Support- Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems-Introduction, File Service architecture, case study- SUN network file systems.
Name Services-Introduction; Name Services and the Domain Name System, Case study of the Global Name Service, Case study of the X.500 Directory Service.

UNIT - III
Peer to Peer Systems–Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies-Pastry, Tapestry, Application case studies-Squirrel, OceanStore.
Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging.
Coordination and Agreement-Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

UNIT - IV
Transactions and Concurrency control-Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.
Distributed Transactions-Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery, Replication-Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data.

UNIT - V
Security-Introduction, Overview of Security techniques, Cryptographic algorithms, Digital signatures, Case studies-Kerberos, TLS, 802.11 WiFi.

Distributed shared memory, Design and Implementation issues, Sequential consistency and Ivy case study, Release consistency and Munin case study, Other consistency models, CORBA case study-Introduction, CORBA RMI, CORBA Services.

TEXT BOOKS:
1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
2. Distributed Systems, S. Ghosh, Chapman & Hall/CRC, Taylor & Francis Group, 2010.

REFERENCE BOOKS:
1. Distributed Computing, S. Mahajan and S. Shah, Oxford University Press.
2. Distributed Operating Systems Concepts and Design, Pradeep K.Sinha, PHI.
3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, TMH.
4. Reliable Distributed Systems, K. P. Birman, Springer.
5. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.
6. Distributed Operating Systems and Algorithm Analysis, R. Chow, T. Johnson, Pearson.
7. Distributed Operating Systems, A. S. Tanenbaum, Pearson education.
8. Distributed Computing, Principles, Algorithms and Systems, Ajay D. Kshemakalyani and Mukesh Singhal, Cambridge, rp 2010.

SOFTWARE PROCESS AND PROJECT MANAGEMENT (CORE ELECTIVE – II)

Course Objectives: At the end of the course, the student shall be able to:
- To describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- To compare and differentiate organization structures and project structures.
- To implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.

UNIT - I
Software Process Maturity: Software maturity Framework, Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process. **Process Reference Models Capability** Maturity Model (CMM), CMMi, PCMM, PSP, TSP.

UNIT - II
Software Project Management Renaissance Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way. **Life-Cycle Phases and Process artifacts** Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model based software architectures.

UNIT - III
Workflows and Checkpoints of process Software process workflows, Iteration workflows, Major milestones, Minor milestones, Periodic status assessments. **Process Planning** Work breakdown structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning.

UNIT - IV
Project Organizations Line-of- business organizations, project organizations, evolution of organizations, process automation. **Project Control and process instrumentation** The seven core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation.

UNIT V
CCPDS-R Case Study and Future Software Project Management Practices Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

TEXT BOOKS:
1. Managing the Software Process, *Watts S. Humphrey*, Pearson Education.
2. Software Project Management, *Walker Royce,* Pearson Education.

REFERENCE BOOKS:
1. Effective Project Management: Traditional, Agile, Extreme, Robert Wysocki, Sixth edition, Wiley India, rp2011.
2. An Introduction to the Team Software Process, Watts S. Humphrey, Pearson Education, 2000
3. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, TMH, 2006
4. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.
5. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007

6. Software Engineering Project Managent, Richard H. Thayer & Edward Yourdon, 2nd edition, Wiley India, 2004.
7. The Art of Project Management, Scott Berkun, SPD, O'Reilly, 2011.
8. Applied Software Project Management, Andrew Stellman & Jennifer Greene, SPD, O'Reilly, rp2011.
9. Agile Project Management, Jim Highsmith, Pearson education, 2004.
10. Process Improvement essentials, James R. Persse, O'Reilly, 2006

SOFT COMPUTING (CORE ELECTIVE – II)

Course Objectives
- This course explains AI Problems and Search techniques.
- To understand Supervised and Unsupervised Learning Networks
- Introduces Classical Sets and Fuzzy Sets.
- To understand Genetic Algorithms.

Course Outcomes
- Comprehend the differences between Classical Sets and Fuzzy Sets
- Get the skill for application of search techniques to solve AI Problems
- Able to apply Genetic Algorithms for solving real time problems

UNIT- I
AI Problems and Search: AI problems, Techniques, Problem Spaces and Search, Heuristic Search Techniques- Generate and Test, Hill Climbing, Best First Search Problem reduction, Constraint Satisfaction and Means End Analysis. Approaches to Knowledge Representation- Using Predicate Logic and Rules.

UNIT- II
Supervised Learning Networks-perceptron, Back propagation algorithm-Classification Problem-Speech Processing Case study.
Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization,

UNIT - III
Introduction to Classical Sets (crisp Sets)and Fuzzy Sets- operations and Fuzzy sets. Classical Relations –and Fuzzy Relations- Cardinality, Operations, Properties and composition. Tolerance and equivalence relations.
Membership functions- Features, Fuzzification, membership value assignments, Defuzzification.

UNIT - IV
Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning Fuzzy Decision making
Fuzzy Logic Control Systems. Genetic Algorithm- Introduction and basic operators and terminology.
Applications: Optimization of TSP, Internet Search Technique

UNIT - V
Genetic Algorithms-Introduction, Biological background, Search space, Basic technologies, Simple and general genetic algorithms, Operations in genetic algorithms, Stopping criteria and constraints in genetic algorithms, Problem solving using genetic algorithms.

TEXT BOOKS:
1. Principles of Soft Computing- S N Sivanandam, S N Deepa, Wiley India, 2007
2. Soft Computing and Intelligent System Design –Fakhreddine O Karray, Clarence D Silva,. Pearson Edition, 2004.

REFERENCE BOOKS:

1. Artificial Intelligence and Soft Computing- Behavioural and Cognitive Modelling of the Human Brain- Amit Konar, CRC press, Taylor and Francis Group.
2. Artificial Intelligence – Elaine Rich and Kevin Knight, TMH, 1991, rp2008.
3. Artificial Intelligence – Patric Henry Winston – Third Edition, Pearson Education.
4. A first course in Fuzzy Logic-Hung T Nguyen and Elbert A Walker, CRC. Press Taylor and Francis Group.

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WEB TECHNOLOGIES LAB

1. Develop static pages (using Only HTML) of an online Book store. The pages should resemble: www.amazon.com The website should consist the following pages.
2. Home page
3. Registration and user Login
4. User Profile Page
5. Books catalog
6. Shopping Cart
7. Payment By credit card
8. Order Conformation

2. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.

3. Create and save an XML document at the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.

4. Bean Assignments

    a. Create a JavaBean which gives the exchange value of INR(Indian Rupees) into equivalent American/Canadian/Australian Dollar value.
    b. Create a simple Bean with a label – which is the *count* of number of clicks. Than create a BeanInfo class such that only the "*count*" property is visible in the Property Window.
    c. Create two Beans-a)KeyPad .b)DisplayPad .After that integrate the two Beans to make it work as a Calculator.
    d. Create two Beans Traffic Light(Implemented as a Label with only three background colours-Red,Green,Yellow) and Automobile(Implemented as a TextBox which states its state/movement). The state of the Automobile should depend on the following Light Transition Table.

Light Transition	Automobile State
Red -→ Yellow	Ready
Yellow -→ Green	Move
Green → Red	Stopped

5. Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.

6. Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.

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LINUX PROGRAMMING LAB

Linux Programming:
Note: Use Bash for Shell scripts.

1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.

2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

3. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.

4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.

5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.

6. Write a shell script to list all of the directory files in a directory.

7. Write a shell script to find factorial of a given integer.

8. Write an awk script to count the number of lines in a file that do not contain vowels.
9. Write an awk script to find the number of characters, words and lines in a file.
10. Write a C program that makes a copy of a file using standard I/O and system calls.
11. Implement in C the following Unix commands using System calls
    a). Cat   b) mv

12. Write a C program to list files in a directory.

13. Write a C program to emulate the Unix ls –l command.
14. Write a C program to list for every file in a directory, its inode number and file name.
15. Write a C program that redirects standard output to a file.Ex: ls > f1.
16. Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.
17. Write a C program to create a Zombie process.
18. Write a C program that illustrates how an orphan is created.
19. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex :- ls –l | sort
20. Write C programs that illustrate communication between two unrelated processes using named pipe.
21. Write a C program in which a parent writes a message to a pipe and the child reads the message.
22. Write a C program (sender.c) to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.

23. Write a C program (receiver.c) that receives the messages (from the above message queue as specified in (22)) and displays them.

24. Write a C programs to transfer a large amount of data between processes, using
    a) a pipe   b)a FIFO c)a message queue.

25. Write a C program to allow cooperating processes to lock a resource for exclusive use,
    using: a)Semaphores   b)flock or lockf system calls.

26. Write a C program that illustrates suspending and resuming processes using signals.

27. Write a C program that implements a producer-consumer system with two processes.
    (using Semaphores).

28. Write client and server programs (using c) for interaction between server and client processes using Unix Domain sockets.

29. Write client and server programs (using c) for interaction between server and client processes using Internet Domain sockets.

30. Write C programs that illustrate two processes communicating using shared memory.

TEXT BOOKS:
1. Advanced Unix Programming, N. B. Venkateswarulu, BS Publications.
2. Unix and Shell programming, B. A. Forouzan and R. F. Gilberg, Cengage Learning.
3. Unix and Shell Programming, M.G. Venkatesh Murthy, Pearson Education, 2005.
4. Unix Shells by Example, 4th Edition, Elllie Quigley, Pearson Education.
5. Sed and Awk, O. Dougherty & A. Robbins, 2nd edition, SPD.

MOBILE APPLICATION DEVELOPMENT

Prerequisites:
- A Course on JAVA
- A Course on DBMS

Course Objectives:
- To demonstrate their understanding of the fundamentals of Android operating systems
- To demonstrate their skills of using Android software development tools
- To demonstrate their ability to develop software with reasonable complexity on mobile platform
- To demonstrate their ability to deploy software to mobile devices
- To demonstrate their ability to debug programs running on mobile devices

Course Outcomes:
- Student understands the working of Android OS Practically.
- Student will be able to develop, deploy and maintain the Android Applications.

UNIT - I:
Introduction to Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Eclipse platform, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools
Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes
Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes

UNIT - II:
Android User Interface: Measurements – Device and pixel density independent measuring units
Layouts – Linear, Relative, Grid and Table Layouts
User Interface (UI) Components – Editable and non editable TextViews, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers
Event Handling – Handling clicks or changes of various UI components
Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities

UNIT - III
Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS
Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity
Notifications – Creating and Displaying notifications, Displaying Toasts

UNIT - IV
Persistent Storage: Files – Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared preferences, saving and retrieving data using Shared Preference

Database – Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and deleting data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update)

UNIT - V
Advanced Topics: Alarms – Creating and using alarms
Using Internet Resources – Connecting to internet resource, using download manager
Location Based Services – Finding Current Location and showing location on the Map, updating location

TEXT BOOKS:
1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox) , 2012
2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013

REFERENCES:
1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

SOFTWARE TESTING METHODOLOGIES

Prerequisites:
- A course on "Software Engineering"

Course Objectives:
- To provide knowledge of the concepts in software testing such as testing process, criteria, strategies, and methodologies.
- To develop skills in software test automation and management using latest tools.

Course Outcomes:
- Design and develop the best test strategies in accordance to the development model.

UNIT - I:
Introduction: - Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs
Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT - II:
Transaction Flow Testing:-transaction flows, transaction flow testing techniques.
Dataflow testing:- Basics of data flow testing, strategies in data flow testing, application of dataflow testing.
Domain Testing:-domains and paths, nice & ugly domains, domain testing, domains and interfaces' testing, domain and interface testing, domains and testability.

UNIT - III:
Paths, Path products and Regular expressions:- path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.
 Logic Based Testing:- overview, decision tables, path expressions, kv charts, specifications.

UNIT - IV:
State, State Graphs and Transition testing:- state graphs, good & bad state graphs, state testing, Testability tips.

UNIT - V:
Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like Jmeter or Win-runner).

TEXT BOOKS:
1. Software Testing techniques – Baris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr. K. V. K. K. Prasad, Dreamtech.

REFERENCES:
1. The craft of software testing – Brian Marick, Pearson Education.
3. Software Testing Techniques – SPD(Oreille)
4. Software Testing in the Real World – Edward Kit, Pearson.
5. Effective methods of Software Testing, Perry, John Wiley.
6. Art of Software Testing – Meyers, John Wiley.

WEB SERVICES & SERVICE ORIENTED ARCHITECTURE (CORE Elective - III)

Pre-requisites:
- The course assumes a reasonable comfort and background about Information Technology and Management Information Systems.

Course Objectives:
- To gain understanding of the basic principles of service orientation
- To learn service oriented analysis techniques
- To learn technology underlying the service design
- To learn the concepts such as SOAP, Registering and Discovering Services.

Course Outcomes: At the end of this course, students are expected to gain the following learning:
- Get the foundations and concepts of service based computing
- Advocate the importance and means of technology alignment with business
- Understanding the basic operational model of web services,
- Gain the knowledge of key technologies in the service oriented computing arena
- Apply and practice the learning through a real or illustrative project/case study.

UNIT - I
Evolution and Emergence of Web Services – Evolution of distributed computing. Core distributed computing technologies – client/server, CORBA, JAVA RMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA). Introduction to Web Services – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

UNIT - II
Web Service Architecture – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication, basic steps of implementing web services. Describing Web Services – WSDL introduction, non functional service description, WSDL1.1 Vs WSDL 2.0, WSDL document, WSDL elements, WSDL binding, WSDL tools, WSDL port type, limitations of WSDL.

UNIT - III
Brief Over View of XML – XML Document structure, XML namespaces, Defining structure in XML documents, Reuse of XML schemes, Document navigation and transformation. SOAP : Simple Object Access Protocol, Inter-application communication and wire protocols, SOAP as a messaging protocol, Structure of a SOAP message, SOAP envelope, Encoding, Service Oriented Architectures, SOA revisited, Service roles in a SOA, Reliable messaging, The enterprise Service Bus, SOA Development Lifecycle, SOAP HTTP binding, SOAP communication model, Error handling in SOAP.

UNIT – IV
Registering and Discovering Services : The role of service registries, Service discovery, Universal Description, Discovery, and Integration, UDDI Architecture, UDDI Data Model, Interfaces, UDDI Implementation, UDDI with WSDL, UDDI specification, Service Addressing and Notification, Referencing and addressing Web Services, Web Services Notification.

UNIT - V

SOA and web services security considerations, Network-level security mechanisms, Application-level security topologies, XML security standards, Semantics and Web Services, The semantic interoperability problem, The role of metadata, Service metadata, Overview of .NET and J2EE, SOA and Web Service Management, Managing Distributed System, Enterprise management Framework, Standard distributed management frameworks, Web service management, Richer schema languages, WS-Metadata Exchange.

TEXT BOOKS:

1. Web Services & SOA Principles and Technology, Second Edition, Michael P. Papazoglou.
2. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India.
3. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education.

REFERENCE BOOKS:

1. XML, Web Services, and the Data Revolution, F. P. Coyle, Pearson Education.
2. Building web Services with Java, 2nd Edition, S. Graham and others, Pearson Education.
3. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly, SPD.
4. McGovern, et al., "Java web Services Architecture", Morgan Kaufmann Publishers, 2005.
5. J2EE Wer Services, Richard Monson-Haefel, Pearson Education.

DISTRIBUTED DATABASES (CORE ELECTIVE - III)

Prerequisites
- A course on "Database Management Systems"

Course Objectives
- To acquire knowledge on parallel and distributed databases and its applications.
- To study the usage and applications of Object Oriented databases.
- To learn the modeling and design of databases
- To acquire knowledge on parallel and distributed databases and its applications.
- Equip students with principles and knowledge of parallel and object oriented databases.
- Topics include distributed DBMS architecture and design; query processing and optimization; distributed transaction management and reliability; parallel and object database management systems.

Course Outcomes
- Understand theoretical and practical aspects of distributed database systems.
- Study and identify various issues related to the development of distributed database system.
- Understand the design aspects of object oriented database system and related development.

UNIT - I
Features of Distributed versus Centralized Databases, Principles of Distributed Databases, Levels Of Distribution Transparency, Reference Architecture for Distributed Databases, Types of Data Fragmentation, Integrity Constraints in Distributed Databases, Distributed Database Design

UNIT - II
Translation of Global Queries to Fragment Queries, Equivalence transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries.
Optimization of Access Strategies, A Framework for Query Optimization, Join Queries, General Queries

UNIT - III
The Management of Distributed Transactions, A Framework for Transaction Management, Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions, Architectural Aspects of Distributed Transactions
Concurrency Control, Foundation of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

UNIT - IV
Reliability, Basic Concepts, Nonblocking Commitment Protocols, Reliability and concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of Inconsistency, Checkpoints and Cold Restart, Distributed Database Administration, Catalog Management in Distributed Databases, Authorization and Protection

UNIT - V
Architectural Issues, Alternative Client/Server Architectures, Cache Consistency, Object Management, Object Identifier Management, Pointer Swizzling, Object Migration, Distributed Object Storage, Object Query Processing, Object Query Processor Architectures, Query Processing Issues,

Query Execution, Transaction Management, Transaction Management in Object DBMSs, Transactions as Objects

Database Integration, Scheme Translation, Scheme Integration, Query Processing Query Processing Layers in Distributed Multi-DBMSs, Query Optimization Issues Transaction Management Transaction and Computation Model, Multidatabase Concurrency Control, Multidatabase Recovery, Object Orientation and Interoperability, Object Management Architecture CORBA and Database interoperability, Distributed Component Object Model, COM/OLE and Database Interoperability, PUSH-Based Technologies

TEXT BOOKS:
1. Distributed Databases Principles & Systems, Stefano Ceri, Giuseppe Pelagatti, TMH.
2. Principles of Distributed Database Systems, M. Tamer Ozsu, Patrick Valduriez ,
Pearson Education, 2nd Edition.

REFERENCE BOOKS:
1. Distributed Database Systems, Chanda Ray, Pearson.
2. Distributed Database Management Systems, S. K. Rahimi and Frank. S. Haug,
Wiley.

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INFORMATION RETRIEVAL SYSTEMS (CORE ELECTIVE - III)

Prerequisites:
- Data Structures

Course Objectives:
- to learn the important concepts and algorithms
- To understand the data/file structures those are necessary to design, and implement Information Retrieval (IR) systems.

Course Outcomes:
- Can be able to use different information retrieval techniques in various application areas
- Can apply IR principles to locate relevant information large collections of data
- Able to analyse performance of retrieval systems when dealing with unmanaged data sources
- Can be able to implement retrieval systems for web search tasks.

UNIT - I
Introduction:
Motivation, Basic Concepts, Past-Present and Future, the Retrieval Process
Modeling :
Introduction, A Taxonomy of Information retrieval Models, Retrieval: Ad hoc and Filtering, A Formal Characteristics of IR Models, Classic Information Retrieval, Alternative Ste Theory Models, Alternative Probabilistic Models, Structured Text Retrieval Models, Model for Browsing

UNIT - II
Retrieval Evaluation
Introduction, retrieval Performance Evaluation, Reference Collections
Query languages
Introduction, Keyword-Based Querying, Pattern Matching, Structural Queries, Query Protocols
Query Operations
Introduction, User Relevance Feedback, Automatic Local Analysis, Automatic global Analysis
Text Operations
Introduction, Document Preprocessing, Document Clustering, Text Compression, Comparing text Compression Techniques

UNIT - III
Indexing and Searching
Introduction, Inverted Files, Other Indices for Text, Boolean queries, Sequential Searching, pattern Matching, Structural Queries, Compression
Searching the Web
Introduction, Challenges, Characterizing the Web, Search Engines, Browsing, Metasearches, Finding the Needle in the Haystack, Searching using Hyperlinks

UNIT - IV
User Interfaces and Visualization
Introduction, human-Computer Interaction, The Information Access Process, Starting Points, Query Specification, Context, User Relevance Judgments, Interface Support for the Search Process

UNIT - V

Multimedia IR: Models and Languages

Introduction, Data Modeling, Query Languages

Multimedia IR: Indexing and |Searching

Introduction, Background-Spatial Access Methods,A Generic Multimedia Indexing Approach, One Dimentional Time Series, wo dimential Color Images, Automatic Feature Extraction.

TEXT BOOKS:
1. Modern Information Retrival by Yates and Neto Pearson Education.

REFERENCES:
1. Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.
2. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
3. Information Storage & Retieval By Robert Korfhage – John Wiley & Sons.

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ETHICAL HACKING (CORE ELECTIVE - IV)

Prerequisites
- A course on "Operating Systems"
- A course on "Computer Networks"
- A course on "Network Security and Cryptography"

Course Objectives
- The aim of the course is to introduce the methodologies and framework of ethical hacking for enhancing the security.
- The course includes-Impacts of Hacking; Types of Hackers; Information Security Models; Information Security Program; Business Perspective; Planning a Controlled Attack; Framework of Steps (Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Deliverable and Integration)

Course Outcomes
- Gain the knowledge of the use and availability of tools to support an ethical hack
- Gain the knowledge of interpreting the results of a controlled attack
- Understand the role of politics, inherent and imposed limitations and metrics for planning of a test
- Comprehend the dangers associated with penetration testing

UNIT - I
Introduction: Hacking Impacts, The Hacker
Framework: Planning the test, Sound Operations, Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Final Analysis, Deliverable, Integration
Information Security Models: Computer Security, Network Security, Service Security, Application Security, Security Architecture
Information Security Program: The Process of Information Security, Component Parts of Information Security Program, Risk Analysis and Ethical Hacking

UNIT - II
The Business Perspective: Business Objectives, Security Policy, Previous Test Results, Business Challenges
Planning for a Controlled Attack: Inherent Limitations, Imposed Limitations, Timing is Everything, Attack Type, Source Point, Required Knowledge, Multi-Phased Attacks, Teaming and Attack Structure, Engagement Planner, The Right Security Consultant, The Tester, Logistics, Intermediates, Law Enforcement

UNIT - III
Preparing for a Hack: Technical Preparation, Managing the Engagement
Reconnaissance: Social Engineering, Physical Security, Internet Reconnaissance

UNIT - IV
Enumeration: Enumeration Techniques, Soft Objective, Looking Around or Attack, Elements of Enumeration, Preparing for the Next Phase
Exploitation: Intutive Testing, Evasion, Threads and Groups, Operating Systems, Password Crackers, RootKits, applications, Wardialing, Network, Services and Areas of Concern

UNIT - V

Deliverable: The Deliverable, The Document, Overal Structure, Aligning Findings, Presentation

Integration: Integrating the Results, Integration Summary, Mitigation, Defense Planning, Incident Management, Security Policy, Conclusion

TEXT BOOK:

1. James S. Tiller, "The Ethical Hack: A Framework for Business Value Penetration Testing", Auerbach Publications, CRC Press

REFERENCE BOOKS:

1. EC-Council, "Ethical Hacking and Countermeasures Attack Phases", Cengage Learning
2. Michael Simpson, Kent Backman, James Corley, "Hands-On Ethical Hacking and Network Defense", Cengage Learning

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MULTIMEDIA AND RICH INTERNET APPLICATIONS (CORE ELECTIVE – IV)

Course Objectives:
This course aims to further develop students' competency in producing dynamic and creative graphic solutions for multimedia productions. It provides students with the basic concepts and techniques of interactive authoring. It also introduces students with the advanced scripting skills necessary for implementing highly interactive, rich internet applications using multimedia technologies and authoring tools. Students will develop aesthetic value and competencies in multimedia authoring. Artistic visual style and layout design are stressed, as well as the editing and integration of graphic images, animation, video and audio files. The course allows students to master industry-wide software and technologies to create highly interactive, rich internet applications.

UNIT - I
Introduction to Multimedia: Internet and Multimedia communications, Multimedia Networks, Multimedia Applications, Multimedia Information representation- Digitization Principles, Text, Images, Audio and Video, Compression Methods-Basic Coding Methods – Run Length coding, Huffman coding, Arithmetic coding, Discrete Cosine Transform, Differential PCM, Motion Compensated Prediction, Video Compression – JPEG, H.261, MPEG-1 Video, MPEG 2 and 3 Video, H.263, Wavelet and Fractal Image Compression, Audio Compression.

UNIT - II
Multimedia Applications in Networks: Introduction, Application Level Framing, Audio/Video Conferencing-Session Directories, Audio/Video Conferencing, Adaptive Applications, Receiver Heterogeneity, Real Time Application with Resource Reservation ,Video Server, Applications requiring reliable multicast – White Board , Network Text Editor for Shared Text Editing, Multi Talk, Multicast file transfer, Multimedia Applications on the World Wide Web – Multicast Web Page Sharing, Audio/Video Streams in the www, Interactive Multiplayer Games.

UNIT - III
Web 2.0: What is web 2.0, Search, Content Networks, User Generated Content, Blogging, Social Networking, Social Media, Tagging, Social Marking, Rich Internet Applications, Web Services, Mashups, Location Based Services, XML, RSS, Atom, JSON, and VoIP, Web 2.0 Monetization and Business Models, Future of the Web.

UNIT - IV
Rich Internet Applications (RIAs) with Adobe Flash and Flex: Adobe Flash- Introduction, Flash Movie Development, Learning Flash with Hands-on Examples, Publish your flash movie, Creating special effects with Flash, Creating a website splash screen, action script, web sources.
Adobe Flex 2- Introduction, Flex Platform Overview, Creating a Simple User Interface, Accessing XML data from your application, Interacting with Server Side Applications, Customizing your User Interface, Creating Charts and Graphs, Connection Independent RIAs on the desktop -Adobe Integrated Runtime (AIR), Flex 3 Beta.

UNIT - V
Ajax- Enabled Rich Internet Application: Introduction, Traditional Web Applications Vs Ajax Applications, Rich Internet Application with Ajax, History of Ajax, Raw Ajax example using xml http request object, Using XML, Creating a full scale Ajax Enabled application, Dojo ToolKit.

TEXT BOOKS:
1. Multimedia Communications: Protocols and Applications, Franklin F Kuo, J. Joaquin Garcia, Wolf gang Effelsberg, Prentice Hall Publications.
2. Multimedia Communications: Applications, Networks, Protocols and Standards, Fred Halsall, Addison Wesley Publications.
3. AJAX, Rich Internet Applications, and Web Development for Programmers, Paul J Deitel and Harvey M Deitel, Deitel Developer Series, Pearson education.

REFERENCE BOOKS:
1. Professional Adobe Flex 2, Rich Tretola, Simon barber and Renaun Erickson, Wrox, Wiley India Edition.
2. Multimedia Information Networking, Nalin K Sharda, PHI Learning.
3. Multimedia Computing, Communications & Applications, Ralf Steinmetz and Klara Nahrstedt, Pearson Education.
4. Multimedia Communication Systems: techniques, standards and networks, K.R.Rao, Bojkovic and Milovanovic, PHI Learning.
5. Programming Flex 3, C. Kazoun and J. Lott, SPD.
6. Dojo, J. E. Harmon, Pearson Education.
7. Adobe Flex 3: Training from the Source, Tapper & others, Pearson Education.
8. Principles of Multimedia, R. Parekh, TMH.
9. Mastering Dojo, R. Gill, C. Riecke and A. Russell, SPD.

SEMANTIC WEB AND SOCIAL NETWORKS (CORE ELECTIVE - IV)

Course Objectives:
- To learn Web Intelligence
- To learn Knowledge Representation for the Semantic Web
- To learn Ontology Engineering
- To learn Semantic Web Applications, Services and Technology
- To learn Social Network Analysis and semantic web

UNIT – I:
Web Intelligence: Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

UNIT - II:
Knowledge Representation for the Semantic Web: Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web –Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL), UML, XML/XML Schema.

UNIT - III:
Ontology Engineering: Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.

UNIT - IV:
Semantic Web Applications, Services and Technology: Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base ,XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods,

UNIT - V:
Social Network Analysis and semantic web: What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

TEXT BOOKS:
1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley inter science, 2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer, 2007.

REFERENCE BOOKS:
1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J. Davies, R. Studer, P.Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)
3. Information sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web, T. Segaran, C.Evans, J.Taylor, O'Reilly, SPD.

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MOBILE APPLICATION DEVELOPMENT LAB

Course Objectives:
- To learn how to develop Applications in android environment.
- To learn how to develop user interface applications.
- To learn how to develop URL related applications.

Course Outcomes:
- Student understands the working of Android OS Practically.
- Student will be able to develop, deploy and maintain the Android Applications.

The student is expected to be able to do the following problems, though not limited.

1. Create an Android application that shows Hello + name of the user and run it on an emulator. (b) Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button.

2. Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button. Use (a) Linear Layout (b) Relative Layout and (c) Grid Layout or Table Layout.

3. Develop an application that shows names as a list and on selecting a name it should show the details of the candidate on the next screen with a "Back" button. If the screen is rotated to landscape mode (width greater than height), then the screen should show list on left fragment and details on right fragment instead of second screen with back button. Use Fragment transactions and Rotation event listener.

4. Develop an application that uses a menu with 3 options for dialing a number, opening a website and to send an SMS. On selecting an option, the appropriate action should be invoked using intents.

5. Develop an application that inserts some notifications into Notification area and whenever a notification is inserted, it should show a toast with details of the notification.

6. Create an application that uses a text file to store user names and passwords (tab separated fields and one record per line). When the user submits a login name and password through a screen, the details should be verified with the text file data and if they match, show a dialog saying that login is successful. Otherwise, show the dialog with Login Failed message.

7. Create a user registration application that stores the user details in a database table.

8. Create a database and a user table where the details of login names and passwords are stored. Insert some names and passwords initially. Now the login details entered by the user should be verified with the database and an appropriate dialog should be shown to the user.

9. Create an admin application for the user table, which shows all records as a list and the admin can select any record for edit or modify. The results should be reflected in the table.

10. Develop an application that shows all contacts of the phone along with details like name, phone number, mobile number etc.

11. Create an application that saves user information like name, age, gender etc. in shared preference and retrieves them when the program restarts.

12. Create an alarm that rings every Sunday at 8:00 AM. Modify it to use a time picker to set alarm time.

13. Create an application that shows the given URL (from a text field) in a browser.

    Develop an application that shows the current location's latitude and longitude continuously as the device is moving (tracking).

14. Create an application that shows the current location on Google maps.

Note:
Android Application Development with MIT App Inventor:For the first one week, the student is advised to go through the App Inventor from MIT which gives insight into the various properties of each component.
The student should pay attention to the properties of each components, which are used later in Android programming. Following are useful links:
1. http://ai2.appinventor.mit.edu
2. https://drive.google.com/file/d/0B8rTtW_91YclTWF4czdBMEpZcWs/view

SOFTWARE ENGINEERING METHODOLOGIES AND UML LAB

PART-A
USING RATIONAL ROSE - CASE TOOL

LIST OF EXPERIMENTS

1. Prepare the following documents for two or three of the experiments listed below and develop the software engineering methodology.
2. Program Analysis and Project Planning. Thorough study of the problem - Identify project scope, Objectives, Infrastructure.
3. Software requirement Analysis. Describe the individual Phases / Modules of the project, Identify deliverables.
4. Data Modeling. Use work products - Data dictionary, Use diagrams and activity diagrams, build and test lass diagrams, Sequence diagrams and add interface to class diagrams.
5. Software Development and Debugging
6. Software Testing. Prepare test plan, perform validation testing, Coverage analysis, memory leaks, develop test case hierarchy, Site check and Site monitor.
7. Using WinRunner Design a test plan for Library Management System.

SUGGESTED LIST OF APPLICATIONS
1. Student Marks Analyzing System
2. Quiz System
3. Online Ticket Reservation System
4. Payroll System
5. Course Registration System
6. Expert Systems
7. ATM Systems
8. Stock Maintenance
9. Real-Time Scheduler
10. Remote Procedure Call Implementation
11. Library Management System

PART-B
UML LAB

Course Objectives:
The student should take up the case study of Unified Library application which is mentioned in the theory, and Model it in different views i.e Use case view, logical view, component view, Deployment view, Database design, forward and Reverse Engineering, and Generation of documentation of the project.

Student has to take up another case study of his/her own interest and do the same whatever mentioned in first problem. Some of the ideas regarding case studies are given in reference books which were mentioned in theory syllabus can be referred for some idea.

Problems on UML:

Unified Modeling Language Lab:
Students are divided into batches of 5 each and each batch has to draw the following diagrams using UML for an ATM system whose description is given below.

UML diagrams to be developed are:
1. Use Case Diagram.
2. Class Diagram.
3. Sequence Diagram.
4. Collaboration Diagram.
5. State Diagram
6. Activity Diagram.
7. Component Diagram
8. Deployment Diagram.
9. Test Design.

Description for an ATM System:
 The software to be designed will control a simulated automated teller machine (ATM) having a magnetic stripe reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot for depositing envelopes, a dispenser for cash (in multiples of Rs. 100, Rs. 500 and Rs. 1000), a printer for printing customer receipts, and a key-operated switch to allow an operator to start or stop the machine. The ATM will communicate with the bank's computer over an appropriate communication link. (The software on the latter is not part of the requirements for this problem.)

The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) - both of which will be sent to the bank for validation as part of each transaction. The customer will then be able to perform one or more transactions. The card will be retained in the machine until the customer indicates that he/she desires no further transactions, at which point it will be returned - except as noted below.

The ATM must be able to provide the following services to the customer:
1. A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiples of Rs. 100 or Rs. 500 or Rs. 1000. Approval must be obtained from the bank before cash is dispensed.
2. A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.
3. A customer must be able to make a transfer of money between any two accounts linked to the card.
4. A customer must be able to make a balance inquiry of any account linked to the card.
5. A customer must be able to abort a transaction in progress by pressing the Cancel key instead of responding to a request from the machine.

The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. Ordinarily, a transaction will be considered complete by the bank once it has been approved. In the case of a deposit, a second message will be sent to the bank indicating that the customer has deposited the envelope. (If the customer fails to deposit the envelope within the timeout period, or presses cancel instead, no second message will be sent to the bank and the deposit will not be credited to the customer.)

If the bank determines that the customer's PIN is invalid, the customer will be required to re-enter the PIN before a transaction can proceed. If the customer is unable to successfully enter the PIN after three tries, the card will be permanently retained by the machine, and the customer will have to contact the bank to get it back.

If a transaction fails for any reason other than an invalid PIN, the ATM will display an explanation of the problem, and will then ask the customer whether he/she wants to do another transaction. The ATM will provide the customer with a printed receipt for each successful transaction

The ATM will have a key-operated switch that will allow an operator to start and stop the servicing of customers. After turning the switch to the "on" position, the operator will be required to verify and enter the total cash on hand. The machine can only be turned off when it is not servicing a customer. When the switch is moved to the "off" position, the machine will shut down, so that the operator may remove deposit envelopes and reload the machine with cash, blank receipts, etc.

REFERENCE BOOKS:
1. Learning UML 2.0, Russ Miles and Kim Hamilton, O'Reilly, SPD.
2. Mastering UML with Rational Rose, W. Boggs & M. Boggs, Wiley India.

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MASTER OF COMPUTER APPLICATIONS (MCA) R17
Effective from Academic Year 2017 - 18 admitted batch

LIST OF OPEN ELECTIVES AND SYLLABUS

S. No.	Open Electives	Prerequisites
1.	'R' Programming	Maths, Statistics
2.	Algorithmics	--
3.	Big Data Analytics	Data Bases , Maths
4.	Bioinformatics	Data Structures
5.	Biometrics	--
6.	Computer Forensics	Maths, Data Structures
7.	Cyber Security	Internet Technologies
8.	Distributed Systems Security	Information Security
9.	E-Commerce	Internet Technologies
10.	Embedded Systems	Digital logic
11.	Intellectual Property Rights	--
12.	Internet of Things	Java
13.	Internet Technologies and Services	Java
14.	Mobile Computing	Java
15.	Mobile Application Security	Mobile Application Development
16.	Open Stack Cloud Computing	Linux Programming
17.	Principles of Information Security	Maths
18.	Social Media Intelligence	--
19.	Storage Area Networks	Computer Networks
20.	Web Usability	--
21.	Organizational Structure and Personnel Management	

R-PROGRAMMING

Course Objectives:

- To Learn the fundamentals of R
- To Understand performing operations on complex data types
- To understanding how to use the four object systems in R
- To Enable the students to use existing functional programming tools
- Explains how to create functions that use non-standard evaluation in a principled way
- Shows how to use profiling to pinpoint performance bottlenecks and how to convert slow R functions to fast C++ equivalents.

UNIT - I

Introduction to R programming, Introduction to Functions, Preview of Important R Data Structures, Vectors, Recycling, Common Vector Operations, Vectorized Operations, Filtering Matrices and Arrays

UNIT – II

Lists, Creating Lists, General List Operations Accessing List Components and Values, Applying Functions to Lists, Recursive Lists, Data Frames, Creating Data Frames, Other Matrix-Like Operations, Merging Data Frames, Applying Functions to Data Frames, Factors and Tables, Factors and Levels, Common Functions Used with Factors, Working with Table, Table-Related Functions

UNIT - III

R Programming Structures, Control Statements, Arithmetic and Boolean Operators and Values, Default Values for Arguments, Environment and Scope Issues, Recursion Replacement Functions, Anonymous Functions Data Frames, Creating Data Frames, Other Matrix-Like Operations, Merging Data Frames, Applying Functions to Data Frames, Factors and Tables Factors and Levels, Common Functions Used with Factors, Working with Table, Table-Related Functions, R Programming Structures, Control Statements Arithmetic and Boolean Operators and Values, Default Values for Arguments, Environment and Scope Issues, Recursion Replacement Functions, Anonymous Functions Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses.

UNIT- IV

Math and Simulations in R, Math Functions, Functions for Statistical Distributions, Sorting, Linear Algebra Operations on Vectors and Matrices, Set Operations, Simulation Programming in R, Object-Oriented Programming, S3 Classes, S4 Classes, S3 Versus S4, Managing Your Objects

UNIT - V

Input/Output, Accessing the Keyboard and Monitor, Reading and Writing Files, Accessing the Internet, String Manipulation, String-Manipulation Functions, Regular Expressions, Use of String Utilities in the edtdbg Debugging Tool, Creating Graphs, Customizing Graphs, Saving Graphs to Files Creating Three-Dimensional Plots

TEXT BOOK:

1. Art of R programming by Norman Matloff ,safari books online Publisher: No Starch Press

REFERENCE BOOKS:

1. Beginning R: The Statistical Programming Language by mark gardener wrox publication
2. Beginning R by lary pace Publishers appress publishing
3. R Programming for Dummies by Andrie De Vries and Joris Meys ,Wiley India Private Limited; 1st edition

ALGORITHMICS

UNIT – I
Relevant Mathematics: Existential and Universal Quantifiers, Logarithms and Exponentials, The Time(and Space) Complexity of an Algorithm, Asymptotic Notations and Their Properties, Adding Mode easy Approximations, Recurrence Relations,
Abstractions: Different representations of Algorithms, Abstract Data Types (ADTs),

UNIT – II
Iterative Algorithms and Loop Invariants: Iterative algorithms: Measures of Progress and Loop Invariants, Examples Using More –Of- the – Input Loop Invariants,

UNIT – III
Narrowing the Search Space: Binary Search, Iterative Searching Algorithm Euclid's GCD Algorithm, The Loop Invariant for Lower Bound,

UNIT – IV
Recursion: Abstractions, Techniques and theory, Some Sample Algorithms of Recursive Algorithms, Recursion on trees, Recursive Images, Parsing with Context-free Grammars.

UNIT – V
Optimization Problems: Definition, Graph Search Algorithms, Network Flow and Linear programming, Greedy Algorithms, Recursive backtracking, Dynamic Programming Algorithms, Examples of Dynamic Programs, Reduction and NP-Completeness, Randomized Algorithms.

TEXT BOOKS:
1. How to think about Algorithms by Jeff Edmonds Cambridge 2003 and 2008.

BIG DATA ANALYTICS

Course Objectives:
- To understand about big data
- To learn the analytics of Big Data
- To Understand the MapReduce fundamentals

UNIT - I

Big Data Analytics: What is big data, History of Data Management; Structuring Big Data ; Elements of Big Data ; Big Data Analytics; Distributed and Parallel Computing for Big Data;

Big Data Analytics: What is Big Data Analytics, What Big Data Analytics Isn't, Why this sudden Hype Around Big Data Analytics, Classification of Analytics, Greatest Challenges that Prevent Business from Capitalizing Big Data; Top Challenges Facing Big Data; Why Big Data Analytics Important; Data Science; Data Scientist; Terminologies used in Big Data Environments; Basically Available Soft State Eventual Consistency (BASE); Open source Analytics Tools;

UNIT- II

Understanding Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics; Points to Consider during Analysis; Developing an Analytic Team; Understanding Text Analytics;

Analytical Approach and Tools to Analyze Data: Analytical Approaches; History of Analytical Tools; Introducing Popular Analytical Tools; Comparing Various Analytical Tools.

UNIT - III

Understanding MapReduce Fundamentals and HBase : The MapReduce Framework; Techniques to Optimize MapReduce Jobs; Uses of MapReduce; Role of HBase in Big Data Processing; Storing Data in Hadoop : Introduction of HDFS, Architecture, HDFC Files, File system types, commands, org.apache.hadoop.io package, HDF, HDFS High Availability; Introducing HBase, Architecture, Storing Big Data with HBase , Interacting with the Hadoop Ecosystem; HBase in Operations-Programming with HBase; Installation, Combining HBase and HDFS;

UNIT - IV

Big Data Technology Landscape and Hadoop : NoSQL, Hadoop; RDBMS versus Hadoop; Distributed Computing Challenges; History of Hadoop; Hadoop Overview; Use Case of Hadoop; Hadoop Distributors; HDFC (Hadoop Distributed File System), HDFC Daemons, read,write, Replica Processing of Data with Hadoop; Managing Resources and Applications with Hadoop YARN.

UNIT - V

Social Media Analytics and Text Mining: Introducing Social Media; Key elements of Social Media; Text mining; Understanding Text Mining Process; Sentiment Analysis, Performing Social Media Analytics and Opinion Mining on Tweets;

Mobile Analytics: Introducing Mobile Analytics; Define Mobile Analytics; Mobile Analytics and Web Analytics; Types of Results from Mobile Analytics; Types of Applications for Mobile Analytics; Introducing Mobile Analytics Tools;

TEXT BOOKS:
1. BIG DATA and ANALYTICS, Seema Acharya, Subhasinin Chellappan, Wiley publications.
2. BIG DATA, Black Book^{TM}, Dream Tech Press, 2015 Edition.

REFERENCE BOOKS:
1. Rajiv Sabherwal, Irma Becerra- Fernandez," Business Intelligence –Practice, Technologies, and Management", John Wiley 2011.
2. Lariss T. Moss,ShakuAtre, " Business Intelligence Roadmap", Addison-Wesley It Service.

3. Yuli Vasiliev, " Oracle Business Intelligence : The Condensed Guide to Analysis and Reporting", SPD Shroff, 2012

BIOINFORMATICS

UNIT - I

Introduction to Bioinformatics and Biological Databases, Sequence allignment, Pairwise Sequence allignment, multiple sequence allignment, database Similarities.

UNIT - II

Molecular phylogenetics: Basics, gene phylogene Vs Systems Phylogene,Tree construction methods and programs, advanced Statistical approaches, profiles and Hidden markow models.

UNIT - III

Gene and promoter prediction: Gene Prediction, promoter and regulatory element pridiction, RNA structure prediction, protine motives and domain prediction
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UNIT - IV

Structural Bioinformatics: Basics,Protine structure Visualization, comparision,classofication, protein secondary structure prediction, protein tertiary structure prediction.

UNIT - V

Genomics and Proteomics: Genome Mapping, Assembly, comparison, functional genomics, proteomics.

Text Book:

1. Essential Bioinformatics: Jin Xiong 2006, Cambridge University Press.

BIOMETRICS

Course Objectives: To learn the biometric technologies
- To learn the computational methods involved in the biometric systems.
- To learn methods for evaluation of the reliability and quality of the biometric systems.

UNIT – I
INTRODUCTION & HANDWRITTEN CHARACTER RECOGNITION
Introduction – history – type of Biometrics – General Architecture of Biometric Systems – Basic Working of biometric Matching – Biometric System Error and performance Measures – Design of Biometric Systems – Applications of Biometrics – Benefits of Biometrics Versus Traditional Authentication Methods – character Recognition – System Overview – Geature Extraction for character Recognition – Neura; Network for handwritten Charater Recognition – Multilayer Neural Network for Handwritten Character Recognition – Devanagari Numeral Recognition – Isolated Handwritten Devanagari Charater Recognition suing Fourier Descriptor and Hidden markov Model.

UNIT – II
FACE BIOMETRICS & RETINA AND IRIS BIOMETRICS
Introduction –Background of Face Recognition – Design of Face Recognition System – Neural Network for Face Recognition – Face Detection in Video Sequences – Challenges in Face Biometrices – Face Recognition Methods – Advantages and Disadvantages – Performance of Biometrics – Design of Retina Biometrics – Iris Segmentation Method – Determination of Iris Region – Experimental Results of Iris Localization – Applications of Iris Biometrics – Advantages and Disadvantages. VEIN AND FINGERPRINT BIOMETRICS & BIOMETRIC HAND GESTURE RECOGNITION FOR INDIAN SIGN LANGUAGE. Biometrics Using Vein Pattern of Palm – Fingerprint Biometrics – Fingerprint Recognition System – Minutiae Extraction – Fingerprint Indexing – Experimental Results – Advantages and Disadvantages – Basics of Hand Geometry – Sign Language – Indian Sign Language – SIFT Algorithms- Practical Approach Advantages and Disadvantages.

UNIT – III
PRIVACY ENHANCEMENT USING BIOMETRICS & BIOMETRIC CRYPTOGRAPHY AND MULTIMODAL BIOMETRICS
Introduction – Privacy Concerns Associated with Biometric Developments – Identity and Privacy – Privacy Concerns – Biometrics with Privacy Enhancement – Comparison of Various Biometrics in Terms of Privacy – Soft Biometrics - Introduction to Biometric Cryptography – General Purpose Cryptosystem – Modern Cryptography and Attacks – Symmetric Key Ciphers – Cryptographic Algorithms – Introduction to Multimodal Biometrics – Basic Architecture of Multimodal Biometrics – Multimodal Biometrics Using Face and Ear – Characteristics and Advantages of Multimodal Biometrics Characters – AADHAAR : An Application of Multimodal Biometrics.

UNIT – IV
WATERMARKING TECHNIQUES & BIOMETRICS : SCOPE AND FUTURE
Introduction – Data Hiding Methods – Basic Framework of Watermarking – Classification of Watermarking – Applications of Watermarking – Attacks on Watermarks – Performance Evaluation – Characteristics of Watermarks – General Watermarking Process – Image Watermarking Techniques – Watermarking Algorithm – Experimental Results – Effect of Attacks on Watermarking Techniques – Scope and Future Market of Biometrics – Biometric Technologies – Applications of Biometrics - Biometrics – and Information Technology Infrastructure – Role of Biometrics in Enterprise Security – Role of Biometrics in Border Security – Smart Card Technology and Biometric – Radio Frequency Identification Biometrics – DNA Biometrics – Comparative Study of Various Biometrics Techniques.

UNIT – V

IMAGE ENHANCEMENT TECHNIQUES & BIOMETRICS STANDS

Introduction – current Research in image Enhancement Techniques – Image Enhancement – Frequency Domain Filters – Databases and Implementation – Standard Development Organizations – Application Programming Interface – Information Security and Biometric Standards – Biometric Template Interoperability.

Text Books:
1. BIOMETRICS: CONCEPTS AND APPLICATIONS by G R SINHA and SANDEEP B. PATIL, Wiely, 2013.
2. Biometrics for Network Security – Paul Reid, Pearson Education.

Reference Books:
1. Biometrics – Identity verification in a networked world – Samir Nanavathi, Micheal Thieme, Raj Nanavathi, Wiley – dream Tech.
2. Biometrics – The Ultimate Reference – John D. Woodward, Jr.Wiley Dreamtech.

COMPUTER FORENSICS

Course Objectives:
- To understand the cyberspace
- To understand the forensics fundamentals
- To understand the evidence capturing process.
- To understand the preservation of digital evidence.

UNIT - I :

Computer Forensics Fundamentals: Introduction to Computer Forensics, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps Taken by Computer Forensics Specialists, Who Can Use Computer Forensic Evidence?.**Types of Computer Forensics Technology :** Types of Military Computer Forensic Technology, Types of Law Enforcement Computer Forensic Technology, Types of Business Computer Forensics Technology.

UNIT - II :

Computer Forensics Evidence and Capture: Data Recovery: Data Recovery Defined, Data Backup and Recovery, The Role of Backup in Data Recovery, The Data-Recovery Solution, Case Histories. **Evidence Collection and Data Seizure:** Why Collect Evidence?, Collection Options, Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collecting and Archiving, Methods of Collection, Artifacts, Collection Steps, Controlling Contamination: The Chain of Custody.

UNIT - III:

Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene, Computer Evidence Processing Steps, Legal Aspects of Collecting And Preserving Computer Forensic Evidence. **Computer Image Verification and Authentication :** Special Needs of Evidential Authentication, Practical Considerations, Practical Implementation.

UNIT - IV:

Computer Forensics Analysis: Discovery of Electronic Evidence: Electronic Document Discovery: A Powerful New Litigation Tool, **Identification of Data:** Timekeeping, Time Matters, Forensic Identification and Analysis of Technical Surveillance Devices. **Reconstructing Past Events**: How to Become a Digital Detective, Useable File Formats, Unusable File Formats, Converting Files. **Networks:** Network Forensics Scenario, A Technical Approach, Destruction of Email, Damaging Computer Evidence, International Principles Against Damaging of Computer Evidence, Tools Needed for Intrusion Response to the Destruction of Data, Incident Reporting and Contact Forms.

UNIT - V:

Current Computer Forensics Tools: Evaluating Computer Forensics Tool Needs, Computer Forensics Software Tools, Computer Forensics Hardware Tools, Validating and Testing Forensics Software.

TEXT BOOKS:
1. "Computer Forensics: Computer Crime Scene Investigation", JOHN R. VACCA, Firewall Media.
2. "Guide to Computer Forensics and Investigations" 4e, Nelson, Phillips Enfinger, Steuart, Cengage Learning.

REFERENCES:
1. "Computer Forensics and Cyber Crime", Marjie T Britz, Pearson Education.

2. "Computer Forensics", David Cowen, Mc Graw Hill.
3. Brian Carrier , "File System Forensic Analysis" , Addison Wesley, 2005
4. Dan Farmer & Wietse Venema ,"Forensic Discovery", Addison Wesley, 2005
5. Eoghan Casey , —Digital Evidence and Computer Crime —, Edition 3, Academic Press, 2011
6. Chris Pogue, Cory Altheide, Todd Haverkos ,Unix and Linux Forensic Analysis DVD ToolKit, Syngress Inc. , 2008
7. Harlan Carvey ,Windows Forensic Analysis DVD Toolkit, Edition 2, Syngress Inc. , 2009
8. Harlan Carvey ,Windows Registry Forensics: Advanced Digital Forensic Analysis of the Windows Registry , Syngress Inc, Feb 2011
9. Eoghan Casey, Handbook of Digital Forensics and Investigation, Academic Press, 2009
10. Gonzales/ Woods/ Eddins, Digital Image Processing using MATLAB, 2nd edition, Gatesmark Publishing, ISBN 9780982085400
11. N.Efford, Digital Image Processing, Addison Wesley 2000, ISBN 0-201-59623-7
12. M Sonka, V Hlavac and R Boyle, Image Processing, Analysis and Machine Vision, PWS
13. 1999, ISBN 0-534-95393-
14. Pratt.W.K., Digital Image Processing, John Wiley and Sons, New York, 1978

CYBER SECURITY

Course Objectives:
- To learn about cyber crimes and how they are planned
- To learn the vulnerabilities of mobile and wireless devices
- To learn about the crimes in mobile and wireless devices

UNIT - I
Introduction to Cybercrime:
Introduction, Cybercrime and Information security, who are cybercriminals, Classifications of Cybercrimes, Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.
Cyber offenses: How criminals Plan Them Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing.

UNIT - II
Cybercrime: Mobile and Wireless Devices
Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies an Measures in Mobile Computing Era, Laptops.

UNIT - III
Cybercrimes and Cyber security: the Legal Perspectives Introduction
Cyber Crime and Legal Landscape around the world, Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario In India, Digital signatures and the Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment ,Cyber law, Technology and Students: Indian Scenario.

UNIT - IV
Understanding Computer Forensics : Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Chain of Custody concept, Network Forensics, Approaching a computer, Forensics Investigation, Challenges in Computer Forensics, Special Tools and Techniques, Forensics Auditing

UNIT - V
Cyber Security: Organizational Implications
Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

Text books:
1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA.
2. Introduction to Cyber Security , Chwan-Hwa(john) Wu,J.David Irwin.CRC Press T&F Group
3. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.

DISTRIBUTED SYSTEMS SECURITY

Course Objectives:
- To learn about the distributed systems and security
- To learn about the host-level, application level threats and vulnerabilities
- To learn about service –level solutions

UNIT - I

Introduction – Distributed Systems, Distributed Systems Security. Security in Engineering: Secure Development Lifecycle Processes - A Typical Security Engineering Process – Security Engineering Guidelines and Resources. Common Security Issues and Technologies: Security Issues, Common Security Techniques.

UNIT - II

Host-level Threats and Vulnerabilities: Transient code Vulnerabilities - Resident Code Vulnerabilities - Malware: Trojan Horse – Spyware - Worms/Viruses – Eavesdropping – Job Faults. Infrastructure-Level Threats and Vulnerabilities: Network-Level Threats and Vulnerabilities - Grid Computing Threats and Vulnerabilities – Storage Threats and Vulnerabilities – Overview of Infrastructure Threats and Vulnerabilities.

UNIT- III

Application-Level Threats and Vulnerabilities: Application-Layer Vulnerabilities –Injection Vulnerabilities - Cross-Site Scripting (XSS) - Improper Session Management - Improper Error Handling - Improper Use of Cryptography - Insecure Configuration Issues - Denial of Service - Canonical Representation Flaws - Overflow Issues. Service-Level Threats and Vulnerabilities: SOA and Role of Standards - Service-Level Security Requirements - Service-Level Threats and Vulnerabilities - Service-Level Attacks - Services Threat Profile.

UNIT - IV

Host-Level Solutions: Sandboxing – Virtualization - Resource Management - Proof-Carrying Code - Memory Firewall – Antimalware. Infrastructure-Level Solutions: Network-Level Solutions - Grid-Level Solutions - Storage-Level Solutions. Application-Level Solutions: Application-Level Security Solutions.

UNIT - V

Service-Level Solutions: Services Security Policy - SOA Security Standards Stack – Standards in Dept - Deployment Architectures for SOA Security - Managing Service-Level Threats - Compliance in Financial Services - SOX Compliance - SOX Security Solutions – Multilevel Policy-Driven Solution Architecture - Case Study: Grid - The Financial Application – Security Requirements Analysis. Future Directions - Cloud Computing Security – Security Appliances - Usercentric Identity Management - Identity-Based Encryption (IBE) - Virtualization in Host Security.

REFERENCES:
1. Abhijit Belapurakar, Anirban Chakrabarti and et al., "Distributed Systems Security: Issues. Processes and solutions", Wiley, Ltd., Publication, 2009.
2. Abhijit Belapurkar, Anirban Chakrabarti, Harigopal Ponnapalli, Niranjan Varadarajan, Srinivas Padmanabhuni and Srikanth Sundarrajan,
3. "Distributed Systems Security: Issues, Processes and Solutions", Wiley publications, 2009.
4. Rachid Guerraoui and Franck Petit, "Stabilization, Safety, and Security of Distributed Systems", Springer, 2010.

E – COMMERCE

Course Objectives:
- Identify the major categories and trends of e-commerce applications.
- Identify the essential processes of an e-commerce system.
- Identify several factors and web store requirements needed to succeed in e-commerce.
- Discuss the benefits and trade-offs of various e-commerce clicks and bricks alternatives.
- Understand the main technologies behind e-commerce systems and how these technologies interact.
- Discuss the various marketing strategies for an online business.
- Define various electronic payment types and associated security risks and the ways to protect against them.

UNIT - I
Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.
Consumer Oriented Electronic commerce - Mercantile Process models.

UNIT - II
Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.
Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.

UNIT - III
Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.
Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses.

UNIT- IV
Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research.
Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering.

UNIT - V
Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing, Desktop video conferencing.

TEXT BOOK:
1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson.

REFERENCES BOOKS:
1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley.
2. E-Commerce, S.Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
4. Electronic Commerce – Gary P.Schneider – Thomson.

EMBEDDED SYSTEMS

Course Objectives:
- To explain various embedded system applications and design requirements.
- To construct embedded system hardware.
- To develop software programs to control embedded system.
- To generate product specification for embedded system.

UNIT - I
Introduction to Embedded Systems: Embedded Systems, Processor Embedded into a System, Embedded Hardware Units and Devices in a System, Embedded Software, Complex System Design, Design Process in Embedded System, Formalization of System Design, Classification of Embedded Systems

UNIT - II
8051 and Advanced Processor Architecture: 8051 Architecture, 8051 Micro controller Hardware, Input/output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/output, Interrupts, Introduction to Advanced Architectures, Real World Interfacing, Processor and Memory organization - Devices and Communication Buses for Devices Network: Serial and parallel Devices & ports, Wireless Devices, Timer and Counting Devices, Watchdog Timer, Real Time Clock, Networked Embedded Systems, Internet Enabled Systems, Wireless and Mobile System protocols

UNIT - III
Embedded Programming Concepts: Software programming in Assembly language and High Level Language, Data types, Structures, Modifiers, Loops and Pointers, Macros and Functions, object oriented Programming, Embedded Programming in C++ & JAVA

UNIT - IV
Real – Time Operating Systems: OS Services, Process and Memory Management, Real – Time Operating Systems, Basic Design Using an RTOS, Task Scheduling Models, Interrupt Latency, Response of Task as Performance Metrics - RTOS Programming: Basic functions and Types of RTOSES, RTOS VxWorks, Windows CE

UNIT - V
Embedded Software Development Process and Tools: Introduction to Embedded Software Development Process and Tools, Host and Target Machines, Linking and Locating Software, Getting Embedded Software into the Target System, Issues in Hardware-Software Design and Co-Design - Testing, Simulation and Debugging Techniques and Tools: Testing on Host Machine, Simulators, Laboratory Tools

TEXT BOOK:
1. Embedded Systems, Raj Kamal, Second Edition TMH.

REFERENCE BOOKS:
1. Embedded/Real-Time Systems, Dr.K.V.K.K.Prasad, Dreamtech press
2. The 8051 Microcontroller and Embedded Systems, Muhammad Ali Mazidi, Pearson.
3. The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson.
4. An Embedded Software Primer, David E. Simon, Pearson Education.
5. Micro Controllers, Ajay V Deshmukhi, TMH.
6. Microcontrollers, Raj kamal, Pearson Education.
7. Introduction to Embedded Systems,Shibu K.V,TMH.

INTELLECTUAL PROPERTY RIGHTS

UNIT - I

Introduction to Intellectual Property Law – The Evolutionary Past - The IPR Tool Kit- Para -Legal Tasks in Intellectual Property Law Ethical obligations in Para Legal Tasks in Intellectual Property Law - Introduction to Cyber Law – Innovations and Inventions Trade related Intellectual Property Right

UNIT - II

Introduction to Trade mark – Trade mark Registration Process – Post registration Procedures – Trade mark maintenance - Transfer of Rights - Inter partes Proceeding – Infringement - Dilution Ownership of Trade mark – Likelihood of confusion - Trademarks claims – Trademarks Litigations – International Trade mark Law

UNIT - III

Introduction to Copyrights – Principles of Copyright Principles -The subjects Matter of Copy right – The Rights Afforded by Copyright Law – Copy right Ownership, Transfer and duration – Right to prepare Derivative works – Rights of Distribution – Rights of Perform the work Publicity Copyright Formalities and Registrations - Limitations - Copyright disputes and International Copyright Law – Semiconductor Chip Protection Act

UNIT - IV

The law of patents-patent searches –Patent ownership and transfer-Patent infringement-International Patent Law

UNIT - V

Introduction to Trade Secret – Maintaining Trade Secret – Physical Security – Employee Limitation - Employee confidentiality agreement - Trade Secret Law - Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law

TEXT BOOKS:
1. Debirag E.Bouchoux: "Intellectual Property" 4e . Cengage learning, New Delhi
2. M.Ashok Kumar and Mohd.Iqbal Ali: "Intellectual Property Right" Serials Pub.
3. Cyber Law. Texts & Cases, South-Western's Special Topics Collections
4. Prabhuddha Ganguli: ' Intellectual Property Rights" Tata Mc-Graw –Hill, New Delhi
5. J Martin and C Turner "Intellectual Property" CRC Press
6. Richard Stimm " Intellectual Property" Cengage Learning

INTERNET OF THINGS

Course Objectives:
- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web based services on IoT devices.

UNIT - I
Introduction to Internet of Things –Definition and Characteristics of IoT,
Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs
IoT enabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates
Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle.

UNIT - II
IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT
Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

UNIT - III
Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling
Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

UNIT - IV
IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C)
Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

UNIT - V
IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs, Webserver – Web server for IoT, Cloud for IoT, Python web application frameworkDesigning a RESTful web API

Text Books:
1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

INTERNET TECHNOLOGIES AND SERVICES

Course Objective:

The student who has knowledge of programming with java should be able to develop web based solutions using multi-tier architecture. S/he should have good understanding of different technologies on client and server side components as Follows:

Client Side: HTML5, CSS3, Javascript, Ajax, JQuery and JSON

Server Side: Servlets, JSP

Database: MySQL with Hibernate and Connection Pooling

Framework: Struts with validation framework, Internationalization (I18N)

SOA: Service Oriented Architecture, Web services fundamentals, Axis framework for WS

UNIT - I

Client Side Technologies:

Overview of HTML - Common tags, XHTML, capabilities of HTML5

Cascading Style sheets, CSS3 enhancements, linking to HTML Pages, Classes in CSS

Introduction to JavaScripts, variables, arrays, methods and string manipulation, BOM/DOM (Browser/Document Object Model), accessing elements by ID, Objects in JavaScript

Dynamic HTML with JavaScript and with CSS, form validation with JavaScript, Handling Timer Events

Simplifying scripting with JQuery, JASON for Information exchange.

UNIT - II

Introduction to Java Servlets:

Introduction to Servlets: Lifecycle of a Servlet, Reading request and initialization parameters, Writing output to response, MIME types in response, Session Tracking: Using Cookies and Sessions

Steps involved in Deploying an application

Database Access with JDBC and Connection Pooling

Introduction to XML, XML Parsing with DOM and SAX Parsers in Java

Ajax - Ajax programming with JSP/Servlets, creating XML Http Object for various browsers, Sending request, Processing response data and displaying it.

Introduction to Hibernate

UNIT - III

Introduction to JSP:

JSP Application Development: Types of JSP Constructs (Directives, Declarations, Expressions, Code Snippets), Generating Dynamic Content, Exception Handling, Implicit JSP Objects, Conditional Processing, Sharing Data Between JSP pages, Sharing Session and Application Data, Using user defined classes with jsp:useBean tag, Accessing a Database from a JSP

UNIT - IV

Introduction to Struts Framework:

Introduction to MVC architecture, Anatomy of a simple struts2 application, struts configuration file, Presentation layer with JSP, JSP bean, html and logic tag libraries, Struts Controller class, Using form data in Actions, Page Forwarding, validation frame work, Internationalization

UNIT - V

Service Oriented Architecture and Web Services

Overview of Service Oriented Architecture – SOA concepts, Key Service Characteristics, Technical Benefits of a SOA

Introduction to Web Services– The definition of web services, basic operational model of web services, basic steps of implementing web services.

Core fundamentals of SOAP – SOAP Message Structure, SOAP encoding, SOAP message exchange models,

Describing Web Services –Web Services life cycle, anatomy of WSDL

Introduction to Axis– Installing axis web service framework, deploying a java web service on axis.

Web Services Interoperability **–** Creating java and .Net client applications for an Axis Web Service

(Note: The Reference Platform for the course will be open source products Apache Tomcat Application Server, MySQL database, Hibernate and Axis)

TEXT BOOKS:
1. Web Programming, building internet applications, Chris Bates 3rd edition, WILEY Dreamtech .
2. The complete Reference Java 7th Edition , Herbert Schildt., TMH.
3. Java Server Pages,Hans Bergsten, SPD, O'Reilly.
4. Professional Jakarta Struts - James Goodwill, Richard Hightower, Wrox Publishers.
5. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India, rp – 2008.
6. Understanding SOA with Web Services, Eric Newcomer and Greg Lomow, Pearson Edition – 2009
7. Java Web Service Architecture, James McGovern, Sameer Tyagi et al., Elsevier - 2009

REFERENCE BOOKS:
1. Programming the world wide web,4th edition,R.W.Sebesta,Pearson
2. Core SERVLETS ANDJAVASERVER PAGES   VOLUME 1: CORE
3. TECHNOLOGIES , Marty Hall and Larry Brown Pearson
4. Internet and World Wide Web – How to program , Dietel and Nieto PHI/Pearson.
5. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly.
6. Professional Java Server Programming,S.Allamaraju & othersApress(dreamtech).
7. Java Server Programming ,Ivan Bayross and others,The X Team,SPD
8. Web Warrior Guide to Web Programmming-Bai/Ekedaw-Cengage Learning.
9. Beginning Web Programming-Jon Duckett ,WROX.

MOBILE COMPUTING

UNIT - I

Introduction, Mobile Computing Architecture, Mobile Computing through Telephony, Emerging Technologies

UNIT - II

Global System for Mobile Communications (GSM), Short Message Service (SMS), General Packet Radio Services (GPRS), Wireless Application Protocol (WAP), CDMA and 3G.

UNIT - III

Wireless LAN, Intelligent Network and Internetworking, Client Programming, Programming for PalmOS, Wireless Devices with Symbian OS.

UNIT - IV

J2ME Introduction, J2ME Architecture, MIDLET, MidLet Suite , J2ME Profiles, Wireless Devices with WindowsCE, Voice Over Internet Protocol and Convergence, Session Internet Protocol(SIP),other protocols.

UNIT - V

Multimedia, IP Multimedia Subsystems, Security Issues in Mobile Computing, Next Generation Networks.

TEXTBOOKS:

1. Mobile Computing Technology, Applications and Service Creation by Ashok Talukder , Hasan Ahmed, Roopa R Yavagal.
2. Mobile Computing Principles by Raza B'Far, Cambridge.
3. Mobile Computing by Raj Kamal 2e.
4. Mobile Computing by Jochen schiller.

MOBILE APPLICATION SECURITY

Course Objectives:
- To understand the mobile issues and development strategies
- To understand the WAP and mobile security issues
- To understand the Bluetooth security issues.

UNIT - I:
Top Mobile Issues and Development Strategies: Top Issues Facing Mobile Devices, Physical Security , Secure Data Storage (on Disk), Strong Authentication with Poor Keyboards , Multiple-User Support with Security, Safe Browsing Environment , Secure Operating Systems, Application Isolation, Information Disclosure, Virus, Worms, Trojans, Spyware, and Malware , Difficult Patching/Update Process, Strict Use and Enforcement of SSL, Phishing , Cross-Site Request Forgery (CSRF), Location Privacy/Security, Insecure Device Drivers, Multifactor Authentication, Tips for Secure Mobile Application Development .

UNIT - II:
WAP and Mobile HTML Security :WAP and Mobile HTML Basics , Authentication on WAP/Mobile HTML Sites , Encryption , Application Attacks on Mobile HTML Sites ,Cross-Site Scripting , SQL Injection , Cross-Site Request Forgery , HTTP Redirects , Phishing , Session Fixation , Non-SSL Login , WAP and Mobile Browser Weaknesses , Lack of HTTPOnly Flag Support , Lack of SECURE Flag Support , Handling Browser Cache , WAP Limitations.

UNIT - III:
Bluetooth Security: Overview of the Technology , History and Standards , Common Uses , Alternatives , Future , Bluetooth Technical Architecture , Radio Operation and Frequency, Bluetooth Network Topology , Device Identification , Modes of Operation , Bluetooth Stack ,Bluetooth Profiles , Bluetooth Security Features , Pairing , Traditional Security Services in Bluetooth, Security "Non-Features" , Threats to Bluetooth Devices and Networks, Bluetooth Vulnerabilities , Bluetooth Versions Prior to v1.2, Bluetooth Versions Prior to v2.1.

UNIT - IV:
SMS Security: Overview of Short Message Service, Overview of Multimedia Messaging Service, Wireless Application Protocol (WAP), Protocol Attacks , Abusing Legitimate Functionality, Attacking Protocol Implementations, Application Attacks , iPhone Safari , Windows Mobile MMS, Motorola RAZR JPG Overflow, Walkthroughs ,Sending PDUs ,Converting XML to WBXML .

UNIT - V
Enterprise Security on the Mobile OS: Device Security Options , PIN , Remote , 346 Secure Local Storage , Apple iPhone and Keychain , Security Policy Enforcement ,Encryption ,Full Disk Encryption ,E-mail Encryption , File Encryption , Application Sandboxing, Signing, and Permissions , Application Sandboxing , Application Signing , Permissions , Buffer Overflow Protection ,Windows Mobile , iPhone ,Android ,BlackBerry , Security Feature Summary.

TEXT BOOK:
1. "Mobile Application Security", Himanshu Dwivedi, Chris Clark, David Thiel, TATA McGRAW-Hill.

REFERENCES:
1. "Mobile and Wireless Network Security and Privacy", Kami S.Makki,et al, Springer.
2. "Android Security Attacks Defenses", Abhishek Dubey, CRC Press.

OPEN STACK CLOUD COMPUTING

UNIT - I
Keystone OpenStack Identity Service. Installing OpenStack Identity service. Starting OpenStack Image Service. Installing OpenStack Image Service, Configuring OpenStack Image Service with MySQL, Configuring OpenStack Image Service with OpenStack Identity Service, Managing images with OpenStack Image Service, Registering a remotely stored image, Sharing images among tenants, Viewing shared images. Starting OpenStack Compute. Installing OpenStack Compute Controller services, Creating a sandbox Compute server with VirtualBox and Vagrant, Installing OpenStack Compute packages, Stopping and starting Nova services.

Installation of command-line tools on Ubuntu. OpenStack Compute services. Compute Managing security groups. Launching our first Cloud instance, Terminating your instance.

UNIT - II
Installing OpenStack Object Storage. Configuring OpenStack Object Storage Service, Making rings, Stopping and starting OpenStack Object Storage. Configuring OpenStack Object Storage with OpenStack Identity Service, Setting up SSL access, Testing OpenStack Object Storage.

Using OpenStack Object Storage. Installing the swift client tool. Creating containers, Uploading objects, Listing containers and objects, Downloading objects, Deleting containers and objects. Using OpenStack Object Storage ACLs.

Administering OpenStack Object Storage. Preparing drives for OpenStack Object Storage, Managing OpenStack Object Storage cluster with swift-init, Checking cluster health. Benchmarking OpenStack Object Storage. Detecting and replacing failed hard drives , Collecting usage statistics.

UNIT - III
Starting OpenStack Block Storage. Configuring OpenStack Compute for Cinder volume. OpenStack Networking. Configuring Flat networking with DHCP. Configuring VLAN Manager networking. Configuring per tenant IP ranges for VLAN Manager. Automatically assigning fixed networks to tenants, Modifying a tenant's fixed network, Manually associating floating IPs to instances, Manually disassociating floating IPs from instances, Automatically assigning floating IPs. Creating a sandbox Network server for Neutron with VirtualBox and Vagrant. Installing and configuring OVS for Neutron. Creating a Neutron network 203, Deleting a Neutron network, Creating an external Neutron network.

UNIT - IV
Using OpenStack Dashboard. Installing OpenStack Dashboard, Using OpenStack Dashboard for key management, Using OpenStack Dashboard to manage Neutron networks, Using OpenStack Dashboard for security group management, Using OpenStack Dashboard to launch instances, Using OpenStack Dashboard to terminate instances, Using OpenStack Dashboard for connecting to instances using VNC, Using OpenStack Dashboard to add new tenants, Using OpenStack Dashboard for user management.

Automating OpenStack Installations. Installing Opscode Chef Server. Installing Chef Client, Downloading cookbooks to support DHCP, Razor, and OpenStack. Installing PuppetLabs Razor and DHCP from cookbooks. Setting up a Chef environment for OpenStack. Booting the first OpenStack node into Razor, Defining a Razor broker, model, and policy. Monitoring the node installation. Using Chef to install OpenStack, Expanding our OpenStack environment.

UNIT - V
Highly Available OpenStack. Using Galera for MySQL clustering. Configuring HA Proxy for MySQL Galera load balancing, Installing and setting up Pacemaker and Corosync, Configuring Keystone and Glance with Pacemaker and Corosync, Bonding network interfaces for redundancy.

Troubleshooting. Understanding logging. Checking OpenStack services. Troubleshooting OpenStack Compute services. Troubleshooting OpenStack Object Storage services. Troubleshooting OpenStack

Dashboard. Troubleshooting OpenStack Authentication, Troubleshooting OpenStack Networking, Submitting Bug reports, Getting help from the community.

Monitoring. Monitoring OpenStack services with Nagios. Monitoring Compute services with Munin. Monitoring instances using Munin and Collectd. Monitoring the storage service using StatsD/Graphite. Monitoring MySQL with Hyperic.

Text Book:

1. OpenStack Cloud Computing Cookbook - Second Edition, Kevin Jackson , Cody Bunch, October 2013, Packt Publishing-OpenSource.

Reference:

1. https://www.packtpub.com/virtualization-and-cloud/openstack-cloud-computing-cookbook-second-edition

PRINCIPLES OF INFORMATION SECURITY

UNIT – I

Introduction to Information Security, Need For Security,

UNIT –II

Legal Ethical and Professional Issues in Information Security, Planning For Security.

UNIT – III

Risk Management, Security Technology: Firewalls and VPNs, Security Technology: Intrusion Detection and Prevention Systems, and Other Security Tools.

UNIT – IV

Cryptography, Physical Security, Implementing Information Security,

UNIT – V

Security and Personnel, Information Security Maintenance.

TEXT BOOKS:
1. Principles of Information Security by Whitman, Thompson

SOCIAL MEDIA INTELLIGENCE

UNIT – I

The Beginnings of Social Media Intelligence: What is Social Media monitoring? Anecdotal referencing of Social Media Comments, Text Mining, Some Simple Metrics, Using Social Media as Early Warning System.

Fundamental of Opinion Formation: Affecting Opinion versus Biasing Expression, How Do We Form Opinions?, How Do Expectations Affect Opinion?, How Do Expertise and Knowledge Influence How We Form Opinions?, Opinion Formation in a Social Context, Bandwagon behavior and Information Cascades, Implications for Social Media Intelligence.

UNIT – II

Why Do We Share our Opinions : Poster versus Lurkers, What Motivates Us to Post/, Posting Motivations and Selection effects, Implications for Social Media Intelligence.

The Social effects of Strangers : How Does Social Context Affect Our Behavior?, How Influential is the Social Context/, How Does Social Context Affect Opinion Expression/, Bandwagon Behavior in Opinion expression, Differentiating Our opinions, Multiple Audience Effects, /can We Trust the Wisdom of Crowds.

UNIT – III

Opinion Ecosystems and the Evolution Within : Life Cycle Dynamics, Preference Mismatching and Sequential Dynamics, Social Dynamics, Are Social Media Communities the Cause of Opinion Radicalization ?, Online Echo Chambers, Implications for Social Media Monitoring and Metrics.

Are Social Media Fragmenting the Population ? : Self-Organization, Birds of a Feather Flock Together, Geography No Longer Defines Our Communities, The influential Hypothesis, The New Influential, How Can We Identify Influentials, Influence in e-Commerce, Some Concluding Remarks.

UNIT – IV

Managing Social Media Communities for Better Social Media Intelligence: Creating an Inviting Environment, The Benefits of a Well-Managed Opinion Community (and the Costs of Not Managing the Community at All) Quality of Intelligence Depends on the Quality of the Opinion Community, Creating and Manipulating Buzz, Buzz Campaign or Fraud?, Identifying Fraudulent Opinions

Cutting Through the Online Chatter : A New Paradigm for Marketing Research, Measure What Matters, Cast a Wide Net, Analyze the Text, Understand the biases, Establish Links to Performance metrics.

UNIT – V

Intelligence Integration : Overview of Marketing Research Methods, Using Social Media for Marketing research, Tracking Brand Health, Understanding Market Structure, Social Shopping, Integration with Data from Other Parts of the Organization, Intelligence Dashboards.

Building Social Media Intelligence into Our Strategies : How Can Social Media Intelligence Help Integrate an Organization's Strategy?, Multichannel Strategies, Rapid Response System, Integrated CRM, Leveraging Social Data, Seeding Strategies.

Moving from Social Media monitoring to Social Media Intelligence : Social Media Intelligence today, Social Media Intelligence tomorrow, Building on the Science of Opinion, tapping into Opinion Ecosystems, Developing an Integrated Strategy.

References:

1. SOCIAL MEDIA INTELLIGENCE: by Wendly W.Moe, David A. Schweidel, Cambride University, edition 2014.

STORAGE AREA NETWORKS

Course Objectives:
- To understand Storage Area Networks characteristics and components.
- To become familiar with the SAN vendors and their products
- To learn Fibre Channel protocols and how SAN components use them to communicate with each other
- To become familiar with Cisco MDS 9000 Multilayer Directors and Fabric Switches Thoroughly learn Cisco SAN-OS features.
- To understand the use of all SAN-OS commands. Practice variations of SANOS features

UNIT - I

Introduction to Storage Technology Review data creation and the amount of data being created and understand the value of data to a business, challenges in data storage and data management, Solutions available for data storage, Core elements of a data center infrastructure, role of each element in supporting business activities

UNIT - II

Storage Systems Architecture Hardware and software components of the host environment, Key protocols and concepts used by each component ,Physical and logical components of a connectivity environment ,Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications, Concept of RAID and its components , Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Compare and contrast integrated and modular storage systems ,High-level architecture and working of an intelligent storage system

UNIT - III

Introduction to Networked Storage Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN, Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS fulfills the need , Understand the appropriateness of the different networked storage options for different application environments

UNIT - IV

Information Availability & Monitoring & Managing Datacenter List reasons for planned/unplanned outages and the impact of downtime, Impact of downtime, Differentiate between business continuity (BC) and disaster recovery (DR) ,RTO and RPO,   Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures, Architecture of backup/recovery and the different backup/recovery topologies , replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities
Identify key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data center.

UNIT V

Securing Storage and Storage Virtualization Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain, Virtualization technologies, block-level and file-level virtualization technologies and processes
Case Studies
The technologies described in the course are reinforced with EMC examples of actual solutions.

Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

TEXT BOOK:
1. EMC Corporation, Information Storage and Management, Wiley.

REFERENCE BOOKS:
1. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, Osborne, 2003.
2. Marc Farley, "Building Storage Networks", Tata McGraw Hill, Osborne, 2001.
3. Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.

WEB USABILITY

UNIT - I
Introduction to Usability, Human Factors,

UNIT - II
 User-Centered Design, Usability Aware Design,

UNIT - III
Accessibility, Understanding your Users and Goals,

UNIT - IV
 Heuristic Evaluation, Usability Testing,

UNIT - V
Other Tools and Techniques, Transferring Data into Change

Text Books:
1. Web Usability Hand Book by Mark Pearrow, Thomson Delmar learning

ORGANIZATION STRUCTURE AND PERSONNEL MANAGEMENT

Course Objectives:
One of the main objectives of this course is to provide the students with an in depth understanding of organizations. Organizations are a main tool that modern society applies to meet the challenges of innovation and resolution of complex tasks. To understand how to organize to resolve the challenges organizations meet is a main focus of this course. The course reviews the main contributions to organization research.

This is an introductory course in Organization Theory. In this course we will explore the basic theories and principles around which contemporary organizations are structured in complex, dynamic, uncertain, and competitive environments. The course examines the effects of both the internal and external environment on managerial choices for the structuring of organizations, as well as the implications that stem from these choices.

This course also covers Personnel Management and Communication. In this course we will explore the basic theories of Personnel Management and its functions. The object of the study is to do the analysis of various functions of the organization in functional area of Personnel Management so that the student should be in a position to create data bases and programs in the content of Personnel Department.

Course Outcomes: The course will help each student to better:
- Understand the importance of organizational structure and design on internal organizational processes and overall effectiveness.
- Understand the relationships between organization structure and the behavior of those who work in them or otherwise interact with them.
- Recognize the managerial implications of organization design and change and how these are informed by the relevant theories.
- Appreciate the impact of advanced technologies on the strategy and structure of organizations and how to address the changes implied by the adoption of these technologies.
- Acquire the knowledge and skills needed to analyze the design and structure of organizations through a combination of lectures, discussions, and cases.
- Understand the Personnel Functions like position of the personnel department in the organization.
- Understand manpower planning, job description, interviewing techniques, transfers, promotion and its policies.
- Understand the training and development and career planning and Performance Appraisal.
- Obtain and practice effective written and oral business communications skills.

UNIT - I
Classical Theories of organization : Functional approach, classical theories of organization, division of labour, levels of authority, span of control, authority & responsibility, efficiency of management. Behavioral theories of organization, limitations of formal organization, human relation, group behavior, committee and group making, motivation and morale.

UNIT - II
Personnel Function: Evaluation, objectives, principles, philosophies and policies, duties & responsibilities of the manager, position of the personnel department in the organization, line and staff relationship & the changing concept of personnel management in India.

UNIT - III

Manpower planning : Uses benefits problems and limitations, manpower inventory, manpower forecasting, job description, recruitment, Job specification and job selection, interviewing techniques, transfers, promotion and its policies.

Training and development : Objectives and policies planning, organizing the training department, training manager and his job, on and off the job training, techniques, career planning, objectives of performance appraisal.

UNIT - IV

Strategic management: Objectives, importance policies, concept of core competence capability of organizational learning, strategic levels and planning, business level strategy and functional level, PHASES OF PLANNING, SWOT, develop strategies and prepare strategic plan.

UNIT - V

Communication : Importance of communication, inter personnel communication barriers of communication, communication in organizations, using communication skills to manage conflicts. Impact of informational technology and fostering effective communication

TEXT BOOKS:
1. L. M. Prasad, Principles and Practice of Management, Sultan Chand & Sons.
2. A. R. Aryasri, Organizational Structure and Personnel Management, TMH, 2009

REFERENCE BOOKS:
1. Hellriegel, Jackson and Slocum, Edition 9, Management-A competency – Based Approach
2. L.M.Prasad, Human Resource Management.