SCHEME OF EXAMINATION

&

DETAILED SYLLABUS

For

B.Sc Computer Science

(W.e.f. 2019 – 2020)

KALINGA UNIVERSITY
RAIPUR

FACULTY OF INFORMATION TECHNOLOGY

Kalinga University, Naya Raipur, Chhattisgarh

Kalinga University, Raipur
B.Sc Computer Science (3 Years Programme)
w.e.f 2019-20 session

Code No.	Paper	Credits	External Marks	Internal Marks	Total Marks
SEM I					
BCS101	Mathematics - I	4	70	30	100
BCS102	Communicative English-I	4	70	30	100
BCS103	Programming with C	4	70	30	100
BCS104	Fundamentals of Information Technology	4	70	30	100
BCS105-P	Fundamentals of Information Technology Lab	1	30	20	50
BCS106-P	Programming in C –Lab	1	30	20	50
	Total	**18**	**340**	**160**	**500**
SEM II					
BCS201	Mathematics - II	4	70	30	100
BCS202	Object Oriented Programming in C++	4	70	30	100
BCS203	Digital Electronics	4	70	30	100
BCS204	Data Structures using C	4	70	30	100
BCS205	Database Management Systems	4	70	30	100
BCS 206	Communicative English -II	4	70	30	100
BCS207-P	Programming in C++ -Lab	1	30	20	50
BCS208-P	Oracle Lab	1	30	20	50
	Total	**26**	**480**	**220**	**700**
SEM III					
BCS301	System Software	4	70	30	100
BCS302	Operations Research	4	70	30	100
BCS303	Visual Programming	4	70	30	100
BCS304	Principles of Electrical Communications	4	70	30	100
BCS305	Computer Organisation and Architecture	4	70	30	100
BCS 306	Communicative English -III	4	70	30	100
BCS307-P	VB Lab	1	30	20	50
	Total	**25**	**450**	**200**	**650**
SEM IV					
BCS401	Data Communication	4	70	30	100
BCS402	Discrete Mathematics	4	70	30	100
BCS403	Microprocessor and its Applications	4	70	30	100
BCS404	Computer Network &Internet	4	70	30	100
BCS405	Operating System	4	70	30	100
BCS406-P	Microprocessor – Lab	1	30	20	50
	Total	**21**	**380**	**170**	**550**
SEM V					
BCS501	Computer Aided Optimization Techniques	4	70	30	100
BCS502	System Analysis &Design	4	70	30	100
BCS503	Java Programming & Internet	4	70	30	100
BCS504	Linux and PHP	4	70	30	100
BCS505	Internet, Web Designing and Cyber Laws	4	70	30	100
BCS506-P	Linux Programming (Lab)	1	30	20	50
BCS 507-P	Project in Java Lab	1	30	20	50
	Total	**22**	**410**	**190**	**600**

SEM VI					
BCS601	Parallel Processing	4	70	30	100
BCS602	Computer Graphics and Multimedia	4	70	30	100
BCS603	Environmental Science	3	70	30	100
BCS604	**Elective :**	4	70	30	100
BCS604A	Data Mining				
BCS604B	Client Server Computing				
BCS605-P	Project + Course Viva	6	70	30	100
	Total	**21**	**350**	**150**	**500**

Program Educational Objectives

PEO 1. Graduates of the program will be a successful professional and quick learner in diverse fields of Computer Science.
PEO 2. Graduate of the program will be capable to adapt innovative computing technology.
PEO 3. Graduate of the program will develop effective leadership and communication skills so as to work harmoniously work as a team member.
PEO 4. Graduates of the program will work productively as a Computer professional to develop and test Computer Software and Applications using Modern Tools.
PEO 5. Graduate of the program will be capable of ethical responsibility and work for the betterment of the society.

Program Outcomes

PO 1. Ability to apply knowledge of Computer Science and its Applications.
PO 2. An ability to design, implements, and evaluate a computer based system to meet desired needs within realistic constraints.
PO 3. An ability to identify, formulate, and develop solutions to computational challenges.
PO 4. An ability in the understanding of professional, ethical, legal, security and social issues and responsibilities.
PO 5. An ability to function effectively in teams and individually to accomplish a common goal.

Program-Specific Outcomes

PSO 1. An ability to use innovative tools, techniques and skills necessary for developing multidisciplinary projects.
PSO 2. Ability to use knowledge gained for solving complex problems using Computational sciences.

SEMESTER – I

BCS101

Mathematics – I

Course Objective

The course is aimed to develop the basic Mathematical skills of engineering students that are imperative for effective understanding of engineering subjects. The topics introduced will serve as basic tools for specialized studies in many fields of engineering and technology. i.e.: Matrices, Partial Derivatives, Complex Numbers, Intermediate forms and Taylor Series, Successive differentiation and Numerical methods.

Course Outcomes

CO 1. Solve linear system equation
CO 2. Determine the Eigen values and vectors of a matrix
CO 3. Determine the power series expansion of a function
CO 4. Estimate the maxima and minima of multivariable functions.
CO 5. Solve any given first order ordinary differential equation.
CO 6. Solve any higher order linear ordinary differential equation with constant coefficients.

Unit I

Basics of Counting: Permutations and Combination, Concept of Factorial, Principle of Counting, Permutation with Restriction, Circular Permutation and Combination with Restriction; Mathematics Induction: Principle, Sequences & Series -A.P. & G.P.

Unit II

Linear Algebra: Determinants; Minors and Co-factors, Laplace Expansions; Matrices-Special types; operations, Rank and Elementary Transformations; Inverse and Normal form; Consistency of linear system of equations (Up to three variables); Application to Business Problems.

Unit III

Differential Calculus: Concepts of function, limit and continuity, graphs of functions, definition of derivative; Derivative as a Rate Measure and Measure of slope; Functions of more than one variable; Partial Derivatives(up to second order); Homogenous Functions and Euler's Theorem; Differentiation of Implicit functions; Maxima-minima of Functions of one and two variables; Applications in Business Problems.

Unit IV

Integral Calculus: Concept of Integration- as anti-derivative process; Standard forms; Methods of integration- by substitution, by parts, and partial fractions; Definite integration; Finding areas in simple cases; Consumers' and producers' surplus.

Reference Books:

1. Trivedi C. and Kashyap Trivedi, (2010), Business Mathematics, 1st edition, Pearson Education.
2. Hazarika, P. (2010), A textbook of Business Mathematics, S. Chand Publication
3. Holden, (2011), Introductory Mathematics for Business and Economics, 1st Edition, Palgrave Publication.
4. Tuttle, Michael, D., (2008) Practical Business Math: An Applications Approach, 8th Edition, Prentice Hall.
5. Bradley, T. and Paul Patton, (2006) Essential Mathematics for Economics and Business, 2nd Edition, Wiley India Pvt. Ltd.

6. Stanley A, Salzman, Charles D. Miller and Gary Clendenen, (2011), Business Mathematics, Addison Wesley Longman Publication

BCS102

Communicative English-I

Course Objective

Ensure of understanding of the basics of communication through English, application of the various models of verbal and non-verbal communication in the social and professional sphere, the rules of phonology and its application, understanding the basics of grammar to improve communication and speak a neutral and correct form of English.

Course Outcomes

CO 1. Acquire knowledge about the various principles of communication, understand its various stages and the role of audience and purpose, deal with the barriers that affect communication in a professional set up.
CO 2. Understand the different channels that are functional at the work place.
CO 3.Learn the importance of verbal and non-verbal communication in the professional world along with its uses.
CO 4.Learning the uses and application of RP to improve pronunciation.
CO 5. Importance of syntax for cultivating effective language skills.

Unit-I
Fundamental of Grammar and their Usage: How to Improve Command over Spoken and Written English with Stress on Noun, Verb, Tense and Adjective. Sentence Errors, Punctuation, Vocabulary Building to Encourage the Individual to Communicate Effectively, Common Errors in Business Writing.

Unit-II
Introduction to Business Communication: Basic Forms of Communication, Process of Communication, Principles of Effective Business Communication, 7Cs; Media of Communication: Types of Communication: Barriers of Communication (Practical exercise in communication)

Unit-III
Business letter writing: Need, Functions and Kinds, Layout of Letter Writing, Types of Letter Writing: Persuasive Letters, Request Letters, Sales Letters, Complaints and Adjustments;

Unit-IV
Departmental Communication: Meaning, Need and Types: Interview Letters, Promotion. Letters, Resignation Letters, News Letters, Circulars, Agenda, Notice, Office Memorandums, Office Orders, Press Release.

Unit-V
Business Etiquettes and Public Speaking: Business Manners. Body Language Gestures, Email and Net Etiquettes, Etiquette of the Written Word, Etiquettes on the Telephone, Handling Business Meetings; Introducing Characteristic, Model Speeches, Role Play on Selected Topics with Case Analysis and Real Life Experiences.

Reference Books:

1. Boove, C.L., Thill, J.V., and Chaturvedi, M., (2009) Business Communication Today, Pearson Education.
2. Murphy and Hildebrandt, (2008) Effective Business Communication, McGraw Hill Education.
3. Krizan, A. C. Buddy, and Merrier, Patricia (2008) Effective Business Communication, 7th Edition, Cengage Learning.
4. Lesikar, (2009), Business Communication: Making Connections in a Digital World, McGraw Hill Education.
5. McGraw, S. J., (2008) Basic Managerial Skills for All, 8th edition, Prentice Hall of India.
6. Wren & Martin, (2008), English Grammar and Composition, Sultan chand & Sons.

BCS103

Programming with C

Course Objective

Learn how to solve common types of computing problems. Learn data types and control structures of C. Learn to map problems to programming features of C. Learn to write good portable C programs.

Course Outcomes

CO 1. Appreciate and understand the working of a digital computer.
CO 2. Analyze a given problem and develop an algorithm to solve the problem. Improve upon a solution to a problem.
CO 3. Use the 'C' language constructs in the right way.
CO 4. Design, develop and test programs written in 'C'

UNIT I
C basics: C character set, Identifiers and keywords, Data types, constants, variables and arrays, declarations, expressions statements, symbolic constants, compound statements, arithmetic operators, unary operators, relational and logical operators, assignment operators, conditional operators, bit operators.

UNIT – II
C constructs: If statement, if….else statement, if…..else if….else statement, while statement, do….while statement, for statement, switch statement, nested control statement, break operator, continue operator, comma operator, goto statement.

UNIT – III
C Functions: Function: declaration, definition & scope, recursion, call by value, call by reference. Storage Classes: automatic, external (global), static & registers.

UNIT – IV
Arrays: Arrays, Array Declaration, Syntax of Array Declaration, Size Specification , Array Initialization, Initialization of Array Elements in the Declaration, Character Array Initialization, Subscript, Processing the Arrays, Multi-Dimensional Arrays, Multi-Dimensional Array, Declaration pointers, array & pointer relationship, pointer arithmetic, dynamic memory allocation, pointer to arrays, array of pointers, pointers to functions, array of pointers to functions, Preprocessor directives: #include, #define, macro's with arguments, the operators # and ##, conditional compilations, multiple file programming.

UNIT – V
Structures: Structures, unions, structure passing to functions, bit fields, file handling [text (ascii), binary], Standard library functions from stdio.h, stdlib.h, conio.h, ctype.h, math.h, string.h, process.h.

Text Book:

1. Yashwant Kanetkar, “Let us C”, BPB Publications, 2002

Reference Books:

1. E. BalaGuruswamy, “Programming in ANSI C”, TMH, 1999.
2. Al Kelly and Ira Pohl, “A Book on C”, (4th Ed.), Addison Wesley, 1999.
3. B. Kernighan and D. Ritchie, “The ANSI C Programming Language”, PHI., 2000.

BCS104

Fundamentals of Information Technology

Course Objective

The main objective is to introduce IT in a simple language to all undergraduate students, regardless of their specialization. It will help them to pursue specialized programs leading to technical and professional careers and certifications in the IT industry. The focus of the subject is on introducing skills relating to IT basics, computer applications, programming, interactive medias, Internet basics etc.

Course Outcomes

CO 1. Understand basic concepts and terminology of information technology.
CO 2. Have a basic understanding of personal computers and their operations.
CO 3. Be able to identify issues related to information security.

UNIT – I
Introduction to Computers:
The evolution of computers - Computer Generation from First Generation to Fifth Generation, Classifications of Computers - Micro, Mini, Mainframe and Super Computers, Distributed Computer System, Parallel Computers.

Computer Hardware – Major Components of a Digital Computer, Block Diagram of Computer, Input-Output devices, Description of Computer Input Units, Output Units, CPU, Current trends in I/O

Computer Memory - Memory Cell, Memory Organization, Read Only Memory, Serial Access Memory, Physical Devices Used to construct Memories, Magnetic Hard disk, floppy Disk Drives, Compact Disk Read Only Memory, Magnetic Tape Drives, What is the need of memory hierarchy? Memory Hierarchy with examples of each level , Current trends in memory

UNIT – II
Number System:
Decimal, Binary, Octal, Hexa-decimal. Conversion - Decimal to all other number systems, Binary to octal and Hexa Decimal, Addition of binary numbers, Binary subtraction, Use of complements to represent negative numbers, Conversion of a binary fraction to a decimal fraction and decimal to binary fraction, Binary Coded Decimal(BCD), ASCII Codes, EBCDIC codes, Gray codes, Unicodes.

Algorithm and Flowcharts:
Algorithm: Definition, Characteristics, Advantages and disadvantages, Examples
Flowchart: Definition, Define symbols of flowchart, Advantages and disadvantages, Examples

UNIT – III
Computer Software:
System software, assemblers, compilers, interpreters, linkers Elementary , Operating System concepts, different types of operating systems, Application Software.
Introduction to MS Office (MS-Word, MS PowerPoint, MS-Excel)
Computer Programming and Languages: Algorithms, flow chart, decision tables, pseudo code, Low level languages and introduction to high level languages.

UNIT – IV

Data Communication and Computer Networks:
Data Transmission mode, Data transmission media, Digital and Analog Transmission
What is computer Network? Network types, Network Topologies, Communication Protocol, OSI Model

UNIT - V
The Internet:
Definition, Brief History, Network Types (LAN, WAN and MAN), Client and Servers, Intranet, Extranet. Basic Services, Email, File Transfer Protocol, Telnet, Usenet News, Terminologies related to Internet: Protocol, Domain name, IP address, URL, World Wide Web.
Overview of various services on Internet: E-mail, FTP, Telnet, Chat, Instant Messaging
Internet Search Tools: Gopher, Archie, World Wide Web.
WWW Browsers: Line Browsers, Graphical Browsers, Java Enabled Browsers.
Uses of the Internet: Internet Service Providers and Types of Internet Connection: Direct/Leased line Connection, Remote Dial up Connection, SLIP/PPP Connection

Text Books:

1. Alex Leon & Mathews Leon, "Fundamentals of Information Technology", LeonTechworld, 1999.
2. Vikas Gupta, "Comdex Computer Kit", Wiley Dreamtech, Delhi, 2004
3. P. K. Sinha & Priti Sinha , "Computer Fundamentals", BPB Publications, 1992.

Reference Books:

1. V. Raja Raman, "Introduction to Computers", PHI, 1998.
2. Alex Leon & Mathews Leon, "Introduction to Computers", Vikas Publishing House, 1999.
3. Norton Peter, "Introduction to computers", 4th Ed., TMH, 2001.

BCS105-P

Fundamentals of IT Lab

MS-WORD

1. Text Manipulations
2. Usage of Numbering, Bullets, Tools and Headers
3. Usage of Spell Check and Find and Replace
4. Text Formatting
5. Picture Insertion and Alignment
6. Creation of Documents Using Templates`
7. Creation of Templates
8. Mail Merge Concept
9. Copying Text and Picture From Excel
10. Creation of Tables, Formatting Tables
11. Splitting the Screen
12. Opening Multiple Document, Inserting Symbols in Documents

MS-EXCEL

1. Creation of Worksheet and Entering Information
2. Aligning, Editing Data in Cell
3. Excel Function (Date, Time, Statistical, Mathematical, Financial Functions)
4. Changing of Column Width and Row Height (Column and Range of Column)
5. Moving, copying, Inserting and Deleting Rows and Columns
6. Formatting Numbers and Other Numeric Formats
7. Drawing Borders Around Cells
8. Creation of Charts Raising Moving
9. Changing Chart Type
10. Controlling the Appearance of a Chart

MS -POWER POINT

Working With Slides

1. Creating, saving, closing presentation
2. Adding Headers and footers
3. Changing slide layout
4. Working fonts and bullets
5. Inserting Clip art: working with clipart,
6. Applying Transition and animation effects
7. Run and Slide Show

DOS

1. Basics of DOS
2. DOS (Internal & External Commands)
3. Use of Wild Card Character

BCS106-P `

Programming in C –Lab

Programs using Basic Constructs: Fundamental data types, qualifiers- long, short, unsigned, input/output functions – scanf(), printf(), Arithmetic expressions, Evaluation of integer, real and mixed mode arithmetic expressions, truncation effect, type casting, relational and logical expressions, Conditional operators, trigonometric functions- sin(), cos(), tan(), mathematical functions – abs(), sqrt(), round() defined in math.h, printing formatted outputs using width specifier.

Programs using control structures: if, switch, for, while, do…while, nested structures, break and continue. Sample programs should include printing of Fibonacci numbers, prime numbers, check for armstrong numbers, summation series – exp(x), sin series etc and verification of result using built in functions, printing pyramid like pattern & other similar patterns using nested loops.

Programs using Arrays: Array based programs – Creation of array containing prime numbers, matrix addition, matrix multiplication, transpose of a matrix, array sorting, preparing rank lists based on marks, searching of arrays(linear) for finding price of an item. static initialization of arrays.

String manipulation programs : reading strings using %s, gets(), getchar(), copying one string into another, counting number of characters, vowels, words etc, searching for substring, string manipulation using functions in string.h and ctype.h.

User Defined Functions: Programs using return type functions, void type functions, example program using recursive functions, array sorting program using function with call by reference, function to copy one string into another, menu driven program using modular approach in programming.

Program using structures: array of structures, dictionary search program using structure containing arrays and array of structures.

Program using pointer : initialization, pointer arithmetic - swap function to interchange two locations, array manipulation using pointers- sorting list of names using pointer array, string handling using pointers, Simple program using dynamic memory allocation.

Program to create a data file, reading a data file , search for record(serial search) and displaying report, simple program using command line arguments- to copy one file into another by giving file names as arguments, sorting list of names provided at command line.

SEMESTER – II

BCS201

Mathematics – II

Course Objective

To introduce the basic concepts required to understand, construct, solve and interpret differential equations. To teach methods to solve differential equations of various types. To give an ability to apply knowledge of mathematics on engineering problems

Course Outcomes

CO 1. Solve linear differential equations using Laplace transforms.
CO 2. Evaluate multiple integrals and improper integrals.
CO 3. Convert line integrals to area integrals.
CO 4. Convert surface integrals to volume integrals.
CO 5. Determine potential functions for irrotational force fields.

UNIT-I
Basic Statistics: Measure of Central Tendency, Preparing frequency distribution table,Mean, Mode, Median, Measure of Dispersion: Range, Variance and Standard Deviations, Correlation and Regression.

UNIT-II
Algorithm: Algorithms, merits and demerits, Exponentiation, How to compute fast exponentiation. Linear Search, Binary Search, "Big Oh" notation, Worst case, Advantage of logarithmic algorithms over linear algorithms, complexity.

UNIT-III
Graph Theory: Graphs, Types of graphs, degree of vertex, sub graph, isomorphic and homeomorphic graphs, Adjacent and incidence matrices, Path Circuit ; Eulerian, Hamiltonian path circuit.

UNIT-IV
Tree: Trees, Minimum distance trees, Minimum weight and Minimum distance spanning trees.
Recursion: Recursively defined function. Merge sort, Insertion sort, Bubble sort, and Decimal to Binary.

UNIT-V
Recurrence Relations: Linear Homogeneous Recurrence Relation, Recursive procedures.
Number Theory: Principle of Mathematical induction, GCD, Euclidean algorithm, Fibonacci numbers, congruences and equivalence relations, public key encryption schemes.

Reference Books :

1. Gupta S.P. and Kapoor, V.K., Fundamentals of Applied statistics, Sultan Chand & Sons, 1996.
2. Gupta S.P. and Kapoor, V.K., Fundamentals of Mathematical statistics, Sultan Chand and Sons, 1995.
3. Graybill, Introduction to Statistics, McGraw.
4. Anderson, Statistical Modelling, McGraw.
5. Babu Ram : Discrete Mathematics

BCS202

Object Oriented Programming in C++

Course Objective

To get a clear understanding of object-oriented concepts. To understand object oriented programming through C++. To learn the basic principles of object-oriented design and software engineering in terms of software reuse and managing complexity. To enhance problem solving and programming skills in C++ with extensive programming projects.

Course Outcomes

CO 1. Gain the basic knowledge on Object Oriented concepts.
CO 2. Develop applications using Object Oriented Programming Concepts.
CO 3. Demonstrate the differences between traditional imperative design and objectoriented design.
CO 4. Explain class structures as fundamental, modular building blocks.
CO 5. Understand the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code.
CO 6. Write small/medium scale C++ programs with simple graphical user interface.
CO 7. Understand the file handling and error handling machanisms in C++.
CO 8. Get knowledge to use strings and Streams in C++.
CO 9. Implement features of object oriented programming to solve real world problems

UNIT-I
Introduction : Objects, object oriented development, object oriented methodology, object oriented models, object oriented themes, modeling

UNIT-II
Object Modeling, objects and classes, links and association, advanced links and association concepts, generalization and inheritance, Concept of Reusability, Types of Inheritance, Single and Multiple Inheritance, Multilevel,Inheritance. grouping constructs, dynamic modeling, functional modeling

UNIT-III
Object Oriented language C++: structure of C++ program, basic and user defined data types, functions in C++, the main function, function prototyping, call by reference, return by reference, function overloading, friend and virtual functions, classes and objects, specifying a class, defining member functions, nesting of member functions, private member functions, arrays within a class, static data members, static member functions, Arrays of objects, objects as function arguments.

UNIT-IV

Constructors and Destructors: Copy constructor, dynamic constructor, destructors, operator overloading, inheritance, defining derived classes-, single, multiple, multilevel, hierarchical and hybrid inheritance, virtual base classes, abstract classes

UNIT-V

Pointers : Virtual functions and polymorphism, pointers to objects, this pointer, pointers to derived classes, virtual functions, C++ streams, stream classes, unformatted and formatted console I/O operations, managing output with manipulators.

Reference books:

1. Object Oriented Modeling and Design, James Rumbaing, Michael Blaha, William Premerlani, Frederick Eddy
2. Object oriented Programming By Balaguruswamy

BCS203

Digital Electronics

Course Objective

To learn the fundamentals of digital system design. To learn combinational and sequential logic. To learn hardware fundamentals of computer design.

Course Outcomes

CO 1. Understand the concepts of various components to design stable analog circuits.
CO 2. Represent numbers and perform arithmetic operations.
CO 3. Minimize the Boolean expression using Boolean algebra and design it using logic gates.
CO 4. Analyze and design combinational circuit.
CO 5. Design and develop sequential circuits.
CO 6. Translate real world problems into digital logic formulations using VHDL

UNIT-I
Boolean Algebra : Basics Laws of Boolean Algebra, Logic Gates, Simplifications of Boolean equations using K-maps, Code Conversion, (Binary, Octal, Hexadecimal), Overview of Gray codes and Excess – 3 codes.

UNIT-II
Arithmetic Circuits Adder, Subtractor, Parallel binary adder/Subtractor, binary multiplier and dibvider. Combinational Circuits Multiplexers, De-Multiplexers, decoders, encoders, Design of code converters.

UNIT-III
Flip-flops -S-R, D, J-K, T, Clocked Flip -flop, Race around condition, Master slave Flip-Flop, Realisation of one flip-flop using other flip-flop.

UNIT-IV
Shift Registers, Serial-in-serial-out, serial-in-parallel-out, parallel-in-serial-out and parallel-in-parallel-out,Bi-directional shift register.

UNIT-V
Counters- Ripple counter, Synchronous Counter, Modulo Counters, Ring Counter, Twisted Ring Counter.
Memory Devices - RAM, ROM, PAL & PLA

Text Books:

1. Moris Mano, “Digital Logic and Computer Design”, PHI Publications, 2002
2. R. P. Jain, “Modern Digital Electronics”, TMH, 3rd Edition, 2003.

References Books:

1. R.L.Tokheim, “Digital Electronics, Principles and Applications”, Tata McGraw Hill, 1999.
2. W.Gothman, “Digital electronics”, PHI.
3. S. Salivahanan & S. Arivyhgan. “Digital circuits and design”, Vikas Publication, 2001
4. Malvino Leach, "Digital Principles and Application", TMH, 1999

BCS204

Data Structures using C

Course Objective

To introduce the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms. Understand and remember algorithms and its analysis procedure. Introduce the concept of data structures through ADT including List, Stack, Queues. To design and implement various data structure algorithms. To introduce various techniques for representation of the data in the real world. To develop application using data structure algorithms. Compute the complexity of various algorithms.

Course Outcomes

CO 1. Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms
CO 2. Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs.
CO 3. Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs.
CO 4. Demonstrate different methods for traversing trees.
CO 5. Compare alternative implementations of data structures with respect to performance.
CO 6. Compare and contrast the benefits of dynamic and static data structures implementations.
CO 7. Describe the concept of recursion, give examples of its use, describe how it can be implemented using a stack .
CO 8. Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing.

UNIT-I
Arrays: Representation of single and multidimensional arrays; sparse arrays - lower and upper triangular matrices and Tri-diagonal matrices.

UNIT-II
Stacks and Queues: Introduction and primitive operations on stack; Stack application: Infix, postfix, prefix expressions; Evaluation of postfix expression; Conversion from infix to postfix. Introduction and primitive operation on queues, D-queues and priority queues.

UNIT-III
Lists: Introduction to linked lists; Sequential and linked lists, operations such as traversal, insertion, deletion, searching, Two way lists and Use of headers ,polynomial representation using linked list,linked list inversion.

Trees: Introduction and terminology; Traversal of binary trees; Recursive algorithms for tree operations such as traversal, insertion, deletion;

UNIT-IV

Multilevel indexing and B-Trees: Introduction: The invention of the B-tree; Statement of the problem; Indexing with binary search trees; Multilevel indexing, a better approach to tree indexes; B-trees: working up from the bottom; Example for creating a B-tree.

UNIT-V

Sorting Techniques: Insertion sort, selection sort, merge sort, heap sort.
Searching Techniques: linear search, binary search and hashing

Text Books:

1. E. Horowitz and S. Sahani, "Fundamentals of Data Structures", Galgotia Booksource Pvt. Ltd, 2003.
2. R. S. Salaria, "Data Structure & Algorithms", Khanna Book Publishing Co. (P) Ltd., 2002.

References Books:

1. P. S. Deshpande and O.G. Kakde, "C & Data Structure", Wiley Dreamtech, 1st Edition, 2003.
2. Y. Langsam et. al., "Data Structures using C and C++", PHI, 1999.
3. Schaum's outline series, "Data Structure", TMH, 2002.

BCS205

Database Management Systems

Course Objective

Design & develop database for large volumes & varieties of data with optimized data processing techniques. This is a foundational course on Data Modeling. The course aims to impart knowledge of the concepts related to database and operations on databases. It also gives the idea how database is managed in various environments with emphasis on security measures as implemented in database management systems.

Course Outcomes

CO 1. Design and model of data in database.
CO 2. Store, Retrieve data in database.
CO 3. Understand the concepts of database and techniques for its management.
CO 4. Different Data Models at Conceptual and Logical level.
CO 5. Differentiate between the role of DBA and Data Architect
CO 6 Understanding Data Security standards and Methods

UNIT – I
Introduction: Characteristics of database approach, data models, DBMS architecture and data independence.

UNIT – II
E-R Modeling: Entity types, entity set, attribute and key, tuples and relation, super keys,candidate keys and primary keys relationships, relation types, roles and structural constraints, weak entities, enhanced E-R and object modeling, domains Sub Classes: Super classes, inheritance, specialization and generalization.

UNIT – III
File Organization: Indexed sequential access files, implementation using B++ trees, hashing, hashing functions, collision resolution, extendible hashing, dynamic hashing approach- implementation and performance.

UNIT – IV
Relational Data Model: Relational model concepts, relational constraints, domain constraint, key constraint, integrity constraint,relational algebra SQL: SQL queries, programming using SQL EER and ER to relational Mapping: Data base design using EER to relational language.

UNIT – V
Data Normalization: Functional dependencies, Normal form up to 3rd normal form. Concurrency Control: Transaction processing, locking techniques and associated, database recovery, security and authorization. Recovery Techniques, Database Security

Text Books:

1. R. Elmarsi and SB Navathe, “Fundamentals of Database Systems”, Addison Wesley, 4th Ed., 2004

Reference Books:

1. Abraham Silberschatz, Henry Korth, S. Sudarshan, “Database Systems Concepts”, 4th Edition, McGraw Hill, 1997.
2. Jim Melton, Alan Simon, “Understanding the new SQL: A complete Guide”, Morgan Kaufmann Publishers, 1993. A. K. Majumdar, P. Battacharya, “Data Base Management Systems’, TMH, 1996.
3. Bipin Desai, “An Introduction to database Systems”, Galgotia Publications, 1991.

BCS206

Communicative English-II

Course Objective

Learn the skills, contexts, and ethics of interpreting texts, particularly of the English mediums. Each program learning outcome is followed by elaborations of how the department interprets the achieve the outcome.outcome and what activities the students perform to.

Course Outcomes

CO 1. Review of grammar – verbs and its different forms and application of the different forms of advanced grammar.
CO 2. Learning the nuances of effective writing by using short and crisp sentences.
CO 3. Understanding and adhering to deadlines while completing assignments.
CO 4. Understanding the importance of intonation, word and sentence stress for improving communicative competence, identifying and overcoming problem sounds.

Unit I

Project and Report writing and Proposals: – How to write an Effective Report, Basics of Project writing, Paragraph writing, Paper reading and Voice modulation, Basics of Project presentation.

Unit II

How to Make a Presentation, the Various Presentation Tools, along with Guidelines of Effective Presentation, Boredom Factors in Presentation and How to Overcome them, Interactive Presentation & Presentation as Part of a Job Interview, Art of Effective Listening.

Unit III

Resume Writing Skills, Guidelines for a Good Resume, How to Face an Interview Board, Proper Body Posture, Importance of Gestures and Steps to Succeed in Interviews. Practice Mock Interview in Classrooms with Presentations on Self; Self Introduction – Highlighting Positive and Negative Traits and Dealing with People with Face to Face.

Unit IV

Leadership – Qualities of a Leader, Leadership Quiz with Case Study, Knowing Your Skills and Abilities; Introduction to Group Discussion Techniques with Debate and Extempore, Increase Your Professionalism.

Audio Video Recording and Dialogue Sessions on Current Topics, Economy, Education System, Environment, Politics.

Reference Books

1. Bovee, Thill and Chaturvedi, (2010), Business Communication, 2nd edition, Pearson Education.
2. Lillian, Chaney, (2008), Intercultural Business Communication, 4th edition, Pearson Education.
3. Chaturvedi, Mukesh, (2009), Business Communication: Concepts, Cases & Applications, 1st edition, Pearson Education.
4. McGraw, S. J., (2008), Basic Managerial Skills for All, 8th edition, Prentice Hall of India.
5. Michaul, V. K., (2007), Communication & Research for Management, Himalaya Publication House.

Paul, Rajendra, (2008), Essentials of Business Communication, Sultan Chand & Sons

BCS207-P

Programming in C++ - Lab

- Programs based on class, objects and manipulation of objects using member functions
- Programs based on friend functions, passing objects as arguments to function.
- Programs based on array of objects.
- Programs based on function overloading, Default arguments.
- Programs based on operator overloading (binary, unary) using member functions and friend functions.
- Programs based on constructors, different types of constructors- copy constructor, default constructor.
- Programs based on Inheritance, different types of inheritance.
- Programs using virtual functions and polymorphism

BCS208-P `

ORACLE LAB

SQL Commands:

1. Data definition commands - CREATE, ALTER, DROP, Adding Constraints -Primary key, foreign key, unique key, check, not null.

2. Basic SQL queries - INSERT, SELECT, DELETE, UPDATE, Using multiple tables, ordering of rows using ORDER BY option, Set operations using UNION, EXCEPT, INTERSECT, Substring Comparison using LIKE operator, BETWEEN operator.

3. Complex Queries -Nested Queries, EXISTS and UNIQUE/DISTICNT functions, NULL values, Renaming of attributes and Joining of tables, Aggregate functions and grouping.

4. Managing views, Simple stored procedures.

5. Data Control commands - Access Control and Privilege commands.

SEMESTER-III

BCS301 `

System Software

Course Objective

To view some of the major tasks of the system software of a computer system, focusing on internal working of the hardware and software interface of a typical system.

Course Outcomes

CO 1. Identify and understand different components of a compiler and their functioning.
CO 2. Know lexical, syntax and semantic analysis processes.
CO 3. Understand and define the role of lexical analyzer, use of regular expression and transition diagrams.
CO 4. Understand Finite state machine and purpose
CO 5. Know, and use Context free grammar, and parse tree construction.
CO 6. Understand the working of lex and yacc compiler for debugging of programs
CO 7. Comprehend and apply error detection and correction methods
CO 8. Determine code generation and optimization techniques

UNIT-I
System Software: General Concepts, assemblers, design of assemblers, pass structure of assembler, single-Pass Assembler, two-Pass Assembler, macros and macro processors, macro definitions, features of macro facility, nested macro c alls

UNIT- II
Loading, Linking and Relocating: Loading and linking schemes, relocatability of programmes, concepts of binders, linking loaders, overlays, dynamic binders, design of an absolute loader

UNIT- III
Phases of compiler: aspects of compilation, datatypes, data structures, scope ruler, control structure, compilation process, analysis phase, synthesis phase, programming language grammar, derivations, reduction and system trees

UNIT-IV
Classification of grammars: Ambiguity in program specification, lexical scanner, parsing topdown, bottomup, table driven parsing

UNIT- V
Compilation of expressions: intermediate code forms for expression, compilation of control structures, code optimization, local and global

Text book:
1. Systems Programming and Operating Systems by D.M. Dhamdhere, - Tata McGrow Hill.

Reference Books:

1. Principles of Compiler Design by Aho and Ullman.

BCS302 `

Operations Research

Course Objective

The goal of this course is to teach you to formulate, analyze, and solve mathematical models that represent real-world problems. To learn linear programming, network flow problems, integer programs, nonlinear programs, dynamic programming and queueing models.

Course Outcomes

CO 1. Formulate a real-world problem as a mathematical programming model
CO 2. Understand the theoretical workings of the simple method for linear programming and perform iterations of it by hand
CO 3. Understand the relationship between a linear program and its dual, including strong duality and complementary slackness
CO 4. Solve specialized linear programming problems like the transportation and assignment problems
CO 5. Solve network models like the shortest path, minimum spanning tree, and maximum flow problems
CO 6. Understand the applications of, basic methods for, and challenges in integer programming
CO 7. Understand how to model and solve problems using dynamic programming

UNIT-I
Beginning of O.R: Problems in O.R., Mathematical Modeling.

UNIT-II
Linear Programming: Formulation of LP models, Solution of a L.P.P., Graphical method for solving a L.P.P.

UNIT-III
Simplex Method: Maximization/ Minimization of objective functions, Simplex method, unbounded solution-optimality conditions- artificial variable Techniques-Big M method.

UNIT-IV
Transportation problems: Transportation model, Solution by North West corner lowest cost entry Vogel's and MODI method, Degeneracy Assignment problems.

UNIT-V
Game Theory: Two persons zero sum games, pure and mixed strategy with saddle point, solution of pure strategy games, solution of mixed strategy problems by arithmetic method, principle of dominance.

Reference Book:
1. Operations Research, Prem Kumar Gupta & D.S Hira, Kanti Swaroop

BCS303 `

Visual Programming

Course Objective

This course introduces computer programming using the Visual BASIC programming language with object-oriented programming principles. Emphasis is on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger. Upon completion, students should be able to design, code, test and debug at a beginning level.

Course Outcomes

CO 1. Design, create, build, and debug Visual Basic applications.
CO 2. Explore Visual Basic‟s Integrated Development Environment (IDE).
CO 3. Implement syntax rules in Visual Basic programs.
CO 4. Explain variables and data types used in program development.
CO 5. Apply arithmetic operations for displaying numeric output.
CO 6. Write and apply decision structures for determining different operations.
CO 7. Write and apply loop structures to perform repetitive tasks.
CO 8. Write and apply procedures, sub-procedures, and functions to create manageable code.
CO 9. Create one and two dimensional arrays for sorting, calculating, and displaying of data.
CO 10. Write Visual Basic programs using object-oriented programming techniques including classes, objects, methods, instance variables, composition, and inheritance, and polymorphism.
CO 11. Write Windows applications using forms, controls, and events.

UNIT-I
Introduction to windows, GUI concept, concept of event driven programming, the Visual Basic IDE, types of Visual Basic projects, Visual Basic Editions, the Visual Basic project life cycle, project files

UNIT-II
Programming elements, data types, constants, variables, operators, user defined data types, library functions, program comments, arrays, dynamic arrays, strings, enumerations, logic statements, conditional constructors (If…then, select case), Iteration (Do loop, for loop), do events, exit, stop and end, Functions and Subroutines – arguments, By ref Vs. By Val parameters, optional arguments, Module basics, event procedures, class modules, types of errors, error handling, creating error handlers, debugging, debugging tools

UNIT-III
Forms, controls, control arrays, menus, menu editor, graphics programming, simple animation, SDI and MDI application, Database concepts – visual data manger, the ADO data control, data grid control, DB List and DB combo controls, Data view window, data form wizard, data environment designer ,RDO,DAO

UNIT-IV

Visual Basic files access, File I/O commands, file common dialogs, object oriented programming with Visual Basic, defining classes, classes Vs. Modules, object life time, constructors and destructors, class properties, fields and methods, creating and using objects, collections in Visual Basic, event and event handlers

UNIT-V

Reports using Crystal reports, data environment, reports using data reports, error handling, creating ActiveX controls, ActiveX EXE, ActiveX DLL

Text Book:

1. Visual Basic 6 : How to Program, H. M. Deitel, P. J. Deitel and T. R. Neilo, Pearson Education

Reference Books:

1. Mastering VB 6, Evangelous Petroutosos – BPB Publications
2. Visual Basic, Shaum's outlines,Byron S Gottfried

BCS304 `

Principles of Electrical Communications

Course Objective

To understand operation of semiconductor devices. To understand DC analysis and AC models of semiconductor devices. To apply concepts for the design of Regulators and Amplifiers.To verify the theoretical concepts through laboratory and simulation experiments. To implement mini projects based on concept of electronics circuit concepts.

Course Outcome

CO 1. Understand the current voltage characteristics of semiconductor devices.
CO 2. Analyze dc circuits and relate ac models of semiconductor devices with their physical Operation.
CO 3. Design and analyze of electronic circuits.
CO 4. Evaluate frequency response to understand behavior of Electronics circuits.

UNIT- I
Signals: - Introduction To Signals- Analog And Digital- Periodic And A Periodic. Different Types - Graphical Representation. Frequency Spectrum -Bandwidth- Simple Communication Model. Communication Blocks.

UNIT- II
Media: Different Types- Guided And Unguided-Physical Description And Characteristics Of Twisted Pair Cables, Coaxial Cables And OFCs- Introduction To Signal Noise - Transmission Impairments- Channel Capacity- SNR- Wireless Transmission-Satellite Communication- IR Transmission.

UNIT- III
Modulation and Demodulation: - Modulation- Introduction AM, FM, PM- DSB, SSB. Vestigial Sideband Modulation-Analysis Of AM, FM, PM Waves- Generation of AM Waves, Filter System- Phase Shift Method- Third Method- Generation Of FM- FM Methods- Direct Method- AFC- Indirect Method. Demodulators- AM And FM- AM Receivers- FM Receivers- Comparison Of AM And FM.

UNIT- IV
Digital Communication: Introduction-Sampling-Quantization- Companding- Nyquist Criteria- Pulse Modulation- Digital Communications: - PCM, DPCM, DM, ADM, Concept Of FDM And TDM.

UNIT- V
Digital Modulation Techniques: - ASK, FSK, PSK, BPSK,QPSK, BFSK.

Text Books:

1. Electronic Communication Systems , Kennedy And Davis
2. Principles of Communication Systems , Taub And Schilling

References Books:

1. Data & Computer Communications ,William Stallings
2. Data Communication And Networking , Behrouz A Forouzan

BCS305 `

COMPUTER ORGANISATION AND ARCHITECTURE

Course Objective

This course is designed to provide a comprehensive introduction to digital logic design leading to the ability to understand number system representations, binary codes, binary arithmetic and Boolean algebra, its axioms and theorems, and its relevance to digital logic design. To Analyze and design simple systems composed of programmable logic, such as ROMs and PLAs. Aiming at conducting Tutorial, seminars and remedial classes.

Course Outcomes

1. Demonstrate knowledge of binary number theory, Boolean algebra and binary codes.
2. Analyze and design combinational systems using standard gates and minimization methods (such as Karnaugh maps).
3. Analyze and design combinational systems composed of standard combinational modules, such as multiplexers flip-flops,demultiplexer and decoders.
4. Demonstrate knowledge of simple synchronous sequential systems.
5. Analyze and design sequential systems composed of standard sequential modules, such as counters and registers.
6. Analyze and design simple systems composed of programmable logic, such as ROMs and PLAs.
7. Perform basic arithmetic operations with signed integers represented in binary

UNIT-I
Functional units of a computer, basic operational concepts, bus structures.
Addressing methods: Memory location and addresses, instructions and instruction sequencing, instruction execution, addressing modes.

UNIT-II
The processing unit: General register organization, stack organization, instruction formats, instruction classifications.
Main memory: organization of RAM and ROM, auxiliary memory, cache memory, memory heirarchy,virtual memory.

UNIT-III
Introduction to parallel processing: Evolution parallelism in unprocessed systems, parallel processing Mechanisms. Introduction to distributed computing

UNIT-IV
Parallel computer structures: Pipeline computers array processors, multiprocessing systems, architectural classification Scheme SISD, SIMD, MISD, MIMD

UNIT-V

Pipelining and vector processing: Principles, classification of Pipeline processors- instruction and arithmetic pipelines: designs.

Text Book:

1. Computer System Architecture, M. Moris Mano
2. Computer architecture and parallel processing by Kai Hwang Feue A Briggs.

Reference Books:

1. Computer Organization, Hamacher

BCS306

Communicative English-III

Course Objective

To learn the skills, contexts, and ethics of interpreting texts, particularly of the English mediums and to elaborate how the department interprets the result and to learn key vocabulary in an academic context and to specialize how to pronounce in today's globalised world to work in a cross-cultural environments.

Course Outcomes

CO 1. To prepare presentation and to elaborate the findings of the project to a cross-cultural team
CO 2. To Using English as a lingua franca with speakers from different linguistic backgrounds
CO 3. Using language to establish interpersonal relationships

Minor Project and Presentation

Minor projects are tasks that add to the knowledge of the students. A topic shall be given to each student in the beginning of the semester in various areas of management. The Presentation Project comprises of either of the following:

Project Presentation
OR
*Case Study Presentation

Suggested Topics for Minor Projects

1. Goals of an organization.
2. Work Values
3. Character Ethics
4. Working Conditions
5. Decision making Strategies
6. Goal Setting
7. Customer Satisfaction

** Case study can be chosen by the students in their respective areas of interest.*

Reference Books

1. Lather, A.S. & Handa, M (2009). Cases in Management. Wisdom Publications.
2. McGrath. (2009). Basic Managerial Skills for All, 8th ed. Prentice Hall India
3. Ellis. (2009). Management Skills for New Managers. Prentice Hall India

BCS307-P `

VB LAB

Visual Basic

1. Designing User Interface using- List Box, Combo Box, Image and Picture Box, Directory-File-Drive list boxes, Rich text box, etc

2. Creating Menus- Creating Menus and writing Codes, Linking Menus with SDI

3. forms, Creating toolbox and access it for loading and working forms.

4. Database Connectivity using Controls - Designing user interface with forms

5. and controls and create database connectivity by DAO and ADO Control.

6. Database connectivity using Object models - Creating Database connectivity by DAO Object model and Connectivity Using ADO Object model by OLE DB as well as ADODC Connectivity.

7. Creating Reports - Create reports using Data Report in VB and also using Crystal report.

8. Package and deployment Wizard - Package, Deploy and Scripting

SEMESTER-IV

BCS401 `

Data Communication

Course Objective

Build an understanding of the fundamental concepts of computer networking. Familiarize the student with the basic taxonomy and terminology of the computer networking area. Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking. Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

Course Outcomes

1. Describe the components of a data communications system.
2. Identify key considerations in selecting various transmission media in networks.
3. Explain the role of line codes in a data communications network.
4. Explain the role of digital communications devices in a data communications network.
5. Describe the various types of signals and their features.
6. Identify the roles and features of various data transmission protocols.
7. Describe the features and functions of multiplexing and modulation.
8. Describe the various error detection and correction schemes.

UNIT- I

Communication Devices :- Digital Data Transmission-DTE-DCE-Interface-Other Interface Standards-Modem-Different Types Hub Repeaters Switches Routers Comparison NIC - Multilayer Devices.

UNIT- II

Error Detection and Correction: - Errors Types Detection - Redundancy Check Vertical Horizontal Cyclic Checksum Correction - Humming Code - Burst. Wireless Devices and Wired Devices: - Cables for Communication - CAT 5 UTP - BNC, Optic Transmission and Reception. Different Transmission Modes.

UNIT-III

Data Link Control - Line Discipline - ENQ/ACK - Poll/Select - Flow Control - Stop and Wait - Sliding Window - Error Control ARQ - Different Types. Data Link Protocols - Asynchronous and Synchronous Protocols Frames - Character Oriented - Bit Oriented HDLC - Link Access Procedures.

UNIT-IV

Switching Packet Circuit - Message. Approaches. Frame Relay: - Introduction-Layers - Congestion Control - Traffic Control - Other Features.

UNIT-V

Upper OSI Layers Session - Session and Transport Interaction Synchronization SPDU Presentation Translation - Encryption and Decryptions Authentication - Data Compression Application MHS FTAM VT DS – CMIP.

Text Books:

1. Data Communication and Networking By Behrouz A. Forouzan.

References:

1. Data & Computer Communications , William Stallings
2. Electronic Communication Systems , Kennedy and Davis
3. Principles of Communication Systems, Taub and Schilling

BCS402 `

Discrete Mathematics

Course Objective

To familiarize the students with the concept and techniques of propositional logic and equivalences and their application to logic theory. To study the Graph and Graph modules. To grasp the concepts in lattices as algebraic system

Course Outcomes

1. Explain and illustrate the concept of proposition disjunction,conjunction,and conditional statement and their use in solving problems.
2. Explain and illustrate the concept of mathematical induction and its their use in solving problems.
3. Demonstrate the concept of graphs and graph models, marginal and conditional probability distribution involving two random variables.
4. Explain and illustrate algebraic systems, semigroups, monoids and homomorphism.
5. Understand the concept of lattices and special type of Boolean algebra.

UNIT- I
Preliminaries: Basic Set Theory Terminology and notation, Venn Diagrams, Truth Tables and proof, Functions and relations, Partial Orderings and equivalence relations, mathematical Induction, An application: Hamming codes.

UNIT- II
Logic propositions: Truth and falsehood of propositions, basic operations, Boolean algebra, De Morgan's laws.

UNIT- III
Propositional calculus: conjunctive and disjunctive normal forms, rules of inference, chain rule modusponens, chains of inference, tautology and contradiction, proof by adopting a premise.

UNIT- IV
Predicate Calculus: Predicates, examples, quantifiers, the universal quantifier, the existential quantifier, combination of quantifiers, negating quantifiers, recursive definitions, recursive list processing.

UNIT- V
Graphs & Algorithms: Euler and the seven Bridges, Trees and Spanning Trees, Prim's Algorithm, Binary tree, tree searching, Euler's Theorem The Shortest-Path Problem, Dijkstra's Algorithm, All-Pairs Algorithms, Floyd's Algorithm, Warshall's Algorithm

Reference Books:

1. Introduction to Discrete Mathematics, Robert J McEliece, Robert Ash and Carol Ash,McGraw Hill
2. Discrete Mathematics and Structures, satinder Bal Gupta.

BCS403 `

Microprocessor and Its Applications

Course Objective

To provide a theoretical & practical introduction to microcomputer and microprocessors, assembly language programming techniques, design of hardware interfacing circuit.

Course Outcomes

1. Solve basic arithmetic operations using the 8085 assembly language.
2. Write program to find out smallest/largest number stored in memory, program related to conversion from Binary to Gray code, Hexadecimal to decimal using the 8085 assembly language.
3. Understand the Hardware and Interfacing.
4. Write program with 8085.
5. Understand BCD Arithmetic, 16-Bit Data operations and Interrupts.
6. Interface with Data Converters
7. Demonstrate the concept of Programmable Interface Devices

UNIT- I
Microprocessor architecture and its operations: microprocessor initiated operations and 8085 bus organization, internal data operations, 8085 registers, externally initiated operations. Memory - memory map, memory and instructions, peripheral mapped I/O, 8085 microprocessor and its architecture.

UNIT- II
8086 Internal architecture. Basic 8086 microcomputer system, system overview, 8086 bus, Read machine cycle, Write machine cycle, Assembly language programming - program development steps, 8086 instructions - data transfer instructions, arithmetic instructions, bit manipulation instructions, string instructions, program execution, Constructing the machine codes for 8086 instructions. Implementing standard program in 8086, unconditional jump instructions, condition flags, conditional jump instructions, If-then, If-then else, and multiple if-then-else , while-do , repeat-until, loop instructions, instruction timing and delay loops.

UNIT- III
Strings, Procedures and Macros - 8086 string instructions, writing and using procedures, CALL and RET instructions, stack, using PUSH and POP to save register contents, passing parameters, reentrant and recursive procedures, writing and using macros.

UNIT- IV
8086 interrupts: program examples, interrupt Types, 8254 software, programmable TIMER/ COUNTER, basic 8253 and 8254 operations, 8259A Priority interrupt controller, Direct Memory Access data transfer - circuit connections and operations of the Intel 8257 DMA controller, DMA transfer timing diagram.

UNIT- V

Intel 80286 microprocessor: architecture, signals and system connections, Real address mode operation, protected mode operation. Intel 80386 32-bit microprocessor - architecture, pins and signals. Intel 80486 microprocessor. RISC machines.

Text Book:

1. Microprocessors and Interfacing , Programming and Hardware, Douglas V- Hall. Tata McGraw-Hill.

Reference Books:

1. Microprocessor 8086 programming & interfacing , A.nagoor Kani. RBA publications. The Intel Microprocessors 8086 / 8088 , 80186 / 80188 , 80286 , 80386 , 80486 , Pentium, and Pentium Pro processor Architecture, Programming and Interfacing - Barry B.Brey Prentice - Hall India.

BCS404 `

Computer Network &Internet

Course Objective

To be familiar with the basics of data communication. To be familiar with various types of computer networks. To have experience in designing communication protocols. To be exposed to the TCP/IP protocol suite.

Course Outcomes

CO 1. Define, use and implement Computer Networks and the basic components of a Network system.
CO 2. Know and Apply pieces of hardware and software to make networks more efficient, faster, more secure, easier to use, able to transmit several simultaneous messages, and able to interconnect with other networks.
CO 3. Differentiate the various types of network configurations and applying them to meet the changing and challenging networking needs of organizations.
CO 4. Understand the layers of OSI and TCP and get knowledge about congestion control and network security
CO 5. Define the different protocols, software, and network architectures.
CO 6. Define the concept of local area networks, their topologies, protocols and applications.
CO 7. Analyze why networks need security and control, what errors might occur, and how to control network errors.

UNIT- I
se of computer networks: Hardware – LAN, MAN, WAN, Wireless network Internet works, Software – Protocol Hierarchies, Design issues for the layers, Interfaces, & Services, Connection Oriented and connectionless Services, Service primitives, Relationship of services to protocol. Reference models – OSI, TCP/IP, Comparison, Wireless LANs, RFID and Sensor Networks,,Example networks- Novell Netware, Arpanet, Internet, Network topologies.

UNIT- II
Transmission media: Magnetic media, twisted pair Base band, broadband and fiber optic cables, Data link Layer, Design issues, Services Framing, Error and flow control. Error detection and correction, Elementary protocols, Unrestricted, Simplex stop and wait, Protocols, Unrestricted, Simplex stop and wait, Protocol for noisy channel.

UNIT- III
Static and dynamic channel allocations of LANS and MANS, ALOHA,CSMA and Collision free protocols, Network layer, design issued, Services, Internal organization, Virtual Circuits and datagram subnets, Routing algorithms, Optimality, Shortest path, Inter networking, Different networks, Concatenated virtual circuits, connectionless internet working Tunneling, Internet work routine, Fragmentation, Fire walls.

UNIT- IV
Transport layer: Services, Quality of Service, service primitives, Elements of protocols, Addressing, Establishing and releasing connections, flow control, buffering, multiplexing, Crash recovery, Performance issues, performance problems, measuring improving etc, Fast TPDU processing, protocols for gigabit networking.

UNIT- V

Application layer: Name space, domain name system resolution, remote logging, electronic mail, File transfer and HTTP.

Text Book:

Computer Networks, Andrew S. Tanenbaum

Reference Books:

Computer Network, Uyless Black, PHL.
Data Communications and Networking, Behrouz A. Ferguzan.
Data and Computer communications, William Stalling, Pearson Education

BCS405 `

Operating Systems

Course Objective

To understand the services provided by and the design of an operating system. To understand the structure and organization of the file system. To understand what a process is and how processes are synchronized and scheduled. To understand different approaches to memory management. Students should be able to use system calls for managing processes, memory and the file system.

Course Outcomes

CO 1. Analyze the concepts of processes in operating system and illustration of the scheduling of processor for a given problem instance.
CO 2. Identify the dead lock situation and provide appropriate solution so that protection and security of the operating system is also maintained.
CO 3. Analyze memory management techniques, concepts of virtual memory and disk scheduling.
CO 4. Understand the implementation of file systems and directories along with the interfacing of IO devices with the operating system.

UNIT- I
Introduction: OS Functions and objectives, The Evolution of operating Systems, Batch, interactive, time sharing and real time systems Computer System Organization, Computer System Architecture, Operating System Structure, Operating System Operations, Operating System Services, User Operating System Interface, System Calls, Types of System Calls.

UNIT- II
Process: Basic Concepts, Process Scheduling, Operations on Processes, Inter process communication, Process Scheduling - Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling.

UNIT- III
Process Coordination: Synchronization, The Critical Section problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Dead Locks, System Model, Dead Lock Characterization, Methods of Handling Dead Locks, Dead Lock Prevention, Dead Lock Avoidance, Dead Lock Detection, Recovery from Dead Lock.

UNIT- IV
Memory Management: Memory Management Strategies, Swapping, Contiguous memory allocation, Paging, Segmentation, Virtual Memory Management, Demand paging, Copy - on - Write, Page Replacement

UNIT- V

Storage Management: File System, File Concept, Access Methods, Directory Structure, protection, Implementing File Systems, File System Structure, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery.

Text book :

1. Operating System Principles, 7th Edition, Abraham Silberschatz, Peter Galvin and Greg Gagne, John Wiley

BCS406-P `

MICROPROCESSOR LAB

(Minimum four programs from each section and 10 hrs per section.)

1. Simple Arithmetic Calculations
2. Conditional Statements
3. Control Statements
4. Loop and Arrays
5. Character Strings
6. Subroutines and Stack Operations

SEMESTER-V

BCS501

Computer Aided Optimisation Techniques

Course Objective

The study of Optimization Techniques emphasizes Mathematical Modeling problem solving and the effect of marginal change in parameters on the solution of the problem. Understand the need and origin of the optimization methods. Get a broad picture of the various applications of optimization methods used in engineering.

Course Outcomes

CO 1. After completing the course student shall be able to distinguish different computer aided optimization techniques.
CO 2. Be able to create simple architecture for evaluationary algorithms.
CO 3. Have the knowledge of applying evaluation optimization technique, engineering applications.

UNIT – I
Linear Programming: Mathematical formulation, Graphical methods of solution, general properties, Simplex method, Duality, dual simplex, post-optimality analysis.

UNIT – II
Transportation and Assignment Problems: Transportation and transshipment problems, assignment problems, sample programs.

UNIT – III
Network analysis, CPM and PERT: Shorter route problem, maximal flow problem, project scheduling, critical path calculations, PERT calculations, Sample programs.

UNIT – IV
Inventory models: Deterministic inventory models, infinite delivery rate with no backorders, infinite delivery rate with back orders, finite delivery rate with back orders.Introduction to probabilistic inventory models, sample programs.

UNIT – V
Sequencing models: Processing of n jobs through m2 machines, n jobs through 3 machines, 2 jobs through m machines, maintenance crew scheduling.

Text Books:
Operations Research Kanti Swarup, P.K. Gupta, Man Mohan (Sultan Chand & Sons)

References:
1. Operations Research: An Introduction Hamdy A. Taha (Prentice Hall of India)
2. Introduction to Operations Research:Computer oriented Algorithmic (Mc Graw Hill 1976)

BCS502

System Analysis &Design

Course Objective

This module aims to as to introduce variety of new software used by analysts, designers to manage projects, analyze and document systems, design new systems and implement their plans. It introduces also a recent coverage of UML, wireless technologies and ERP; web based systems for e-commerce and expanded coverage on RAD and GUI design.

Course Outcomes

CO 1. Understand the principles and tools of systems analysis and design.
CO 2. Understand the application of computing in different context.
CO 3. Understand the professional and ethical responsibilities of practicing the computer professional including understanding the need for quality.
CO 4. Solve a wide range of problems related to the analysis, design and construction of information systems.
CO 5. Analysis and Design of systems of small sizes

UNIT-I
Introduction to system, Definition and characteristics of a system, Elements of system, Types of system, System development life cycle, Role of system analyst, Analyst/user interface, System planning and initial investigation: Introduction, Bases for planning in system analysis, Sources of project requests, Initial investigation, Fact finding, Information gathering, information gathering tools, Fact analysis, Determination of feasibility.

UNIT-II
Structured analysis, Tools of structured analysis: DFD, Data dictionary, Flow charts, Gantt charts, decision tree, decision table, structured English, Pros and cons of each tool.

UNIT-III
Feasibility study: Introduction, Objective, Types, Steps in feasibility analysis, Feasibility report, Oral presentation, Cost and benefit analysis: Identification of costs and benefits, classification of costs and benefits, Methods of determining costs and benefits, Interpret results of analysis and take final action.

UNIT-IV
System Design: System design objective, Logical and physical design, Design Methodologies, structured

design, Form-Driven methodology(IPO charts), structured walkthrough, Input/Output and form design: Input design, Objectives of input design, Output design, Objectives of output design, Form design, Classification of forms, requirements of form design, Types of forms, Layout considerations, Form control.

UNIT-V

System testing: Introduction, Objectives of testing, Test plan, testing techniques/Types of system tests, Quality assurance goals in system life cycle, System implementation, Process of implementation, System evaluation, System maintenance and its types, System documentation, Forms of documentation.

Reference Books:

1. Systems Analysis and design BY e.m. aWAD Galgotia Pub.(P) Ltd.
2. Data Management and Data Structures by Loomis (PHI)
3. System Analysis and Design by Elias Awad.
4. Introductory System analysis and Design by Lee Vol. I & II

Note: Latest and additional good books may be suggested and added from time to time

BCS503

Java Programming & Internet

Course Objective

As the business environment becomes more sophisticated, the software development (software engineering is about managing complexity) is becoming increasingly complex. As of the best programming paradigm which helps to eliminate complexity of large projects, Object Oriented Programming (OOP) has become the predominant technique for writing software in the past decade. Many other important software development techniques are based upon the fundamental ideas captured by object-oriented programming

Course Outcomes

CO 1. Understand the concept and underlying principles of Object-Oriented Programming.
CO 2. Understand how object-oriented concepts are incorporated into the Java programming language.
CO 3. Develop problem-solving and programming skills using OOP concept.
CO 4. Understand the benefits of a well structured program.
CO 5. Develop the ability to solve real-world problems through software development in high-level CO programming language like Java.
CO 6. Develop efficient Java applets and applications using OOP concept.
CO 7. Become familiar with the fundamentals and acquire programming skills in the Java language.

UNIT-I

Introduction to Internet – Definitions, Advantages, Browsers, Brief overview of server, URL definition, Introduction to WWW, uses, multimedia capabilities of www, commercial uses, client server architecture in internet, domain name, extension types, Internet services, features, Introduction to HTML, list, creating table, linking document, feature, font, colour and background colour, adding pictures to HTML documents.

UNIT-II

Object Oriented Fundamental and Java Revolution – OOP, Encapsulation, Inheritance, polymorphism, Java Genesis, characteristics, how java different from c and C++, java and Internet, Java and WWW, Web browsers, overview of java, simple java programmes, structure, tokens, statements, JVM, operator precedence.

UNIT-III

Constants, variables, data types, operators and expressions, decision making and branching, if, if…else, nested if, switch, ?: operator, decision making and looping, while, do, for, jumps in loops, labeled loops, classes, objects and methods.

UNIT-IV

Arrays, strings and vectors, constructors, Interfaces, multiple inheritance, packages, putting classes together, multithreaded programming, managing errors and exceptions, applet programming, graphics programming.

UNIT-V

Managing input/output files in java, concepts of streams, stream classes, byte stream classes, character stream classes, using streams, I/O classes, file classes, I/O exceptions, creation of files, reading/writing characters, byte handling primitives, data types, random access files, JDBC (Java Database Connectivity), overview, implementation.

Text Book:

1. Programming with Java-APrimer, E. Balaguruswamy
2. Internet Complete Reference, Harley Hahm.

Reference Books:

1. The Java Complete Reference, 3rd edition by Patrick Naughton, TATA Mc Graw-Hill
2. E. Balaguruswami, Programming with Java, TATA Mc Graw Hill.

BCS504

Linux and PHP

Course Objective

The objective of this course is to provide the necessary knowledge to design and develop dynamic, database-driven web applications using PHP version 5. Students will learn how to connect to any ODBC-compliant database, and perform hands on practice with a MySQL database to create database-driven HTML forms and reports etc. Students also learn how to configure PHP and Apache Web Server. Comprehensive lab exercises provide facilitated hands on practice crucial to develop competence web sites.

Course Outcome

CO 1. Students will get hands on experience on various techniques of web development and will be able to design and develop a complete website.
CO 2. Explore different open source technology like Linux & PHP with different packages.
CO 3. Execute Linux commands for programming.
CO 4. Execute programs of PHP with data base connection

UNIT – I
Overview of Linux, features, advantages, Booting process, kernel, simple commands-ls,cd, pwd, cp, mv, rm, rmdir, date-file permissions chmod- Editing files using vi editor, shell variables-shell types-filters pr, head, tail, cut, paste, sort, grep, pipe, tee-Communication &Scheduling commands- mail, wall, write, talk, at, cron, crontab.

UNIT – II
Shell Programming-control structures, operators, simple shell programs.

UNIT – III
System Administration-creating and deleting users-mounting file systems-mount, umount-changing passwords-passwd-network administration netstat, ping, ifconfig, traceroute-remote login-telnet, ssh, file transfer-ftp. process related commands- ps, killarchiving-tar, gzip, Installation of packages using rpm command-Understanding variousservers-DHCP,DNS, Apache, squid.

UNIT – IV
Introduction to PHP- Advantages features-PHP syntax-variables-PHP tags and styles -data types, variables, operators-type casting- array operators-control structures-arrayssorting arrays-file functions-string functions-functions in PHP.

UNIT – V
Object Oriented Concepts in PHP classes, objects, inheritance, overloading and overriding interfaces-exception handling techniques.

Reference Books:

1. Linux (Fedora) Bible , Christopher Negus, Wiley India Edition , 2007.
2. Linux Administration A beginners guide 2nd Edition.
3. Beginning PHP5,Apache,MYSQL, web development Wrox publication .

BCS505

Internet, Web Designing and Cyber Laws

Course Objective

To provide knowledge on web architecture, web services, client side and server side scripting technologies to focus on the development of web-based information systems and web services. To provide skills to design interactive and dynamic web sites.

Course Outcomes

CO 1. To understand the web architecture and web services.
CO 2. To practice latest web technologies and tools by conducting experiments.
CO 3. To design interactive web pages using HTML and Style sheets.
CO 4. To study the framework and building blocks of .NET Integrated Development Environment.
CO 5. To provide solutions by identifying and formulating IT related problems

UNIT – I
Internet – Introduction, Basic Communication, Local Area Network, Packet Switching, Internet: A Network of Networks, ISPs and Network Connections, IP Address, Transaction Control Protocol (TCP), Domain Names.

UNIT – II
Internet Services: Electronic Mail, Bulletin Board Services (Network News), Browsing the World Wide Web, Automated Web Search (Search Engines), Audio and Video Communication, Faxes and Files (FTP), Remote Login.

UNIT – III
Facilities for Secure Communication, Electronic Commerce and Business.

UNIT – I V
Web Programming – Introduction to HTML, Creating Web Pages, Formatting Tags, Font, Lists, Table, Form, Marquee, Frame Tags, Creation of simple websites.

UNIT – V
Cyber Crimes- Computer Crime, Nature of Crimes, Penalty for damage to computer, Computer system, Tampering with Computer source documents, Hacking, Computer related offences, Theft, The Language of Cyber space.

Text Books:

1. "The Internet", Douglas. E. Comer, Prentice hall of India – Third Edition

2. HTML Black Book.
3. " Cyber Law Crimes ", Barkhs and U. Rama Mohan, Asia Law House, New Edition References.
4. "Internet Complete References , Harley Hahn.

BCS506-P

Linux Programming (Lab)

Part A Linux Lab

1. Introduction to Linux Booting ,login-simple commands.

2. Bash- wild card characters grep-pipe-tee- command substitutions Shell variables subshells export filters pr, head,tail ,cut,paste,sort,uniq,nl.grep,tr,join,-editors vi and emacs-Communication and scheduling commands mail ,talk,write,wall,at,cron process related commands- ps,kill,nohup,nice,time archieving tar gzip rpm.

3. Shell programming shell variables , read,echo,command line arguments && ,||,if, while case,for, until, test,set,shift , trape.

4. System administration booting ,init,runlevels ,creating users and groups , system databases password ,group ,shadow,init tab ,inetd.conf-startup scripts shutdown mount fsck network administration net stat, ping , traceroute, ifconfig telnet and ftp.

5. X-windows systems concepts ,window managers ,KDE and GNOME setting up servers DHCP DNS NFS-proxy- apache samba.

BCS507-P

Project in Java Lab

Students will work and prepare a small Project in Java

SEMESTER – VI

BCS601

Parallel Processing

Course Objective

Students will demonstrate an understanding of concepts, algorithms, and design principles underlying parallel computing, develop algorithm design and implementation skills, and gain practical experience in programming large scale parallel machines

Course Outcomes

1. Apply parallel computing to a variety of applications in Mathematics and Engineering.
2. An ability To assess a problem presented to them, design a solution, and test their implementation.
3. Presented with problems and will have to design and implement solutions for those problems.
4. An ability to discuss large scale machine design as well as
applications and algorithms on those machines.
5. Learn to use large scale parallel machines to solve problems as well as discuss the issues related to their construction and use.

UNIT – I
Introduction to parallel processing: Parallelism in uniprocessor systems, parallel computer structures, Architectural classification schemes (Flynn s, Feng s and handler s), parallel processing applications.

UNIT – II
Pipelining and vector processing: Linear pipelining, classification of pipeline processors, Instruction and arithmetic pipelines, principles of designing pipelined processors, characteristics of vector processing.

UNIT – III
Structures and algorithms for Array processors: SIMD array processors, SIMD interconnection networks, parallel algorithms for array processors.

UNIT – IV
Multiprocessor architecture and programming: functional structures of multiprocessor systems, interconnection networks, multiprocessor operating systems, interprocessor communication mechanisms.

UNIT – V
Dataflow computers: Distinction between control flow and data flow computers, data flow graphs and languages, advantages and disadvantages of dataflow computers, dataflow computer architectures.

Text Books:
Computer Architecture and parallel processing-Kai Hwang and F A Briggs.

References:

1. Introduction to Computer Architecture-Stone H S(Galgotia publishers)
2. The Architecture of pipelined computers-Koggi H(Mc Graw Hill)

BCS602

Computer Graphics and Multimedia

Course Objective

This course is designed to provide a comprehensive introduction to computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends.

Course Outcomes

CO 1. Demonstrate an understanding of contemporary graphics hardware.
CO 2. Create interactive graphics applications in C++ using one or more graphics application programming CO interfaces.
CO 3. Write program functions to implement graphics primitives.
CO 4. Write programs that demonstrate geometrical transformations.
CO 5. Demonstrate an understanding of the use of object hierarchy in graphics applications.
CO 6. Write program functions to implement visibility detection.
CO 7. Write programs that demonstrate computer graphics animation.
CO 8. Write programs that demonstrate 2D image processing techniques.

UNIT-I
Overview of Graphics System: display devices, raster scan systems, random scan systems, input devices, graphics software.Output Primitives: points and lines, line drawing algorithms, DDA, Bresenhams line algorithm, circle generating algorithms, Bresenhams, Mid-point, Filled area primitives.

UNIT-II
Attributes of Output Primitives: Line, Curve, Area fill, Character text, Marker Antialiasing. 2D Transformations: Basic transformations, Matrix representations and Homogeneous co-ordinates, Composite transformations, Reflection, Shear. 2D Viewing: viewing pipeline, window to viewport co-ordinate transformations, clipping operations, point, line-Cohen Sutherlands, polygon clipping-Hodgemans, Weilor-Atherton, curve,text.

UNIT-III
Structures: concepts, basic modeling concepts, interactive graphics, logical classification of input devices, input functions, interactive picture construction techniques. 3D Concepts: Introduction to 3D graphics, display methods, 3D representations-polygon surfaces.

UNIT-IV
Definition of Multimedia ; Applications, Hardware and Software requirements for creating multimedia ; Building blocks of multimedia text, graphics(image), video, audio, animation ; Different types of animation ; Brief overview of stages in execution of multimedia project pre production, production and post production phases.

UNIT-V

What is Compression ; Lossy and Lossless compression ; Compression techniques RLE in text and image, LZW, Huffman s Coding, GIF, JPEG, MPEG, Fractal, Wavelet ; Image Filetypes; Advanced Multimedia Virtual Reality, Augmented Reality, Video Conferencing, Morphing, voIP, Video on Demand .

Reference Books:

1. Computer Graphics Hearn & Baker-Pearson Prentice Hall, 2005.
2. Multimedia.

BCS603

Environmental Science

Course Objective

Creating awareness among engineering students about the importance of environment, the effect of technology on the environment and ecological balance is the prime aim of the course**.**

Course Outcomes

CO 1. Know the importance of environmental studies and methods of conservation of natural resources.
CO 2. Describe the structure and function of an ecosystem.
CO 3. Identity the values and conservation of bio-diversity.
CO 4. Explain the causes, effects and control measures of various types of pollutions.
CO 5. Select the appropriate methods for waste management.
CO 6. Get knowledge about various disaster management methods
CO 7. Recall social issues and legal provision.

UNIT – I

General: Environmental segments, environmental degradation, environmental impact assessment.

Concept of Ecosystem: Fundamental of Ecology and Ecosystem, components of ecosystem, food-chain, food-web, trophic levels, energy flow, cycling of nutrients, major ecosystem types (forest, grass land and aquatic ecosystem).

UNIT – II

Air Pollution: Atmospheric composition, energy balance, classification of air pollutants, source and effect of pollutants – Primary (CO, SOx, NOx, particulates, hydrocarbons), Secondary [photochemical smog, acid rain, ozone, PAN (Peroxy Acetyl Nitrate)], green house effect, ozone depletion, atmospheric stability and temperature inversion, Techniques used to control gaseous and particulate pollution, ambient air quality standards.

UNIT – III

Water Pollution: Hydrosphere, natural water, classification of water pollutants, trace element contamination of water, sources and effect of water pollution, types of pollutants, determination and significance of D.O., B.O.D., C.O.D. in waste water, Eutrophication, methods and equipment used in waste water treatment preliminary, secondary and tertiary.

UNIT – IV

Land Pollution & Noise Pollution: Lithosphere, pollutants (agricultural, industrial, urban waste, hazardous waste), their origin and effect, collection of solid waste, solid waste management, recycling and reuse of solid waste and their disposal techniques (open dumping, sanitary land filling, thermal, composting).
Noise Pollution: Sources, effect, standards and control.

UNIT – V

Environmental Biotechnology: Definition, current status of biotechnology in environmental protection, bio-fuels, bio-fertilize, bio-surfactants, bio-sensor, bio-chips, bio-reactors.

Pollution Prevention through Biotechnology: Tannery industry, paper and pulp industry, pesticide industry, food and allied industry.

Text Books

1. Environment and Ecology by Piyush Kant Pandey and Dipti Gupta (Sum India Publication)
2. A Textbook of Environmental Chemistry and Pollution Control by S.S. Dara (S. Chand and

Company)

Reference Books:

1. Masters, G.M. Introduction to Environment Engineering and Science (Prentice Hall of India).
2. Environmental Chemistry by A.K. Dey (Eastern Ltd.).
3. Environmental Chemistry by B.K. Sharma (Krishna Prakashan).
4. Nebel B.J. Environmental Science (Prentice Hall of India-1987).
5. Environmental Biotechnology by S.N. Jogdand (Himalaya Publishing House).
6. Introduction to Environmental Biotechnology by A.K. Chatterji (Prentice Hall of India).

ELECTTIVE COURSES

BCS604A

Data Mining

Course Objective

To interpret the contribution of data warehousing and data mining to the decision support level of organizations.To evaluate different models used for OLAP and data pre-processing. To categorize and carefully differentiate between situations for applying different data mining techniques: mining frequent pattern, association, correlation, classification, prediction, and cluster analysis.

Course Outcomes

1. Understand the data extraction and transformation techniques.
2. Understand the association rule mining techniques and understand association mining to correlation analysis, constraint based association mining.
3. Understand operational database, warehousing and multidimensional need of data base to meet industrial needs.
4. Understand the components of warehousing, classification methods and clustering analysis.
5. Identify and understand the Business analysis, query tools and application, OLAP etc.

UNIT- I

Introduction Data Mining, Data Ware House, Transactional Databases, Data Mining Functionalities Characterization and Discrimination, Mining frequent patterns, Association and correlation, Classification and Prediction, Cluster Analysis, Classification of Data Mining Systems, Data Mining Task Primitive, Integration of Data Mining systems, Major issues in Data Mining, Data integration and transformation, Data reduction, Data discretization.

UNIT- II

Data Warehouse and OLAP technology Data Warehouse, Multidimensional data Model, Data warehouse architecture, Data Warehouse implementation,OLAP, Data Warehouse and data mining.

UNIT- III

Association Rules and Classification Concepts Efficient and Scalable Frequent item set Mining methods, Mining various kind of association rules, from association mining to Co-relation analysis, Classification and prediction, Issues, Classification by Decision tree induction, Bayesian Classification, Rule-based classification, Support Vector Machines, Learning from your neighbors, Prediction.

UNIT- IV

Cluster Analysis Definition, Types of data in cluster analysis, A categorization major Clustering methods- Partitioning methods, K-means K- medoids, from k-medoids to CLARANS, Hierarchical methods, Density based methods.

UNIT- V

Mining Complex Data Spatial Data Mining, Multimedia Data Mining, Text Mining and Mining WWW.

Text Books:

1. Jiawei Han and Micheline Kamber Data Mining - Concepts and Techniques (Second Edition) Elsevier, 2006

Reference Books:

1. Witten and Frank Data Mining Practical Machine Learning Tools and Techniques (Second Edition) Elsevier, 2005
2. Soman, Divakar and AjayData Mining Theory and Practice PHI, 2006

BCS604B

Client Server Computing

Course Objective

To learn about objective evaluations and details of Client/Server development tools, used operating system and database management system and its mechanism in respect to client/server computing and network components used in order to build effective client/server applications**.**

Course Outcomes

1. An ability to identify, analyze, and solve broadly-defined engineering technology problems.
2. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature.
3. A knowledge of the impact of engineering technology solutions in a societal and global context.

UNIT- I

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.

UNIT- II

Client hardware and software: Client components and operating systems. GUI, Xwindow vs.windowing, database access. Application logic client software products: GUI environments, converting 3280/5250 screens, database access tools. Client requirements: GUI design standards, Open GUI standards, Interface dependents, testing interfaces, development aides.

UNIT- III

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

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

Text Books:

1. Dawna Travis Dewire , Client Server Computing, McGraw Hill International

Reference Books:

1. Tanenbaum and Van Steen, Distributed Systems Principles and Paradigams, Pearson Education, 2005
2. Orfali,Harkey and Edwards, The Essential Client server Survival guide, 2nd edition Galgotia, 2003
3. Jeffrey.D.Schan, C/S Application and Architecture, Novell Press, BPB
4. Joe Salami, Guide to C/S Databases, Bpb Publn., 1994
5. David Vaskevitch , Client Server Strategies, Galgotia, 1994.

BCS605-P `

PROJECT + COURSE VIVA

The project topic shall be chosen from areas of current day interest using latest packages/ languages running on appropriate platforms, so that the student can be trained to meet the requirements of the Industry. A bonafied project report shall be submitted in hard bound complete in all aspects. For internal evaluation, the progress of the student shall be systematically assessed through two or three stages of evaluation at periodic intervals.
In Course Viva, the student is to be assessed on ,the basis of his knowledge in all the subjects taught in the curriculum as well as topics of current day interest in the pertinent areas.