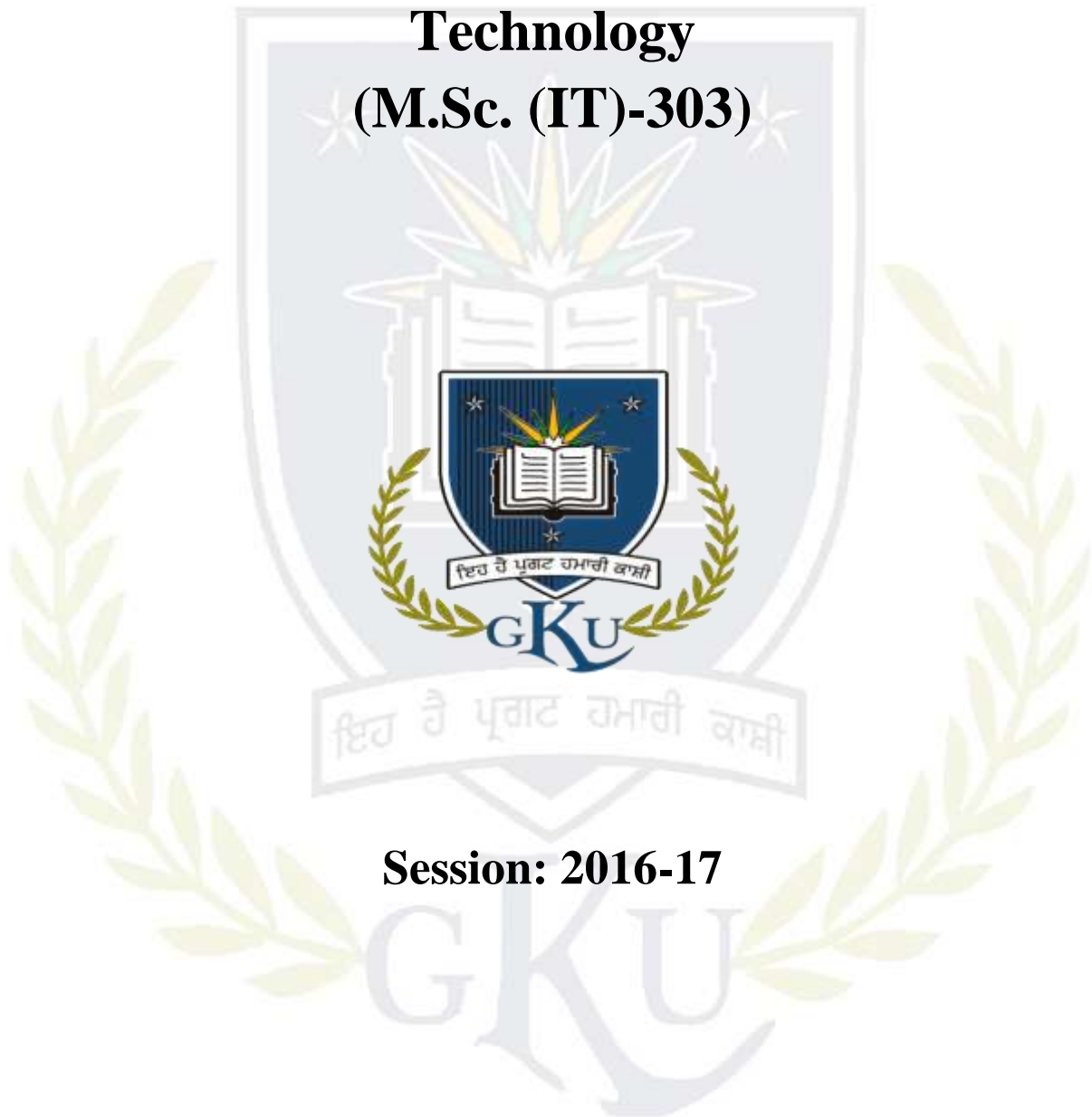


Program Syllabus Booklet

Master of Science in Information Technology

(M.Sc. (IT)-303)



Session: 2016-17

**University College of Computer Applications
Guru Kashi University, Talwandi Sab**

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Introduction about Program

M.Sc. in Information Technology is a two-year post-graduate program dedicated to providing knowledge of programming, implementation of common data structures using OOP principles in C++ and ADTs. It covers in-depth analysis of Lists, Stacks, Queues, Trees, and Graphs. Students are introduced to various aspects of information technology including software development, data manipulation, and technology re-engineering.

This program is designed to help students explore different types of technology applications and the way in which information is created exchanged and stored. Students may learn how to write code and can explore areas such as information security software applications system design and databases.

The program offers a broad technical understanding of current and evolving technologies in the IT field. The emphasis of the program is moving technology from the laboratory to the realm of business development.



| Semester: 1st | | | | | | | | | | |
|---------------------------------|--------------|---|---------------------|------------------|---|---|----------------|----------------|----------------|-------------|
| Sr. | Subject Code | Subject Name | Type of Subject T/P | (Hours Per Week) | | | No. of Credits | Internal Marks | External Marks | Total Marks |
| | | | | L | T | P | | | | |
| 1 | A304101 | Programming Using C | T | 3 | 1 | 0 | 4 | 50 | 50 | 100 |
| 2 | A304102 | Fundamentals of Computers & Information Technologies | T | 3 | 1 | 0 | 4 | 50 | 50 | 100 |
| 3 | A304103 | Computer Organization & Architecture | T | 3 | 1 | 0 | 4 | 50 | 50 | 100 |
| 4 | A304104 | Data Communication | T | 3 | 1 | 0 | 4 | 50 | 50 | 100 |
| 5 | A304105 | Operating Systems | T | 3 | 1 | 0 | 4 | 50 | 50 | 100 |
| 6 | A304106 | S/w Lab-I(Fundamentals of Computers & Information Technologies) | P | 0 | 0 | 4 | 2 | 60 | 40 | 100 |
| 7 | A304107 | S/w Lab-II(C programming) | P | 0 | 0 | 6 | 3 | 60 | 40 | 100 |
| Total No. of Credits | | | | 25 | | | | | | |



| Semester: 2nd | | | | | | | | | | |
|----------------------|--------------|--|---------------------|------------------|---|---|----------------|----------------|----------------|-------------|
| Sr. | Subject Code | Subject Name | Type of Subject T/P | (Hours Per Week) | | | No. of Credits | Internal Marks | External Marks | Total Marks |
| | | | | L | T | P | | | | |
| 1 | A304201 | Data Structures | T | 3 | 1 | 0 | 4 | 50 | 50 | 100 |
| 2 | A304202 | Digital Electronics | T | 3 | 1 | 0 | 4 | 50 | 50 | 100 |
| 3 | A304203 | Database Management Systems | T | 3 | 1 | 0 | 4 | 50 | 50 | 100 |
| 4 | A304204 | Internet Concepts and Web Designing | T | 3 | 1 | 0 | 4 | 50 | 50 | 100 |
| 5 | A304205 | S/w Lab-III(Data Structures using C/C++) | p | 0 | 0 | 8 | 4 | 60 | 40 | 100 |
| 6 | A304206 | S/w Lab-IV(Database Management Systems) | P | 0 | 0 | 4 | 2 | 60 | 40 | 100 |
| 7 | A304207 | S/w Lab-V(Internet Concepts and Web Designing) | P | 0 | 0 | 6 | 3 | 60 | 40 | 100 |
| Total No. of Credits | | | | 25 | | | | | | |

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| Semester: 3rd | | | | | | | | | | |
|----------------------|--------------|---|---------------------|------------------|---|---|----------------|----------------|----------------|-------------|
| Sr. | Subject Code | Subject Name | Type of Subject T/P | (Hours Per Week) | | | No. of Credits | Internal Marks | External Marks | Total Marks |
| | | | | L | T | P | | | | |
| 1 | A303301 | Object Oriented Programming using C++ | T | 4 | 1 | 0 | 5 | 50 | 50 | 100 |
| 2 | A303302 | System Analysis and Design | T | 4 | 1 | 0 | 5 | 50 | 50 | 100 |
| 3 | A303303 | Parallel Processing | T | 4 | 1 | 0 | 5 | 50 | 50 | 100 |
| 4 | A303304 | Network Security and Cryptography | T | 4 | 1 | 0 | 5 | 50 | 50 | 100 |
| 5 | A303305 | S/w Lab-VI(Object Oriented Programming using C++) | P | 0 | 0 | 8 | 4 | 60 | 40 | 100 |
| 6 | A303307 | S/w Lab-VII(Workshop on Visual Basic) | P | 0 | 0 | 6 | 3 | 60 | 40 | 100 |
| Total No. of Credits | | | | 27 | | | | | | |

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| Semester: 4th | | | | | | | | | | |
|----------------------|--------------|--|---------------------|------------------|---|---|----------------|----------------|----------------|-------------|
| Sr. | Subject Code | Subject Name | Type of Subject T/P | (Hours Per Week) | | | No. of Credits | Internal Marks | External Marks | Total Marks |
| | | | | L | T | P | | | | |
| 1 | A303401 | Computer Graphics and Multimedia | T | 4 | 1 | 0 | 5 | 50 | 50 | 100 |
| 2 | A303402 | Software Engineering | T | 4 | 1 | 0 | 5 | 50 | 50 | 100 |
| 3 | A303403 | Object Oriented Technologies and Java Programming | T | 4 | 1 | 0 | 5 | 50 | 50 | 100 |
| 4 | A303404 | System Software | T | 4 | 1 | 0 | 5 | 50 | 50 | 100 |
| 5 | A303405 | S/w Lab-VIII(Computer Graphics using C) | P | 0 | 0 | 4 | 2 | 60 | 40 | 100 |
| 6 | A303406 | S/w Lab-IX(Object Oriented Technologies and Java Programming) | P | 0 | 0 | 6 | 3 | 60 | 40 | 100 |
| 7 | A303407 | Major Project | P | 0 | 0 | 6 | 3 | 60 | 40 | 100 |

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Course Name: Programming Using C

Course Code: A300102

Semester: 1st

Credits 04

L T P

3 1 0

Course Contents

Unit - I

Introduction: ANSI C standard, Overview of Compiler and Interpreters, Structure of C Program, Programming rules, Execution

Basic structure of C program: Character set, Identifiers and keywords, constants, variable, Data types, input and output, type conversion,

Operators and expressions: Arithmetic, Unary, Logical and Relational operators, assignment operators, Conditional operators, type conversion. Library functions.

Unit - II

Input/ Output in C: Formatting input & output functions.

Decision making statements – if, else if

Control statements: branching, looping using For, While and Do-While statements, nested control structures, switch, break and continue statements.

Unit - III

Arrays: Definition, declaration, assignment, one dimensional and two dimensional arrays.

Strings: input/output of strings, string handling functions, table of strings.

Pointers: pointer data type, pointer declaration, initialization, accessing values using pointers. **Functions:** prototype, definition and call, formal and actual arguments, methods of parameter passing to functions, recursion versus iteration.

Unit – IV

Structures and unions: using structures and unions, comparison of structure with arrays and union.

Files: opening and closing files, Basic I/O operation on files.

Storage Classes: automatic, external, static and register variables.

Text Books:

1. KanetkarP. Yashvant. *Let us C*, Seventh Edition, BPB Publications, NewDelhi.



2. Balagurusamy E. Programming in C, Tata McGrawHill.
3. G.S. Byron. Programming in C, Second Edition, McGraw Hills.
4. Kernighan & Richie. The C Programming Language, Second Edition, PHI.
5. Salaria R. S. *Problem Solving and Programming in C*, Second Edition, PHI



Course Name: Fundamentals of Computer & Information Technologies

Course Code: A304102

Semester: 1st

L T P

Credits: 04

3 1 0

Course Contents

Section - A

Information concepts and processing: Evolution of information processing, data, information language and communication.

Elements of computer processing system: Hardware-CPU, storage devices and media. VDU, input-output devices, data communication equipment, Software-system software, application software.

Programming Language: classification, machine code, assembly language, higher level languages, and fourth generation languages.

Introduction to Operating System: its need and Operating System services; Operating System classification- single user, multi-user, simple batch processing, Multiprogramming, Multitasking, Parallel system, Distributed system, Real time system. Typical commands of DOS, GUI - Windows.

Section – B

Computers and Communication: Single user, multi-user, work station, client server systems, Computer networks, network protocols, LAN, MAN, WAN.

Introducing the Internet: Description of the Internet–Working, Surfing, Internet Domain Names and Addresses

Connecting LAN to Internet: Protocols, IP Address, and Web Server.

Internet Applications : Email , Working of email , Advantages of email, Understanding of Internet Email, Net news ,Search Engines, Introducing to Usenet ,organization of Usenet articles, reading, saving ,mailing, writing and posting of an articles.

WWW- World Wide Web

Working of WWW, Hypertext and Hypermedia, URL, Searching the WWW, Web access using web browser, locating information on the Web.

Text Books:

1. Sinha P.K.Computer Fundamentals
2. RajaramanV.Fundamentals of Computers,Prentice Hall



Course Name: Computer Organization & Architecture

Course Code: A304103

Semester: 1st

Credits: 04

L T P

3 1 0

Course Contents

Section-A

Boolean Algebra: Boolean operations, Truth Tables, Boolean Laws, K-maps (2,3 and 4 variable maps, don't care conditions).

Basic Gates, Combinational logic design: half-adder, full adder, parallel adder.

Sequential circuits: concept, flip-flops (D, RS, JK, T), counters (Ripple, Asynchronous, Synchronous).

Instruction codes, Instruction formats, Instruction cycle, Addressing modes.

Section -B

Register Transfer Language, Arithmetic, Logic and Shift micro-operations, Arithmetic Logic Shift unit

Control Memory: Design of control unit, Micro programmed and hardwired control unit (overview only), Features of RISC and CISC

Memory Organisation: memory hierarchy, Memory types: cache, associative and other types.

I/O organization: I/O interface, Modes of data transfer: Programmed I/O, Interrupt initiated I/O, DMA.

Block diagram depicting architecture of 8085 machine.

Text Books/References:

1. M.M. Mano (2002). *"Computer System Architecture"*. Third Edition, Prentice-Hall of India.
2. A.S.Tannenbaum (1999). *"Structured Computer Organisation"*. Prentice-Hall of India.
3. William Stallings (2002). *"Computer Organisation and Architecture"*. 6th Edition, Pearson Education.

Course Name: Data Communication

Course Code: A304104

Semester: 1st

L T P

Credits: 04

3 1 0

Course Contents

Section -A

Introduction to Data Communication, Analog vs Digital Communication; Fourier Analysis, Band Width Limitation, Data rate of a channel, Error Detection and Correction: Nature of errors, Parity Check, CRC, Hamming Code, Modulation techniques :AM, PM, FM, Synchronous and Asynchronous Modulation, Multiplexing : SDM, FDM, TDM, STDM.

Section - B

Introduction to Computer networks and applications; Network structure and Architecture, OSI reference model, Network standardization,

Physical Layer: Circuit switching, Packet Switching, Message Switching, Terminal Handling, Telephone system, modems, congestion, Multi channel Access, Transmission media.

The Data Link Layer : Design Issues, Elementary Data Link Protocols, Sliding Windows Protocol, Protocol performance, Protocol Specification & verification, DLL in X.25, HDLC/SDLC.

The Network Layer: Design Issues, Routing Algorithms, Congestion Control Algorithms, Internet working, Example of Network layer in ARPANET, X.25 Protocol.

Application Layer

Text Books:

1. Tanenbaum Andrew S (2010).*Computer Networks*, 3rd Edition, Pearson Prentice Ltd.
2. Behruoz A Forouzan (2009). *Data Communication and Networking*, 4th Edition, Tata McGraw Hill.
3. Larry L.Peterson (2008).*Computer Networks*, A System Approach, 4th Edition, Elsevier Publication.

Course Name: Operating Systems

Course Code: A304105

Semester: 1st

Credits: 04

L T P

3 1 0

Course Contents

Section-A

Introduction: Operating System, Role as resource manager, Operating system strategies, Factors in operating system design, operating system functions and services.

Process Management: The system view of processes, Process descriptor, Process state diagram, Resource abstraction, Process hierarchy, Process scheduling strategies, Process synchronization, Deadlock handling,

Section-B

Memory Management: Factors in memory design, Memory hierarchies, Memory manager strategy, Memory allocation strategies, Paging, Demand paging and Segmentation techniques

Device Management: Device management approaches, Device allocation considerations, Disk scheduling.

Information Management: File system, its layered structure and general model, Allocation methods, free space management.

References:

1. Silberschatz Galvin. *Operating system concepts*
2. Milan Milenkovic. *Operating system*
3. Deital H.M. *An introduction to operating system* (Addison Wesley).

Course Name: S/W Lab-I (Fundamentals of Computer & Information Technology)

Course Code: A304106

Semester: 1st

Credits: 02

L T P

0 0 4

Course Contents

1. [MS-WORD] Creating, opening, closing, saving and editing a word Document.
2. [MS-WORD] Insert header and footer in the document.
3. [MS-WORD] Create a link between two files using Hyperlink.
4. [MS-WORD] Create a mail-merge and add data of 5 recipients.
5. [MS-WORD] Protect a document.
6. [MS-WORD] Implement macro.
7. [MS-POWERPOINT] Create duplicate slides in PowerPoint. Give an example.
8. [MS-POWERPOINT] Make a master slide.
9. [MS-POWERPOINT] Design a chart of population.
10. [MS-POWERPOINT] Insert Animation.
11. [MS-POWERPOINT] Insert a background in PowerPoint.
12. [MS-EXCEL] How you can filter your data.
13. [MS-EXCEL] Sort data in ascending and descending order.
14. [MS-EXCEL] To show the use of goal seek
15. [MS-EXCEL] To show the use of scenarios.
16. [MS-EXCEL] Perform any 5 Date and Time functions.
17. [MS-EXCEL] Perform any 5 Math & Trig functions.



Course Name: S/W Lab-II(C Programming)

Course Code: A304107

Semester: 1st

Credits: 03

L T P

0 0 6

Course Contents

1. Program to find sum of two numbers.
2. Program to test whether an entered number is even, odd or zero.
3. Program to test whether an entered number is prime number or not.
4. Program to print N terms of a Fibonacci Series.
5. Program to find the reverse of number.
6. Program to check whether a given Number or a given string is palindrome or not.
7. Program to reverse a given string.
8. Program to check whether a given number is prime or not.
9. Program to find the prime numbers up to N.
10. Program to print:
*
**

11. Program to search a string in an array using read-data.
12. Program to find the frequency of vowels in a given string.
13. Program to find the frequency of each character in a given string.
14. Program to find greatest in a matrix using subroutine.
15. Program for Matrices Addition. And subtraction.
16. Program for Matrix Transpose.
17. Program to find sum of rows and column of a matrix.
18. Program to find sum of both diagonals of the matrix.

Course Name: Data Structures

Course Code: A304201

Semester: 2nd

Credits: 04

**L T P
3 1 0**

Course Contents

Section-A

Basic concept and notations, data structures and data structures operations, mathematical notation and functions, algorithmic complexity, Big 'O' notations and time space trade off.

Arrays: Linear array, representation of linear array in memory, Traversing linear array, insertion and deletion in an array, multi-dimensional array: row-major, column major order, sparse array.

Stacks: Push and Pop in stack. Representation of stack in memory (linked and sequential) applications of Stack: conversion from infix notation to post fix notations, evolution of postfix notation, matching of Parenthesis, recursion, Tower of Hanoi.

Queue: Queues and Dequeues, Priority Queues, Operations on queues.

Section-B

Linked list: Representation of linked list using static and dynamic data structures, Comparison of Linear and non-linear data structures, Insertion and deletion of a node from a linear linked list, Introduction to doubly and circular linked lists, Application of linked lists.

Searching and Sorting: Linear and binary search, Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Radix Sort and Quick Sort comparison of various searching and sorting algorithms.

References:

1. Schaum Series, *Data Structure*.
2. Ni Claus Wirth. *Algorithm and Data Structures & Programs*.
3. Tanenbaum. *Data Structures*.
4. Trembley & Soreson. *An Introduction to Data Structures Applications*

Course Name: Digital Electronics

Course Code: A304202

Semester: 2nd

Credits: 04

L T P

3 1 0

Course Contents

Section-A

Information Representation: Number systems, Integer and floating point representation, character codes (ASCII, EBCDIC).

Digital IC's: Logic gates, flip-flops, clocks and timers, shift registers, counters.

Boolean Algebra & Circuit Design: Basic laws of Boolean algebra, circuit design using standard (NAND) gates, Adder, coder / De-multiplexer, encoder / multiplexer design.

Section-B

MOS & LSI Digital Systems: Semiconductor memory, static and dynamic devices, read only & random access memory chips, PROMS and EPROMS. Address selection logic. Read and write control timing diagrams for memory ICs.

Logical Families: TTL, STTL, CMOS logic families.

Digital Peripherals: Keyboard, multiplexed seven segment display, CRT display schemes, Printers, Control interfaces (parallel and serial) for the peripheral units.

References:

1. Mano D. Morris. *Digital Circuits of logic design*, (PHI)
2. 2.T.C. Bartee. *Digital and electronic circuits* (McGraw Hill)
3. Malvino. *Digital computer electronics*
4. Floyd. *Digital fundamentals*
5. Jain R.P. *Modern digital electronics*
6. Tauls and Schillings. *Digital integrated electronics*

Course Name: Database Management System

Course Code: A304203

Semester: 2nd

L T P

Credits: 04

3 1 0

Course Contents

Section-A

Traditional file processing system: Characteristics, limitations, Database: Definition, composition.

Database Management System: Definition, Characteristics, advantages over traditional file processing system, User of database, DBA and its responsibilities, Database schema, instance.

DBMS architecture, data independence, mapping between different levels.

Database languages: DDL, DML, DCL.

Database utilities, Data Models, Keys: Super, candidate, primary, foreign.

Section-B

Entity relationship model: concepts, mapping cardinalities, entity relationship diagram, weak entity sets, strong entity set, aggregation, generalization, Overview of Network and Hierarchical model.

Relational Data Model: concepts, constraints. Relational algebra: Basic operations, additional operations.

Database Design: Functional dependency, decomposition, problems arising out of bad database design, Normalization- Normal forms based on primary keys (1 NF, 2 NF, 3 NF, & BCNF), multi-valued dependency, Database design process, data base protection, database integrity.

Database concurrency: Definition and problems arising out of concurrency.

References:

1. C.J. Date. *An Introduction to Data Base Systems*, Narosa Publications.
2. Henry F. Korth. *Database System Concepts*, McGraw Hill.
3. Naveen Prakash. *Introduction to Database Management*, TMH.
4. Bipin C. Desai. *An Introduction to Database System*, Galgotia Publications.
5. Ullman. *Principles of Database Systems*, Galgotia Publications.

Course Name: Internet Concepts and Web Designing

Course Code: A304204

Semester: 2nd

L T P

Credits: 04

3 1 0

Course Contents

Section -A

Introduction The World Wide Web (WWW) , History, Hypertext and Hypertext Markup Language, Microsoft Front Page, HTML Documents, various Tags.

Elements of an HTML Document: Text Elements, Tag Elements, Special Character elements Structural elements of HTML documents: Header tags, Body tags, Paragraphs, Titles, Numbered list, Non, Numbered lists, Definition lists.

Formatting HTML Documents: Logical styles (source code, text enhancements, variables), Physical Styles (Bold, Italic, underlined, crossed).

Managing images in Html: Image format (quality, size, type), Importing images (scanners), Tags used to insert images, Frames.

Tables in HTML documents Hypertext and Link in HTML Documents, URL/FTP/HTTP

Types of links: Internal Links, External Links, Link Tags, Links with images and buttons, Links that send email messages

Special effects in HTML documents: Text fonts, Sensitive Images, Tip tables, Page background (Variable, Fixed), Rotating messages (Marquee)

Managing forms: Interactive forms, creating data entry forms

Section –B

Cascading Style Sheets: ways of inserting a style sheet:

- External style sheet
- Internal style sheet
- Inline style

CSS Id and Class, Inheritance in CSS

Scripting and websites: Java scripting

PHP: This course is an introduction to the PHP programming language. Topics include installation and configuration with the Apache http server, variables and data types, language syntax, control structures, functions, strategies and tools for handling input and generating output, error handling, sending email, manipulating dates and times, string manipulation and regular expressions, SQL and MySQL database access, object oriented programming

(OOP),.Though primarily focused on PHP 5.X. We will emphasize security and sound coding practices throughout.

References:

1. Mark Surfas, Mark Brown and John Juge.*Special Edition Using Intranet HTML*
2. JefDouyer – Hayden development group,*Dynamic HTML Web Magic*
3. Elizabeth Castro. *HTML 4 for the World Wide Web*



Course Name: S/W Lab-III (Data Structure Using C/ C++)

Course Code: A304205

Semester: 2nd

L T P

Credits: 04

0 0 8

Course Contents

1. Write a program to insert an element into an array
2. Write a program to delete an element from an array.
3. Write a program to implement linear search algorithm
4. Write a program to implement binary search algorithm
5. Write a program to implement bubble sort algorithm.
6. Write a program to implement selection sort algorithm.
7. Write a program to implement PUSH operation in stacks.
8. Write a program to implement POP operation in stacks.
9. Write a program to implement Queues.
10. Write a program to insert an element in the beginning of the link list.
11. Write a program to insert an element in the middle of the link list.
12. Write a program to insert an element in the end of the link list.
13. Write a program to delete an element from the beginning of the link list.
14. Write a program to delete an element from the end of the link list.
15. Write a program for implementation of a graph.
16. Write a program for implementation of binary search tree.
17. Write a program for implementation of binary search tree.



Course Name: S/W Lab-IV (Database Management System)

Course Code: A304206

Semester: 2nd

L T P

Credits: 02

0 0 4

Course Contents

1. Data Definition, Table Creation, Constraints,
2. Insert, Select Commands, Update and Delete Commands.
3. Nested Queries and Join Queries
4. Views
5. High level programming language extensions (Control structures, Procedures and Functions).
6. Front end Tools
7. Forms
8. Triggers
9. Menu Design
10. Reports.
11. Database Design and implementation (Mini Project).

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Course Name: S/W Lab-V (Internet Concepts and Web Designing)

Course Code: A304207

Semester: 2nd

L T P

Credits: 03

0 0 6

Course Contents

1. Design the page with an attractive background color, text color and background image.
2. Design the page with an attractive color combination, with suitable headings and horizontal rules.
3. Write an HTML document with an example of Ordered List and Unordered List.
4. Write an HTML document with an example of Table format to print your Bio-Data.
5. Write an HTML document with an example of Table format to print your Telephone Bill.
6. Develop a complete web page using Frames and Frameset.
7. Write an HTML code for designing the subscription form of mail account in the e-mail website with appropriate fields.
8. Write an example of Style Sheet.
9. Design a webpage with colors in bgcolor, text and link, try out different sizes.
10. Design a single page web site for a university containing a description of the courses offered, it should also contain some general information about the university such as its history.
11. Write a HTML code for specifying the heading BS or cities in the HTML document.
12. Write a HTML Code for Nested list.
13. Write HTML code to develop a web page having background in blue and title "Welcome to my home page" in red other color.
14. Create an HTML document of giving details of your name, age, telephone no, address and enrolment no, aligned in proper order.
15. Design a web page that provides links to five different web pages or to entirely different websites.

Course Name: Object Oriented Programming Using C++

Course Code: A303301

Semester: 3rd

L T P

Credits: 05

4 1 0

Course Contents

Section -A

Introduction to C++, C++ standard library, Basics of a C++ Environment, Object Oriented Concepts, Introduction to objects and object oriented programming, Abstraction, Encapsulation, and Access Modifiers: controlling access to a class, method or variable (public, protected, private).

Classes and Data Abstraction: Introduction, structure definition, accessing members of a structure, class scope and accessing class members, separating interface from implementation, controlling access function and utility functions, Constructors, Destructors, friend function and friend classes, using “this” pointer, static class member, function overloading.

Operator Overloading: Introduction, fundamentals of operator overloading, restriction on operators overloading, operator function as class members vs. as friend functions, overloading unary operator, overloading binary operators.

Section-B

Inheritance :Introduction , inheritance: base class, protected members, casting base class pointer to derived- class pointers, using member functions, Types of Inheritance, public, protected and private inheritance, using constructors and destructors in derived classes, implicit derived class object to base class object conversion , composition Vs. inheritance.

Virtual Functions and Polymorphism: Introduction to virtual function, abstract base class and concrete class, polymorphism, dynamic binding, virtual destructor, Implementation in C++ using virtual function.

Files and I/O Streams: Files and streams, creating a sequential access file, reading data from A Sequential access file, updating Sequential Access file, Random Access File , Creating A Random Access File, Writing data Randomly To a random Access file, Reading Data Sequentially from A Random Access File.

Exception Handling: Introduction, Basic of C++ Exception Handling: Try, Catch, Throwing, Catching and Re-throwing an Exception, Exception specification, Processing Unexpected Exception.

Text Books:

1. Lafore Robert. *Object Oriented Programming in Turbo C++*, Pearson Education, New Delhi.
2. Kamthane. *Object Oriented Programming in Turbo C++*, Pearson Education, New Delhi.
3. H M Deitel and P J Deitel. *C++ How to Program*, Prentice Hall, India, New Delhi.
4. Schildt Herbert. *The Complete Reference in C++*, TMH, New Delhi.
5. Ravichandran D. *Programming with C++*, TMH, New Delhi.
6. Balagurusamy E. *Object Oriented Programming with C++*, Tata McGraw- Hill, New Delhi.

Course Name: System Analysis and Design

Course Code: A303302

Semester: 3rd

Credits: 05

L T P

4 1 0

Section-A

System Concepts: Definition, characteristics, elements & types of system.

System development life cycle: Recognition of need: Feasibility study, system analysis, introduction, information collection, interviews, questionnaires, observation, record searching and document analysis, analysis tools, data flow diagram, data dictionary, decision tree, structured English and decision table.

Section -B

System Design: The process and stages of systems design, input/output and file design;
System Implementation: System implementation, system testing, implementation process and implementation methods, system maintenance.

References:

1. Awad Elias N. *System analysis and design* (Galgotia)
2. Sen James A. *Analysis and design of information system*(Tata McGraw)

Course Name: Parallel Processing

Course Code: 303303

Semester: 3rd

L T P

Credits: 04

4 0 0

Course Contents

Section -A

Introduction: Paradigms of parallel computing: Synchronous - vector/array, SIMD, Systolic; Asynchronous -MIMD,

Hardware taxonomy: Flynn's classifications, Handler's classifications.

Software taxonomy: Kung's taxonomy.

Abstract parallel computational models: Combinational circuits, Sorting network, PRAM models, Interconnection RAMs. Parallelism approaches - data parallelism, control parallelism

Performance Matrices: Laws governing performance measurements. Matrices - speedups, efficiency, communication overheads, single/multiple program performances.

Section-B

Parallel Processors: Taxonomy and topology - shared memory multiprocessors, distributed memory networks. Processor organization - Static and dynamic interconnections. Embeddings and simulations.

Parallel Programming: Shared memory programming, distributed memory programming, object oriented programming, data parallel programming, functional programming.

Scheduling and Parallelization: Scheduling parallel programs, Loop scheduling, Parallelization of sequential programs, Parallel programming support environments.

References:

- 1.M. J. Quinn, (1994) *Parallel Computing: Theory and Practice*, McGraw Hill, New York.
- 2.T. G. Lewis and H. El-Rewini (1992) *Introduction to Parallel Computing*, Prentice Hall, New Jersey.
- 3.T. G. Lewis,(1994) *Parallel Programming: A Machine-Independent Approach*, IEEE Computer Society Press, Los Alamitos.

Course Name: Network Security and Cryptography

Course Code: A303304

Semester: 3rd

L T P

Credits: 04

4 1 0

Course Contents

Section A

Introduction: Need for securing a network; attacks from within and external, introduction to cyber crime, cyber law-indian Perspective (IT Act2000), cyber ethics, ethical hacking. What is hacking. Attacker, phreaker etc. Securing Data over internet :Introduction to basic encryption and decryption, concept of symmetric and asymmetric key cryptography, overview of DES, RSA and PGP. Introduction to Hashing:MD5,SSL,SSH,HTTPS,digital signatures.

Section B

Virus,Worms and Trojans : Definitions, preventive measures access control, checksum verification, process neutering, virus scanners, heuristic scanners, application level virus scanners, deploying virus protection. Computer network attacks : Active Attacks, passive Attacks, Stealing Passwords,Social Engineering, Bugs and Backdoors, Authentication Failures, Protocol Failures, information Leakage, Denial-of-Service Attack, Botnets, Phishing Attacks

Section C

Firewalls: Definition and types of firewalls, defining access , policies, address translation, firewall logging, firewall deployment Intrusion Detection System (IDS):Introduction;IDS limitations teardrop attack, counter measures; Host based IDS Virtual Private Network (VPN): Basics, setting of VPN diagram, configuration of required objects, exchanging keys, modifying security policy. Cryptography: Symmetric Key Encryption and Asymmetric Key Encryption, DES,AES,RSA

Text Books/Reference Books

1. William Stallings(2003) “*Cryptography & Network Security*” , Pearson Education, 3rd Edition
2. Charlie Kaufman(2002) Radia Perlman, Mike Speciner, “ *Network Security, private communication in a public world*”, PHI, 2nd edition.
3. Douglas R.Stinson,(1995) “*Cryptography – Theory and Practice* “ , CRC Press .
4. Bruce Schneier , Niels Ferguson (2003) “*Practical Cryptography*”, Wiley Dreamtech India Pvt Ltd.

Course Name: S/W Lab-VI (Object Oriented Programming using C++)

Course Code: A303305

Semester: 3rd

L T P

Credits: 04

0 0 8

Course Contents

1. Program to show the use of cin, cout
2. Program to implement the operators
3. Program based on decision making statement (if else)
4. Program based on the loops(while,do while)
5. Program based on loops(for),switch statement
6. Program based on structures and enumerated data types
7. Program based functions, overloaded functions
8. Program to show usage of storage classes.
9. Program to show usage of function overloading, default arguments
10. Program to show usage of classes, objects
11. Program to show usage of constructors, destructors
12. Program to manipulate arrays and array of objects
13. Program to manipulate strings.
14. Program to show usage of inheritance of various types (multiple, multilevel etc.)
15. Program to show usage of unary operator overloading
16. Program to show usage of binary operator overloading
17. Program for conversion from basic to user defined data type
18. Program for conversion from user defined to basic
19. Program to show usage of basics of pointers
20. Program to show usage of pointers and arrays.
21. Program to show usage of pointers, function arguments



22. Program to show usage of new, delete, memory management
23. Program to show usage of virtual function
24. Program to show usage of friend, static function
25. Program to show usage of overloaded assignment operator, this pointer
26. Program to read & write contents of a text file
27. Program to show usage of file pointers.
28. Program to show usage of command line arguments
29. Program to show usage of overloading of right & left shift operators.
30. Program to show usage of exception handling mechanism
31. Program to show usage of `uncaught_exception()`, the `exception` and `bad_exception` classes
32. Program to show usage of templates
33. Program to show usage of generic classes
34. Implementation of File handling
35. Implementation of Wrapper classes

Course Name: S/W Lab-IX (Workshop on Visual Basic)

Course Code: (A303307)

Semester: 3rd

Credits: 05

L T P

0 0 6

Course Contents

Develop an Application using Visual Basic

1. Bank transactions management
2. Hotel Management
3. Gas agency management
4. Office automation
5. Railway reservation
6. Computerization course registration
7. Hostel management
8. Hospital management
9. Inventory management
10. Competitive examination database
11. Air line reservation
12. Transport management
13. College admission
14. Library management

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Course Name: Computer Graphics and Multimedia

Course Code: A303401

Semester: 4th

L T P

Credits: 05

4 1 0

Course Contents

Section -A

Input devices: Keyboard, Touch panel, light pens, Graphic tablets, Joysticks, Trackball, Data glove, Digitizers, Image scanner, Mouse, Voice & Systems.

Hard copy devices: Impact and non-impact printers, such as line printer, dot matrix, laser, inkjet, electrostatic, flatbed and drum plotters.

Video Display Devices Refresh cathode ,ray tube, raster scan displays, random scan displays, color CRT, monitors, direct view storage tube, flat, panel displays; 3,D viewing devices, raster scan systems, random scan systems, graphics monitors and workstations.

Scan conversion algorithms for line, circle and ellipse, Bresenham's algorithms, area filling techniques, character generation.

Section -B

2Dimensional Graphics: Cartesian and Homogeneous coordinate system, Geometric transformations(translation, Scaling, Rotation, Reflection, Shearing), Two-dimensional viewing transformation and clipping (line, polygon and text).

3Dimensional Graphics: Geometric transformations (translation, Scaling, Rotation, Reflection, Shearing), Mathematics of Projections (parallel & perspective). 3D viewing transformations and clipping.

References:

1. D. Hearn and M.P. Baker (1995). *Computer Graphics*, PHI New Delhi; Second Edition.
- 2 J.D. Foley, A.V. Dam (1994). *Introduction to Computer Graphics*, S.K. Feiner, J.F. Hughes, Addison, Wesley Publishing company, R.L. Phillips. N.Y.; Second Edition.
3. R.A. Plastock and G. Kalley (1986). *Computer Graphics*, McGraw Hill.

Course Name: Software Engineering

Course Code: A303402

Semester: 4th

L T P

Credits: 05

4 1 0

Course Contents

Section- A

Introduction: Programs vs. software products, emergence of software engineering, software life cycle, models; waterfall, prototype, evolutionary and spiral model, Software Characteristics, Applications, Software crisis.

Software project management: Project management concepts, software process and project metrics Project planning, project size estimation metrics, Empirical estimation techniques, COCOMO, A Heuristic estimation techniques, staffing level estimation, team structures, staffing, risk analysis and management, project scheduling and tracking.

Requirement Analysis and specification: Requirements engineering, partitioning Software, prototyping, Prototyping methods and tools, Specification principles, Representation, the software requirements specification and reviews, Analysis Modeling,

Section-B

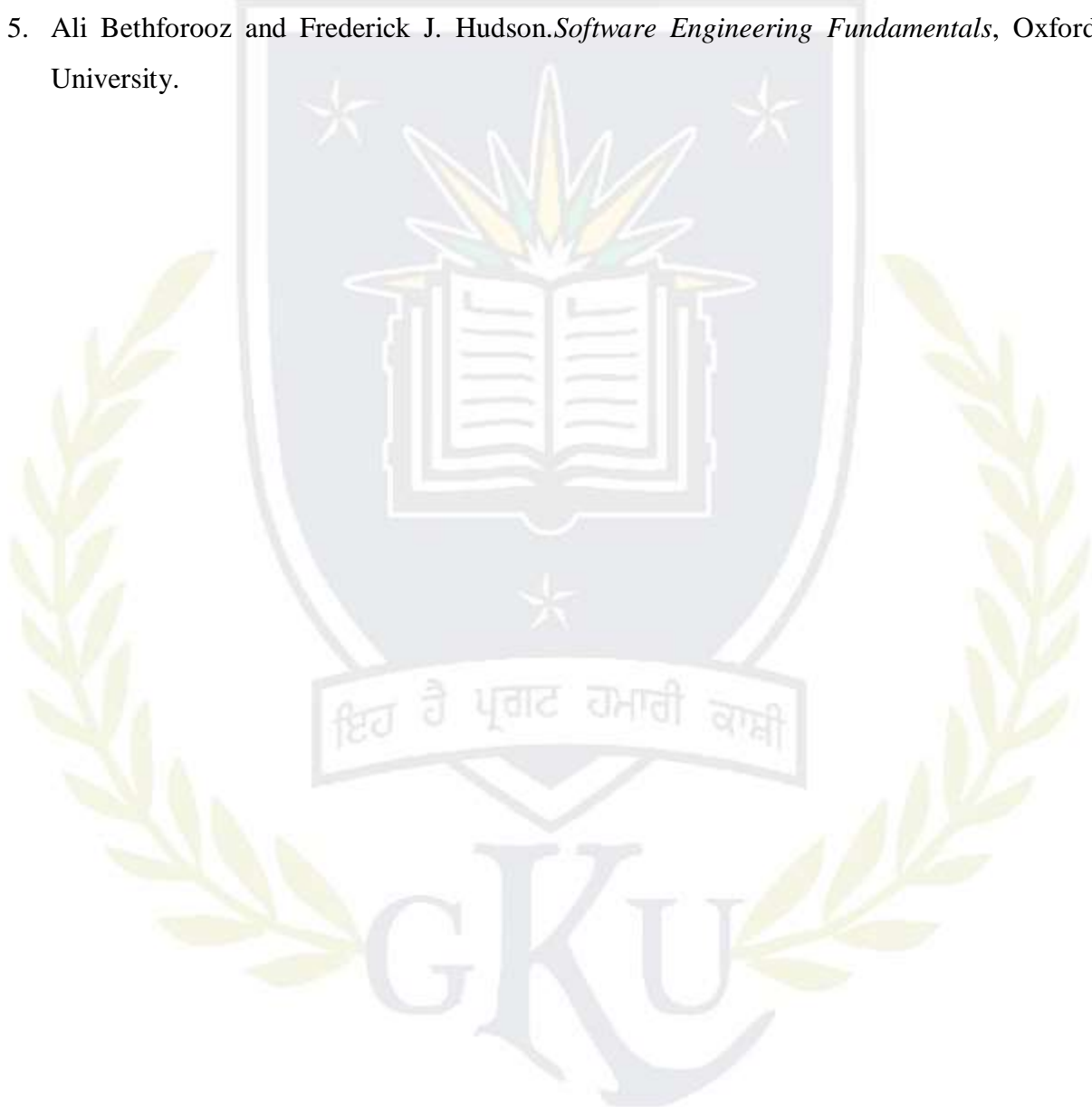
Testing and maintenance: Software Testing Techniques, Software testing fundamentals: objectives principles, testability; test case design, Unit testing: white box testing, basis path testing: Control structure testing: Black box testing, testing for specialized environments, architectures and applications. Software Testing Strategies; Verification and validation, Integration testing, Validation testing, alpha and beta testing, System testing: Recovery testing, security testing, stress testing, performance testing; The art of debugging, process debugging approaches. Software re-engineering: Reverse engineering, restructuring, forward engineering.

Software Reliability and Quality Assurance: Quality concepts, Software quality assurance: SQA activities; Software reviews; cost impact of software defects, defect amplification and removal; formal technical reviews: The review meeting, review reporting record keeping, review guidelines; Formal approaches to SQA;

Text Book/ Reference Books:



1. Roger S. Pressman. *Software Engineering - A Practitioner's Approach*, MGH Publications, New Delhi.
2. Ian Sommerville. *Software Engineering*, 5th Edition, Pearson Education, New Delhi.
3. Pankaj Jalote. *An Integrated Approach to Software Engineering*, Narosa Publications, New Delhi.
4. Rajib Mall. *Fundamentals of Software Engineering*, PHI, New Delhi.
5. Ali Bethforooz and Frederick J. Hudson. *Software Engineering Fundamentals*, Oxford University.



Course Name: Object Oriented Technologies and Java Programming

Course Code: A303403

Semester: 4th

Credits: 05

L T P

4 1 0

Course Contents

Unit - I

Introduction to Java: Introduction to java , Java History, Java Features; How Java Differs from C and C++; Comments in java, Java Program Structure, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, Programming Style, Java and Internet, Java and World Wide Web, Web Browsers; Hardware and Software Requirements; Java Support Systems, Java Environment, Java Tokens; Java Statements.

Unit - II

Constants, Variables and Data Types: Introduction; Constants, Variables, Data Types, Introduction to Operators, Expressions, Operator Precedence. Decision Making, Branching and Looping: Decision making and branching Statements, Looping Statements, Labelled loops, Jumping Statements.

Unit – III

Classes, Objects and Methods: Introduction, Defining a Class, Data member, member function, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods. Arrays, Strings, Vectors: Arrays, Jagged Arrays, Strings, String functions: Vectors, Wrapper Classes. Inheritance: Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalizer Methods, Abstract Methods and Classes, Visibility Control.

Unit – IV

Interfaces: Introduction, Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables, Implementing Multiple Inheritance using Interfaces. Packages: Introduction; System Packages, Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, Hiding Classes.

Managing Errors and Exceptions: Introduction; Types of Errors; Exceptions, Exception Handling using Try, Catch and Finally block: Throwing Our Own Exceptions, Using Exceptions for Debugging. Applet Programming: Introduction; How Applets Differ from Applications; Applet Life Cycle; Creating an Executable Applet

Text Books:

1. Balaguruswamy E. *Programming with JAVA*.
2. *Java Network Programming*, Publisher: Manning Publications.
3. Naughton Patrick and Morrison Michael, *The JAVA handbook*.



Course Name: System Software

Course Code: A303404

Semester: 4th

L T P

Credits: 05

4 1 0

Course Contents

Section- A

Introduction to software processors; elements of assemble language programming; assembly scheme; single pass and two pass assembler; general design procedure of a two pass assembler

Software Tools: Text editor and its design. Macros and microprocessor: macro definition, macro expansion, Nested macro calls, features of macro facility, design of a macro pre-processor.

Interpreters: use of interpreter, pure and impure interpreter

Loaders: Compile and go loader, Absolute loader, Relocating loader, and direct linking loader.

Section-B

Compilers: Aspects of compilation, lexical analysis, syntax analysis, memory allocation, compilation of expressions; intermediate code for expressions, compilation of control structures, Code optimization – local and global optimization. Linkers – translated linked and load time addresses, relocation and linking concepts. Design of a linker, self relocating programs. Basic concepts of an operating system and its functions.

Memory management: contiguous, non-contiguous memory allocation, Paged allocation, Demand paged allocation, segmented paged allocation.

Processor management: Scheduler, traffic controller, race condition. Information management: Structure and features of file systems, objectives of segmented environment.

References:

1. Dhamdhare, *Systems Programming and operating systems*, TMH.
2. Donovan, *System Programming*, (MC Graw Hill)

Course Name: S/w Lab-VIII (Computer Graphics using C)

Course Code: A303405

Semester: 4th

L T P

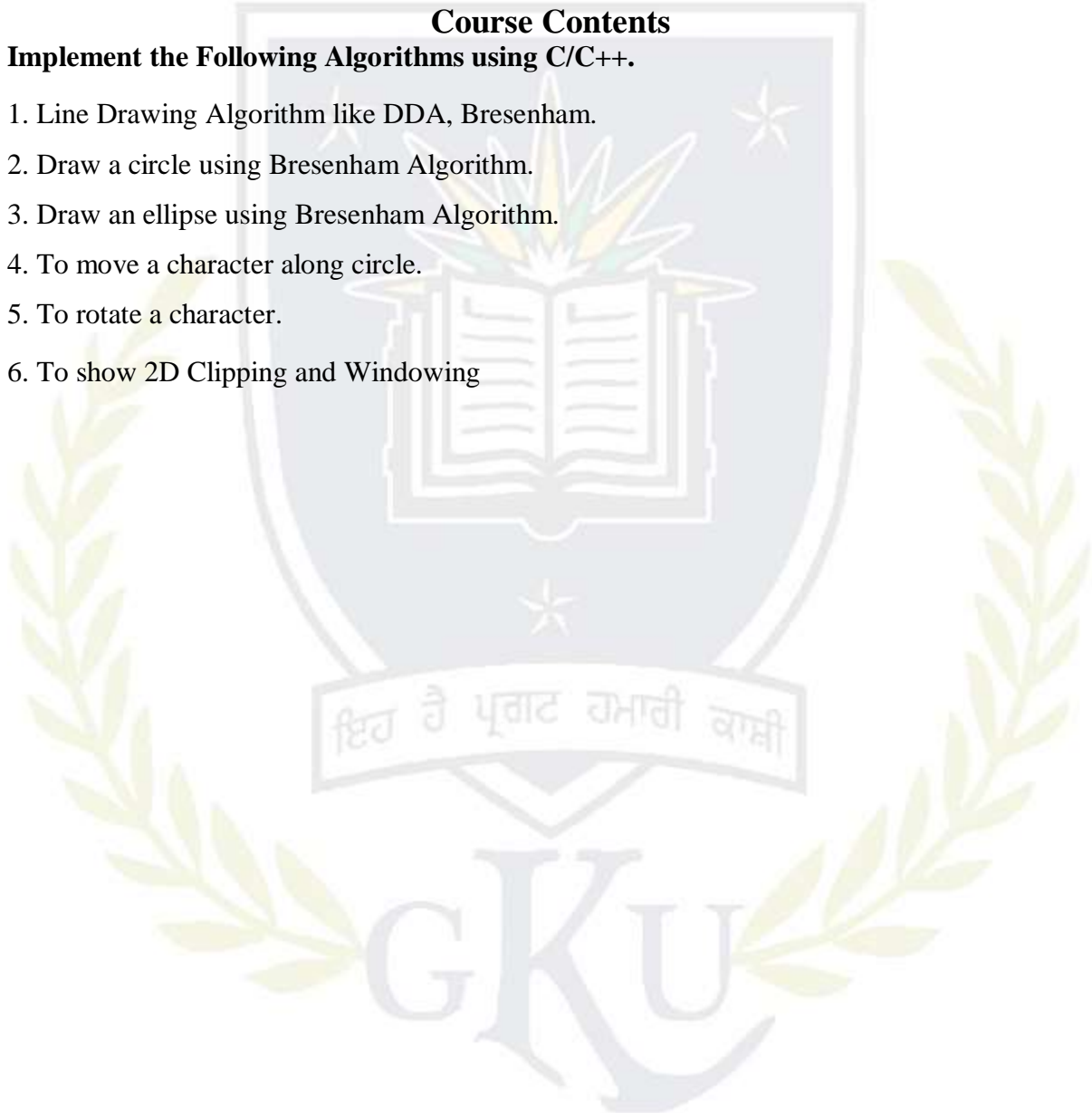
0 0 4

Credits: 02

Course Contents

Implement the Following Algorithms using C/C++.

1. Line Drawing Algorithm like DDA, Bresenham.
2. Draw a circle using Bresenham Algorithm.
3. Draw an ellipse using Bresenham Algorithm.
4. To move a character along circle.
5. To rotate a character.
6. To show 2D Clipping and Windowing



Course Contents

1. Write a program to print "Hello World" in java.
2. Write a program to implement basic data types and control structure (loop, if-else etc) in java.
3. Write a program to implement Array, polymorphism, inheritance, using methods in java.
4. Write a program to implement abstract and static keyword in java.
5. Write a program to implement packages and interface in java.
6. Write a program to implement Strings and String functions in java.
7. Write a program to implement Thread in java.
8. Write a program to draw an image using applet in Java.
9. Write a program to read and write data in a file using java.
10. Create a webpage using HTML to describe your department using paragraph and list.
11. Create a table in HTML to show your class time table.
12. Apply CSS(Cascade Style Sheet) to change a certain portion ,Bold ,Italic and underline certain words in your HTML web page.
13. Create a registration form and put validation checks on values entered by the users using java scripts.
14. Create a JSP page for the form which embedded JSP in HTML.
15. Using idea from the above experiments try to create a website for your college
16. Write a program to create the connectivity with database in java.
17. Write a program to implement how to perform insertion, deletion, updation operation with database table using My-Sql database.

Course Name: Major Project

Course Code: A303407

Semester: 4th

L T P

Credits: 02

0 0 4

Note: The marks distribution for the practical will be as under

- Viva Voce 10 marks
- System development 30 marks

| | |
|----------------------------|-----|
| Total Number of Course | 27 |
| Number of Theory Course | 17 |
| Number of Practical Course | 10 |
| Total Number of Credits | 105 |

Academic Instructions

Attendance Requirements

A student shall have to attend 75% of the scheduled periods in each course in a semester; otherwise he / she shall not be allowed to appear in that course in the University examination and shall be detained in the course(s). The University may condone attendance shortage in special circumstances (as specified by the Guru Kashi University authorities). A student detained in the course(s) would be allowed to appear in the subsequent university examination(s) only on having completed the attendance in the program, when the program is offered in a regular semester(s) or otherwise as per the rules.

Assessment of a course

Each course shall be assessed out of 100 marks. The distribution of these 100 marks is given in subsequent sub sections (as applicable).

| Components | Internal (50) | | | | | External (50) ETE | Total | |
|-----------------------|---------------|------------|----|----|----------|----------------------|-------|------|
| | Attendance | Assignment | | | MST 1 | | | MST2 |
| | | A1 | A2 | A3 | | | | |
| Weight age | 10 | 10 | 10 | 10 | 30 | 30 | 50 | |
| Average Weight age | 10 | 10 | | | 30 | | 50 | 100 |

Passing Criteria

The students have to pass both in internal and external examinations. The minimum passing marks to clear in examination is 40% of the total marks.



**GURU KASHI
UNIVERSITY**
PUNJAB - INDIA

