Semester I

DMCA101 ENGLISH
MODULE - I

Speech Sounds: Phonemic symbols - Vowels - Consonants - Syllables - Word stress - Stress in polysyllabic words - Stress in words used as different parts of speech - Sentence stress - Weak forms and strong forms - Intonation - Awareness of different accents: American, British and Indian - Influence of the mother tongue

MODULE - II

Listening: Active listening - Barriers to listening - Listening and note taking- Listening to announcements - Listening to news on the radio and television

MODULE- III

Speaking: Word stress and rhythm - Pauses and sense groups - Falling and rising tones - Fluency and pace of delivery - Art of small talk - Participating in conversations - Making a short formal speech - Describing people, place, events and things - Group discussion skills and telephone skills

MODULE - IV

Reading: Reading: theory and Practice - Scanning - Surveying a textbook using an index - reading with a purpose - making predictions - Understanding text structure - Locating main points - Making inferences - Reading graphics - reading critically - Reading for research

TEXT BOOKS
V.Sasikumar, P Kiranmai Dutt and Geetha Rajeevan, Communication Skills in English. Cambridge University Press and Mahatma Gandhi University.
Sasikumar V, Kiranmai Dutt and Geetha Rajeevan, A course in listening and speaking I & II
Tony Lynch, study Listening: A course in Listening to lectures and note-taking
Anderson Kenneth, Joan Maclean, Study speaking: A Course in Spoken
DMCA102 - Mathematical Foundations of Computer Science

Module 1:- Sets: Basic Concepts. Relations: Binary relations, Equivalence relations and partition. Functions: Different types of functions, Composition and Inverse.

Module 2:- Partial Ordering Relations

Module 3:- Logic

Module 4:- Graph Theory
Basic terminology: Different types of graphs – Directed and undirected, Simple, Pseudo, Complete, Regular, Bipartite. Incidence and degree, Pendant and Isolated vertex and Null graph. Isomorphism, Sub graphs.

Module 5:- Euler & Hamiltonian Graphs

References
Discrete Mathematical Structures with Applications to Computer Science
DMCA 103- Statistics I

Module I:- Scope and Limitations of Statistics

Module II:-Diagrams and Graphs
Pictorial representation of data, Representation of categorical data, Graphs of frequency distribution, ogives and uses of ogives

Module III:-Measures of central tendency and Dispersion
Definition of central tendency, Measures- Mean, Median, Mode, Geometric Mean , Harmonic Mean. Dispersion –Introduction, Absolute and relative measures of
dispersion-Range, Inter-quartile range, quartile deviation, mean deviation and standard deviation

Module IV:- Skewness, Moments and Kurtosis
Definition and types of Skewness, Measures of Skewness-Karl pearson’s coefficient of skewness, Bowley’s coefficient of skewness, Kelly’s measure of skewness. Moments- raw and central moments. Kurtosis

Module V:- Correlation and Regression
Correlation- Meaning and definition, types of correlation, Karl Pearson’s coefficient of correlation, Rank correlation. Regression- Meaning and definition, types of regression, lines of regression.

References

Introduction to Probability and Statistics, Medenhall, Thomson Learning , 12 Edn.

B.L. Agarwal: Basic Statistics, New Age International (p) Ltd.

Murthy M.N.: Sampling theory and Methods, Statistical Publishing Society, Calcutta

DMCA 104- Introduction to Computers and PC hardware
Module I

Module II
CPU & Memory – CPU, ALU, Control Unit & Registers, RAM, Variants of RAM, ROM, Variants of ROM, Physical Memory organization: DIP, SIMM, DIMM, SIPP.

Module III
Introduction, Getting started with PC hardware support, Operating systems, CPUs and motherboards, Basic Input/Output System, Memory systems, Bus structures, Expansion cards, Ports, connectors, and cables, Data storage devices, Video and multimedia input/output devices,

Module IV
Hard Disk: Hard disk drive components, disk platter, read/ write head, head arm/ head slider, spindle motor, logic board, air filter, head actuator mechanism. Disk Geometry: Sides or heads, track, cylinder, sector, Disk Recording: Data recording method, writing on reading from a magnetic disk, interleave, skew. Hard Disk Interfacing: Concepts of Interfacing Formatting: Low level and high level.

Module V
Mother Board: CPU socket, Memory and secondary Cache sockets or chips, ROMBIOS and BIOS CMOS, Universal serial bus. Secondary Storage Devices: Floppy disk, CD Family, DVD, ZIP Drive. Trouble shooting and PC Maintainance.

References

All About Hard Disk, Manohar Lotia

All About Motherboard, Manohar Lotia

DMCA 105 Programming methodology & C Programming

Module I
Introduction to algorithm, flowchart, structured programming concept, programs – Compiler, Interpreter. Introduction to C Language: The C character set, identifiers and keywords, data types, how floats and doubles are stored, constants, variables and arrays, declarations, expressions, statements,
Lvalues and Rvalues, type conversion, symbolic constants.

**Module II**
Operators and expressions: Arithmetic operators, unary operator, relational and logical operator, assignment operators, the conditional operator, type conversion, Library function, Data input and output: Single character input, single character output, scanf, printf, puts gets functions, interactive programming. Control statement: Branching: if else statement, Looping, nested control structure, switch statement, break statement, continue statement, comma operator, goto statement.

**Module III**
Functions: Overview, function prototypes, passing arguments to a function, recursion. Program structure: Storage classes, automatic variables, external variables, static variables, multifile program. Arrays: Defining an array, passing array to functions, multidimensional arrays, strings: one dimensional character array, array of strings.

**Module IV**
Pointers: Fundamentals, void pointer, null pointer, passing pointers to a function, pointers and one dimensional arrays, dynamic memory allocation, operation on pointers, pointers and multidimensional arrays, array of pointers, pointer to an array, pointers and strings, structure pointer, pointers to function, pointers and variable length arguments list, passing functions to other functions. Structures and unions: Defining a structure, processing a structure, user defined data types, structure and pointers, passing structure to function, self-referential structures, and union.

**Module V**
Data files: Why files, opening and closing a data file, reading and writing a data file, processing a data file, unformatted data file, concept of binary file. Low level programming: Register variable, bitwise operations, bit fields. Additional features of C: Enumeration, Command line parameters, Macros, C Preprocessor.

**References**
Computer Science: A Structured Programming Approach Using C,
DMCA 106 – Software Lab I (PC HARDWARE LAB)

1. Identification of PC Components and Assembling the PC
2. Understanding BIOS set up-
3. Installation of Operating Systems-
4. Installation of Software Packages
5. Replacing and fitting of Hard Disk and Removable Disk Drives on PC
6. Identification of different cards in the PC
7. Disc Managers and it's use
8. Virus removal and disc scan
9. Backup and Restoration utility
10. Connecting input/output devices and installation of their driver softwares.
11. Configuration of Audio and Video
12. Trouble shooting of the PC

References


DMCA 107 Software Lab II (C Programming Lab)
**Section A**

- Implementation of the various Data Types in C.
- Demonstration of Data type conversion (Hint: Usage of type casting).
- Implementation of various Storage Types.
- Demonstration of for loop.
- Demonstration of do...while loop.
- Demonstration of while loop.
- Demonstration of nested if (Hint: Use logical operators).
- Demonstration of switch... case structure.
- Implementation of arrays.
- Implementation of multidimensional arrays (Hint: implement matrix operation).
- Implementation of functions (Hint: Demonstrate call by value, call by schemes, passing of arrays).
- Demonstration of various string operations (Hint: Usage of user defined functions only allowed).
- Demonstration of pointer operations.
- Demonstration of recursion (Hint: GCD, factorial, Fibonacci series).
- Demonstration of Debugging a C program.

**Section B**

- Implementation of structures (Hint: simple structure operations, array of structures).
- Implementation of Union.
- Implementation of pointers to structures and unions.
- Demonstration of dynamic allocation of memory (Hint: malloc, calloc, realloc, free).
- Demonstration of sorting techniques (Hint: selection sort, bubble sort).
- Demonstration of searching techniques (Hint: linear search, binary search).
- Demonstration of bitwise operations.
- Demonstration of macro processing.
- Demonstration of various file operations. (Hint: Text file)
- Implementation of character counting, line counting and word counting for a file.
- Program to find the lengthiest line in a text file.
Semester II

DMCA 201 Technical Communication

Module I
Listening - Introducing learners to GIE - Types of listening - Listening to audio (verbal & sounds); Speaking - Speaking about one’s place, important festivals etc. – Introducing oneself, one’s family / friend; Reading - Skimming a reading passage – Scanning for specific information - Note-making; Writing - Free writing on any given topic (My favourite place / Hobbies / School life, etc.) - Sentence completion - Autobiographical writing (writing about one’s leisure time activities, hometown, etc.); Grammar - Prepositions - Reference words - Wh-questions - Tenses (Simple); Vocabulary - Word formation - Word expansion (root words / etymology); E-materials - Interactive exercises for Grammar & Vocabulary - Reading comprehension exercises - Listening to audio files and answering questions.

Module II
Listening - Listening and responding to video lectures / talks; Speaking - Describing a simple process (filling a form, etc.) - Asking & answering questions - Telephone skills – Telephone etiquette; Reading – Critical reading - Finding key information in a given text - Sifting facts from opinions; Writing - Biographical writing (place, people) - Lab descriptions (general/specific description of laboratory experiments) - Definitions - Recommendations; Grammar - Use of imperatives - Subject-verb agreement; Vocabulary - Compound words - Word Association; E-materials - Interactive exercises for Grammar and Vocabulary - Listening exercises with sample telephone conversations / lectures – Picture-based activities.

Module III
Listening - Listening to specific task - focused audio tracks; Speaking - Role-play – Simulation - Group interaction - Speaking in formal situations (teachers, officials, foreigners); Reading - Reading and interpreting visual material; Writing - Jumbled sentences - Coherence and cohesion in writing - Channel conversion (flowchart into process) - Types of paragraph (cause & effect / compare & contrast / narrative / analytical) - Informal writing (letter/e-mail/blogs) - Paraphrasing; Grammar - Tenses (Past) - Use of sequence words - Adjectives; Vocabulary - Different forms and uses of words, Cause and effect words; E-materials - Interactive exercises for Grammar and Vocabulary - Excerpts from films related to
the theme and follow up exercises - Pictures of flow charts and tables for interpretations.

**Module IV**

**Listening** - Watching videos / documentaries and responding to questions based on them; **Speaking** - Responding to questions - Different forms of interviews - Speaking at different types of interviews; **Reading** - Making inference from the reading passage - Predicting the content of a reading passage; **Writing** - Interpreting visual materials (line graphs, pie charts etc.) - Essay writing – Different types of essays; **Grammar** - Adverbs – Tenses – future time reference; **Vocabulary** - Single word substitutes - Use of abbreviations & acronyms; **E-materials** - Interactive exercises for Grammar and Vocabulary - Sample interviews - film scenes - dialogue writing.

**Module V**

**Listening** - Listening to different accents, Listening to Speeches / Presentations, Listening to broadcast & telecast from Radio & TV; **Speaking** - Giving impromptu talks, Making presentations on given topics; **Reading** - Email communication - Reading the attachment files having a poem/joke/proverb - Sending their responses through email **Writing** - Creative writing, Poster making; **Grammar** - Direct and indirect speech; **Vocabulary** - Lexical items (fixed / semi fixed expressions); **E-materials** - Interactive exercises for Grammar & Vocabulary - Sending emails with attachment – Audio / video excerpts of different accents, - Interpreting posters

**References:**

Mindscapes: English for Technologists and Engineers, Department of English, Anna University, Chennai, 2012.
DMCA 202 Statistics II

Module I:- Probability Theory

Introduction, Sample space, Events, Different approaches to probability, Addition and multiplication theorems on probability, Independent events, conditional probability, Bayes theorem

Module II:- Random Variables and Mathematical Expectations

Random Variables, probability functions and distribution functions, marginal density functions, joint density functions

Mathematical Expectation- Definition, elementary properties of expectation, Moments-Raw and central moments, Mean, Variance and Co variance, Moment generating function, characteristic functions

Module III:- Standard distributions

Discrete probability distributions-Uniform distribution, Binomial distribution, Poisson distribution, Geometric distribution, Exponential distribution

Continuous probability distributions-Uniform distribution and Normal distribution

Module IV:- Sampling and Estimation

Theory of Sampling-population and sample, Types of sampling

Theory of Estimation-Introduction, point estimation, methods of point estimation-maximum Likelihood estimation and method of moments, Central Limit theorem (statement only)

Module V:- Testing of Hypothesis

Null and alternative hypothesis, types of errors, level of significance, critical region, large sample Tests-Testing of hypothesis concerning mean of a population and equality of means of two populations. Small sample tests-t Test for single
mean, difference of means, Paired t-test, Chi-square test, F test-test for equality of two population variances

References

Probability and Statistics – Schaums outline series

DMCA 203 Digital Systems & Logic Design

Module I - Number systems and code.
Number systems - Efficiency of number system, Decimal, Binary, Octal, Hexadecimal conversion from one to another- Binary addition, subtraction, multiplication and division, representation of signed numbers, addition and subtraction using 2’s complement and 1’s complement. Binary codes - BCD code, Excess 3 code, Gray code, Alphanumeric code, Error detection codes, Error correcting code.

Module II - Logic Gates and Boolean Algebra.
Logic Gates - Basic logic gates- AND, OR, NOT, NAND, NOR, Exclusive OR, Exclusive NOR gates- Logic symbols, truth table and timing diagrams. Boolean Algebra - Basic laws and theorems, Boolean functions, truth table, minimization of boolean function using K map method, Realization using logic gates and universal gates.

Module III - Combinational and Sequential Logic Circuits.
Combinational circuits - Half adder, Full Adder, Parallel binary adder, Subtractor, Magnitude
Comparator, Decoders, Encoders, Multiplexers, Demultiplexers, Parity bit generator, PLA. Sequential circuits - Flip Flops – RS, JK, T and D Flip Flops, Edge triggered Flip Flops, Master slave Flip Flops.

Module IV - Registers and counters.
**Registers** - Serial in serial out, Serial in Parallel out, Parallel in serial out, Parallel in Parallel out registers, Bidirectional shift registers, universal shift registers.

**Counters** - Synchronous and asynchronous counters, UP/DOWN counters, Modulo-N Counters, Cascaded counter, Programmable counter, Counters using shift registers, application of counters.

**Module V - Introduction to computers.**

**References**
- All about Hard Disk- Manohar Lotia, BPB Publications.
- Digital principles and Applications- Albert Paul Malvino, Donald P Leach, McGraw Hill
- All about Mother Board- Manohar Lotia, 2002.

**DMCA 204 Data Structures-C**

**Module I**
**Introduction:** Algorithmic notation, Introduction to algorithm analysis for time and space requirements. **Arrays:** Ordered lists – polynomial addition, sparse matrices, representation of array.

**Module II**
**Linked List:** Singly linked list, Linked stacks and queues, Polynomial addition, Equivalence relation, sparse matrices, doubly linked list and dynamic storage management, Garbage collection and compaction. Strings – data representation for strings, Pattern matching in strings,
Module III
Stacks and Queues: Definition and concepts, Operations on stacks. Application of stacks- recursion, polish expressions and their compilation, queue, representation of queue, circular queue, deque, priority queue, Application of queues, Linked stacks and queues.

Module IV

Module V

References:

Fundamentals of data structures – Ellis Horowitz and Sartaj Sahni (Galgota)
An introduction to data structures with applications – Jean Paul Tremblay, paul G Sorenson(Tata McGraw Hill)
Data Structures – E.M Reingald , W Hamen (CBS Publishers and distributors)
Data Structures – a psedocode approach with C –Richard F Gilberg, Behrouz A Forouzan, Thomson Learning, 2 Edn.
Data Structures and program design – R. L Kruse (Prentice Hall of India)
Data structures using C – Tanenbaum and Augustine (Prentice Hall of India)
Theory and problems of data structures – Seymour lipschutz (Tata McGraw Hill)
Data structures and Algorithms in C++, Adam Drozdek, Thomson Learning, 3 Edn
Classic data structures – D Samanta (PHI)
DMCA 205 Object Oriented Programming with C++

Module I


Objects and Classes: Access Specifiers. Memory Allocation for Objects, Friend Functions and Friend Classes, Static Data Members; Static Member Functions. this pointer. Comparison of class with structure. Inline functions.

Arrays and Strings: Arrays Within a Class; Arrays of Objects; Objects as Function Arguments; Returning Objects; const Member Functions; Constructing Two-Dimensional Arrays. String Manipulation using objects

Module II

Constructors and Destructors: Purpose of Constructors and Destructors. Default Constructors, Constructors with & without parameters, Constructor Overloading, Copy Constructor. Invoking Constructors and Destructors.

Pointers in C++: Pointer declaration and Access, Pointer to void, pointer and arrays, pointer to pointer, pointer to functions, call by pointer, pointer arrays, Jagged array, array of pointers to string, memory management – new and delete, pointer to object. self referencing class, wild pointers.

Module III

Polymorphism: Overloading Concepts, Function Overloading: Operator Overloading: Defining Operator Function, Rules for overloading Operators. Overloading unary operators, overloading binary operators, Overloading Comma, [], (), ->, new, delete Operators. Type Conversions – Basic to Class, Class to Basic and One class to another class type, Advanced Type Casting.

Module IV

Inheritance: Basic Concepts, Reusability & Extensibility. Defining derived classes, protected access specified in Base class constructors and destructors in derived classes – Types of Inheritances. Making a Private Member Inheritable; Member Classes: Nesting of Classes.

Virtual Functions: Virtual Base Classes, Normal member functions accessed with
pointers, virtual member function access, late binding, pure virtual function, abstract classes.

Module V

**Console I/O operations:** C++ streams and C++ stream classes – Predefined Objects, unformatted I/O operations, Formatted I/O operations - manipulators - User defined manipulators - Overloading << and >> Operators for Objects.

**Disk I/O Operations:** Stream Classes, classes for file stream operations, opening and closing a file, file nodes, writing an object to disk, reading an object from disk, binary versus character files, I/O with multiple objects, tellg() and seekg(), seekp() and tellp(). Updating a File : Error Handling During File Operations; Command-Line Arguments ,sequential access to a file, file input/output with stream class, error handling during file manipulations, filter utilities.

**Templates:** Generic Functions- A generic swap function, Functions with more than one Generic Type, Overloading a Function Template. Generic Classes – A stack generic class, Class template with more than one Generic Type, type name and template keywords, Template Restrictions, The power of Templates.

**Exception Handling:** Fundamentals of Exception Handling, Catching Class Types, Using Multiple catch statements, Catching All Exception, Restricting Exception, throw statement, Setting the Terminate and Unexpected Handlers, Uncaught exception,  bad_exception Classes, and Built-In Exceptions. Exception Vs Error Handling, Assertion in C++.

**References**


Computer Science: A Structured Programming Approach Using C++, Forouzan, Thomson Learning , 2 Edn

C++ Programming: Malik, Thomson Learning , 3 Edn

K.R Venugopal Rajkumar, *Mastering C++*, TMH.

Gaddis Tony, *Starting Out with C++*, dreamtech Press,


DMCA 206 Software Lab-III (Data Structures Lab in C)

1. Program to represent sparse matrix manipulation using arrays.
2. Program to represent Singly Linked List.
3. Program to represent Doubly Linked List.
4. Program to represent Circular Linked List.
5. Program to represent Linked Stacks.
6. Program to represent Linked Queues.
7. Program to represent string operations.
8. Program to represent Stack operations using array and pointers.
9. Program to represent Queue operations using array and pointers.
10. Program to represent Conversion of infix to postfix.
11. Program to represent Evaluation of Expressions.
12. Program to represent Binary Tree Operations.
13. Program to represent Binary Tree Traversals.
14. Program to represent Searching procedures (Linear search, Binary search and Interpolation search).
15. Program to represent sorting procedures (Selection, Bubble, Insertion, Quick, Heap, Merge).

DMCA 207 Software Lab-IV (C++ Lab)

1. Program to Implement Classes and Objects.
2. Program to Implement Constructors and Destructors with array of Objects.
3. Program to Implement Passing and returning parameters as objects by reference.
4. Program to demonstrate Function Overloading.
5. Program to overload different operators – incr & decr operators with post & pre forms; new, delete, [], () and arithmetic operators.
6. Program to perform pointer sort operation.
7. Program to demonstrate friend functions and friend classes.
8. Program using objects for String manipulation functions.
9. Program to implement different types of inheritances like Multiple, Multilevel and Hybrid.
10. Program to demonstrate the use of Virtual Functions.
11. Program to demonstrate the use of abstract classes.
12. Program to demonstrate I/O streams and functions.
13. Program to Overload << and >> operators as a member and as a non-member operator functions.
14. Program to create a file to store some records and search for a particular record and display it.
15. Program to demonstrate namespaces and Volatile member functions.
16. Program to perform all possible Type Conversions.
17. Program to create function Templates, and overload the function Templates.
18. Program to create a generic stack class and member functions to perform stack operations.
19. Program to implement Exception Handling with minimum 5 exception classes including two built-in exceptions.

Semester 3

DMCA 301 Computer Organization & Architecture

Module I
Introduction: Basic structure of computers-Machine Instructions and programs: Memory Locations and addresses, Memory Operations, Instructions and Instruction sequencing, Addressing modes, Basic Input Output Operations, Subroutines.

Module II
Central Processing Unit: Arithmetic & Logic Unit: Number Representation – Addition of positive numbers – Fast Adders – Signed Addition and Subtraction – Multiplication of positive numbers – Multiplication using Booth's algorithm - Fast Multiplication – Floating point numbers and Operations. The Processing Unit: Basic Concepts - Instruction execution cycle - sequencing of control signals - hardwired control - microprogrammed control - control signals - microinstructions- microprogram sequencing - Branch address modification- Pre fetching of microinstructions

Module III

Module IV
DMA operations & DMA Controller – 
Buses – Introduction to I/O interfaces.

Module V
Parallel processing : Basic Parallel Processing Architecture - Flynn”s Classification - SISD, MISD, SIMD, MIMD structures - Pipelining – Basic Concepts of pipelining, Instruction Pipelining, Hazards, Vector processing & Vector processors - Loosely Coupled & Tightly Coupled Systems - Instruction-level parallelism: Concepts of instruction-level parallelism (ILP), Superscalar, Super pipelined and VLIW processor architectures - Comparison of RISC and CISC.

References
- Computer Architecture: A Quantitative Approach - John Hennessy and David Patterson,
- Morgan Kaufmann Publishers Inc., Third Edition

DMCA 302 Operating Systems

Module I:
Evolution of operating systems:- Serial processing, Batch Processing, multiprogramming. Types of operating systems-Batch Operating System, Multi programming-Time sharing, Real time, distributed operating systems.
Operating Systems Structures:- Systems Components, Operating System Services, System Calls, System Programs, System Structures, Virtual Machines
Processor Management:- Job and process concept, Operating system view of processes, process-state transition diagram, PCB (Process control block), Threads, Operating system services. Process Scheduling:-Types of schedulers, scheduling and performance criteria, scheduling algorithms, multiple processor scheduling.
Module II:
**Inter process synchronization and communication**- Concurrent Processes- need for inter process synchronization, critical section problem, mutual exclusion-mutual exclusion algorithms, semaphores-definition busy wait implementation, monitors, inter process communication using messages.

**Deadlocks:** - Definition – Deadlock characterization-Resource allocation graph, methods for handling deadlocks, deadlock prevention, deadlock avoidance-safe state-resource allocation graph algorithm-Banker’s algorithm, deadlock detection, recovery from deadlock.

Module III:

**Memory Management**: - Preliminaries-address binding, dynamic linking and loading, Overlays. Logical versus physical address space, Swapping, Contiguous allocation Paging-principles of page allocation. Structure of page table-hardware support, multi level paging, hierarchical paging, inverted page table, shared pages. Segmentation-principles of operation, hardware, implementation of segment table, protection and sharing, fragmentation, segmentation with paging.

Module IV:
**Virtual Memory**- Demand paging – performance. Page replacement-page replacement algorithms. Thrashing, Segmentation and paging implementation of virtual memory, hierarchical address translation tables and MMUS.
**Device Management**: - Disk structure, Disk scheduling- FCFS-SSTF-C-Scan-Look, Disk management, Swap space management, Disk reliability.

Module V:
**File Management**:- File structure, File types, File access, File attributes, and File operations. Directories-Flat directory systems, hierarchical directory systems. File system implementation-Allocation methods-contiguous allocation, linked allocation, indexed allocation

References
- Milan Milenkovic „Operating systems” TATA Mc GrawHill.
DMCA 303 DATABASE MANAGEMENT SYSTEMS

MODULE I
Introduction to Database Systems and E-R Model
Overview, A Historical Perspective, Files System versus DBMS, Advantages of DBMS, Describing and storing data in a DBMS Transaction management, Structure of a DBMS, People who work with Databases, Overview of Database Design. Entities, Attributes and Entity Sets, Relationships and Relationship sets, Additional Features of E-R Model: Key Constraints. Conceptual Design with the E-R Model Overview of Unified Modeling Languages Recommended to use a couple of specific ER-Models (Chen Model, Yourdon Model etc)

MODULE II
Relational Model and Query Languages
Introduction to the Relational Model. Integrity Constraints over Relations :Primary Key, Foreign Key and General Constraints. E-R Model to Relational Model: Entity Sets to Tables, Relationship Sets to Tables, Translating, Relationship Sets with Key Constraints, Translating Relationship Sets with Participation Constraints, Translating Weak Entity Sets, Translating Class Hierarchies. Translating E-R Diagrams with Aggregation, Introduction to Query Languages, Relational Algebra: Selection and Projection Operations. Set Operations, Renaming, Joins, Division

MODULE III
Structured Query Language
Overview of SQL, Basic Queries in SQL, Union, Intersect and Except, Nested Queries, Aggregate Operators, Null Values, Number, String and Date Functions, Using user defined functions inside queries, Complex Integrity Constraints in SQL, Triggers and Views in SQL, Embedded SQL and Cursors

MODULE IV
Relational Database Design
Introduction to Schema Refinement, Functional Dependencies, Properties of Decomposition, Normal Forms: First Normal Form, Second Normal Form, Third Normal Form, Boyce Codd Normal Form, Fourth Normal Form, Fifth Normal Form

MODULE V
Transaction Management, Concurrency Control, Distributed System and Database Administration
The ACID Properties, Transactions and Schedules, Concurrent Execution

Introduction to Locking Management: Dealing with Deadlock. Introduction to ARIES, Introduction to Distributed Databases: Advantages & Disadvantages, Transaction Types – Local & Global Transactions, Distributed DBMS Architectures, Design of Distributed Databases: Replication, Fragmentation How to add users, space management of table spaces and objects

References

Concept of Database Management, Pratt, Thomson Learning, 5Edn.

DMCA 304 Accounting & Financial Management

Module I

Accounting and its Functions, Scope of Accounting, Emerging Role of Accounting, Accounting as an Information System, Role and Activities of an Accountant, Accounting Personnel, Nature of Accounting Function, Organization Chart for Accounting and Finance Accounting Framework, Accounting Concepts, Accounting Standards, Changing Nature of Generally Accepted, Accounting Principles (GAAP), Attempts towards Standardization, Accounting Standards in India

Module II

Module III

Preparation and Analysis of Final Accounts: Trading Account, Profit And Loss Account . Balance Sheet Constructing Balance Sheet Adjustment Entries

Module IV

Analysis of financial statement: Ratio Analysis- solvency ratios, profitability ratios, activity ratios, liquidity ratios, market capitalization ratios ; Common Size Statement ; Comparative Balance Sheet and Trend Analysis of manufacturing, service & banking organizations.

Module V


References
11) Accounting for Management, Srinivasan & Murugan, S.Chand & Company Ltd.
DMCA 305: VISUAL PROGRAMMING (VB)

Module 1
Introduction to Windows, GUI concept, Concept of Event-driven programming, The Visual Basic IDE (S,S0), Types of Visual Basic Projects, Visual Basic Editions, The Visual Basic Project Lifecycle, Project Files.

Module 2
Programming Elements - Data types- Constants- Variables- operators - user defined data types- Library Functions- Program Comments- Arrays - Dynamic Arrays- Strings- Enumerations. Logic Statements - Conditional Constructs (if / Then, Select Case),Iteration (Do Loop, For Loop, DoEvents- Exit, Stop and End. Functions and Subroutines-Arguments - ByVal vs. ByVal Parameters- Optional Arguments-Module Basics-Event Procedures- Class Modules. Types of Errors,Error handling, Creating Error Handlers- Debugging -Debugging Tools.

Module 3
Forms- Controls, Control arrays, menus, menu editor, Graphics programming, Simple animation SDI, MDI Applications Database Concepts- Visual data manager ,The ADO Data Control-Data Grid Control - DBList and DBCombo Controls -Data view Window-Data form Wizard - Data Environment Designer.

Module 4
Report using Crystal Reports, data environment - Reports using reports-Error handling -Creating Active X controls, Active EXE, Active X DLL.

Module 5
Introduction to the Web- Internet & Web Protocols- HTML, Structure of HTML documents, Attributes, Basic HTML Tags, Forms and Controls, VB Scripts, DHTML, DHTML object model,ASP,ASP object model.

References
1. Francesco Balena; Programming MS VB 6. 0, WP Publishers and Distributors (p) Ltd South Asian Edition.
3. Deitel& Detiel, T. R. Nieto; VB 6 How to Program, Pearson Education.
DMCA 306 SOFTWARE LAB-V (DBMS LAB)

Installation and configuration of Oracle Database
1 Table Design- Using foreign key and Normalization
2 Practice SQL Data Definition Language (DDL) commands
   a) Table creation and alteration (include integrity constraints
      such as primary key, referential integrity constraints, check, unique and null
      constraints both column and table level
   b) Other database objects such as view, index, cluster, sequence, synonym etc.
3 Practice SQL Data Manipulation Language (DML) commands
   a) Row insertion, deletion and updating
   b) Retrieval of data
      i) Simple select query
      ii) Select with where options (include all relational and logical operators)
      iii) Functions: Numeric, Data, Character, Conversion and Group functions with having clause.
         iv) Set operators
         v) Sorting data
         vi) Sub query (returning single row, multiple rows, more than one column, correlated sub query)
         vii) Joining tables (single join, self join, outer join)
   x) Data manipulations using date functions
   xi) User defined functions in a query
   xii) How to use hints in queries to optimize performance
   xiii) Manage ODBC/JDBC connections
4 Practice Transaction Control Language (TCL) commands (Grant, revoke, commit and save point options)
5 Usage of triggers, functions and procedures using PL/SQL constructs
6 Development of sample applications using Oracle as Back End Sample applications may include
   i) Payroll Information System
ii) Student Information System  
iii) Bank Transaction  
iv) Library Information System etc.  

7 How to take back up and restore using Oracle  
8 How to conduct query optimization in a database  

**DMCA 306 (SOFTWARE LAB-VI) Visual Programming Lab**  
1. Dialog based application  
2. Menus and keyboard  
3. Splitter window  
4. Document/view architecture  
5. Application using toolbar  
6. Activex control  
7. Data access through ODBC  

**Semester 4**  

**DMCA 401 Java and Web Programming**  

**Module I**  
Introduction to object oriented programming Brief History of Java, Feature of Java, JDK, Data Types, Operators, Control Structures in JAVA, Arrays, The JAVA Class, Constructor, Finalize, static & inner Classes.  

**Module II**  
Module III


Module IV


Module V

Networks & Layer of Networks , IP Address & Port Numbers ,URLs ,Client/Server Model, Socket Basics ,Server Socket ,Applets ,JDBC ,RMI .

References

- Java 6 by Rogers Cadenhead, Laura Lemay, Pearson education

DMCA 402 Microprocessors

Module 1 - The Processors : 8086
Module 2 - Instruction Set,Assembler Directives and Assembly Language Programming of 8086
Machine Language Instruction Formats – Instruction Set of 8086-Data transfer instructions,Arithmetic and Logic instructions,Branch instructions,Loop instructions,Processor Control instructions,Flag Manipulation instructions,Shift and Rotate instructions,String instructions,Assembler Directives and operators,Example Programs,Introduction to Stack, STACK Structure of 8086, Interrupts and Interrupt Service Routines, Interrupt Cycle of 8086, Non-Maskable and Maskable Interrupts, Interrupt Programming, MACROS.

Module 3 - Special Purpose Programmable Devices and their Interfacing
Data transfer schemes-programmed I/O, Interrupt I/O, DMA, DMA Controller 8257, Programmable Interval Timer 8253, Programmable Interrupt Controller 8259A, Programmable Communication Interface 8251 USART, Programmable Peripheral Interface 8255.

Module 4 – Architecture and Comparison of various Processors
80186,80286,80386,80486, Pentium Case Study on Advanced Multiprocessors

Module 5 - Microcontrollers

References


Microprocessor x86 Programming by K.R. Venugopal and Raj Kumar – BPB publications

Microprocessors and Microcomputer based system design by Mohamed Rafiqussaman.
DMCA 403 MULTIMEDIA SYSTEMS

Module I
Media and data streams - Medium, Properties of a multimedia system, Traditional data streams, Continuous data stream, Information Units. Sound concepts, Music - MIDI, MIDI Devices, MIDI and SMPTE timing standards, MIDI software. Speech - Generation, Analysis, Transmission.

Module II

Module III

Module IV
Multimedia DBMS- Characteristics, Data Structure, Operations, Database Model. Hypertext and Hypermedia, SGML, ODA, MHEG.

Module V
Synchronization- Notion of synchronization, Presentation requirements, Reference model for synchronization, Synchronization Specifications, Synchronization Case Studies- MHEG, HyTime, MODE, ACME.

References:

• Multimedia: Computing, Communications and Applications, Steinmetz & Nahrstedt, Pearson Education
• Multimedia communications, Fred Halsall, Pearson Education
• Multimedia Systems, Koegel Buford, Pearson Education
• Principles of MultiMedia, Renjan Parekh, Tata Mcgraw Hill Publicaton
• Fundamentals of MultiMedia, Li Ze-Nian, Drew Mark S., Prentice Hall
DMCA 404 Data Communications

Module I


Module II

Module III
Analog Transmission:- Modulation of Analog signals:- Analog to Analog modulation- Amplitude Modulation, Frequency Modulation, and Phase Modulation. Modulation of Digital Data – Bit Rate and Baud Rate, ASK, FSK, PSK, QAM. Modems. Multiplexing:- FDM, TDM, statistical TDM, WDM. Channelization:- FDMA, TDMA, CDMA.

Module IV

Module V
High-Speed Digital Access: DSL Technology-ADSL, xDSL, Spread Spectrum-Concept, Frequency Hopping, Direct Sequence

References

- Behrouz A Forougan, Data Communications and Networking, 4th ed. McGraw Hill

DMCA 405 MANAGEMENT INFORMATION SYSTEMS

Module I

Module II

Module III
Business Process Re-engineering, Value Stream Model, MIS and BPR, DSS, GDSS, Knowledge Management Systems, DSS in E-enterprises, Enterprise Management System, ERP, SCM, CRM, EMS and MIS.

Module IV
Technology of IS - Data Processing, Transaction Processing, OLAP, TQM, Networks - Topology, Data Communication, Unified Communications, Components of UC, WiMAX. Database- Database Models, Database Design,

Module V

References

- Management Information System, Davis & Olson, Tata McgrawHill Publication.
- Information system for Modern management, Murdick, Rose & Clogget, PHI Publications.

DMCA 406 SOFTWARE LAB VII (Java LAB)

- Program to illustrate class, objects and constructors
- Program to implement overloading, overriding, polymorphism etc
- Program to implement the usage of packages
- Program to create our own exception
- Program for handling file operation
- Implement the concept of thread programming
- Program to implement Generic class and generic methods
- Applet program for passing parameters
- Applet program for running an audio file
- Program for event-driven paradigm in Java
- Event driven program for Graphical Drawing Application
- Program that uses Menu driven Application
- Program to implement JDBC in GUI and Console Application
- Socket programming to implement communications
- Develop a multi-threaded applet of your choice.
References

- Java 6 by Rogers Cadenhead, Laura Lemay, Pearson education
- Java Network Programming, Elliote Rusty Harrold, Oreilly Publications

DMCA 407 SOFTWARE LAB VIII – (Microprocessors Lab)

I) Programs to get familiarized with Microprocessor Kit.
   - Program to implement various addressing modes like Immediate, Direct, Indexed, etc.
   - Program to find one’s complement of a 16 bit number.
   - Program to mask off bits selectively.
   - Program to perform addition of 2 16 bit numbers.
   - Program to perform division by 8 and multiplication by 16 using shift and rotate instructions.

ii) Program to display a message on screen using Code and Data Segment.

iii) Programs to perform arithmetic, logic, shift and string instructions.
a) Program to display ASCII code and character.
b) Program to read password and check the validity of the user.
c) Program to set and get the system date and time.
d) Program to implement delay routine.
e) Program to find sum of n numbers.
f) Program to implement 32 bit arithmetic operations.
g) Program to perform concatenation of 2 strings.

iv) Programs to implement modular programming using Stacks, subroutines, macros, etc.

1. Program to find factorial.
2. Program to find nCr.
3. Program to find the Fibonacci series.
4. Program to implement a 2 digit calculator.
5. Program to generate a real time clock.
6. Program to perform sorting.

v) Programs for display/video manipulation.

a) Program to read a string at location (x1,y1) and display at video location (x2,y2).
b) Program to clear a portion of a screen.

vi) Programs to get familiarized with DOS and BIOS interrupts.
i) Program to display the current working directory.

ii) Program to change the working directory.

*Note:* A minimum of 20 programming examples have to be done.

**References:**


2. The Intel Microprocessors 8086/8088, 80186/188, 80286, 80386, 80486, Pentium & Pentium Pro Processor Architecture, Programming and Interfacing - Barry B. Brey – PHI Edition


**S5 Semester**

**DMCA 501 OPERATIONS RESEARCH**

**Module I**
Linear programming problems - Mathematical formulation, graphical method of solution, simplex method

**Module II**
Duality in linear programming problems, dual simplex method, sensitivity analysis, transportation and assignment problems, Traveling salesman Problem.

**Module III**
Game theory Introduction, two-person zero-sum games, some basic terms, the maxmini-minimax principle, games without saddle points-Mixed Strategies, graphic solution of 2 *n and m*2 games, dominance property. CPM & PERT- project scheduling, critical path calculations, Crashing.

**Module IV**
Queueing theory -basic structure of queueing systems, roles of the Poisson and
exponential distributions, classification of queues basic results of M/M/1: FIFO systems, extension to multi-server queues.

Module V
Simulation: simulation concepts, simulation of a queuing system using event list, pseudo random numbers, multiplication congruential algorithm, inverse transformation method, basic ideas of Monte-Carlo simulation.

References


DMCA 502 PHP Programming

Module 1
PHP Basics- Syntax, Operators, Variables, Constants, Control Structures, Language Constructs and Functions.

Module 2
Functions- Syntax, Arguments, Variables, References, Returns, Variable Scope Arrays- Enumerated Arrays, Associative Arrays, Array Iteration, Multi-Dimensional Arrays, Array Functions, SPL.

Module 3
Object Oriented Programming- Instantiation, Modifiers/Inheritance, Interfaces, Exceptions, Static Methods & Properties, Autoload, Reflection, Type Hinting, Class Constants.

Module 4
Strings and Patterns- Quoting, Matching, Extracting, Searching, Replacing, Formatting

Module 5
Web Features- Sessions, Forms, GET and POST data, Cookies, HTTP Headers Databases and SQL - SQL, Joins, Analyzing Queries, Prepared Statements, Transactions. Streams and Network Programming- Files,
DMCA503 LINUX AND SHELL PROGRAMMING

Module I

Module II
Basics of shell programming, various types of shell available in Linux, comparisons between various shells, shell programming in bash - Conditional and looping statements, Iterations, Command Substitution - expr command, arithmetic expansion, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automating system tasks.

Module III
Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator, Managing user accounts - adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disabling of users accounts, creating and mounting file system.

Module IV
Checking and monitoring system performance - file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions
& sizes, users, kernel. Installing and removing packages. Backup, restore and Compress utilities - tar, cpio, dump, rsync and restore utilities,

Module V

Communication in Linux - mesg, who- T, talk, write, wall, finger, chfn, ping, traceroute utilities, email facilities. Configuration of servers- Telnet, FTP, DHCP, NFS, SSH, Proxy Server(Squid), Web server (Apache), Samba. Daemons-init, crond, atd, xinetd, inetd, the services file. named, sshd, httpd.

References

Operating System - Linux, NUT Press, PHI Publisher, 2006 Edition Red Hat Linux Bible, Cristopher Negus, Wiley Dreamtech India

UNIX Shell Programming by YeswantKanetkar, BPB

Linux Administration Handbook, EviNemeth, Garth Snyder, Trent KHein - Pearson Education.

Beginning Linux Programming by Neil Mathew & Richard Stones, Wiley Dreamtech India

DMCA504 COMPUTER NETWORKS

Module I

Networking Concepts: Simplified network model. Classification of networks: LAN, MAN, WAN and the Internet. Protocols and protocol architecture. The OSI ref. Model, TCP/IP ref. model, its origin, the Internet layer, the TCP layer, the application layer. Comparison of the OSI and TCP/IP ref. models. A critiques of the OSI model and protocols, A critique of the TCP/IP ref. model, Novel Netware.

Data Link Layer: Need for data link control, Frame synchronization - flag fields, bit stuffing, flow control - stop and wait, sliding window protocol, error detection - parity check, CRC, Error control - Stop and wait ARQ, Go back-N ARQ, HDLC protocol, other data link protocols - LAPB, LAPD.

Module II

LAN systems: Traditional Ethernet:- MAC sub layer access method (CSMA/CD), IEEE 802.3 MAC frame, Addressing physical layer, Physical Layer, Physical Layer Implementation, Bridged Ethernet, Switched Ethernet, Full-Duplex Ethernet.


Module III


Module IV

Network Layer: Services of NW layer, Routing: Characteristics, performance criteria, routing strategies: fixed routing, flooding, random routing, Adaptive routing, congestion control,


Module V

High Speed Switched WANs.


Transport Layer: Services, elements of transport protocol, simple transport protocol.

References

Andrew S Tanenbaum- Computer Networks - Fourth Edition- PHI.
William Stallings - Wireless Communications and Networks-Pearson Education.

DMCA505 SOFTWARE ENGINEERING

Module 1 The Software Process

Module II Modeling and Design
Understanding Requirements, Requirements Modeling: Scenarios, Information, and Analysis Classes, Requirements Modeling for WebApps, Design Concepts, Software Architecture : Definition, Importance and Styles, User Interface Design

Module III Quality Management
Quality Concepts, Review Techniques, Software Quality
Assurance, Software Configuration Management, Product Metrics

**Module IV Testing**

**Module V Project Management**
Project Management Concepts, Process and Project Metrics, Estimation for Software Projects, Project Scheduling, Risk Management

**References**
- Schach, S., Software Engineering, TMH, 7th Ed., 2007
- Humphrey, W.S., Managing the Software Process, Addison Wesley, 1999

**DMCA 506 SOFTWARE LAB IX (PHP LAB)**

1) Reverse of a number
2) Prime numbers upto a given range.
3) Check whether a given number is Armstrong or not.
4) Print Fibnoccic series
5) Sort an array using functon
6) Validate date, mobile no and email id entered by the user
7) Display the current date in different formats
8) Create a simple integer array and perform search operation in it
9) Create an associate array with values and sort in ascending and descending order
10) Upload a file and store it in server.
11) String operations of an inputted string
12) File operations
13) Implement cookies
14) Implement creation of session & destroy the session in a web page.
15) Display the contents of a directory including its subdirectories
16) File or directory searching.
17) Implement OOPs concept.
18) Demonstrate the concept of constructor and destructor using object oriented programming
19) Demonstrate inheritance in PHP
20) Implement Database Connectivity
21) Implement web application using PHP

**DMCA507 SOFTWARE LAB X (Linux and Shell Programming Lab)**

1) Installation of Linux, network based installation

Basic Overview of various commands- cal, pwd, cd, ls, mv, cd, cp, rm, mkdir, rmdir, more, less, touch. Creating and viewing files using cat, file comparisons, disk related commands, checking disk free spaces. Batch commands, kill, ps, who, Printing commands, find, sort, touch, file, file processing commands- wc, cut, paste etc - mathematical commands - expr, factor etc.

2) Filter commands- pr, head, tail, cut, sort, uniq, tr - Filter using regular expression grep, egrep, sed, awk


4) Process Management with Linux, File System management, User Administration, Linux
5) Start up and Shutdown, Software package Management


References
- Operating System - Linux, NUT Press, PHI Publisher, 2006 Edition
- Red Hat Linux Bible, Cristopher Negus, Wiley Dreamtech India
- UNIX Shell Programming by YeswantKanetkar, BPB
- Linux Administration Handbook, EviNemeth,Garth Snyder, Trent KHein - Pearson Education.
- Beginning Linux Programming by Neil Mathew & Richard Stones, Wiley Dreamtech India
- Frame Relay and ATM-Fourth Edition - Pearson Education.

S6 Semester

DMCA 601 OBJECT ORIENTED MODELING AND DESIGNING

Module I
Introduction and Inception Object – Oriented Analysis and Design, Iterative Development, Inception , Evolutionary Requirements ,Use Cases and Other Requirements Artifacts

Module II
Elaboration - Iteration 1 Iteration 1 Basics, Domain Models , System Sequence Diagrams , Operation Contracts Requirements to design, Logical Architecture and UML Package Diagrams, Object Design , UML Interaction Diagrams ,UML Class Diagrams

Module III
Design Patterns and Elaboration - Iteration 1 continued Objects and Responsibilities - Grasp , Object Design Examples , Visibility and Design , Mapping Designs to Code , Test Driven Development and Refactoring
Module IV
Elaboration - Iteration 2 and Patterns continued Iteration 2 Basics, UML Tools and UML as Blueprint, Quick Analysis Update, GRASP: More Object Design, GoF Patterns

Module V

References


Martin Fowler et al., UML Distilled, Pearson Education, 2002


The Unified Modeling Language Reference Manual., Rumbaugh, Jacobson and Booch., Addison-Wesley

DMCA 602 IT INFRASTRUCTURE MANAGEMENT

Module 1
INFRASTRUCTURE MANAGEMENT OVERVIEW: Definitions, Infrastructure management activities, Evolutions of Systems since 1960s (Mainframes-to-Midrange-to-PCs-to-Client-server computing-to-New age systems) and their

Module 2
PREPARING FOR INFRASTRUCTURE MANAGEMENT: Factors to consider in designing IT organizations and IT infrastructure, Determining customer’s Requirements, Identifying System Components to manage, Exist Processes, Data, applications, Tools and their integration, Patterns for IT systems management, Introduction to the design process for information systems, Models, Information Technology Infrastructure Library (ITIL).

Module 3
SERVICE DELIVERY PROCESSES: Service-level management, financial management and costing, IT services continuity management, Capacity management, Availability management.

Module 4
SERVICE SUPPORT PROCESSES: Configuration Management, Service desk, Incident management, Problem management, Change management, Release management.

Module 5

References
Sjaak Laan, IT Infrastructure Architecture- infrastructure building blocks and concept, Lulu Com 2013
Manish Mahajan, Shikha Gupta, IT infrastructure and management
Phalguni Gupta, Surya Prakash, Umarani Jayaraman, IT infrastructure and its management
DMCA 603(A) – E-Commerce

(Elective-I)

Module I
INTRODUCTION -Traditional commerce and E commerce – Internet and WWW – role of WWW – value chains – strategic business and Industry value chains – role of E commerce.

Module II
INFRASTRUCTURE FOR E COMMERCE

Module III
WEB BASED TOOLS FOR E COMMERCE

Module IV
SECURITY

Module V
1. INTELLIGENT AGENTS
   Definition and capabilities – limitation of agents – security – web based
marketing
search engines and Directory registration – online advertisements –
Portables and info mechanics – website design issues.

References

Ravi Kalakota, “Electronic Commerce”, Pearson Education,

Gary P Schneider “Electronic commerce”, Thomson learning &

Manlyn Greenstein and Miklos “Electronic commerce”

Efraim Turvan J.Lee, David kug and chung, “Electronic


DMCA 603(B) – Client Server Computing

Elective -I

Module 1

Overview of C/S Computing: Definition, Benefits & Evolution, Hardware &
Software, Trends, Evolution of operating systems, networking trends. Overview of
C/S applications: components, classes, categories. Overview of C/S computing:
Dispelling the Myths, Obstacles- Upfront and hidden, open systems and standards,
Standards setting organizations, factors of success.

Module II

Client hardware and software: Client components and operating systems. What is
GUI?,Xwindow vs. windowing, database access. Application logic client software
products: GUI environments, converting 3270/5250 screens, database access tools.
Client requirements: GUI design standards, Open GUI standards, Interface
dependents, testing interfaces, development aides.

Module III
Server hardware: Benchmarks, categories of servers, features and classes of server machines. Server Environment: eight layers of software, network management and computing environments, extensions, network operating systems, loadable modules. Server operating systems: OS/2, Windows new technology, UNIX based operating systems.

Module IV
Server Requirements: Platform independence, transaction processing, connectivity, intelligent database, stored procedures, Triggers, Load Leveling, Optimizer, testing and diagnostics tools, real ability backup and recovery mechanisms.

Module V
Server data management and access tools: Data manager features, data management software, database gateways. LAN hardware and software, Network Operating Systems.

References
Dawna Travis Dewire , Client Server Computing, McGraw Hill International
Tanenbaum and Van Steen, Distributed Systems Principles and Paradigms, Pearson Education, 2005
Jeffrey.D.Schan, C/S Application and Architecture, Novell Press, BPB
Joe Salami, Guide to C/S Databases, Bpb Publn., 1994

DMCA 603(C) BIOINFORMATICS

(Elective I)

Module I
Biology for Bioinformatics :- Basic concepts - cells- Archaebacteria, Biomembranes, Nucleus, Organelles, Mitochondria, Chloroplasts, Viruses,
BacterioPhage, Genetic contents of a cell - Viral Proteins - Amino acid, DNA and RNA - Forms of DNA.

**Module II**

**Genetic Code** :- Genome - Gene Expressions - Protein Synthesis - Transcription RNA - Processing- Capping- Splicing - Editing, Cell Signaling, DNA cloning Genomic library - cDNA library - Probes - Screening.

**Module III**

**Databases** :- Characteristics of Bioinformatics, Database - Categorizing, Navigating, Information Retrieval systems, Sequence Databases, Structure Databases.

**Module IV**

**Other Databases** :- Enzyme Databases, MEROPS, BRENDA, Pathway Databases: CAZy, Disease Databases, Literature Databases, Other specified Databases.

**Module V**

**Python for Bioinformatics.**

**References**

BIOINFORMATICS Databases, Tools and Algorithms, Orpita Bosu, Simminder Kaur Thukral., Oxford University Press.

Learning Python., Mark Lutz & david Ascher., O'Reilly.
