

Program Syllabus Booklet

**Master of Computer Applications
(MCA-301)**



Session: 2017-18

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

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Introduction about Program

MCA degree a three year Post-Graduate program in Computer Applications. Keeping in mind today's fast paced world's need the MCA course is designed to make software professionals in the field of computer applications with a blend of Management techniques keeping emphasis on application with sound theoretical knowledge. Internal faculty members and external expert from Industries and other reputed universities are continuously reviewing the MCA course curriculum. It strives hard to develop world class, self-disciplined computer professionals who will be responsible for uplifting the economic status of the Nation and humanity.

Aspirants, who are interested in pursuing an MCA course, need to first meet the eligibility criteria set. The criteria may vary under different universities; however, the basic eligibility set is that candidates need to have secured at least 55% marks in the subject in which they want to pursue an MCA degree at the postgraduate level. Candidates are usually shortlisted for admission in an MCA course on the basis of their performance in an entrance exam followed by a Personal Interview (PI) round.

Semester: 1 st										
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	A301101	Communication Skills	T	4	1	0	5	50	50	100
2	A301102	Digital Electronics & Circuit Design	T	4	1	0	5	50	50	100
3	A301103	Programming & Problem Solving in C	T	4	1	0	5	50	50	100
4	A301104	Foundations of Information Technology	T	4	1	0	5	50	50	100
5	A301105	Numerical Methods & Statistical Techniques	T	4	1	0	5	50	50	100
6	A301106	Software Lab-I (Information Technology)	P	0	0	4	2	60	40	100
7	A301107	Software Lab-II (C Language)	P	0	0	6	3	60	40	100
Total No. of Credits				30						



Semester: 2 nd										
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	A301201	Microprocessors and its Applications	T	4	1	0	5	50	50	100
2	A301202	Distributed Computer Systems	T	4	1	0	5	50	50	100
3	A301203	Data Structures & Analysis of Computer Algorithms	T	4	1	0	5	50	50	100
4	A301204	Multimedia & Web Designing	T	4	1	0	5	50	50	100
5	A301205	Principles of Management Functions & Organizational Behaviour	T	4	1	0	5	50	50	100
6	A301206	S/w Lab-III(Data Structure using C/C++)	P	0	0	6	3	60	40	100
7	A301207	S/w Lab-IV(Web Designing)	P	0	0	4	2	60	40	100
Total No. of Credits				30						

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Semester: 3 rd										
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	A301301	Advanced Database Management Systems	T	4	1	0	5	50	50	100
2	A301302	Operating Systems	T	4	1	0	5	50	50	100
3	A301303	Object Oriented Analysis , Design & C++	T	4	1	0	5	50	50	100
4	A301304	Discrete Mathematics	T	4	1	0	5	50	50	100
5	A301305	Computer Organization and Architecture	T	4	1	0	5	50	50	100
6	A301306	Software Lab-V (C++)	P	0	0	6	3	60	40	100
7	A301307	Software Lab-VI (Advanced Database Management System)	P	0	0	4	2	60	40	100
8	A301308	Industrial Training/Internship (6 Weeks)	P	NA	NA	NA	2	60	40	100
Total No. of Credits				32						

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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	A301401	Computer Based Optimization Techniques	T	4	1	0	5	50	50	100
2	A301402	Object Oriented Technologies and Java Programming	T	4	1	0	5	50	50	100
3	A301403	Software Engineering	T	4	1	0	5	50	50	100
4	A301404	Parallel Processing	T	4	1	0	5	50	50	100
5	A301405	Theory of Computation	T	4	1	0	5	50	50	100
6	A301406	S/w Lab-VII(JAVA Lab)	P	0	0	6	3	60	40	100
7	A301407	Workshop on PHP	P	0	0	4	2	60	40	100
Total No. of Credits				30						

Elective-I (Select one of the following subjects)

S.No	Subject Code	Subject Name
1	301408	Data Mining
2	301409	Soft Computing
3	301410	Machine Learning
4	301411	Artificial Intelligence



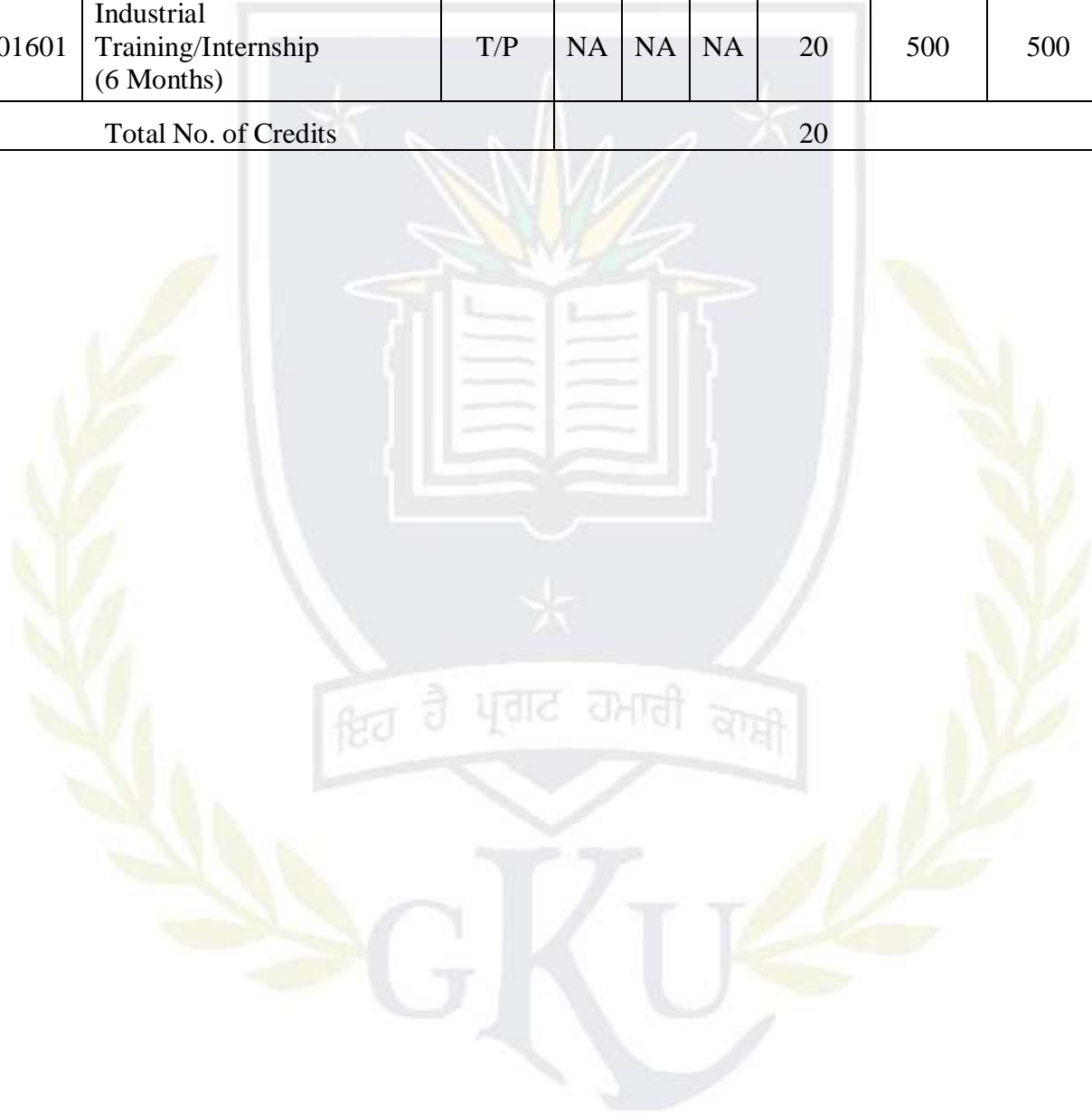
Semester: 5th										
Sr.	Subject Code	Subject Name	Type of Subject T/P	(Hours Per Week)			No. of Credits	Internal Marks	External Marks	Total Marks
				L	T	P				
1	A301501	Computer Graphics and Multimedia	T	4	1	0	5	50	50	100
2	A301502	Data Communication & Computer Networks	T	4	1	0	5	50	50	100
3	A301503	System Software	T	4	1	0	5	50	50	100
4	A301504	Computer Graphics Lab	P	0	0	4	2	60	40	100
5	A301505	Major Project	P	0	0	4	2	60	40	100
6	A301506	Workshop on C#.Net	P	0	0	8	4	60	40	100
7	A301507	Industrial Training/Internship (6 Weeks)	P	NA	NA	NA	2	60	40	100

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Semester: 6th											
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	A301601	Industrial Training/Internship (6 Months)	T/P	NA	NA	NA	20	500	500	1000	
Total No. of Credits							20				



Course Name: Communication Skills

Course Code: -A301101

Semester: 1st

Credits: 05

L T P

4 1 0

Course Contents

Section A

Writing and Speaking English: Parts of Speech, Resume Writing, Business Letters Vowels, Diphthongs, Consonants, Consonant Clusters, Stress, Syllable, Syllabic

The Art of Communication: Verbal Communication: Effective Communication, Effective/Active listening paraphrasing, Feedback Non Verbal Communication: Personality Enhancement, Body Language

The Hidden Data of Communication :The importance of feelings in communication, dealing with feelings, The importance of developing assertive skills, developing self-confidence, developing Emotional Intelligence, Dealing with People,

Section B

Group Activities and World of Teams: Importance of Team work, working with Groups, Group Discussions, Group Decision-making

Getting Ready for Interviews: Corporate Dressing, Business Etiquettes, Media Etiquettes, Table Etiquettes

Ethical Orientation: Ethical Dilemmas and Choices.

Text Books:

1. Strategic interviewing. *Richaurd Camp, Mary E. Vielhaber and Jack L. Simonetti.* Wiley India Pvt. Ltd.
2. Essentials of Effective Communication. *Ludlow and Panthon.* Prentice Hall of India.
3. Spoken English. *V Sasikumar and PV Dhamija.* Tata Mc Graw Hill.
4. Developing Communication Skills. *Krishna Mohan and Meera Banerji.* MacMillan India Ltd., Delhi.
5. Communication Skills. *Ms. R. Datta Roy and K K Dhir.* Vishal Publications, Jalandhar.

Course Name: Digital Electronics & Circuit Design

Course Code: -A301102

Semester: 1st

Credits: 05

L T P

4 1 0

Course Contents

Section A

Number Systems and Binary Code: Introduction of analog and digital signals , binary, octal and hexadecimal number system, signed and unsigned number, arithmetic operations-addition, subtraction, multiplication and division of binary, octal and hexadecimal number systems, conversions of number systems, 1's complement, 2's complement, 9's complement and 10's complement, BCD code, ASCII code, excess 3 code, gray code.

Minimization of Logic Function: OR, AND,NOT,NOR,NAND,EX-OR operations and gates, Boolean theorems, De-Morgan's theorem, SOP and POS, canonical form, minimization using theorems, K-map and Q-M method, completely specified functions.

Section B

Combinational Logic Circuits: Introduction, combinational circuit design, multiplexers, demultiplexer, encoders, decoders, adders, subtractor, code converters, parity checker, parity generator, BCD display drive, magnitude comparators.

Sequential Circuits: Introduction, flip-flops: R, S, J, K and T flip flop using nand gates and their conversions, shift registers.

D/A and A/D Converters: Introduction, weighted register D/A converter, binary ladder D/A converter, parallel A/D converter, counter type A/D converter, successive approximation A/D converter, single and dual slope A/D converter, specifications of ADC&DAC.

TEXT / REFERENCES:

1. Digital principle and applications . *Malvino*. Tata Mc Graw Hills.
2. Modern digital electronics. *R. P. Jain*. Prentice Hall of India.
3. Digital Design. *M.M.Mano*. Prentice Hall of India.
4. An Engineering Approach to Digital Design. *William I. Fletcher*. Prentice Hall of India Pvt. Ltd., NEW Delhi.

Course Name: Programming & Problem Solving in C

Course Code: A301103

Semester: 1st

L T P

Credits: 04

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 Book:

1. Kanetkar P. Yashvant. *Let us C*. Seventh Edition. BPB Publications, New Delhi.
2. Balagurusamy E. *Programming in C*. Tata Mc Graw Hill.
3. G.S. Byron. *Programming in C*, Second Edition. Mc Graw Hills.
4. Kernighan & Richie. *The C Programming Language*, Second Edition

Course Name: Foundations of Information Technology

Course Code: -A301104

Semester: 1st

L T P

Credits: 05

4 1 0

Course Contents

Section A

Computer Fundamentals: Block structure of a computer, characteristics of computers, problem solving with computers, generations of computers, classification of computers on the basis of capacity, purpose, generation, Introduction to Number System

Memory types: Magnetic core, RAM, ROM, Secondary, Cache, Bubble Memory. Input and Output Units: functional characteristics; Overview of storage devices: floppy disk, hard disk, compact disk, tape; Printers: Impact, non-impact. Graphical I/O devices: Light pen, joystick, Mouse, Touch screen; OCR, OMR, MICR

Section B

Computer languages: Machine language, assembly language, higher level language, 4GL. Introduction to Compiler, Interpreter, Assembler, Assembling, System Software, Application Software.

Operating system: Batch, multi-programming, time sharing, network operating system, on-line and real time operating system, Distributed operating system, multi-processor, Multi-tasking.

Computer Network and Communication: Network types, network topologies, network communication devices, physical communication media. Internet and its Applications: E-mail, TELNET, FTP, World Wide Web, Internet chatting; Intranet, Extranet. Introduction to

E-Commerce: Meaning, its advantages & limitations, Types of E-Commerce Applications

Text Books/ Reference Books :

1. Vishal Goyal, Lalit Goyal, Pawan Kumar. *A Simplified Approach to Data Structures*. Shroff Publications.
2. Shubhnandan S. Jamwal. *Programming in C*. Pearson Publications.
3. D. H. Sanders(1988). *Computers Today*. McGraw Hill.
4. Satish Jain (1999). *Information Technology*. BPB.

Course Name: Numerical Method & Statistical Techniques

Course Code: -A301105

Semester: 1st

L T P

Credits: 05

4 1 0

Course Contents

Section A

INTRODUCTION TO STATISTICS: Meaning, scope, collection, classification of data, frequency distributions

THE MEAN, MEDIAN, MODE AND OTHER MEASURES OF CENTRAL TENDENCY: Index or subscript notation. Summation notation. Averages and Measures of central tendency. The arithmetic mean. Weighted arithmetic mean. Properties of the arithmetic mean. Arithmetic, mean computed from grouped data. Empirical relation between mean, median and mode. The geometric mean. The harmonic mean. Relation between arithmetic, Geometric, and harmonic means. The root mean square (r m s) Quartiles, deciles and percentiles.

THE STANDARD DEVIATION AND OTHER MEASURES OF DISPERSION: Dispersion or variation. The range. The mean deviation or average deviation. The semi-interquartile range or quartile deviation. The 10-90 percentile range. The standard deviation. The variance. Short methods for computing the standard deviation. Properties of the standard deviation. Charlier's check. Sheppard's correction for variance. Empirical relations between measures of dispersion. Absolute and relative dispersion. Coefficient of variation. Standardized variable, standard scores.

MOMENTS, SKEWNESS AND KURTOSIS: Moments. Moments for grouped data. Relation between moments. Computation of moments for grouped data. Charlier's check and Sheppard's corrections. Moments in dimensionless form Skew ness. Kurtosis. Population moments, skewness and kurtosis.

ELEMENTARY PROBABILITY THEORY: Classical definition of probability. Relative frequency definition of probability. Conditional probability. Independent and dependent events. Mutually exclusive events. Discrete probability distributions. Continuous probability distributions. Mathematical expectation. Relation between population and sample mean and variance. Combinatorial analysis. Fundamental principle. Factorial a Permutations. Combinations. Stirling's approximation to $n!$ Relation of probability to point set theory.

THE BINOMIAL, NORMAL AND POISSON DISTRIBUTIONS: The binomial distribution. Some properties of the binomial distribution. The normal distribution. Some properties of the normal distribution. Relation between binomial and normal distributions. The Poisson distribution. Some properties of the Poisson distribution. Relation Between binomial and Poisson distributions. The multinomial distribution. Fitting theoretical distributions to sample frequency distributions.

ELEMENTARY SAMPLING THEORY: Sampling theory. Random samples. Random numbers. Sampling with and without replacement. Sampling distributions. Sampling of means. Sampling distribution of proportions. Sampling distribution of differences and sums. Standard errors.

Section B

STATISTICAL ESTIMATION THEORY: Estimation of parameters. Unbiased estimates. Efficient estimates. Point estimates and interval estimate. Reliability. Confidence interval estimates of population parameters. Confidence interval estimates for means. Confidence intervals for proportions. Confidence intervals for differences and sums. Confidence intervals for standard deviations. Probable error.

STATISTICAL DECISION THEORY, TESTS OF HYPOTHESES AND SIGNIFICANCE: Statistical decisions. Statistical hypotheses. Null hypotheses. Tests of hypotheses and significance. Type I and type II errors. Level of significance. Tests involving the normal distribution. One tailed and two-tailed tests. Special tests. Operating characteristic curves. Power of a test. Control charts. Tests of significance involving sample differences. Tests involving the binomial distribution.

SMALL SAMPLING THEORY: Small samples "Student's" t distribution. Confidence intervals. Tests of hypotheses and significance. The chi-square distribution. Confidence intervals for χ^2 . Degree of freedom.

THE CHI-SQUARE TEST: Observed and Theoretical Frequencies. Definition of χ^2 . Significance Tests. The χ^2 tests for Goodness of fit, Contingency Tables, Yate's Correction for Continuity, Simple Formulae for Computing χ^2 . Coefficient of Contingency, Correlation of Attribute, Additive Property of χ^2 .

CURVE FITTING AND THE METHOD OF LEAST SQUARE: Relationship between Variables, Curve Fitting, Equation of Approximating Curves, Freehand method of Curve Fitting, The Straight Line, The Method of Least Squares, The Least Square Line, Non Linear

Relationships, The Least Square Parabola, Regression, Applications to Time Series, Problem Solving involving More than Two Variables.

CORRELATION THEORY: Correlation and Regression, Linear Correlation, Measures of Correlation, The Least Square Regression Lines, Standard Error of Estimate, Explained and Unexplained Variation, Coefficient of Correlation, Remarks Concerning the Coefficient of Correlation, Product Moment Formula for the Linear Correlation Coefficient, Short Computational Formulae, Regression Lines and Linear Correlation Coefficient, Rank Correlation, Correlation of the Time Series, Correlation of Attributes, Sampling Theory of Correlation, Sampling Theory of Regression.

MULTIPLE AND PARTIAL CORRELATION: Multiple Correlation, Subscript Notation, Regression Equation, Regression Plane, Normal Equations for the Least Square Regression Plane, Regression Planes and Correlation Coefficients, Standard Error of Estimate, The Coefficient of Multiple Correlation, Change of Dependent Variable, Generalizations to More than Three Variables, Partial Correlation, Relationships Between Multiple and Partial Correlation Coefficients, Non-Linear Regression.

Text Books:

1. Murray R. Spiegel, R. W. Boxer. *Theory and Problems of Statistics in SI units*. Schaums' outline Series, McGraw-Hill Book Company.
2. S.C. Gupta. *Fundamentals of Statistics*.

Software Lab-I (Information Technology)

Course Code: -A301106

Semester: 1st

L T P

Credits: 02

0 0 4

Course Contents

List of Practical

- Practical1. Introducing Office Suite and its Components; Introduction to OpenOffice.org Writer and its environment
- Practical2. Creating, Opening, Editing and Saving a Document. PC with OpenOffice.org Not Applicable
- Practical3. Selecting and Formatting Text in a Document.
- Practical4. Page Setup and Printing a Document.
- Practical5. Finding and Replacing Text occurrences in a Document.
- Practical6. Bullets and Numbering.
- Practical7. Spelling & Grammar Check, Thesaurus and Autocorrect Options.
- Practical8. Inserting Images and other objects in a Document.
- Practical9. Creating Hyperlinks and Bookmarks in a Document.
- Practical10. Creating and Manipulating Tables in a Document.
- Practical11. Merging Documents together; Implementing Mail Merge.
- Practical12. Introducing Spread-sheet Package; Introduction to OpenOffice.org Calc and its environment.
- Practical13. Entering & editing data in a spread-sheet; Opening, editing and saving workbooks.
- Practical14. Inserting, Deleting, Moving, Copying and Renaming worksheets.
- Practical15. Manipulation Rows and Columns in a worksheet; Using Fill Series.
- Practical16. Cell Naming & Referencing (Absolute & Relative); Basic built-in Mathematical Functions.
- Practical17. Basic built-in Date-Time Functions.
- Practical18. Basic built-in Logical Functions.
- Practical19. Page Setup and Printing spread-sheets
- Practical20. Inserting Graphs/Charts in worksheets.
- Practical21. Formatting Cells and Conditional Formatting.
- Practical22. Protecting Worksheets and cells; Data Validation.

Practical23. Data Sorting and Filtering.

Practical24. Defining & Using Macros for automation of operations

Practical25. Introducing Presentation Packages; Introduction to OpenOffice.org Impress and its

environment.

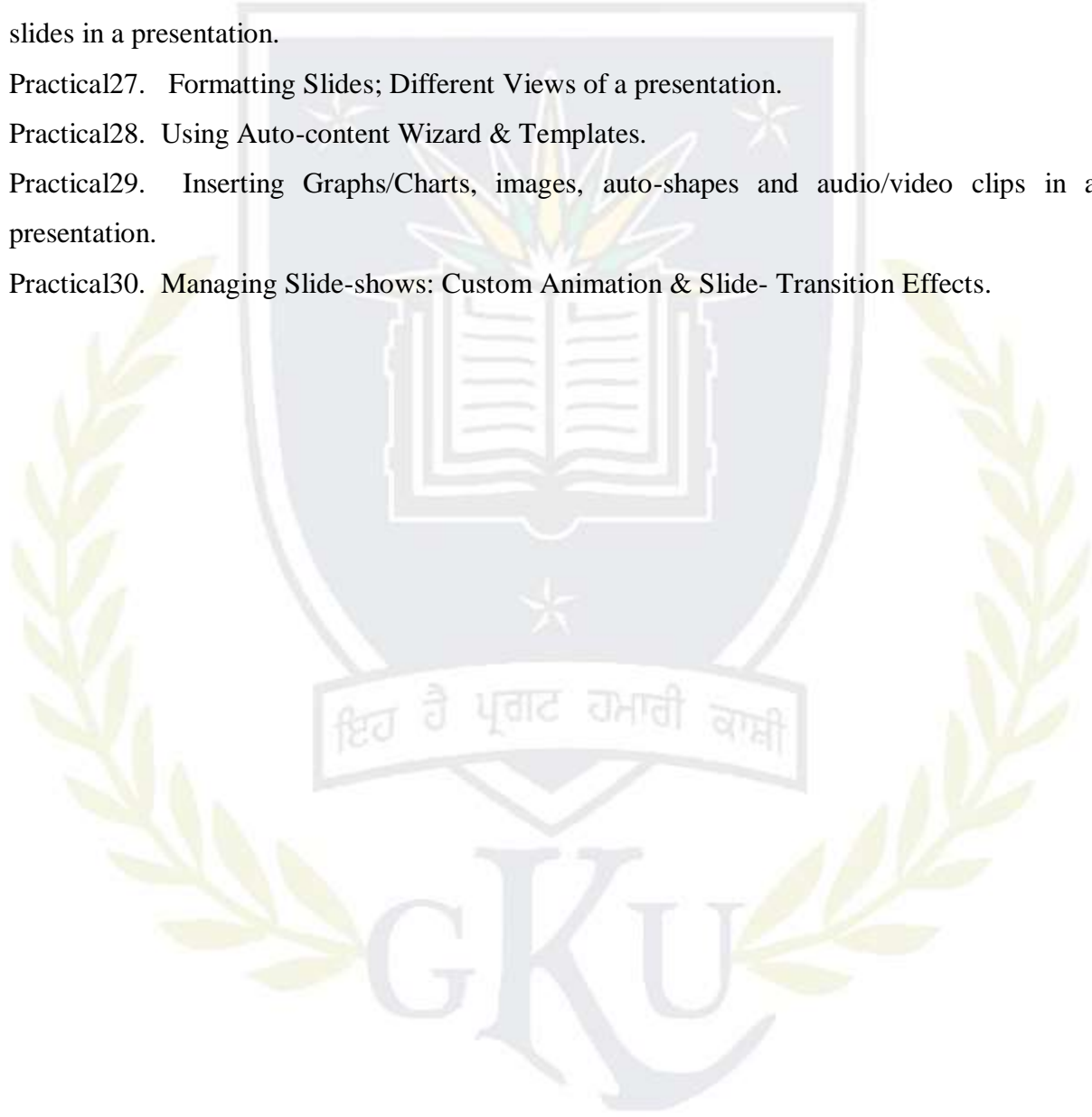
Practical26. Creating, Opening & Saving a presentation; Inserting, Deleting and Ordering slides in a presentation.

Practical27. Formatting Slides; Different Views of a presentation.

Practical28. Using Auto-content Wizard & Templates.

Practical29. Inserting Graphs/Charts, images, auto-shapes and audio/video clips in a presentation.

Practical30. Managing Slide-shows: Custom Animation & Slide- Transition Effects.



Software Lab-II (C Language)

Course Code: -301107

Semester: 1st

L T P

Credits: 03

0 0 6

Course Contents

- Program 1. Program of Basics of C Language
- Program 2. Program of Data Types PCs
- Program 3. Program of Storage classes.
- Program 4. Program of Declarations
- Program 5. Program of Type Conversions, Operators, operator precedence & Associativity
- Program 6. Program of if statement, if-else statement, Logical operators, Conditional operators
- Program 7. Program of Decision Control.
- Program 8. Program of while, for, break, continue, do-while, Nesting of loops
- Program 9. Program of while, for, break, continue, do-while, Nesting of loops
- Program 10. Program of Case switch statement, switch vs if-else, goto keyword
- Program 11. Program of Arrays
- Program 12. Program of Two dimensional arrays
- Program 13. Program of Strings.
- Program 14. Program of Declaring and initializing pointers, Pointer arithmetic, Pointers and arrays,
- Program 15. Program of Pointers and Strings
- Program 16. Program of function, Passing values between functions, calling functions, return type of function,
- Program 17. Program of call by value, call by reference
- Program 18. Program of Passing array to function PCs
- Program 19. Program of passing strings to functions
- Program 20. Program of Features of C Preprocessor, Macro expansion
- Program 21. Program of File Inclusion, Conditional Compilation, #if and #elif directives, #undef, #pragma, Build process
- Program 22. Program of Structures.
- Program 23. Program of array of structures, nested structures
- Program 24. Program of self-referential

Program 25. Program of Unions; union of structures; bit-fields

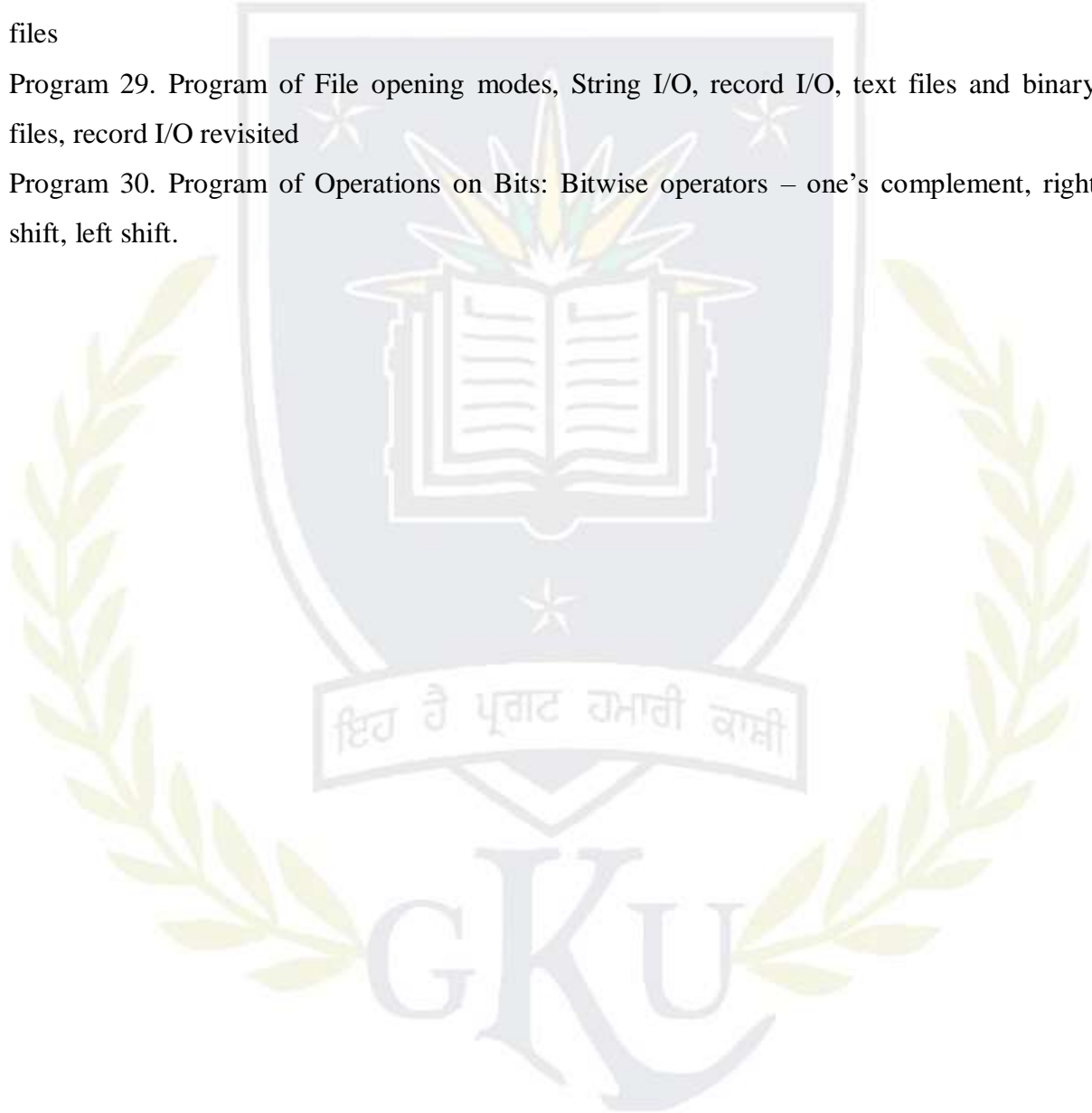
Program 26. Program of Console I/O: I/O types, Console I/O functions, Formatted console I/O, `sprintf()` and `scanf()`, Unformatted console I/O

Program 27. Program of File Input / Output: File operations, opening, reading and closing files

Program 28. Program of File Input / Output: File operations, opening, reading and closing files

Program 29. Program of File opening modes, String I/O, record I/O, text files and binary files, record I/O revisited

Program 30. Program of Operations on Bits: Bitwise operators – one's complement, right shift, left shift.



Course Name: Microprocessors and its Applications

Course Code: -A301201

Semester: 2nd

L T P

Credits: 05

4 1 0

Course Contents

Section A

Introduction to Microprocessor: its historical background and Microprocessor applications.

INTEL 8085: Microprocessor Architecture and its operations, 8085 MPU and its architecture, 8085. Instruction cycle and timing diagram, Memory read and Memory Write operations,

8085: Data movement, Arithmetic and logic; and branch control instructions, RISC v/s CISC Processors.

INTEL 8086: Introduction, 8086Architecture, real and protected mode, Memory Addressing, Memory Paging, Addressing Modes. Pin diagram of 8086, clock generator (8284A)

Section B

Various types of instructions: Data movement, Arithmetic and logic; and program control.

Interrupts: Introduction, 8257 Interrupt controller, basic DMA operation and 8237 DMA Controller, Arithmetic coprocessor, 80X87 Architecture

REFERENCES:

1. B. Brey The Intel microprocessors 8086/8086, 80186/80188, 80286,80386, 80486. Pentium pro processor Architecture,Programming and interfacing 4th Edition.
2. B. Ram Fundamentals of microprocessors and HI microcomputers, Dhanpat RaiPublication.
3. Ramesh S. Gaonkar Microprocessor Architecture, Programming and Applications with 8085,4th edition, Penram International Publishing (India).

Course Name: Distributed Computer Systems

Course Code: - A301202

Semester: 2nd

L T P

Credits: 05

4 1 0

Course Contents

Section A

Characterization of Distributed Systems-Introduction-Resource Sharing and the Web-Challenges. System Models- Architectural-Fundamental. Interprocess Communication-Introduction-API for Internet protocols-External data representation and marshalling--Client-server communication-Group communication-Case study: Interprocess Communication in UNIX

Distributed Objects and Remote Invocation-Introduction-Communication between distributed objects-Remote procedure calls-Events and notifications-Case study: Java RMI. Operating System Support-Introduction-OS layer-Protection-Processes and threads-Communication and invocation OS architecture. Distributed File Systems-Introduction-File service architecture-Case Study:Sun NetworkFile System-Enhancements and further developments.

Section B

Introduction-Name Services and the Domain Name System-DirectoryServices-Case Study: Global Name Service. Time and Global States-Introduction-Clocks, events and process states-Synchronizing physical clocks-Logical time and logical clocks-Global states-Distributed debugging.Coordination and Agreement-Introduction-Distributed mutual exclusion-Elections-Multicast communication-Consensus and related problems.Distributed Shared Memory-Introduction-Design and implementation issues-Sequentialconsistency and Ivy case study Release consistency and Munin case study models.

TEXT BOOK/ REFERENCES:

1. George Coulouris, Jean Dollimore, Tim Kindberg,(2005).*Distributed Systems: Concepts and Design 4th Edition*. Pearson Education.
2. A.t.S. Tanenbaum and M. V. Steen(2006).*Distributed Systems: Principles and Paradigms*,Second Edition. Prentice Hall.
3. M.L.Liu(2004).*Distributed Computing Principles and Applications*. Pearson Addison

Wesley.

4. Mukesh Singhal(1994). *Advanced Concepts In Operating Systems*. McGraw Hill Series in Computer Science.

5. Nancy A. Lynch(2000). *Distributed Algorithms*. The Morgan Kaufmann Series in Data Management System, Morgan Kaufmann Publishers.



Course Name: Data Structures & Analysis of Computer Algorithms

Course Code: -A301203

Semester: 2nd

L T P

Credits: 05

4 1 0

Course Contents

Section A

Basic concepts and notations, data structures: data structure operations, mathematical notation and functions, algorithmic complexity and time space trade off. Basic data structures such as arrays, stack and queues and their applications, linked and sequential representation. Linked list, representation of linked list, multi linked structures. Trees-definitions and basic concepts, linked tree representation, representations in contiguous storage, binary trees, binary tree traversal, searching insertion and deletion in binary trees, heap tree and heap sort algorithm, AVL trees.

Section B

Graphs and their application: sequential and linked representation of graph – adjacency matrix, operations on graph, traversing a graph, Dijkstra's algorithm for shortest distance, DFS and BFS

Hashing: Searching and sorting use of various data structures for searching and sorting, Linear and Binary search, Insertion sort, Selection sort, Merge sort, Radix sort, Bubble sort, Quick sort, Heap Sort.

References:

1. A. Tannenbaum, Y. Lanhgsam and A.J.Augenstein(1990). *Data Structures Using C*. Prentice Hall of India.
2. Seymour Lipschultz(1988). *Theory and Practice of Data structures*. Mc Graw Hill.
3. E. Horowitz and S.Sahni(1991).*Data structures with Pascal*. Galgotia, 3rd edition.

Course Name: Multimedia & Web Designing

Course Code: -A301204

Semester: 2nd

L T P

Credits: 05

4 1 0

Course Contents

Section A

Introduction to Multi-media Technology: Audio System, Image Compression, Data Compression, Digital Motion Video, Authoring tools, Multimedia Applications, Multimedia DBMS. Working of Internet, Connections, TCP/UDP/IP, IP addressing HTTP, SMTP, and E-mail SNMP, Domain Name Server, Internet Services,

WWW, Web Servers, Web Browsers: Web page makers and Editors, Plug-Ins and Delivery vehicles, URL, HTML. VoIP, Multimedia over IP Mobile IP/Next Generation Internet COM, DCOM, Scripting, World Wide Web: Concepts, Web page: static, Dynamic, Active. Scripting languages: Server side, Client Side. Web site development Phases,

Section B

Web: Designing, Development and Publishing, HTTP, URL registration, browsers, search engines, Web server, Proxy servers. HTML: Concepts, Structure of HTML documents,

HTML Elements: Core attributes, Language attributes, Core Events, Block Level Events. Text Level Events, Linking Basics, Linking in HTML, Images and Anchors, Anchor Attributes, Image Maps, Semantic Linking Meta Information, Image Preliminaries, Image Download issues, Images as Buttons, Introduction to Layout: Backgrounds, Colors and Text, Fonts, Layout with Tables.

Advanced Layout : Frames and layers, Style Sheets, Positioning with Style sheets, Forms, Forms Control, New and emerging Form Elements. Front Page Web Tool: Front page editor, Front page explorer

References:

1. M. J. Crouch(2000). *Web Programming with ASP and COM*. Addison-Wesley.
2. D. Chapman(1998). *Web Development with Visual Basic 5*. PHI.
3. J. Greenberg and J.R. Lakeland(2000). *Building Professional Web Sites with the Right Tools*, Prentice Hall, PTR.
4. R. Steinmetz and K. Nahrstedt(1995). *Multimedia: Computing, Communications and Applications*. Prentice Hall, PTR.

Course Name: Principles of Management Functions & Organizational Behaviour

Course Code: -A301205

Semester: 2nd

L T P

Credits:05

4 1 0

Course Contents

Section A

Management: Nature and scope, Planning: - Nature, Types, Steps in planning, the process of planning, setting of objectives, strategies, policies and planning premises, the process of decision making.

Organizing: Nature, Process of organizing, departmentation, line and staff arrangement, organization structure and design, project and matrix organization, authority, decentralization, delegation, creating an effective span of management.

Section B

Controlling: Need, recruitment and selection techniques, types of interview co-ordination: Need and importance, types and techniques. Control process, control techniques.

Directing: Conception, motivation, communication and leadership. Introduction of the following function Areas: Production – Production systems Production planning and control, work study. Marketing – Concept, segmentation of market, marketing mix, marketing research. Finance – Finance functions, sources of finance for fixed assets and working capital structure. HRD – concept, different functions of HRD

Reference:

1. Koontz & O' Donnell Essentials of Management
2. Stephen P. Robbins Management
3. Chhabra Business Organization and Management
4. T.N.Prasad Principles & Practice of Management
5. L.M.Arun Kumar & R. Sharma Principles of Business Management

Course Name: S/w Lab-III(Data Structure using C/C++)

Course Code: -A301205

Semester: 2nd

L T P

Credits: 03

4 1 0

Course Contents

- Programs 1 Program to input 1-D Array
- Programs 2. Program to perform insertion in Arrays
- Programs 3. Program to perform deletion in Arrays
- Programs 4. Program to input 2-D arrays (Matrices)
- Programs 5. Program to find transpose of a matrix multiply 2 matrices.
- Programs 6. Program to implement sparse matrices.
- Programs 7. Program to perform linear search
- Programs 8. Program to perform Binary search
- Programs 9. Program to reverse array without using another variables.
- Programs 10. Program to perform Bubble sort.
- Programs 11. Program to perform sorting using Selection Sort.
- Programs 12. Program to perform sorting using Insertion Sort.
- Programs 13. Program to input and traverse N-nodes in a one way linked list.
- Programs 14. Program to reverse a one way linked list.
- Programs 15. Program to perform insertion/deletion in linked lists.
- Programs 16. Program to input and traverse doubly linked list.
- Programs 17. Program to implement stack operations.
- Programs 18. Program to implement Queues.
- Programs 19. Program to find factorial using recursion.
- Programs 20. Program to print Fibonacci series using recursion.
- Programs 21. Program to input a BST.
- Programs 22. Program to perform insertion in a BST.
- Programs 23. Program to perform deletion in a BST.
- Programs 24. Program to implement min-heaps.
- Programs 25. Program to implement max-heaps.
- Programs 26. Program to implement AVL trees.
- Programs 27. Program to perform rotations in AVL trees.
- Programs 28. Program to perform rotations in AVL trees.

Programs29. Program to input a graph.

Programs30. Program to print adjacency list of a graph.

Programs31. Program to perform traversal in graphs using DFS.

Programs32. Program to perform traversal in graphs using BFS.

Programs33. Program to implement shortest path methods.

Programs34. Programs to perform Dynamic memory allocation.

Programs35. Programs to perform sorting on data stored in a file.

Programs36. Programs to delete duplicates in arrays and linked lists.



Course Name: S/w Lab-IV(Web Designing)

Course Code: -A301206

Semester: 2nd

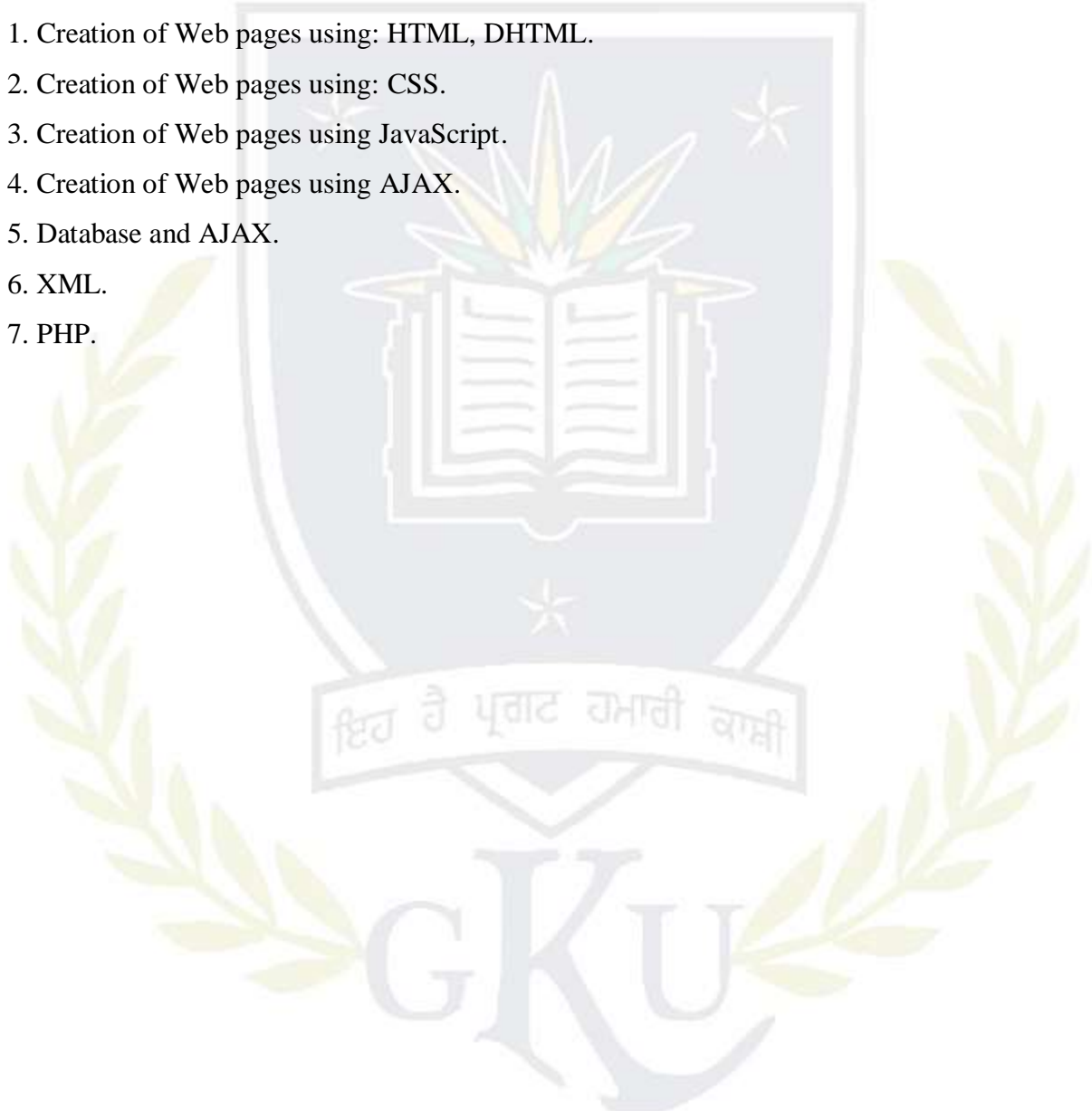
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Credits:02

Course Contents

1. Creation of Web pages using: HTML, DHTML.
2. Creation of Web pages using: CSS.
3. Creation of Web pages using JavaScript.
4. Creation of Web pages using AJAX.
5. Database and AJAX.
6. XML.
7. PHP.



Course Name: Advanced Database Management System

Course Code: A301301

Semester: 3rd

L T P

Credits: 04

4 0 0

Course Contents

Section A

Introduction: Overview of Database Management System: Various views of data Models, Schemes and Introduction to database Languages & Environments, Advantages of DBMS over file processing systems, Responsibility of Database Administrator. Three level architecture of Database Systems. Data Models: E-R Diagram (Entity Relationship), mapping Constraints, keys, Reduction of E-R diagram into tables.

Normalization: Integrity constraints, functional dependencies & Normalization, 1st, 2nd, 3rd and BCNF.

Network, Hierarchical and Relational Data Models: Network Models, Hierarchical Models, Relational Models, Relational Algebra & various operations (set operations, select, project, join, division), Order.

Section B

Security and Recovery in Database: Database protection: Recovery, concurrency, security, integrity and control

Parallel and Distributed Databases and Client-Server Architecture: Architecture for parallel database; Distributed database concepts, Data fragmentation, Replication, and allocation techniques, Overview of Client-Server Architecture.

Enhanced Data Models for Advanced Applications: Active database concepts, Temporal database concepts, Spatial databases, Deductive databases; Emerging Database Technologies: Mobile databases, Multimedia Databases

SQL: Introduction and Basic commands of SQL.

Text Books / Reference Books:

1. Elmasri Ramez, Navathe Shamkant B(2007). *Fundamentals of Database Systems*, 5th Edition, Pearson Education, New Delhi.
2. Date C.J.(2002). *An Introduction to Database Systems*, 7th Edition, Pearson Education, New Delhi.
3. Silberschatz A., Korth H.F., Sudarshan S.(1997). *Database System Concept* 3rd Edition, Mc Graw-Hill, International Edition.
4. Hansen G.W(1999). *Database Management and Design*, 2nd Edition. Prentice-Hall of



India, New Delhi.

5. Majumdar A.,K., Bhattacharyya P.(2007). *Database Management Systems* 5th Edition, Tata McGraw-Hill Publishing Company, New Delhi.
6. Data, C. and Darwen, H.(2003). *A Guide to the SQL Standard* 3rd Edition, Addison-Wesley Publications, New Delhi .



Course Name: Operating System

Course Code: A301302

Semester: 3rd

Credits: 04

L T P

4 0 0

Course Contents

Section A

Introductory Concepts: Operating system functions and characteristics, historical evolution of operating system, Real time system, Distributed system, Methodologies for implementation of O/S service, system calls, system programs, Interrupt mechanisms.

Processes: Process model, Process states, process hierarchies, implementation of Processes, data structures used such as Process table, PCB creation of processes, context switching, exit of Processes.

Inter-process communication: Race conditions, critical sections, problems of mutual exclusion, Peterson's solution, producer-customer problem, Reader Writer's Problem, Dining Philosophers Problem, semaphores, monitors, message passing.

Process scheduling: objective, preemptive vs. non-preemptive scheduling, comparative assessment of different algorithms such as round robin, priority bases scheduling. FCFS, SJF, multiple queues with feedback

Section B

Deadlocks: Conditions, modeling, detection and recovery, deadlock avoidance, deadlock prevention.

Memory Management: Multiprogramming with fixed partition, variable partitions, virtual memory, paging, demand paging, design and implementation issues in paging such as page tables, inverted page tables, page replacement algorithms, page fault handling, working set model, local vs. global allocation, page size, segmentation with paging.

File systems: File type, attributes, access and security, file operations, directory structures, path names, directory operations, implementation of file systems, implementation of file and file operation calls, implementation of directories, sharing of files, disk space management, block allocation, free space management, logical file system, physical file system.

Device management: Techniques for device management, dedicated devices, shared devices, virtual devices; device characteristics, hardware considerations: input & output devices, storage devices: independent device operation, buffering, multiple paths, device allocation considerations.

Text Books/ Reference Books:

1. Peterson, J.L. & Silberschatz, A(2010). *Operating System Concepts*, 2nd, Addison Wesley, NewDelhi.
2. Tanenbaum, A.S. (2002. *Operating System*, 3rd, PHI, New Delhi.
3. Hansen Brinch(2000). *Operating System Principles*. 3rd, PHI, New Delhi.
4. Willams Stalling. *Operating System*, 7th, PHI, Delhi.



Course Name: Object Oriented Analysis, Design & C++

Course Code: A301303

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/ Reference books:

1. Lafore Robert (2015). *Object Oriented Programming in Turbo C++*, 1st, Pearson Education, New Delhi.
2. Kamthane(2013). *Object Oriented Programming Using C++*, 2nd, Pearson Education, New Delhi.
3. Salaria R.S.(2006). *Mastering object Oriented Programming with C++* 3rd, Salaria Publishing House.
4. Deitel H M, Deitel P. *C++ How to Program*, Prentice Hall, India, New Delhi.
5. Schildt Herbert. *The Complete Reference in C++*, TMH, New Delhi.
6. Ravichandran D. *Programming with C++* TMH, New Delhi.
7. Balagurusamy E. *Object Oriented Programming with C++*, Tata McGraw- Hill, New Delhi.
8. Horstmann. *Computing Concept with C++ Essentials*, John wiley, New Delhi.
9. Easttom Chuck. *C++ Programming Fundamentals*, Firewall Medi.

Course Name: Discrete Mathematics

Course Code: A301304

Semester: 3rd

Credits: 04

L T P

4 0 0

Course Contents

Section A

Set Theory: Introduction to set theory, Set operations, Algebra of sets, combination of sets, Duality, Finite and Infinite sets, Classes of sets, Power Sets, Multi sets, Cartesian Product.

Relations and Functions : Representation of relations, Types of relation, Binary Relations, Equivalence relations and partitions, Partial ordering relations and lattices, Mathematics Induction, Principle of Inclusion & Exclusion. Function and its types, Composition of function and relations, Cardinality and inverse relations. Functions & Pigeonhole principle.

Propositional Calculus: Basic operations: AND (\wedge), OR (\vee), NOT (\sim), Truth value of a compound statement, propositions, tautologies, contradictions.

Recursion And Recurrence Relation: Sequences, Introduction to AP and GP series, partial fractions, linear recurrence relation with constant coefficients, Homogeneous solutions, Particular solutions, Total solution of a recurrence relation using generating functions.

Combinatorial Mathematics: Techniques of counting: Rule of sum, Rule of product. Permutations & Combinations.

Section B

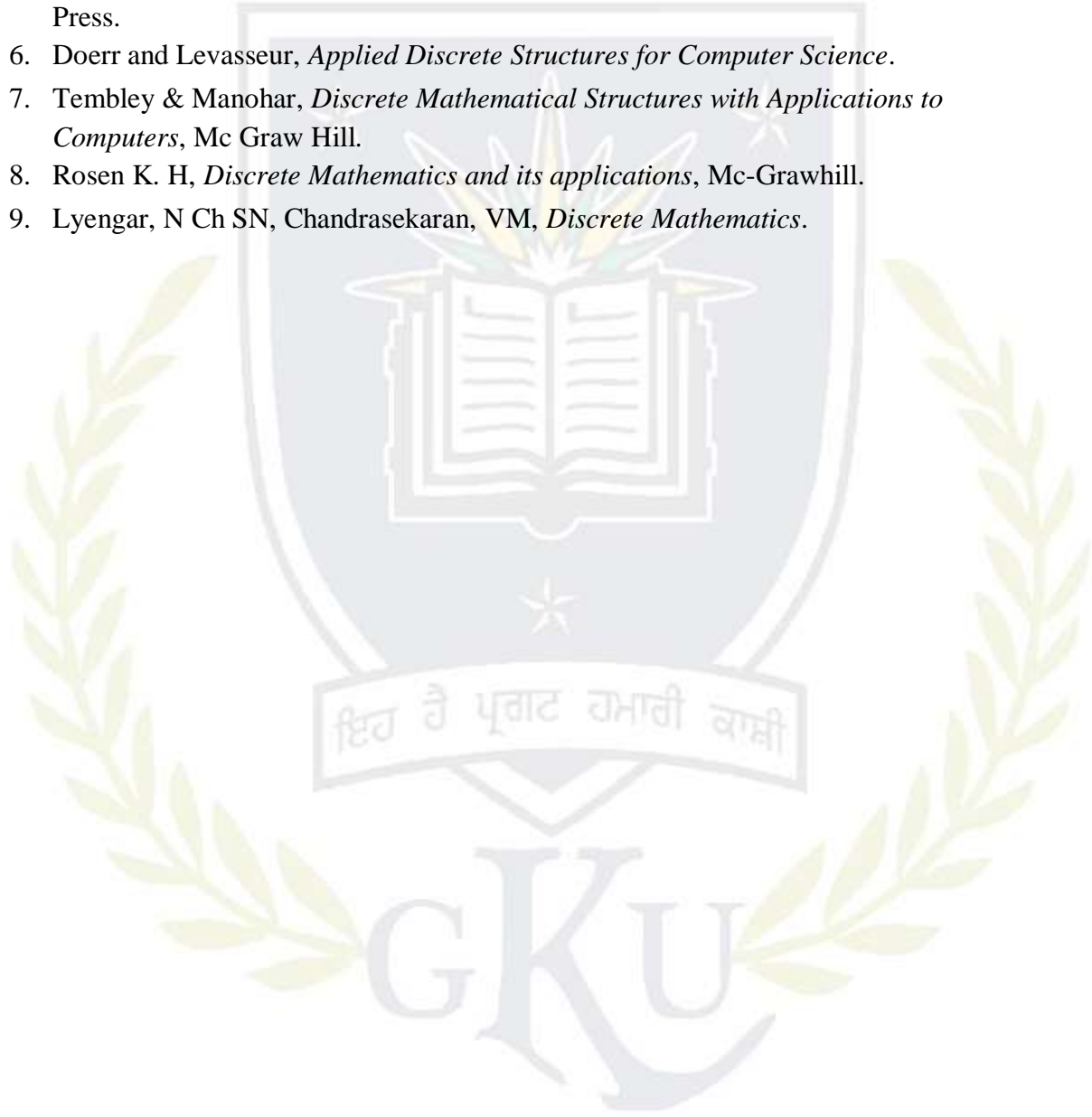
Algebraic Structures: Definition, elementary properties of algebraic structures, Basic algebraic structures: Semi group, monoid, group, subsemigroup, submonoid, subsemigroup. Congruence relations. Homomorphism, Isomorphism and Automorphism, Subgroups and Normal subgroups, Cosets, Lagrange's theorem, cyclic groups. Rings, Types of rings, division rings, Integral domains and fields

Graph Theory: Introduction to graphs , Directed and undirected graphs, Homomorphic and Isomorphic graphs, Subgraphs, Multigraph and Weighted graph, Paths and circuits, Shortest path in weighted graphs, Eulerian paths and circuits, Hamiltonian paths and circuits. Planar graphs, Euler's formula.

Trees: Introduction to trees, Difference between a graph and a tree, Rooted Trees, Path length in trees, Spanning Trees & cut-sets, Minimum cost spanning trees, Binary trees and its traversal.

Text Books /Reference Books:

1. Liu C.L, *Elements of Discrete Mathematics*, Mc Graw Hill.
2. Santha, *Discrete Mathematics with Graph Theory*, Cengage Learning.
3. Ronald G, Knuth, Donald and Patashik, Oren, “*Concrete Mathematics: A Foundation for Computer Science*”, Addison-Wesley.
4. Kolman , B. and Busby ,R.C, *Discrete Mathematical Structures*, PHI.
5. Gersting, Judith L, *Mathematical Structures for Computer Science*, Computer Science Press.
6. Doerr and Levasseur, *Applied Discrete Structures for Computer Science*.
7. Tembley & Manohar, *Discrete Mathematical Structures with Applications to Computers*, Mc Graw Hill.
8. Rosen K. H, *Discrete Mathematics and its applications*, Mc-Grawhill.
9. Lyengar, N Ch SN, Chandrasekaran, VM, *Discrete Mathematics*.



Course Name: Computer Organization and Architecture

Course Code: A301305

Semester: 3rd

Credits: 04

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Course Contents

Section A

Number System: Number conversions, Arithmetical operations, Concepts about bits, bytes and word. Representation of Information: Integer and floating point representation, Complement schemes, Character codes (ASCII, EBCDIC, BCD, 8421, 2421, Excess-3, Grey, Hamming, Parity). Basic Building blocks: Boolean algebra, K-maps.

Combinational logic design: half-adder/subtractor, full adder/subtractor, parallel adder, Multiplexers, Demultiplexers, Decoders, Encoders.

Sequential circuits: concept, flip-flops (RS, D, JK, JK-Master-Slave, T), counters (Asynchronous, Synchronous) Mod-3, Mod-5, Decade Counter.

Computer organization: Structure of Computer, Instruction codes, Instruction formats, Instruction cycle, Addressing modes

Section B

Control Memory: Register Transfer Language, Arithmetic, Logic and Shift micro-operations, Design of control unit, Micro program Sequencer, Micro programmed and hardwired control unit (overview only), Features of RISC and CISC.

Memory organization: Concepts of semiconductor memory, CPU- memory interaction, organization of memory modules, Cache memory and related mapping and replacement policies, Virtual memory

I/O organization: I/O interface, Modes of data transfer: Programmed - initiated, Interrupt initiated, DMA, I/O controllers. Architecture of 8085, Assembly language programming of 8085 machine.

Text Books/ Reference Books:

1. D. P. Leach, A. P. Malvino(2002), *Digital principles & applications* , Tata McGraw-Hill Edition.
2. William Stallings(2002), *Computer Organisation and Architecture*, 6th edition, Pearson Education .
3. A.S.Tannenbaum(1999), *Structured Computer Organisation*, Prentice- Hall of India,
4. JyotsnaSengupta(2009), *Fundamentals of Computer Organization and Architecture*, NuTech Books, Deep and Deep Publications, New Delhi.



5. M.M. Mano(2002), *Computer System Architecture*, Third Edition, Prentice-Hall of India,.
6. Vincent.P.Heuring, Harry.F.Jordan(2000), *Computer Systems Design and Architecture* , Addison Wesley,.
7. Nicholas Carter(2002), *Schaum's Outlines Computer Architecture*, Tata McGraw Hill.



Course Name: SOFTWARE LAB-V (C++)

Course Code: A301306

Semester: 3rd

L T P

Credits: 03

0 0 6

Course Contents

Section-A

- Practical1. Program to show the use of cin, cout
- Practical2. Program to implement the operators
- Practical3. Program based on decision making statement (if else)
- Practical4. Program based on the loops (while, do while)
- Practical5. Program based on loops (for), switch statement
- Practical6. Program based on structures and enumerated data types
- Practical7. Program based functions, overloaded functions
- Practical8. Program to show usage of storage classes.
- Practical9. Program to show usage of function overloading, default arguments
- Practical10. Program to show usage of classes, objects
- Practical11. Program to show usage of constructors, destructors
- Practical12. Program to manipulate arrays and array of objects
- Practical13. Program to manipulate strings.
- Practical14. Program to show usage of inheritance of various type (multiple, multilevel etc.)
- Practical15. Program to show usage of unary operator overloading
- Practical16. Program to show usage of binary operator overloading
- Practical17. Program for conversion from basic to user defined data type
- Practical18. Program for conversion from user defined to basic
- Practical19. Program to show usage of basics of pointers
- Practical20. Program to show usage of pointers and arrays.
- Practical21. Program to show usage of pointers, function arguments
- Practical22. Program to show usage of new, delete, memory management
- Practical23. Program to show usage of virtual function
- Practical24. Program to show usage of friend, static function
- Practical25. Program to show usage of overloaded assignment operator, this pointer
- Practical26. Program to read & write contents of a text file
- Practical27. Program to show usage of file pointers.

Practical28. Program to show usage of command line arguments

Practical29. Program to show usage of overloading of right & left shift operators.

Practical30. Program to show usage of exception handling mechanism

Practical31. Program to show usage of `uncaught_exception()`, the `exception` and `bad_exception` classes

Practical32. Program to show usage of templates

Practical33. Program to show usage of generic classes

Practical34. Implementation of File handling

Practical35. Implementation of Wrapper classes

Practical36. Implementation of container classes





Course Name: Software Lab-VI (Advanced Database Management System Lab)

Course Code: A303307

Semester: 3rd

Credits: 02

L T P

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Course Contents

Section-A

1. Data Definition Language Commands
2. Data Manipulation Language Commands
3. Data Control Language, Transfer Control Language Commands
4. In Built Functions
5. Nested Queries And Join Queries
6. Set operators
7. Views
8. Control Structure
9. Procedure and Function
10. Trigger
11. Front End Tools
12. Form
13. Menu Design
14. Report Generation
15. Database Design And Implementation Payroll Processing

Course Name: Industrial Training/Internship (6 weeks)

Course Code: A301308

Semester: 3rd

Credits -02

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Students will review the latest trends in computer Software and Hardware technology and carry out the required development work as a prelude to work to be done in the next Semester.



Course Name: Computer Based Optimization Techniques

Course Code: A301401

Semester: 4rd

Credits: 04

L T P

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Course Contents

Section-A

Origin & development of O.R: Nature & Characteristic features of O.R., Models & Modeling in Operation research. Methodology of O.R., general methods for solving O.R. & decision making, application, use & limitations of O.R. Linear Programming formulation, graphical & simplex method, duality in L.P. Transportation Problems: Loops, Test For Optimality, Degeneracy In Transportation Problems. Unbalanced Transportation Problems. Transshipment Problems, Assignment & Routing Problems, Travelling Salesman Problem.

Section-B

Probability & Uncertainty: Sample Space & Probability, Algebra of Events, Conditional Probability. Decision Making: Decision Making, Environment, Decision under Uncertainty, **Decision Tree Analysis:** Revised Simplex Method, Integer Programming, Branch & Bound Method, Dynamic Programming.

References:

1. Swarup Kanti, Gupta P.K, Manmohan(1994). *Operation Research*. Sultan Chand & Sons, Seventh Ed.
2. Sharma S.D.(1992). *Operation Research*. Kedar Nath Ram Nath And Co. Meerut, Tenth Ed.

Course Name: Object Oriented Technologies and Java Programming

Course Code: A301402

Semester: 4th

L T P

Credits: 05

4 1 0

Course Contents

Section-A

History and Evolution of Java: Data Types, Variables and Arrays, Operators, Control Statements, Introducing Classes, A Closer Look at Methods and Classes.

Inheritance: Basics, Using super, Creating Multilevel Hierarchy, Method Overriding, Dynamic Method Dispatch, Using Abstract Classes, Using final with inheritance, The object Class.

Packages and Interfaces: Defining a package, Finding packages and CLASSPATH, Access Protection, Importing Packages, Defining an Interface, Implementing Interface, Nested Interface, Applying Interface, Variables in Interfaces, Exception Interface: Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch clauses, Nested try Statements, throw, throws, finally, Java's inbuilt Exceptions, Creating own Exception Subclasses, Chained Exceptions, Using Exceptions.

Multithreaded Programme: The java Thread Model, The Main Thread, Creating a thread, Creating Multiple Threads, Using is Alive() and join (), Thread Priorities, Synchronization, Inter thread Communication, Suspending, Resuming, and Stopping Threads, Using Multithreading.

Section-B

I/O Basics: Streams, Byte Streams, Character Streams, The Predefined Streams, Reading Console Input, Writing Console Output, The Print Writer Class, Reading and writing files, Applet Fundamentals, The Transient and volatile Modifiers, Using Instance of, Static Import, Invoking Overloaded constructors Through this().

Introduction to Swing: Event handling, String Handling, Primitive Type Wrappers, Java and Database: JDBC Basics, SQL Package in Java, Working with database, Creation of JDBC Statements, Networking in Java: Basics

TEXTBOOKS/ REFERENCES:

1. Naughton Patrick, Schildt Herbert(1999). *The Complete Reference Java* 2. Tata Mc Graw Hill.



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PUNJAB - INDIA

2. Arnold Ken, Gosling James, Holmes David. *Java Programming Language*, Third Edition. Pearson Publications.
3. URL: <http://java.sun.com/docs/books/tutorial/jdbc/basics/index.html> .
4. Shah. *Core Java for Beginners*. Shroff- X team.



Course Name: Software Engineering

Course Code: A304103

Semester: 4th

L T P

Credits: 05

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Course Contents

Unit - I

Software: Characteristics, Components, Applications, Software Process Models: Waterfall, Spiral, Prototyping, Fourth Generation Techniques, Concepts of Project Management, Role of Metrics & Measurements.

Unit - II

S/W Project Planning: Objectives, Decomposition techniques: S/W Sizing, Problem, based estimation, Process based estimation, Cost Estimation Models: COCOMO Model, The S/W Equation.

Unit – III

System Analysis: Principles of Structured Analysis, Requirement analysis, DFD, Entity Relationship diagram, Data dictionary.

S/W Design: Objectives, Principles, Concepts, Design methodologies: Data design, Architectural design, procedural design, Object ,oriented concepts

Unit – IV

Testing fundamentals: Objectives, principles, testability, Test cases: White box & Black box testing.

Testing strategies: verification & validation, unit test, integration testing, validation testing, system testing

Text Books:

1. Pressman S Roger(1992). *Software Engineering, A Practitioner's Approach*, Third Edition. McGraw Hill.
2. Fairley E.R(1985). *Software Engineering Concepts*. McGraw Hill.
3. Jalota Pankaj(1992). *An Integrated Approach to Software Engineering*. Narosa Publishing House.

Course Name: Parallel processing

Course Code: A301404

Semester: 4th

L T P

Credits: 05

4 1 0

Course Contents

Unit-I

Introduction: Definition of PP, Feature of PP, Advantages and disadvantages of PP, Synchronous - vector/array, SIMD, MIMD. Hardware taxonomy: Flynn's classifications, Handler's classifications.

Unit-II

Abstract parallel computational models: Combinational circuits, Sorting network, PRAM models, Performance Matrices: Laws governing performance measurements. Matrices - speedups, efficiency, communication overheads.

Unit-III

Parallel Processors: Taxonomy and topology, shared memory multiprocessors, distributed memory networks. Parallel Programming: Shared memory programming, distributed memory programming, object oriented programming, functional programming.

Unit-IV

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

References:

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

Course Name: Theory of Computation

Course Code: A301405

Semester: 4th

L T P

Credits: 05

4 1 0

Course Contents

Section-A

Introduction: Basic Terminology: Alphabet, Formal Language and operations on formal languages, Examples of formal languages.

Finite automata : Concept of Basic Machines, Properties and Limitations of Finite State Machines, Deterministic Finite Automata(DFA), Non-Deterministic Finite Automata(NFA), Equivalence of DFA and NFA , Non-Deterministic Finite automata with Λ -Transitions.

Regular expression: Regular Languages and Regular Expressions, Kleen's Theorem. Arden's Method.

Properties of Regular sets: The Pumping Lemma for Regular sets, Application of the Pumping Lemma, Closure Properties of Regular Sets, Myhill- Nerode Theorem and Minimization of Finite Automata, Minimization Algorithm.

Finite Automata with output: Moore and Mealy Machines. Equivalence of Moore and Mealy Machines.

Section-B

Context Free Grammars: Examples and Definitions, Derivation trees and ambiguity, An Unambiguous CFG for Algebraic Expressions. Regular Grammar, Simplified forms and Normal forms: Removal of useless symbols and unit production, Removal of Λ -moves, Chomsky Normal Form (CNF), Griebach Normal Form (GNF).

Pushdown Automata: Introduction and Definition of Push-Down Automaton, Applications of Push down Automata.

Turing Machines: Definitions and Examples, Deterministic and Non- Deterministic Turing Machines, Unsolvble Problems: A Nonrecursive Language and an Unsolvble Problem, PCP Problem and MPCP Problem.

More General Languages and Grammars: Recursively Enumerable and Recursive Languages, Unrestricted grammars, Context sensitive Language and grammar. Relation between languages of classes, Chomsky hierarchies of grammars.

Text Books/ Reference Books:



1. Martin J.C. *Introduction to Languages and Theory of Computation*. Tata Mc Graw-Hill Publishing Company Limited, 3rd Edition.
2. Hopcroft J.E. and Ullman J.D. *Introduction to Automata Theory Languages and Computation*. Narosa Publications.
3. Sipser. *Theory of Computation*. Cengage Learning.
4. Daniel I.A. Cohen. *Introduction to computer Theory*. John Wiley.



Course Name: S/W LAB VII (Java Programming)

Course Code: A301406

Semester: 4th

L T P

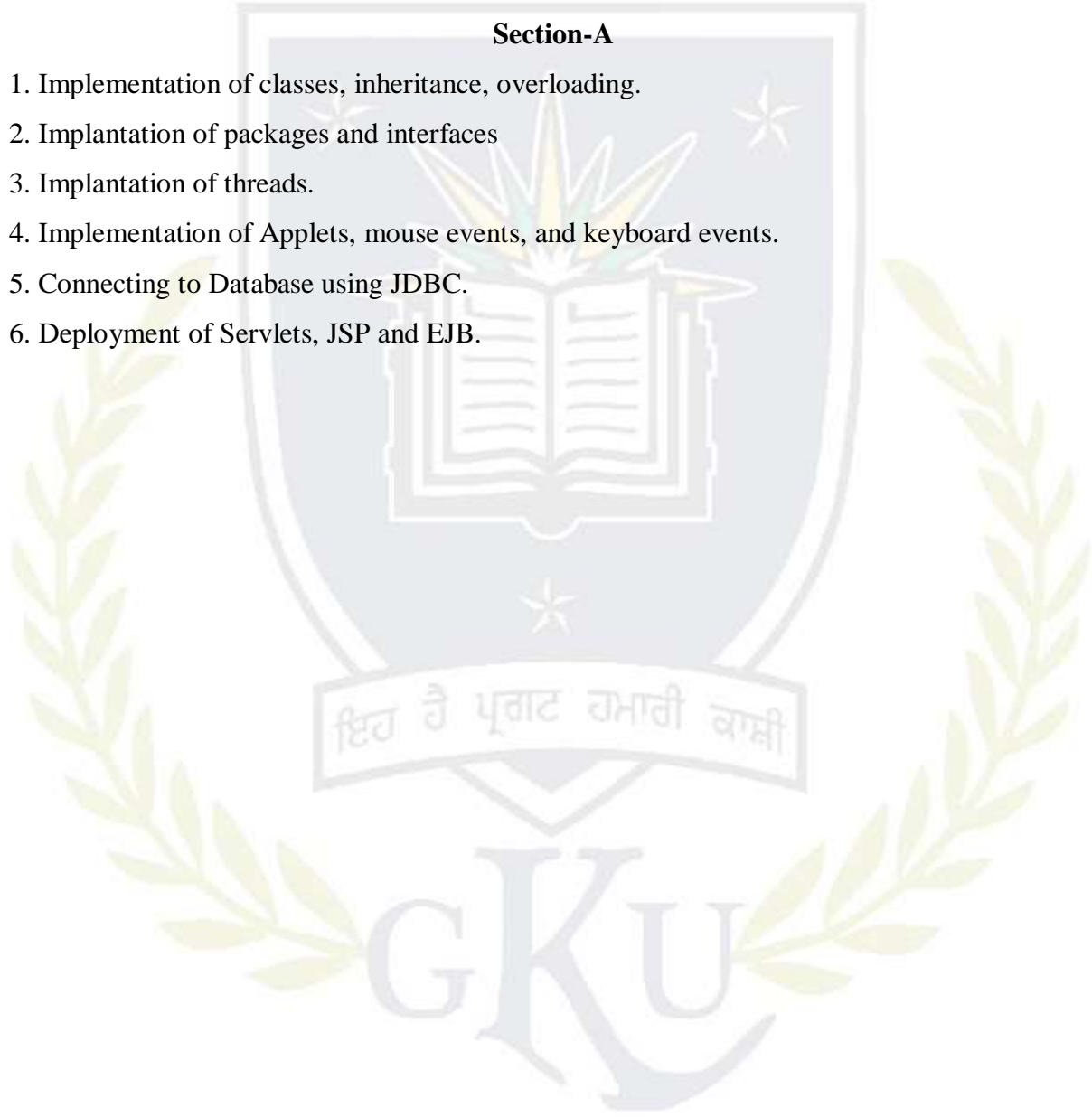
Credits: 03

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Course Contents

Section-A

1. Implementation of classes, inheritance, overloading.
2. Implantation of packages and interfaces
3. Implantation of threads.
4. Implementation of Applets, mouse events, and keyboard events.
5. Connecting to Database using JDBC.
6. Deployment of Servlets, JSP and EJB.



Course Name: S/W Lab- XI (Workshop on Php)

Course Code: A301407

Semester: 4th

L T P

Credits: 03

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Course Contents

List of Experiment

1. Create a basic web page to show use of head, title, and body tag.
2. Create a web page to show use heading and text formatting tags.
3. Create a web page to show use img, ul, ol and anchors.
4. Create a web page to show use tables and div tags.
5. Create a web page using class, id and inline styles.
6. Create a web page to create a form.
7. Create a web page to show an alert using java script.
8. Show the use of get Element by Id in java script.
9. Create a web page using variables, loop and Conditions in java script.
10. Create a web page using Switch in java script.
11. Create a web page to show use of j query.
12. Create a web page to implement get & post in ajax.
13. Create a web page to print your name using PHP.
14. Create a web page to show use of all data types in PHP
15. Create a web page to show use loops & Conditional Statements.
16. Create a web page to show use arrays in PHP
17. Create database and tables in MySQL.
18. Fetch and display data from MySQL table in a web page using PHP.
19. File uploads to server using PHP
20. Working with cookies and sessions.

Elective-I

Course Name: Data Mining

Course Code: 301408

Semester: 2nd

Credits: 04

L T P

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Course Outcomes: On successful completion of this course, the students will be able to:

CO	Statement
CO1	Understand the functionality of various Data mining technique.
CO2	Familiarize with the process of data analysis, identifying the problems and choosing the relevant models and algorithms to apply.
CO3	Apply the Association rules of Data Mining.
CO4	Interpret the various Classification & Prediction Data Mining Techniques.
CO5	Learn to evaluate different clustering methods.

Course Contents

Section A

Introduction to data mining Data mining primitives, Techniques: - Clustering, classification, association rules, linear and multiple regression, Feature selection, Mining and text databases, multimedia databases, data preprocessing: data summarization, data cleaning ,data reduction. Text Mining, Mining Spatial, Data Mining Application.

Mining Frequent Pattern: Basic concept, market basket analysis ,frequent pattern mining, frequent itemset mining methods, mining frequent itemset using candidate generation, mining frequent itemset without candidate generation methods, mining various kind of association rules.

Section B

Classification Issues regarding classification and prediction, Decision tree classifier, bayesian classification, rule based classification, neural network classification, back propagation. KNN classifier, classifier accuracy, Support Vector Machines, introduction to other classification methods like genetic algorithm, rough set approach.

Clustering What is cluster analysis, types of cluster analysis, a categorization of major clustering method ,partition, hierarchical ,density based, grid based method, outlier analysis

Text Books:

1. Dunham Margaret H(2002), *Data Mining: Introductory and Advanced Topics*.
2. Han Jiawei, Kamber Micheline (2006), *Data Mining: Concepts and Techniques*, 2nd ed.
3. Morgan Kaufmann, 2006.
4. Pujari Arun, (2001) *Data Mining Techniques*, University Press,
5. Hand D, Mannila H. and SmythP, (2006) *Principles of Data Mining*, Prentice-Hall of India.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	3	1	1	1	2	2	3	3	3	2	1
CO2	2	2	3	2	1	2	2	-	3	2	2	3	1	3	2
CO3	3	3	2	3	3	2	-	1	2	3	2	2	2	1	2
CO4	2	2	3	3	3	2	-	2	3	2	2	2	3	1	3
CO5	3	2	1	2	3	2	2	-	2	2	2	3	1	2	1
Average	2.6	2.4	2.2	2.4	2.6	1.8	1.6	1.3	2.4	2.2	2.2	2.6	2	1.8	1.8

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Elective-I

Course Name: Soft Computing

Course Code: 301409

Semester: 4th

L T P

Credits: 04

4 0 0

Course Outcomes: On successful completion of this course, the students will be able to:

CO	Statement
CO1	Understand the soft computing techniques and their applications.
CO2	Analyze various neural network architectures.
CO3	Utilize preceptor and counter propagation networks.
CO4	Learn the fuzzy systems.
CO5	Analyze the genetic algorithms and their applications.

Course Contents

Section A

Neural Networks: Introduction to neural networks, working of an artificial neuron, linear separability, perceptron, perceptron training algorithm, back propagation algorithm, adalines and madalines.

Supervised and unsupervised learning: counter-propagation networks, adaptive resonance theory, neocognitron and bidirectional associative memory.

Section B

Fuzzy Logic: Introduction to fuzzy logic and fuzzy sets, fuzzy relations, fuzzy graphs, fuzzy arithmetic and fuzzy if-then rules. Applications of fuzzy logic, neuro-fuzzy systems.

Probabilistic Reasoning

Introduction to probability theory: conditional probability, Baye's theorem, fuzzy logic and its relationship with probability theory.

References:

1. Mehrotra Kishan, Chilkuri K. Mohan and Ranka Sanjay, *Elements of artificial neural networks*, 2007
2. Hassoun Mohammad H., *Fundamentals of artificial neural networks* Prentice Hall of India, 2007.



3. Kosko Bart, *Neural networks and fuzzy systems*, Prentice Hall of India, 2007 Edition.
4. Yen John and Langarim Reza, *Fuzzy logic, intelligence, control and information*, Pearson Education, 2007.
5. Spiegel Murray R., Schiller John and AluSrinivasan R., *Probability and statistics*, Schaum's Outlines, Tata McGraw Hill Publishing Company Limited, 2007.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	2	2	1	2	2	2	3	3	3	2	1
CO2	3	3	3	2	3	2	1	1	3	2	3	3	1	3	2
CO3	2	2	2	2	2	2	1	1	2	2	2	3	2	1	2
CO4	3	2	3	3	2	2	2	1	3	2	3	3	3	1	3
CO5	2	2	2	3	2	2	2	2	1	1	2	3	1	2	1
Average	2.6	2.2	2.6	2.4	2.2	2	1.4	1.4	2.2	1.8	2.6	3	2	1.8	1.8

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.



Elective-I

Course Name: Machine Learning

Course Code: 301410

Semester: 4th

L T P

Credits: 04

4 0 0

Course Outcomes: On successful completion of this course, the students will be able to:

CO	Statement
CO1	Understand the basic concepts of Bayesian Decision Theory.
CO2	Impart Machine Intelligence and its applications
CO3	Learn class conditional probability distributions.
CO4	Get knowledge about the working of Perceptron learning algorithm, criterion and Widrow-Hoff learning algorithm
CO5	Depict classification algorithms like Nearest Neighbor classification, K-nearest neighbor and their applications.

Course Contents

Section-A

Overview and Introduction to Bayes Decision Theory: Machine intelligence and applications, pattern recognition concepts classification, regression, feature selection, supervised learning class conditional probability distributions, Examples of classifiers bayes optimal classifier and error, learning classification approaches.

Linear machines: General and linear discriminates, decision regions, single layer neural network, linear separability, general gradient descent, perceptron learning algorithm, mean square criterion and widrow-Hoff learning algorithm; multi-Layer perceptrons: two-layers universal approximators, back propagation learning, on-line, off-line error surface, important parameters.

Section-B

Learning decision trees: Inference model, general domains, symbolic decision trees, consistency, learning trees from training examples entropy, mutual information, ID3 algorithm criterion, C4.5 algorithm continuous test nodes, confidence, pruning, learning with incomplete data

Instance-based Learning: Nearest neighbour classification, k-nearest neighbour, nearest neighbour error probability,

Machine learning concepts and limitations: Learning theory, formal model of the learnable, sample complexity, learning in zero-bayes and realizable case, VC-dimension, fundamental algorithm independent concepts, hypothesis class, target class, inductive bias, Occam's razor, empirical risk, limitations of inference machines, approximation and estimation errors, Tradeoffs.

Text Books

1. Alpaydin E. *Introduction to Machine Learning*. Prentice Hall of India.
2. Mitchell T. M. *Machine Learning*. McGraw-Hill.
3. Bishop C. M. *Pattern Recognition and Machine Learning*. Springer.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	1	2	1	1	1	2	2	2	3	3	2	3
CO2	3	2	2	1	2	1	1	1	2	2	3	3	2	3	2
CO3	3	2	1	2	1	2	1	2	2	2	3	2	1	2	1
CO4	3	2	2	1	1	2	1	2	1	1	2	3	3	3	2
CO5	3	1	2	1	2	2	2	1	1	2	1	3	2	1	3
Average	3	1.6	1.4	1.2	1.6	1.6	1.2	1.4	1.6	1.8	2.2	2.8	2.2	2.2	2.2

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Elective-I

Course Name: Artificial Intelligence

Course Code: 301411

Semester: 4th

L T P

Credits: 04

4 0 0

Course Outcomes: On successful completion of this course, the students will be able to:

CO	Statement
CO1	Understand the various searching techniques.
CO2	Classify the role of agents and the way of evaluating it.
CO3	Analyze and design a real world problem for dynamic behavior of a system.
CO4	Compare different machine learning techniques to design AI machine and enveloping applications for real world problems.
CO5	Learn the natural language processing and parsing techniques.

Course Contents

Section-A

Concept of intelligence: An Overview of AI: The AI problems, what is an AI technique; Characteristics and applications of AI, General Problem solving: Production systems; Control strategies; forward and backward chaining, Exhaustive searches: Depth first Breadth first search.

Heuristic Search Techniques: Hill climbing, Branch and Bound technique; Best first search and A* algorithm; AND/OR Graphs; Problem reduction; Constraint Satisfaction problems Game Playing Min Max Search procedure; Alpha-Beta cutoff; Additional Refinements.

Section-B

Knowledge Representation Techniques: First Order Predicate Calculus; Inference Mechanisms Horn's Clauses; Semantic Networks; Frame Systems; Scripts; Conceptual Dependency, AI Programming Languages: Introduction to LISP, Syntax and Numeric Function; List manipulation functions; Iteration and Recursion; Property list and Arrays.

Natural Language Processing and Parsing Techniques: Context Free Grammar; Recursive Transition Nets (RTN); Augmented Transition Nets (ATN); Semantic Analysis, Case and Logic Grammars; Probabilistic Reasoning and Uncertainty: Probability theory; Bayes

Theorem and Bayesian networks; Certainty Factor. Introduction to Expert Systems, Architecture of Expert Systems;

Text Books:

1. Rich Elaine, KnightKevin, *Artificial Intelligence*, 3rd Edition, Tata McGraw Hill, 2008.
2. Patterson Dan W., *Introduction to Artificial Intelligence and Expert Systems*, Prentice Hal of India., 1999.
3. Rusell Stuart, Norving Peter, *Artificial Intelligence: A Modern Approach*, Pearson Education 2nd Edition., 2009

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	1	2	1	2	1	2	3	1	2	3
CO2	3	3	3	2	2	2	2	2	2	2	1	2	2	3	2
CO3	3	2	3	2	2	2	1	1	2	2	3	3	3	2	3
CO4	3	3	2	2	2	2	2	2	2	3	3	3	3	2	2
CO5	3	3	3	2	2	1	1	1	3	2	3	3	1	3	1
Average	3	2.8	2.8	2	2	1.6	1.6	1.4	2.2	2	2.4	2.8	2	2.4	2.2

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Computer Graphics and Multimedia

Course Code: A301501

Semester: 5th

Credits: 04

L T P

4 0 0

Course Contents

Section A

Introduction: What is Computer Graphics, Computer Graphics Applications, Computer Graphics hardware and Software, Two dimensional Graphics primitives: Points and Lines

Point plotting Techniques: Coordinate system, Increment method, Line drawing algorithm : DDA, Bresenham's circle drawing algorithm: Using polar coordinates, Midpoint circle drawing algorithms, filled area algorithm: Scan line, Polygon filling algorithms, Boundary filled algorithms.

Point & Positioning devices: light pen, mouse, Tablet, Input technique, positioning technique, and character recognition.

Two Dimensional Geometric transformations: Translation, Scaling, Rotation, Other Transformations Reflection, shear, Homogenous Coordinate System

Clipping: point & line clipping algorithm,

Two Dimensional Viewing: Viewing pipeline, Window to view port transformation, Window to view port mapping

Section B

Three Dimensional Geometric transformations: Translation, Scaling and Rotation

Three Dimensional Viewing: Viewing pipeline, viewing coordinates, Projection: Parallel, perspective

Representation of 3-D curves and surfaces: Curved lines and surfaces, spline representations, interpolation and approximation splines, parametric continuity conditions.

Bezier curves and surfaces: Bezier curves, properties of Bezier curves, Bezier surfaces B-spline curves and surfaces.

Hidden Surfaces removal: Hidden surface elimination, depth buffer algorithm, scan line coherence algorithm, priority algorithm.

Text Books/ Reference Books:

1. Hern & Baker. *Computer Graphics*, 2nd Ed. PHI, New Delhi.
2. Rogers. *Principles of Computer Graphics*. MGH Pub, New Delhi.
3. Foley, Dam Van, Feiner and Hughes. *Computer Graphics Principles and Practice*. Addison-Wesley Pub Company.
4. Kanetkar Yashwant. "*Graphics Programming with C*". BPB Publications, New Delhi



Course Name: Data Communication & Computer Networks

Course Code: A301501

Semester: 5th

Credits: 04

L T P

4 0 0

Course Contents

Section-A

Introduction to Computer Networks and its uses: Network categorization and Hardware: Broadcast and point-to-point networks, Local Area Networks (LAN), Metropolitan Area Networks (MAN), Wide Area Networks (WAN), Internetworks, Topologies, Wireless networks.

Network Software: Protocols, Services, network architecture, design issues, OSI Reference model, TCP/IP Reference model, Comparison of OSI and TCP/IP Models. Introduction to Example Networks: Internet, Connection-Oriented Networks – X.25, Frame Relay, ATM.

Data Communication Model, Digital and Analog data and signals, bit rate, baud, bandwidth, Nyquist bit rate, Guided Transmission Media – Twisted Pair, Coaxial cable, Optical fiber; wireless transmission – Radio waves, microwaves, infrared waves; Satellite communication.

Switching: Circuit Switching, Packet Switching; **Multiplexing:** Frequency Division Multiplexing Time Division Multiplexity, Synchronous and Asynchronous TDM, Modems, Transmission Impairments, Manchester and Differential Manchester encoding, ADSL Versus Cable.

Section B

Data Link Layer Design issues: Framing, error control, Flow Control, Error Detection and correction; Elementary Data Link Protocols, Sliding Window Protocols; Medium Access Control: Aloha, CSMA protocols, Collision free protocols, Limited Contention Protocols; Wavelength division Multiple access protocol, Digital Cellular, Radio: Global System for Mobile Communication (GSM), Code Division Multiple Access(CDMA), Fiber Distributed Data Interface, Distributed Queue Dual Bus (DQDB).

Network Layer Design issues : Virtual Circuit and Datagram Subnet, Routing Algorithms, Optimality principle, Shortest path Routing, Flooding , Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast and Multi Cast Routing, Routing for Mobile hosts,

Routing in Adhoc Networks,, congestion Control Algorithms, General Principals Traffic Shaping, Leaky bucket token bucket, choke packets, Load Shedding.

References:

1. Tanenbaum Andrew s. *Computer Networks*, PHI.
2. Forouzan. *Introduction to Data communications and Networking*. Tata Mc-Graw Hill.



Course Name: System Software

Course Code: A301503

Semester: 5th

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. Dhamdhere. *Systems Programming and operating systems*. TMH.
2. Donovan. *System Programming*. MC Graw Hill.



Course Name: Computer Graphics Lab

Course Code: A301504

Semester: 5th

Credits 02

L T P

0 0 4

Course Contents

1. Write a program for 2D line drawing as Raster Graphics Display.
2. Write a program for circle drawing as Raster Graphics Display.
3. Write a program to draw an ellipse using Mid Point Algorithm.
4. Write a program to draw a circle using Midpoint algorithm. Modify the same for drawing an arc and sector.
5. Write a program to rotate a point about origin.
6. Write a program to rotate a triangle about origin.
7. Write a program to scale the triangle.
8. Write a program to translate a triangle.
9. Write a program to reflect a triangle.
10. Write a program for polygon filling as Raster Graphics Display
11. Write a program for line clipping.
12. Write a program for polygon clipping.
13. Write a program for displaying 3D objects as 2D display using perspective transformation.
14. Write a program for rotation of a 3D object about arbitrary axis.
15. Write a program for Hidden surface removal from a 3DObject.

Course Name: Major Project

Course Code: A301505

Semester: 5th

Credits 02

L T P

0 0 4

Students will review the latest trends in computer Software and Hardware technology and carry out the required development work as a prelude to work to be done in the next Semester.



Course Name Workshop on C#.Net

Course Code A301506

Semester 5th

Credits 04

L T P

0 0 8

Course Contents

1. Console based Programming.
2. Introducing form oriented programming.
3. Implement the concept of Classes and Objects
4. Implement the concept of Inheritance and Polymorphism
5. Implement the concept of Interfaces
6. Implement the concept of Operator Overloading
7. Implement the concept of Delegates and Events
8. Implement the concept of Managing Console I/O Operations
9. Implement the concept of Managing Errors 'and Exceptions.

Course Name: Industrial Training/Internship (6 weeks)

Course Code: A301507

Semester: 5th

Credits -02

L T P

0 0 0

Students will review the latest trends in computer Software and Hardware technology and carry out the required development work as a prelude to work to be done in the next Semester.



Course Name: Industrial Training/Internship (6 Months)

Course Code: A301601

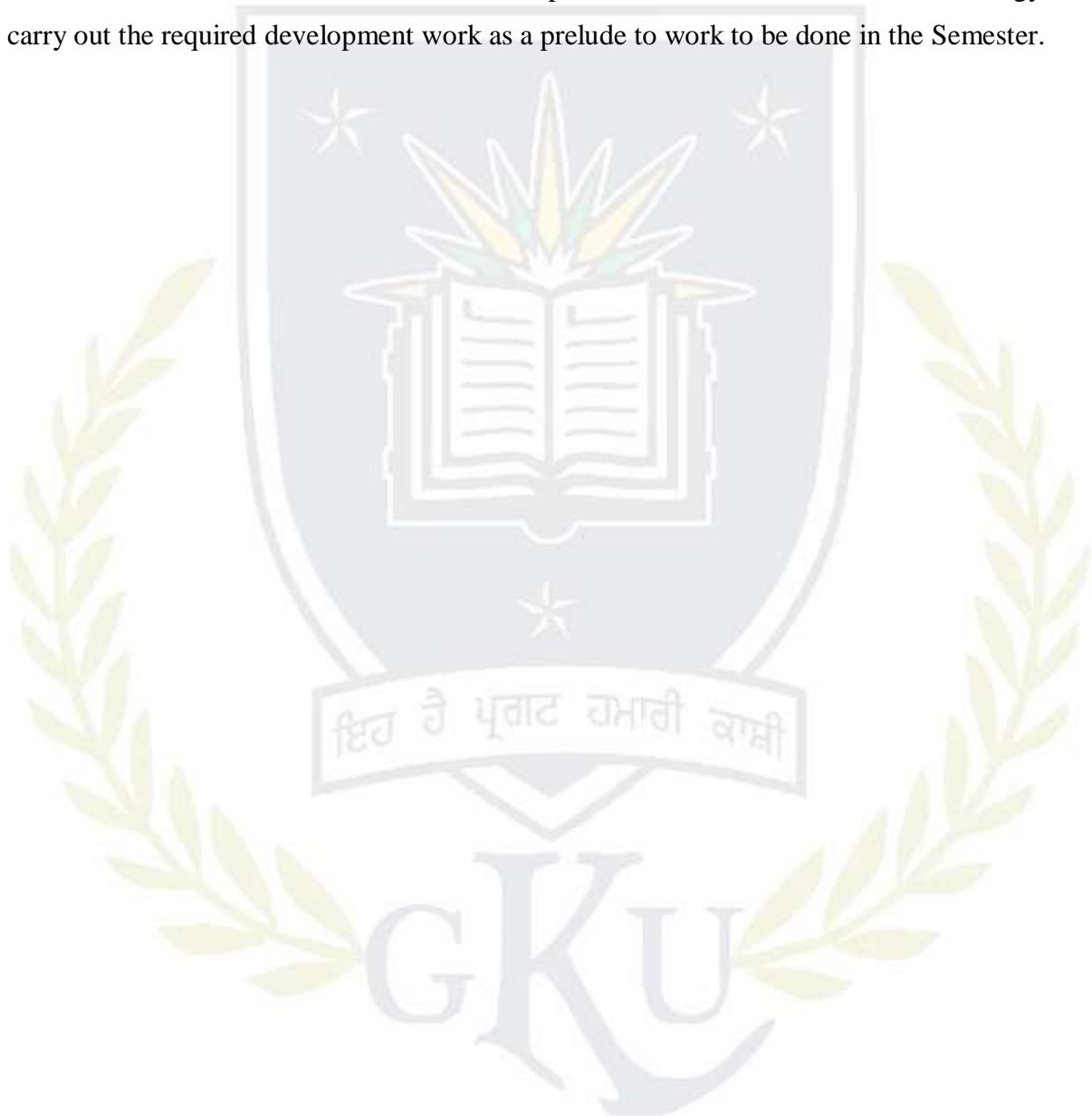
Semester: 6th

Credits -02

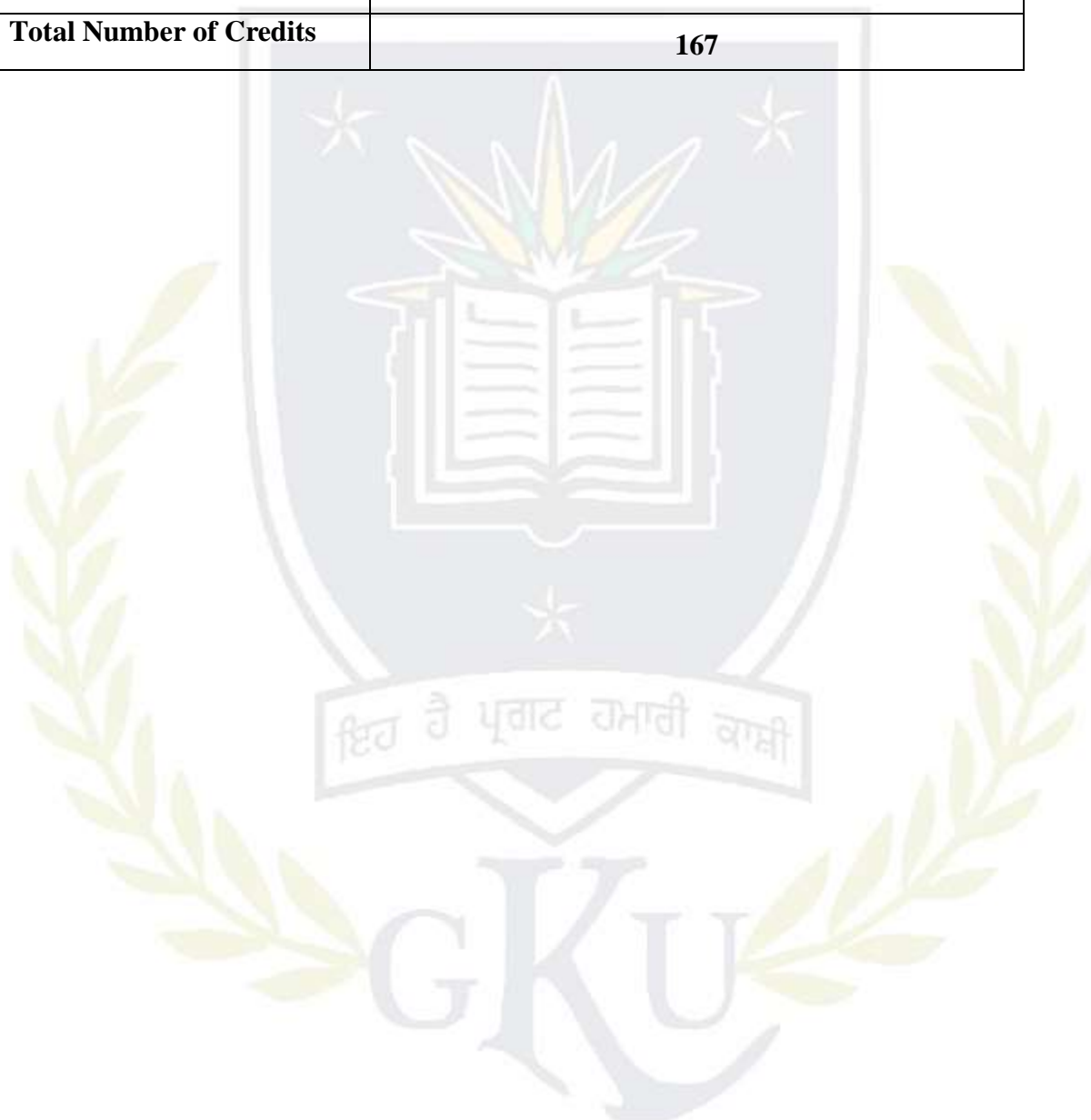
L T P

0 0 0

Students will review the latest trends in computer Software and Hardware technology and carry out the required development work as a prelude to work to be done in the Semester.



Total Number of Course	37
Number of Theory Course	24
Number of Practical Course	13
Total Number of Credits	167



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)	Total	
	Attendance	Assignment			MST 1	MST2		ETE
		A1	A2	A3				
Weightage	10	10	10	10	30	30	50	
Average Weightage	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.