MA201 Linear Algebra and Complex Analysis

Module 1:
Limit, continuity and derivative of complex functions Analytic Functions Cauchy–Riemann Equation(Proof of sufficient condition of analyticity & C R Equations in polar form not required)-Laplace's Equation Harmonic functions, Harmonic Conjugate
Module 2:
Geometry of Analytic functions Conformal Mapping, Circles and straight lines, extended complex plane, fixed points Special linear fractional Transformations, Cross Ratio, Cross Ratio property-Mapping of disks and half planes
Module 3:
Definition Complex Line Integrals, First Evaluation Method, Second Evaluation Method Cauchy's Integral Theorem(without proof), Independence of path(without proof), Cauchy's Integral Theorem for Multiply Connected Domains (without proof) Cauchy's Integral Formula- Derivatives of Analytic Functions(without proof)Application of derivative of Analytical Functions Taylor and Maclaurin series(without proof), Power series as Taylor series, Practical methods(without proof) Laurent's series (without proof).
Module 4:
Singularities, Zeros, Poles, Essential singularity, Zeros of analytic functions Residue Integration Method, Formulas for Residues, Several singularities inside the contour Residue Theorem. Evaluation of Real Integrals.
Module 5:
Linear systems of Equations, Coefficient Matrix, Augmented Matrix Gauss Elimination and back substitution, Elementary row operations, Row equivalent systems, Gauss elimination-Three possible cases, Row Echelon form and Information from it. Linear independence-rank of a matrix Vector Space-Dimension-basis-vector space Solution of linear systems, Fundamental theorem of non-homogeneous linear systems (Without proof)-Homogeneous linear systems (Theory only)
Module 6:
Determination of Eigen values and Eigen vectors-Eigen space Symmetric, Skew Symmetric and Orthogonal matrices –simple properties (without proof) Basis of Eigen vectors- Similar matrices Diagonalization of a matrix- Quadratic forms- Principal axis theorem(without proof).

Text Books:
Erwin Kreyszig: Advanced Engineering Mathematics, 10th ed. Wiley
References:
Dennis g Zill&Patric D Shanahan-A first Course in Complex Analysis with Applications-Jones&Bartlet Publishers
.B. S. Grewal. Higher Engineering Mathematics, Khanna Publishers, New Delhi.
Lipschutz, Linear Algebra,3e (Schaums Series)McGraw Hill Education India 2005
Complex variables introduction and applications-second edition-Mark.J.Owitz-Cambridge Publication

EC 201 SWITCHING THEORY AND LOGIC DESIGN

UNIT-I (10 Lectures): NUMBER SYSTEMS & CODES: Introduction to number systems, Complement representation of negative numbers, binary arithmetic, binary codes, Error detecting & correcting codes.

UNIT-II (15 Lectures) : BOOLEAN ALGEBRA AND SWITCHING FUNCTION: Fundamental postulates of Boolean algebra, Basic theorems and properties, switching functions, Simplification of Boolean equations, Digital logic gates, properties of XOR gates, universal gates - NAND/NOR realizations. K-map method, Prime implicants, don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime – Implicant chart, simplification rules.

UNIT-III (13 Lectures): COMBINATIONAL LOGIC DESIGN: Adders, Subtractor, Multiplexer, De-Multiplexer, MUX Realization of switching functions, Encoder, Decoder, Parity bit generator, Codeconverters, Basic PLD's-ROM, PROM, PLA, PAL Realizations.

UNIT-IV (13 Lectures) SEQUENTIAL CIRCUITS: Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples) Latches and Flip-flops-Triggering and excitation tables, registers, shift registers, Steps in synchronous sequential circuit design, synchronous counters, ripple counters, Design of moduloN Ring & Shift counters, Serial binary adder, sequence detector.

UNIT-V (9 Lectures): FINITE STATE MACHINES: Finite state machine-capabilities and limitations, Mealy and Moore modelsminimization of completely specified sequential machines, Partition techniques, incompletely specified sequential machines using merger table.
ALGORITHMIC STATE MACHINES: Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.
TEXT BOOKS:
Morris Mano, "Digital Design" PHI, 3rd Edition, 2006.
Anand Kumar, "Switching Theory and Logic Design" PHI, 2008
REFERENCES:
ZviKohavi, "Switching & Finite Automata theory" TMH, 2nd Edition,
R.P.Jain. "Modern Digital Electronics", 4th ed., TMH, 2009.
John M. Yarbrough, "Digital Logic Applications and Design" Thomson Publications, 2006.
Charles H. Roth, "Fundamentals of Logic Design" Thomson Publications, 5th Edition, 2004.

CS201 Data Structures

Unit - I Introduction: Basic Terminology, Elementary Data Organization, Structure operations, Algorithm Complexity and Time-Space trade-off. Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered List, Sparse Matrices and Vectors. Stacks: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Application of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack., Applications of recursion in problems like 'Tower of Hanoi'.
UNIT - II Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, D-queues and Priority Queues. Linked list: Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List in Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.
UNIT – III Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees, Traversing Threaded Binary trees, Huffman algorithm. Searching and Hashing: Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.
UNIT – IV Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for Internal Sorting. Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Trees, B-trees.
UNIT – V Graphs: Terminology & Representations, Graphs & Multi-graphs, Directed Graphs, Sequential Representations of Graphs, Adjacency Matrices, Traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees.
UNIT VI File Structures: Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index Files, B Tree index Files, Indexing and Hashing Comparisons.
Text Books:
1. Horowitz and Sahani, "Fundamentals of data Structures", Galgotia Publication Pvt. Ltd., New Delhi.
2. R. Kruse etal, "Data Structures and Program Design in C", Pearson Education Asia, Delhi- 2002
3. A. M. Tenenbaum, "Data Structures using C & C++", Prentice-Hall of India Pvt. Ltd., New Delhi.
4. K Loudon, "Mastering Algorithms with C", Shroff Publisher & Distributors Pvt. Ltd.
5. Bruno R Preiss, "Data Structures and Algorithms with Object Oriented Design Pattern in C++", Jhon Wiley & Sons, Inc.
6. Adam Drozdek, "Data Structures and Algorithms in C++", Thomson Asia Pvt. Ltd.(Singapore)

CS202 Object Oriented Design and Programming

Object oriented thinking: Need for OOP Paradigm, Procedural programming vs object oriented programming, object oriented concepts.
Functions : Main function, function prototyping, inline functions, reference variables, call by reference ,Defaults arguments, function overloading, Math library functions.
Class: Difference between C structure and class, specifying a class, Defining member functions: inside and outside class, scope resolution operator, Array within a class, array of objects, Static data members and member functions,Object as function arguments,returningobjects,Friend function, memory allocation for objects,pointer to members,pointer to object,this pointer local classes.
Constructor and destructor:Constructor,types of constructors:default,parameterized and copy constructor,constructor overloading, constructor with default parameter,dynamic initialisation of objects,destructor Operator overloading and Type Conversion:
Defining operator overloading, overloading unary and binary operator,Data Conversion: Basic to User Defined , User defined to basic, Conversion from one user-defined to other.
Inheritance and polymorphism : Base class, derived class, visibility modes, derivation and friendship,Types of inheritance,Containership,virtual function binding,pure virtual functions,Abstractclass,pointer to derived class.
Console IO operations: C++ stream classes, Unformatted IO operations, formatted IO operations, managing output with manipulators.
Working with files: Classes for file stream operations, opening and closing files, detectinfcof, File opening modes, file Pointers, Error handling during file operations, command line arguments. Templates: Class template, class template with parameter, functiontemplate, function template with parameter.

Text and Reference Books:

1.BjraneStroustrup, “C++ Programming language”,3rdedition, Pearson education Asia(1997)
2. LaforeR.”Object oriented Programming in C++”,4th Ed. Techmedia,New Delhi(2002).
3. YashwantKenetkar,”Let us C++”,1stEd.,Oxford University Press(2006).
4. B.A. Forouzan and R.F. Gilberg,CompilerScience,”A structured approach using C++” Cengage Learning, New Delhi.

EC 202 ELECTRONIC DEVICES AND CIRCUITS

UNIT I PN JUNCTION DEVICES: PN junction diode –structure, operation and V-I characteristics, diffusion and transient capacitance - Rectifiers – Half Wave and Full Wave Rectifier,– Display devices-LED, Laser diodes, Zenerdiodecharacteristics-Zener Reverse characteristics – Zener as regulator
UNIT II TRANSISTORS : BJT, JFET, MOSFET- structure, operation, characteristics and Biasing UJT, Thyristor and IGBT -Structure and characteristics.
UNIT III AMPLIFIERS: BJT small signal model – Analysis of CE, CB, CC amplifiers- Gain and frequency response –MOSFET small signal model– Analysis of CS and Source follower – Gain and frequency response High frequency analysis.
UNIT IV MULTISTAGE AMPLIFIERS AND DIFFERENTIAL AMPLIFIER : BIMOS cascade amplifier, Differential amplifier – Common mode and Difference mode analysis – FET input stages – Single tuned amplifiers – Gain and frequency response – Neutralization methods, power amplifiers –Types (Qualitative analysis).
UNIT V FEEDBACK AMPLIFIERS AND OSCILLATORS : Advantages of negative feedback – voltage / current, series, Shunt feedback –positive feedback –Condition for oscillations, phase shift – Wien Bridge, Hartley, Colpitts and Crystal oscillators.
TEXT BOOKS:

1. David A. Bell ,”Electronic devices and circuits”, Prentice Hall of India, 2004.
2. Sedra and smith, “Microelectronic circuits “ Oxford University Press, 2004. REFERENCES:
1. Rashid, “Micro electronic circuits” Thomson publications, 1999.
2. Floyd, “Electron devices” Pearson Asia 5th Edition, 2001.
3. Donald A Neamen, “Electronic Circuit Analysis and Design” Tata McGraw Hill, 3rd Edition, 2003.
4. Robert L.Boylestad, “Electronic devices and circuit theory”, 2002.

5. Robert B. Northrop, "Analysis and Application of Analog Electronic Circuits to Biomedical Instrumentation", CRC Press, 2004.

HU 201 Business Economics

Unit I
Nature of Economics Definitions of Economics and their limitations, Economic Problems , Economic Systems, meaning of Business or Managerial Economics and its role and relevance in managerial decision making in an industrial setting.
Unit II
Demand and Supply Analysis Demand Curve, Demand function , Elasticity of demand and its estimation Supply curve, equilibrium price and price mechanism. Production Economics Economies of Scale and Diseconomies of Scale , Production and Cost Functions. Factors of Production ,Law of Diminishing marginal Productivity. Construction and
analysis of Break Even Charts

Unit III
Market Structure and Price-Output Decisions Price and output determination under Perfect Competition, Monopoly and Monopolistic Competition. Collusion and Cartel, Nash Equilibrium
Money, National Income and Taxation Money, Emerging Bit Coin concept, Quantity Theory of Money, Interest Rate Management , Open Market Operations by RBI, Selective Credit Controls, SLR, CRR , Definition & Measurement of National Income, methods, sectors of economy , inflation, deflation, trade cycles- ValueAdded Tax .

Unit IV
Investment Decisions and Balance Sheet Analysis Capital Budgeting, Investment Analysis – NPV, IRR, Profitability Index, ARR, Payback Period, Depreciation, Time value of money. Business Forecasting– Elementary techniques .Balance sheet preparation principles and interpretation.

Text Book
Yogesh, Maheswari, Management Economics , PHI learning, NewDelhi, 2012
References :
Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010.
Khan M Y, Indian Financial System, Tata McGraw Hill, 7th edition, 2011.
Samuelson, Managerial Economics, 6th edition, Wiley
Snyder C and Nicholson W, Fundamentals of Microeconomics, Cengage Learning (India), 2010.
Truett, Managerial Economics: Analysis, Problems, Cases, 8th Edition, Wiley Welch, Economics: Theory and Practice 7th Edition, Wiley

CS 211 Data Structure Lab:

Write Program in C or C++ for following.
1. Array implementation of Stack, Queue, Circular Queue, List.
2. Implementation of Stack, Queue, Circular Queue, List using Dynamic memory
Allocation.
3. Implementation of Tree Structures, Binary Tree, Tree Traversal, Binary Search Tree,
Insertion and Deletion in BST.
4. Implementation of Searching and Sorting Algorithms.
5. Graph Implementation, BFS, DFS, Min. cost spanning tree, shortest path algorithm.

EC 211Digital System Lab

List of Exercises/Experiments : (minimum 12 exercises/experiments are mandatory)
1. Familiarizations and verification of the truth tables of basic gates and universal gates.
2. Verification of Demorgan's laws for two variables.
3. Implementation of half adder and full adder circuits using logic gates.
4. Implementation of half subtractor and full subtractor circuits using logic gates.
5. Implementation of parallel adder circuit.
6. Realization of 4 bit adder/subtractor and BCD adder circuits using IC 7483.
7. Implementation of a 2 bit magnitude comparator circuit using logic gates.
8. Design and implementation of code convertor circuits
9. a) BCD to excess 3 code b) binary to gray code
10. Implementation of multiplexer and demultiplexer circuits using logic gates. Familiarization with various multiplexer and demultiplexerIcs.
11. Realization of combinational circuits using multiplexer/demultiplexer ICs.
12. Implementation of SR, D, JK, JK master slave and T flip flops using logic gates. Familiarization with IC 7474 and IC 7476.
13. Implementation of shift registers using flip flop Integrated Circuits.
14. Implementation of ring counter and Johnson counter using flip flop Integrated Circuits.
15. Realization of asynchronous counters using flip flop ICs.
16. Realization of synchronous counters using flip flop ICs. Familiarization with various counter Integrated Circuits.
17. Implementation of a BCD to 7 segment decoder and display.
18. Simulation of Half adder, Full adder using VHDL.

(Note: The experiments may be done using hardware components and/or VHDL)

MA 202 Probability Distributions, Transforms and Numerical Methods

Discrete random variables and Discrete Probability Distribution.
Discrete Random Variables, Probability distribution function, Cumulative distribution function. Mean and Variance of Discrete Probability Distribution. Binomial Distribution-Mean and variance.Poisson Approximation to the Binomial Distribution.Poisson distribution-Mean and variance.
Continuous Random variables and Continuous Probability Distribution.
Continuous Random Variable, Probability density function, Cumulative density function, Mean and variance.Normal Distribution, Mean and variance (without proof).Uniform Distribution.Mean and variance.Exponential Distribution, Mean and variance.
Fourier transforms. Laplace Transforms.
Fourier Integrals.Fourier integral theorem (without proof). Fourier Transform and inverse transform. Fourier Sine & Cosine Transform, inverse transform. Laplace Transforms, linearity, first shifting Theorem. Transform of derivative and Integral, Inverse Laplace transform, Solution of ordinary differential equation using Laplace transform. Unit step function, second shifting theorem.Convolution Theorem (without proof).Differentiation and Integration of transforms.
Numerical methods-solution of Algebraic and transcendental Equations, Interpolation.
Solution Of equations by Iteration, Newton- Raphson Method.Interpolation of Unequal intervals-Lagrange's Interpolation formula. Interpolation of Equal intervals-Newton's forward difference formula, Newton's Backward difference formula. Numerical solution of system of Equations.
Solution to linear System- Gauss Elimination, Gauss Seidal Iteration Method.Numeric Integration-Trapezoidal Rule, Simpson's 1/3 Rule. Numerical solution of first order ODE-Euler method, Runge-Kutta Method (fourth order)
Text Books:
1. Miller and Freund's "Probability and statistics for Engineers"-Pearson-Eighth Edition.
2. Erwin Kreyszig, "Advanced Engineering Mathematics", 10th edition, Wiley, 2015.
References:
1. V. Sundarapandian, "Probability, Statistics and Queuing theory", PHI Learning, 2009.

2. C. Ray Wylie and Louis C. Barrett, “Advanced Engineering Mathematics”-Sixth Edition.
3. Jay L. Devore, “Probability and Statistics for Engineering and Science”-Eight Edition.
4. Steven C. Chapra and Raymond P. Canale, “Numerical Methods for Engineers”-Sixth Edition-McGraw Hill.

MA 203 Discrete Mathematics

UNIT-I

Set Theory: Definition of Sets, Venn Diagrams, complements, cartesian products, power sets, counting principle, cardinality and countability (Countable and Uncountable sets), proofs of some general identitites on sets, pigeonhole principle. Relation:Definition, types of relation, composition of relations, domain and range of a relation, pictorial representation of relation, properties of relation, partial ordering relation. Function: Definition and types of function, composition of functions, recursively defined functions.

UNIT-II

Propositional logic: Proposition logic, basic logic, logical connectives, truth tables, tautologies, contradiction , normal forms(conjunctive and disjunctive), modus ponens and modus tollens, validity,
predicate logic, universal and existential quantification. Notion of proof: proof by implication, converse, inverse, contrapositive, negation, and contradiction, direct proof, proof by using truth table, proof by counter example.

UNIT-III

Combinatories:Mathematical induction, recursive mathematical definitions, basics of counting, permutations, combinations, inclusion-exclusion, recurrence relations (nth order recurrence relation with constant coefficients, Homogeneous recurrence relations, Inhomogeneous recurrence relation), generating function (closed form expression, properties of G.F., solution of recurrence relation using G.F, solution of combinatorial problem using G.F.)

Unit-IV

Algebraic Structure:Binary composition and its properties definition of algebraic structure; Groyas Semi group, Monoid Groups, Abelian Group, properties of groups, Permutation Groups, Sub Group, Cyclic Group, Rings and Fields (definition and standard results).

UNIT-V

Graphs:

Graph terminology, types of graph connected graphs, components of graph, Euler graph, Hamiltonian path and circuits, Graph coloring, Chromatic number. Tree: Definition, types of tree(rooted, binary), properties of trees, binary search tree, tree traversing (preorder, inorder, postorder). Finite Automata: Basic concepts of Automation theory, Deterministic finite Automation(DFA), transition function, transition table, Non Deterministic Finite Automata (NDFA), Mealy and Moore Machine, Minimization of finite Automation.

Text Books

1.Trembly J.P and Manohar R, “Discrete Mathematical Structures with Applications to Computer Science”, Tata McGraw–Hill Pub.Co.Ltd, New Delhi, 2003.
2. Ralph. P. Grimaldi, “Discrete and Combinatorial Mathematics: An Applied Introduction”, 4/e, Pearson Education Asia, Delhi, 2002.

References:

1. Liu C. L., “Elements of Discrete Mathematics”, 2/e, McGraw–Hill Int. editions, 1988.
2. Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, “Discrete Mathematical Structures”, Pearson Education Pvt Ltd., New Delhi, 2003
3. Kenneth H.Rosen, “Discrete Mathematics and its Applications”, 5/e, Tata McGraw – Hill Pub. Co. Ltd., New Delhi, 2003.
4. Richard Johnsonbaugh, “Discrete Mathematics”, 5/e, Pearson Education Asia, New Delhi, 2002.
5. Joe L Mott, Abraham Kandel, Theodore P Baker, “Discrete Mathematics for Computer Scientists and Mathematicians”, 2/e, Prentice-Hall India, 2009.

CS 203 Computer Organization and Architecture

Unit-I (Representation of Information and Basic Building Blocks)
Introduction to Computer, Computer hardware generation, Number System: Binary, Octal, Hexadecimal, Character Codes (BCD, ASCII, EBCDIC), Logic gates, Boolean Algebra, Kmap simplification, Half Adder, Full Adder, Subtractor, Decoder, Encoders, Multiplexer, Demultiplexer, Carry lookahead adder, Combinational logic Design, Flip-Flops, Registers, Counters (synchronous & asynchronous), ALU, Micro-Operation. ALU-Chip, Faster Algorithm and Implementation (multiplication & Division)
Unit-II (Basic Organization)
Von Neumann Machine (IAS Computer), Operational flow chart (Fetch, Execute), Instruction Cycle, Organization of Central Processing Unit, Hardwired & micro programmed control unit, Single Organization, General Register Organization, Stack Organization, Addressing modes, Instruction formats, data transfer & Manipulation, I/O Organization, Bus Architecture, Programming Registers
Unit-III (Memory Organization)
Memory Hierarchy, Main memory (RAM/ROM chips), Auxiliary memory, Associative memory, Cache memory, Virtual Memory, Memory Management Hardware, hit/miss ratio, magnetic disk and its performance, magnetic Tape etc.
Unit-IV (I/O Organization)
Peripheral devices, I/O interface, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input-Output Processor, and Serial Communication. I/O Controllers, Asynchronous data transfer, Strobe Control, Handshaking.
Unit-V (Process Organization)
Introductory Concept of pipeline, Flynn's and Feng's Classification, Parallel Architectural classification.Concept of Pipelining, Multi-Core Archetecture.

Text and Reference Books:
1. William Stalling, "Computer Organization & Architecture", Pearson education Asia
2. Mano Morris, "Computer System Architecture", PHI
3. Zaky&Hamacher, "Computer Organization", McGraw Hill
4. B. Ram, "Computer Fundamental Architecture & Organization", New Age
5. Tannenbaum, "Structured Computer Organization", PHI.

CS 204 Operating System

Module 1: Introduction: Basics of Operating Systems: Definition – Generations of Operating systems – Types of Operating Systems, OS Service, System Calls, OS structure: Layered, Monolithic, Microkernel Operating Systems – Concept of Virtual Machine.
Module 2: Process Management Processes: Definition , Process Relationship , Process states , Process State transitions , Process Control Block ,Context switching – Threads – Concept of multithreads , Benefits of threads – Types of threads Process Scheduling: Definition , Scheduling objectives ,Types of Schedulers ,Scheduling criteria : CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time (Definition only) , Scheduling algorithms : Pre emptive and Non , pre emptive , FCFS – SJF – RR , Multiprocessor scheduling : Types , Performance evaluation of the scheduling.
Module 3: Interprocess Communication Race Conditions, Critical Section, Mutual Exclusion, Hardware Solution, Strict Alternation , Peterson's Solution, The Producer Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc., Scheduling , Scheduling Algorithms.
Module 4: Deadlocks: Definition,Deadlock characteristics , Deadlock Prevention , Deadlock Avoidance :banker's algorithm, Deadlock detection and Recovery.
Module 5: Memory Management Basic Memory Management: Definition ,Logical and Physical address map , Memory allocation : Contiguous Memory allocation – Fixed and variable partition – Internal and External fragmentation and Compaction , Paging : Principle of operation – Page allocation – Hardware support for paging –,Protection and sharing – Disadvantages of paging. Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging (Concepts only) – Page Replacement policies : Optimal (OPT) , First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

Module 6: I/O Management Principles of I/O Hardware: I/O devices, Device controllers , Direct memory access Principles of I/O Software: Goals of Interrupt handlers , Device drivers , Device independent I/O software , Secondary-Storage Structure: Disk structure ,Disk scheduling algorithm.
Module 7: File Management File concept, Aaccess methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous,linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table),efficiency & performance.
Module 8: Security & Protection Security Environment, Design Principles Of Security, User Authentication, Protection Mechanism : Protection Domain, Access Control List.
Module 9: Unix/Linux Operating System Development Of Unix/Linux, Role & Function Of Kernel, System Calls, Elementary Linux command & Shell Programming, Directory Structure, System Administration Case study: Linux, Windows Operating System.

Reference Books:

1. Operating System Concepts (8th Edition) by Silberschatz, Peter B. Galvin and Greg Gagne, WileyIndian Edition (2010).
2. Modern Operating Systems (Third Edition) by Andrew S Tanenbaum, Prentice Hall India (2008).
3. Principles of Operating Systems by Nareshchauhan, Oxford Press (2014).
4. Operating Systems by D.M. Dhamdhere, Tata McGraw Hill 2nd edition.
5. Operating Systems (5th Ed) – Internals and Design Principles by William Stallings, Prentice Hall India, 2000
6. UNIX Concepts and Applications(4th Edition)– by Sumitabha Das, Tata McGraw Hill. 7. Unix Shell Programming – by YashwantKanetkar, BPB publications.

CS 205 Principles of Database Design

Unit- I
Introduction: An overview of database management system, database system Vs file system, Database system concepts and architecture, data models schema and instances, data independence and database language and interfaces, Data definitions language, DML, Overall Database Structure. Data Modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.
Unit- II
Relational data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus, Introduction to SQL: Characteristics of SQL. Advantage of SQL.SQL data types and literals.Types of SQL commands.SQL operators and their procedure.Tables, views and indexes. Queries and sub queries. Aggregate functions. Insert, update and delete operations. Joins, Unions, Intersection, Minus, Cursors in SQL.
Unit- III
Data Base Design & Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependences, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.
Unit- IV
Transaction Processing Concepts: Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling.
Unit- V
Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi version schemes, Recovery with concurrent transaction.

Text Books
1. Date C J, “An Introduction To Database System”, Addision Wesley
2. Korth, Silbertz, Sudarshan, “Database Concepts”, McGraw Hill

3. Elmasri, Navathe, “Fundamentals Of Database Systems”, Addision Wesley
4. Leon & Leon, “Database Management System”, Vikas Publishing House.
5. Bipin C. Desai, “An introduction to Database Systems”, Galgotia Publication
6. Majumdar& Bhattacharya, “Database Management System”, TMH
7. Ramakrishnan, Gehrke, “Database Management System”, McGraw Hill
8. Kroenke, “Database Processing: Fundamentals, Design and Implementation”, Pearson Education.
9. Maheshwari Jain, “DBMS: Complete Practical Approach”, Firewall Media, New Delhi.

HU 202Principle of Accountancy and Management

Module 1: Fundamentals of Managerial Accounting

Meaning and Significance. Need to learn Accounting. Financial, Cost and Management Accounting.Recognizing Financial Transactions - Money Measurement Concept.Single entry vs. Double Entry.Uses of Accounting Information - Various Stakeholders.Forms of Organization.

Module 2: Financial Statements : Financial Statements. Balance Sheet and P & L Account.Time reference - Periodicity.Understanding Assets & Liabilities - Entity Concept.Concept of Capital and Borrowings.Basic Balance Sheet Structure.Contents of Annual Reports.Income Statement - P & L Account.Income vs. Expenditure - Matching Concept.Revenue Recognition - Realization & Accrual Concept.Basic Format of Income Statement.Operating Profit, PBIT, PBT, PAT. Outstanding Expense, Provision, Contingent Liability.

Module 3: Recording Financial Transactions : Books of Accounts - Journal, Ledger & other books.
System of Accounting - Cash vs. Mercantile System.Impact on Balance Sheet.Cases for Recording Simple Transactions. Preparation of Simple Final accounts. Corporate Accounting - Issue of Shares, Issue and Redemption of Debentures.
Module 4: Accounting Standards, GAAP, IFRS Principles of Accounting. GAAP.Accounting Standards, IAS, IFRS.Convergence of GAAPs.

Module 5: Depreciation and Inventory Doctrine of Conservatism. Depreciation and other Provisions.Goodwill and its Amortization. Valuation and Accounting for Inventory. Window Dressing.

Module 6: Cash Flow: Cash Flow Statement. Fund Flow Statement. Cases on preparation and Interpretation of Cash Flow Statement.

Module 7: Interpretation and analysis of Accounts : Ratio Analysis. Vertical and Horizontal Analysis.Interpretation and analysis of Accounts.

Module 8: Introduction to Cost & Managerial Accounting Definition of Cost, Period Cost, Expenses, variable and fixed costs, other classifications of cost.

Module 9: Cost Accumulation Direct and indirect costs, predetermined overhead rate, under/over application of overheads.

Module 10: Product and Process Costing Job costing , process costing , normal loss, abnormal loss, operation costing.

Module 11: Activity Based Costing Activity Based Costing (ABC), Traditional costing methods-limitations, benefits of ABC.

Module 12:
Cost Volume Profit analysis CVP, Fixed costs, variable costs, semi variable costs, operating leverage, contribution margin, break even point.

Module 13: Relevant Costs in Decision making Shut down/continue, make/buy, Processing of joint products, introducing a new product, effect of sunk costs.

Module 14: Budgeting : Budgeting, Concept and advantages, Types, Flexible Budgeting.

Module 15: Standard Costing and Variance Analysis : Standard Costs and Variances: Material , Labour, overhead and Sales variances.

References:

1. J. H. Rossell, W.W. Frasure and D.H. Taylor, Managerial Accounting, 3rd ed., Merrill, Columbus.
2. PrasannaChandra : Managers Guide to Finance and Accounting, Tata McGraw Hill.
3. Ashok Banerjee, Financial Accounting: A Managerial Emphasis, Excel Books.
4. R. Narayanswamy, Financial Accounting: A Managerial Perspective, PHI.
5. Ramchandran and Kakani, Financial Accounting for Management, Tata Mcgraw Hill.
6. C.T. Horngren, Accounting for Management Control: An Introduction, Prentice Hall, New Delhi

Books:

1. M.A. Pocock and A. H. Taylor, Handbook of Financial Planning and Control, Gower, Westmead.
2. Meigs and Meigs, Financial Accounting, McGraw Hill.

Periodicals:

1. The Chartered Accountant; Journal of the Institute of Chartered Accountants of India.
2. The Management Accountant; Journal of the Institute of Cost and Works Accountants of India.

CS 216 Free and Open Source Software laboratory

Course Objectives: To expose students to FOSS environment and introduce them to use open source packages in open source platform.
List of Exercises/Experiments: (Minimum 12 exercises/experiments are mandatory)
1. Getting started with Linux basic commands and directory structure, execute file, directory operations.
2. Linux commands for redirection, pipes, filters, job control, file ownership, file permissions, links and file system hierarchy.
3. Shell Programming : Write shell script to show various system configuration like
Currently logged user and his logname Your current shell Your home directory Your operating system type Your current path setting Your current working directory Show Currently logged number of users .
4. Write shell script to show various system configuration like About your OS and version, release number, kernel version Show all available shells Show mouse settings Show computer CPU information like processor type, speed etc Show memory information Show hard disk information like size of hard-disk, cache memory, model etc File system (Mounted)
5. Shell script program for scientific calculator.
6. Write a script called addnames that is to be called as follows, where classlist is the name of the classlist file, and username is a particular student's username.
./addnamesclasslistusername
The script should
check that the correct number of arguments was received and print an usage message if not, check whether the classlist file exists and print an error message if not, check whether the username is already in the file, and then either print a message stating that the name already existed, or add the name to the end of the list.

7. Version Control System setup and usage using IT. Creating a repository , Checking out a repository , Adding content to the repository , Committing the data to a repository , Updating the local copy , Comparing different revisions Revert Conflicts and Solving a conflict .
8. Text processing and regular expression with Perl, Awk: simple programs, connecting with database e.g., MariaDB.
9. Shell script to implement a script which kills every process which uses more than a specified value of memory or CPU and is run upon system start.
10. GUI programming : Create scientific calculator – using Gambas or try using GTK or QT
11. Running PHP : simple applications like login forms after setting up a LAMP stack 12. Advanced linux commands curl, wget, ftp, ssh and grep
13. Application deployment on a cloud-based LAMP stack/server with PHP eg: Openshift, Linode etc.
14. Kernel configuration, compilation and installation : Download / access the latest kernel source code from kernel.org, compile the kernel and install it in the local system. Try to view the source code of the kernel
15. Virtualisation environment (e.g., xen, kqemu, virtualbox or lguest) to test an applications, new kernels and isolate applications. It could also be used to expose students to other alternate OSs like *BSD
16. Compiling from source: learn about the various build systems used like the auto* family, cmake, ant etc. instead of just running the commands. This could involve the full process like fetching from a cvs and also include autoconf, automake etc.,
17. Introduction to packet management system: Given a set of RPM or DEB, how to build and maintain, serve packages over http or ftp. and also how do you configure client systems to access the p ackage repository.
18. Installing various software packages. Either the package is yet to be installed or an older version is existing. The student can practice installing the latest version. Of course, this might need Internet access.

- Install samba and share files to windows
- Install Common Unix Printing System(CUPS).

CS 215 Database Design Lab

The Queries to be implemented on DBMS using SQL.
1. Write the queries for Data Definition and Data Manipulation language.
2. Write SQL queries using Logical operators (=,<,>,etc.).
3. Write SQL queries using SQL operators (Between…. AND, IN(List), Like, ISNULL and also with negating expressions).
4. Write SQL query using character, number, date and group functions.
5. Write SQL queries for Relational Algebra (UNION, INTERSECT, and MINUS, etc.).
6. Write SQL queries for extracting data from more than one table (Equi-Join, Non-EquiJoin , Outer Join)
7. Write SQL queries for sub queries, nested queries.
8. Write programs by the use of PL/SQL.
9. Concepts for ROLL BACK, COMMIT & CHECK POINTS.
10. Create VIEWS, CURSORS, and TRIGGRS & write ASSERTIONS.
11. Create FORMS and REPORTS.

*Students are advised to use Developer 2000/Oracle-9i version or other latest version for above listed experiments. However depending upon the availability of software's, students may use Power Builder /SQL SERVER. Mini Project may also be planned & carried out through out the semester to understand the important various concepts of Database.

CS 212 Object Oriented Programming Laboratory

As per theory paper.

CS 215 Database Design Laboratory

As Per Theory paper

CS 214 Operating System Laboratory

As Per Theory paper