

Department of Computer Science & Information Technology (CSIT)
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

(A Central University established by the Central University Act 2009 No. 25 of 2009)

SYLLABUS FOR M.Sc.(CS) CBCS based

Session 2021-22

Semester-I

| S.No. | Subject Code | Title | Credits | Marks | | Total |
|-------|--------------|---|---------|----------|----------|-------|
| | | | | Internal | External | |
| 1 | CIPATT1 | Design of Operating System | 5 | 30 | 70 | 100 |
| 2 | CIPATT2 | Artificial Intelligence | 5 | 30 | 70 | 100 |
| 3 | CIPATT3 | Relational Data Base Management Systems | 5 | 30 | 70 | 100 |
| 4 | CIPATT4 | Advanced JAVA Programming | 5 | 30 | 70 | 100 |
| 5 | CIPALT4 | Programming Lab in JAVA | 5 | - | 100 | 100 |
| | | Total | 25 | | | 500 |

Semester-II

| S.No. | Subject Code | Title | Credits | Marks | | Total |
|-------|--------------|-----------------------------------|---------|----------|----------|-------|
| | | | | Internal | External | |
| 1 | CIPBTT1 | Design and Analysis of Algorithm | 5 | 30 | 70 | 100 |
| 2 | CIPBTT2 | Machine Learning | 5 | 30 | 70 | 100 |
| 3 | CIPBTD1 | Neural Networks and Deep Learning | 5 | 30 | 70 | 100 |
| 4 | CIPBTD2 | Web Technology | 5 | 30 | 70 | 100 |
| 5 | CIPBTT3 | Research Methodology | 2 | 30 | 70 | 100 |
| 6 | CIPBLD2 | Programming Lab in Web Technology | 5 | - | 100 | 100 |
| | | Total | 27 | | | 600 |

Semester-III

| S.No. | Subject Code | Title | Credits | Marks | | Total | |
|-------|--------------|----------------------------------|---------|----------|----------|-------|--|
| | | | | Internal | External | | |
| 1 | CIPCTT1 | Computer Graphics and Multimedia | 5 | 30 | 70 | 100 | |
| 2 | CIPCTT2 | Compiler Design | 5 | 30 | 70 | 100 | |
| 3 | CIPCTD1 | Data Mining and Data Warehousing | 5 | 30 | 70 | 100 | |
| 4 | CIPCTD2 | Network Security | 5 | 30 | 70 | 100 | |
| 5 | CIPCTO1 | Open Elective* | 5 | 30 | 70 | 100 | |
| | CIPCTO2 | | | | | | Programming in C/C++ |
| | CIPCTO3 | | | | | | Data Structure Using C/C++/Python/Java |
| | CIPCTO4 | | | | | | RDBMS |
| | CIPCTO5 | | | | | | Introduction to Information Technology |
| | CIPCTO6 | | | | | | Linux Operating System |
| 6 | CIPCLD1 | Programming Lab in Data Mining | 5 | | | 100 | |
| Total | | | 30 | | | 600 | |

*** Open Elective will be decided after the information of availability of courses from other departments**

Semester-IV

| S.No. | Subject Code | Title | Credits | Total |
|--------------------|--------------|--|------------|-------------|
| 1 | CIPDPF1 | Major Project (Dissertation/Field Work/Internship/Project/Industry Visit) | 18 | 500 |
| GRAND TOTAL | | | 100 | 2200 |

Note: The structure, marking scheme, courses can be changed by university/statutory body's direction whenever required.

CIPATT1

Design of Operating System

COURSE OBJECTIVE:

The main objective of this course is to learn the fundamentals of Operating Systems. This course explores the mechanisms of OS to handle processes and threads and their communication and also learn the mechanisms involved in memory management in contemporary OS. It also includes and explores the file and secondary storage management system.

1. **Introduction:** Definition, Design Goals, Types, Batch processing, Multi-programming, Real time, Timesharing; Functions of Operating System.
2. **Process Management:** Process states, Process Control block, Schedulers, CPU Scheduling algorithms
3. **Inter process synchronization and communication:** need, Mutual exclusion, semaphore, and classical problems in concurrent programming, critical region and conditional critical region, Deadlock, Characteristics, prevention, resource allocation graphs.
4. **Memory Management:** Address Binding, Dynamic Loading and Linking Concepts, Logical and Physical, Addresses, Contiguous Allocation, Fragmentation, Paging, Segmentation, Virtual Memory, Demand, Paging, Page fault, Page replacement algorithms, Global Vs Local Allocation, Thrashing,
5. **File and Secondary Storage Management:** File Attributes, File Types, File Access Methods, Directory, Structure, File System Organization, Allocation Methods, Free Space management; Disk Structure, Logical and Physical View, Disk Head Scheduling, Formatting, Swap Management. UNIX/ LINUX/ WINDOWS/Android as an example of Operating systems

References:

1. Operating System Concepts 6/ed By Silberschatz and Galvin, Addison Wesley.
2. Operating Systems: Internals and Design Principles 5/ed By William Stalling, PHI.
3. Modern operating Systems By Tanenbaum, PHI.
4. Operating System Concepts By Peterson and Silberschatz, Addison Wesley.
5. Operating System Principles By P. B. Hansen, PHI.
6. The UNIX Operating System By K. Christian, John Wiley

COURSE OUTCOME:

The student will be

- Able to analyze the architecture of OS and basic architectural components involved in OS design.
- Able to analyze and design the applications to run in parallel either using process or thread models of different OS.
- Able to analyze the various device and resource management techniques.
- Able to understand the Mutual exclusion, Deadlock detection.
- Able to understand the file and secondary storage management system.

CIPATT2

Artificial Intelligence

COURSE OBJECTIVE:

The main objective of this course work is to understanding the basic concept of AI and expert system. This course explores the basic concept of various searching techniques for problem solving approach. It also includes supervised and unsupervised learning for classification and pattern reorganization.

1. **Introduction:** Definitions and approaches, Foundation of A.I., Challenges in AI, Area and Applicationsof A.I., Intelligent Agents: meaning, types, environments, examples.
2. **Problem Solving:** Problem solving as state space search, production system, writing production systemand solution for a Water jug problem; some AI classical problems(statements only) cannibal missionaries, tower of Hanoi, tic tac toe, 8-puzzle, Search techniques: Breadth First, and Depth-first, Best-First Search, Hill-climbing, Heuristics,A* algorithm, local and global maxima(minima),
3. **Knowledge Representation and Reasoning:** Predicate and propositional logic, conversion of sentences towffs of predicate logic, Resolution, clause form, Skolem functions, Unification, Resolution inPropositional and predicate logic, Semantic Nets.
4. **Pattern Recognition:** Meaning of pattern, Pattern Recognition, Classification, Supervised &Unsupervised Learning of classifiers, K-NN, K-MEANS algorithms.
5. **Expert Systems:** Introduction, Advantages, components and participants in an expert system, Application

References:

1. Artificial Intelligence: E. Rich and K. Knight, Tata McGraw Hill.

2. Artificial Intelligence: A New Synthesis By Nilsson, Morgan Kaufmann.
3. Pattern Classification 2nd Edition By R.O. Duda, Hart, Stork (2001) ,John wiley, New York.
4. Pattern Recognition: Technique and Applications By Shinghal (2006) ,Oxford University Press, New Delhi

COURSE OUTCOME:

- The student will be able to analyze and understanding of the fundamental issues and challenges of AI and machine Expert System: like their applications, problem solving methods and complexity.
- Able to understanding of the strengths and weaknesses of many popular searching techniques, supervised and unsupervised approaches.

CIPATT3

Relational Data Base Management System

COURSE OBJECTIVE:

The objective of this course work is to understand and uses of the basic concept of database management system. This course explores how to update database content with SQL and transaction handling.

1. **Overview of Database Management** :Data, Information and knowledge, Increasing use of data as a corporate resource, data processing versus data management, file oriented approach versus database oriented approach to data management; data independence, database administration roles, DBMS architecture, different kinds of DBMS users, importance of data dictionary, contents of data dictionary, types of database languages. Data models: network, hierarchical, relational. Introduction to distributed databases.

2. **Relational Model**: Entity - Relationship model as a tool for conceptual design-entities attributes and relationships. ER diagrams; Concept of keys: candidate key, primary key, alternate key, foreign key; Strong and weak entities, Case studies of ER modeling Generalization; specialization and aggregation. Converting an ER model into relational Schema. Extended ER features.

3. **Structured Query Language** :Relational Algebra: select, project, cross product different types of joins(inner join, outer joins, self-join); set operations, Tuple relational calculus, Domain relational calculus, Simple and complex queries using relational algebra, stand alone and embedded query languages, Introduction to SQL constructs (SELECT...FROM, WHERE... GROUP BY... HAVING...ORDER BY...), INSERT, DELETE, UPDATE, VIEW definition and use, Temporary tables, Nested queries, and correlated nested queries, Integrity constraints: Not null, unique, check, primary key, foreign key, references, Triggers. Embedded SQL and Application Programming Interfaces.

4. **Relational Database Design**: Normalization concept in logical model; Pitfalls in database design, update anomalies: Functional dependencies, Join dependencies, Normal forms (1NF, 2NF, 3NF). BoyceCodd Normal form, Decomposition, Multi-Valued Dependencies, 4NF, 5NF. Issues in physical design; Concepts of indexes, File organization for relational tables, De-normalization.

5. **Introduction to Query Processing and Protecting the Database & Data Organizations**: Parsing, translation, optimization, evaluation and overview of Query Processing. Protecting the Data Base -Integrity, Security and Recovery. Domain Constraints, Referential Integrity, Assertion, Triggers, Security & Authorization in SQL.

References:

1. Database system concept By H. Korth and A. Silberschatz, TMH.
2. Data Base Management System By Alexies & Mathews, Vikas publication.
3. Data Base Management System By C. J. Date, Narosha Pub.
4. Data Base Management System By James Matin.
5. Principles of Database System By Ullman.
6. An Introduction to database systems By Bipin Desai, 2011 ed., Galgotia Publication.
7. Database Management System By A. K. Majumdar & P. Bhattacharya, TMH

COURSE OUTCOME:

The students will be

- Able to Learn about database models.
- Able to Learn how to write simple as well as complex queries for retrieving data from database
- Able to learn how to update, insert and delete data.
- Able to Learn about functions and procedure and gain understanding on different Views
- Able to learn how to work with Triggers and design a database
- Able to learn how to ensure integrity related to multiple a related database updates.

CIPATT4

Advanced Java Programming

COURSE OBJECTIVE:

To provide the ability to design console based, GUI based and web based applications. Students will also be able to understand integrated development environment to create, debug and run multi-tier and enterprise-level applications

1. **Basics of Core JAVA:** class, interface, exception handling, Collections: Collection Interfaces, Concrete Collections, Collections Framework, Multithreading: Creating thread and running it, Multiple Thread acting on single object, Synchronization, Thread communication, Thread group, Thread priorities, Daemon Thread, Life Cycle of Thread. I/O

2. **Networking:** Internet Addressing, InetAddress, Factory Methods, Instance Methods, TCP/IP Client Sockets, URL, URLConnection, TCP/IP Server Sockets, Datagrams. Java Database Connectivity (JDBC): Merging Data from Multiple Tables: Joining, Manipulating, Databases with JDBC, Prepared Statements, Transaction Processing, Stored Procedures.

3. **Servlets:** Servlet Overview and Architecture, Interface Servlet and the Servlet Life Cycle, Handling HTTP get Requests, Handling HTTP post Requests, Redirecting Requests to Other Resources, Session Tracking, Cookies, Session Tracking with HttpSession

4. **Java Server Pages (JSP):** Introduction, JavaServer Pages Overview, A First Java Server Page Example, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries, Enterprise Java Bean: Preparing a Class to be a JavaBean, Creating a JavaBean, JavaBean Properties, Types of beans, Stateful Session bean, Stateless Session bean, Entity bean.

5. **Remote Method Invocation:** Defining the Remote Interface, Implementing the Remote Interface, Compiling and Executing the Server and the Client, Struts: Basics of Struts, Struts: What and Why?, Model1 vs Model2, Struts2 Features, Steps to create Struts application, Understanding Action class, Understanding struts.xml file

References:

1. “Advanced Java 2 Platform HOW TO PROGRAM” by H. M.Deitel, P. J. Deitel, S. E. Santry – Prentice Hall
2. “Effective Java” 3rd Ed by Joshua Bloch Addition-Wesley
3. “Murach’s Java Servlet & JSP” 3rd Ed. by Joel Murach, Michael Urban
4. “Beginning Java™ EE 6 Platform with GlassFish

COURSE OUTCOME:

Student will be able to

- Develop Swing-based GUI
- Develop client/server applications and TCP/IP socket programming
- Update and retrieve the data from the databases using SQL
- Develop distributed applications using RMI
- Develop component-based Java software using JavaBeans
- Develop server side programs in the form of servlets.

SEMESTER-II

CIPBTT1

Analysis & Design of Algorithm

COURSE OBJECTIVE:

- This course aims to introduce the classic algorithms in various domains, and techniques for designing efficient algorithms.
- Introducing students to the general tools and techniques for analyzing computer algorithms.
- Equip the students with mathematical preliminaries required to analyses and design computer algorithms.

1. **Introduction:** Algorithm, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation-Big oh notation, Omega notation, Theta notation and Little oh and omega notation, recurrence relation: Substitution method, Master method Deterministic Algorithms

2. **Divide and conquer:** General method, applications-Binary search, Quick sort, Merge sort. Greedy method: General method, Greedy knapsack problem, Minimum cost spanning trees: prims and kruskal's algorithm, Single source shortest path problem: Dijkstra's Shortest Path Algorithm, Huffman coding.

3. **Dynamic Programming:** General method, applications-Matrix chain multiplication, optimal binary search trees, Longest Common Sub sequence Problem. Back Tracking: 8-Queen problem, Graph Coloring, Hamiltonian Cycle, Branch and Bound: 0/1 knapsack problem, travelling sales person problem Non Deterministic Algorithms

4. **Intractable problems:** Basic concepts, non-deterministic algorithms, NP-Hard and NP-Complete problems, Classes P and NP, Reducibility, Satisfiability Problem, Cook's theorem. Approximation: Graph Coloring, Task scheduling, bin packing, Probabilistic algorithm: Numerical integration, primality testing, Graph Algorithms: BFS and DFS and its applications.

5. **Evaluation of Algorithm Lower bound Techniques:** Lower bound techniques, Comparison Techniques, reduction.

References:

1. The Design and Analysis of Computer Algorithms, A. Aho, J. Hopcroft and J. Ullman, Addison Wesley.
2. Fundamentals of Computer Algorithms, E. Horowitz and S. Sahani, Galgotia, New Delhi.

3. Introduction to the Design and Analysis of Algorithms, S.E. Goodman and S.T. Hedetniemi, McGrawHill.
4. Design Methods and Analysis of Algorithmic, G.Brassard and P.Bratley, PHI.
5. Design Methods and Analysis of Algorithms, S.K.Basu, PHI, 2005.
6. Introduction to Algorithms, Thomas H Cormen, Charles E Leiserson, Ronald L Rivest, Clifford Stein, MIT Press
7. Rosen, Kenneth, Discrete Mathematics and Its Applications , McGraw-Hill Science

COURSE OUTCOME:

After successful completion of this course, students should be able to:

- Prove the correctness and analyze the running time of the basic algorithms for those classic problems in various domains.
- Apply the algorithms and design techniques to solve problems.
- Analyze the complexities of various problems in different domains.

CIPBTT2

Machine Learning

COURSE OBJECTIVE:

- Differentiate between supervised, unsupervised machine learning approaches
- Ability to choose appropriate machine learning algorithm for solving a problem
- Design and adapt existing machine learning algorithms to suit applications
- Understand the underlying mathematical relationships across various machine learning algorithms
- Design and implement machine learning algorithms to real world applications

1. **Introduction:** Meaning and need of Machine Learning, Types of Machine Learning: Supervised Learning, Unsupervised Learning, Semi Supervised Learning, Reinforcement Learning, Applications of Machine Learning, Type of Data in Machine Learning, Data Repository

2. **Introduction to Feature Analysis and Bayesian Theory:** Meaning of patterns and pattern classification, feature selection and curse of dimensionality, Bayesian theorem and concept learning, examples.

3. **Supervised Learning:** Introduction to supervised learning, its examples, classification models, classification algorithms with Implementation: k-nearest neighbor (KNN), Decision Tree, Random forest, Support Vector Machine (SVM),

4. **Unsupervised Learning:** Introduction to unsupervised learning, metrics for evaluating a feature, clustering, types of clustering techniques, partitioning, hierarchical and density based clustering

5. **Modeling a classifier:** Validation, classification and prediction accuracy, confusion matrix, learning, bootstrap aggregation (bagging) , boosting, ensembles for classification

References:

1. Pattern Classification 2nd Edition By R.O. Duda, Hart, Stork (2001), John Wiley, New York.
2. Pattern Recognition: Technique and Applications By Shinghal (2006) , Oxford University Press, New Delhi.
3. Christopher M. Bishop, "Pattern Recognition and Machine Learning", Springer, 2006

COURSE OUTCOME:

On completion of the course students will be expected to:

- Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.

- Have an understanding of the strengths and weaknesses of many popular machine learning approaches.
- Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.
- Be able to design and implement various machine learning algorithms in a range of real-world applications.

CIPBTD1

Neural Networks and Deep Learning

COURSE OBJECTIVE:

- To develop the skills to gain a basic understanding of neural networks.
- To Introduce students to different artificial neural networks and learning rules to from an application perspective
- To familiar with significant technological trends in neural networks and deep learning
- To develop inclination towards research.

1. Introduction: Biological neuron, artificial neuron, biological neuron vs. artificial neuron, evolution of neural networks, basic models of artificial neural networks(ANN) : connections, learning :- supervised,unsupervised, reinforcement, activation functions, important terminology of ANN. McCulloch-Pitts neuron, linearseparability, types of neural networks,

2. Perceptron Networks: Implementation of AND gate, OR gate, NAND gate etc., **Gradient descent algorithm**, implementation of AND gate, OR gate, NAND gate etc., Building a neural controller for obstacle avoidance, Pseudo inverse solution, nonlinear separability. **Back propagation (BP) networks:**Derivation of BP algorithmfor single hidden layer architecture, momentum terms, implementation of XOR problem using BPalgorithm.Modifiedmultilayer neural network, modified Back propagation (BP) algorithm

3. Other Neural network architectures:Radial basis function neural network (RBFNN): architecture, training algorithm, Implementation of XOR problem using RBF, Functional link artificial neural networks (FLANN): architecture, training, delta learning rule, Extreme Learning Machine (ELM): architecture, learning algorithm, Recurrent neural network (RNN): architecture, training algorithm, Back propagation through time (BPTT). Real time recurrent learning algorithm (RTRL), Self-organizingmap (SOP).

4. DeepLearning: Introduction, Long short term memory (LSTM) network, Convolution neural network, Boltzman Machine network.

5. Applications: function optimization, classification, prediction, detection.

Readings:

1. Neural Networks and Learning machines by Simon Haykin, PHI, 3rd Edition
2. Neural Network Design by M. Hagan, 2nd Edition, eBook

3. Principles of Soft Computing by S. N. Shivanandam and S. N. Deepa, Wiley, 2nd Edition
4. Artificial neural networks by B. Yegnanarayana, PHI.
5. Deep Learning by John D. Kelleher, MIT Press.
6. Neural networks and Deep learning by Charu C. Aggarwal, Springer, 1st Edition, 2018.

COURSE OUTCOME:

Students will able

- Build, train and apply neural networks for different applications
- Identify the key parameters of the neural network architectures.
- Understand the capabilities, challenges and consequences of deep learning.
- Gain the knowledge and skill to apply neural networks and deep learning in various real life problems.
- Level up his/her technical career, and take the definitive step in the world of AI.

CIPBTD2 Web Technology

COURSE OBJECTIVE:

- To understand, analyze and apply the role languages like HTML, CSS, XML, JavaScript and protocols in the workings of web and web applications.
- To understand about programming and know about the application of dynamic page functionality in web pages using CGI, JSP, and ASP.
- To create and communicate between client and server and create a good, effective and dynamic website.

1 Internet Concept: Fundamental of Web ,History of Web, Web development overview, Domain NameSystem (DNS),DHCP,and SMTP and other servers ,Internet service provider (ISP), Concept of IP Address, Internet Protocol, TCP/IP Architecture ,Web Browser and Web Server.

2. HTML and DHTML:- HTML Tag, Rules of HTML, Text Formatting and Style, List, Adding Graphics toHTML Document, Tables and Layout , Linking Documents, Frame,

Forms, Project in HTML, Introduction to DHTML, CSS, Class and DIV, External Style Sheet.

3. **Scripting Languages:** Java Script (JS) in Web Page, Advantage of Java Script, JS object model and hierarchy, Handling event, Operators and syntax of JS, JS Function, Client side JS Vs Server side JS, JS security, Introduction to VB Script, Operator and Syntax of VB Script, Dialog Boxes, Control and Loop, Function in VBS.

4. **XML:** Introduction to XML, XML in Action, Commercial Benefits of XML, Gaining Competitive advantage with XML, Programming in XML, XML Schema, XSLT, DOM structure model, XML queries and transformation.

5. **Active Server Page (ASP):** Introduction, Internet Information System (IIS), ASP object, Server object, Filesystem object, session, Accessing data base with an ASP page, ODBC – ADO connection object, common methods and properties, ADO record set object. Introduction to ASP.Net.

References:

1. The complete Reference By Thomas A. Powell, TMH publication
2. Web Technology: A Developers Perspective, N.P. Gopalan, J. Akilandeswani, PHI Publication.
3. Java Script : The definite Guide By Flanagan, O'Reilly
4. Java Script: Developers Resource by Kamran Husain and Jason Levitt PTR-PHI publication.
1. "Mastering VB Script" BPB Publication.
2. World Wide Web design with HTML by Xavier Tata McGraw Hill Publication.
3. XML By Example, Sean Mc Grath Pentice Hall Publication.
4. Web Technology : A Developments Perspective, N.P. Gopalan, J. Akilandeswari, PHI Publication

COURSE OUTCOME:

Student will be able to

- Select and apply markup languages for processing, identifying, and presenting of information in web pages.
- Use scripting languages to transfer data and add interactive components to web pages

CIPBTT3

Research Methodology

COURSE OBJECTIVE:

This course is designed to enable students to:

- Identify and discuss the role and importance of research in the field of sciences.
- Identify and discuss the issues and concepts salient to the research process.
- Identify and discuss the complex issues inherent in selecting a research problem, selecting an appropriate research design, and implementing a research project.
- Identify and discuss the concepts and procedures of sampling, data collection, analysis and reporting.

UNIT I –RESEARCH FORMULATION AND DESIGN: Motivation and objectives – Research methods vs. Methodology. Types of research – Descriptive. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, concept of applied and basic research process, criteria of good research. Defining and formulating the research problem, selecting the problem, necessity of defining the problem, importance of literature review in defining a problem, literature review-primary and secondary sources, reviews, monograph, patents, research databases, web as a source, searching the web, critical literature review, identifying gap areas from literature and research database, development of working hypothesis.

UNIT II – DATA COLLECTION AND ANALYSIS: Accepts of method validation, observation and collection of data, methods of data collection, sampling methods, data processing and analysis strategies and tools, data analysis with statically package (Sigma STAT, SPSS for student t-test, ANOVA, etc.), hypothesis testing.

UNIT III –RESEARCH ETHICS, IPR AND SCHOLARY PUBLISHING: Ethics-ethical issues, ethical committees (human & animal); IPR- intellectual property rights and patent law, commercialization, copy right, royalty, trade related aspects of intellectual property rights (TRIPS); scholarly publishing- IMRAD concept and design of research paper, citation and acknowledgement, plagiarism, reproducibility and accountability.

UNIT IV –INTERPRETATION AND REPORT WRITING: Meaning of Interpretation, Technique of Interpretation, Precaution in Interpretation, Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports, Conclusions.

References:

1. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to

- Research Methodology, RBSA Publishers.
2. Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International. 418p.
 3. Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, EssEssublications. 2 volumes.
 4. Trochim, W.M.K., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing. 270p.

COURSE OUTCOME:

Students who successfully complete this course will be able to:

- Explain key research concepts and issues
- Read, comprehend, and explain research articles in their academic discipline.
- Demonstrate the ability to choose methods appropriate to research aims and objectives
- Understand the limitations of particular research methods
- Develop skills in qualitative and quantitative data analysis and presentation
- Develop advanced critical thinking skills
- Demonstrate enhanced writing skills
- Describe the appropriate statistical methods required for a particular research design
- Choose the appropriate research design and develop appropriate research hypothesis for a research project
- Develop an appropriate framework for research studies

SEMESTER-III

CIPCTT1

Computer Graphics and Multimedia

COURSE OBJECTIVE:

- To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.
- To learn the basic principles of 3-dimensional computer graphics.
- To provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the Picture definition.
- To provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections.

1. **Fundamentals of Computer Graphics:** Concepts and applications, Random and Raster scan devices, input-output devices: CRT, LCD, laser printer. Output primitives: Line drawing algorithm: DDA and Bresenham's; Circle generating algorithm: Bresenham's Midpoint algorithms, Ellipse: midpoint ellipse drawing algorithm. Antialiasing techniques: super sampling, pixel weighting, area sampling, pixel phasing Area filling: boundary fill algorithm, flood fill algorithm: Scan-line Polygon Fill Algorithm.

2. **Transformation, viewing, Clipping: 2-D Transformation:** Translation, scaling, rotation, reflection, shear, matrix representation of all homogeneous coordinates, composite transformations. Two dimensional viewing: Viewing pipeline Window-to-view port transformation. Clipping operations: Line Clipping: Cohen Sutherland and Liang-barsky, Polygon Clipping: Cohen Sutherland-Hodgeman and Weiler – Atherton Polygon clipping.

3. **3D Transformation, Visible Surface Detection and curves:** Visible Surface detection Algorithm: Object based and image based methods, depth comparison, A-Buffer, Back face removal, Scan-line method, Depth Sorting Method Area subdivision method. 3-D Transformation: translation, scaling, rotation, reflection. Three-dimensional object representations 3-D Viewing Projections – parallel and perspective projection. Curved lines and Surfaces: Spline representations, Interpolating and approximation curves, continuity conditions Bezier curves: concept and characteristics; B-Spline curves: concept and characteristics.

4. **Color Models and Basic Concept of Animation:** Introduction of multimedia: Properties and applications, types of medium, data stream characteristics, Basic File and Data format: BMP, JPEG, GIF, TIFF. Color models: RGB, YIQ, CMY, HSV. Animation:

Basic concept, animation languages, computer-based animation, methods of controlling animation, display of animation, animation techniques: onion skinning, motion cycling, masking, morphing, and transmission of animation, Multimedia Authoring tools.

5. **Multimedia Systems:** Data compression: storage space, coding requirements. Source, entropy and hybrid coding some basic compression technique: runlength code, Huffman code. JPEG: Image preparation, Lossy sequential DCT –based mode, expanded Lossy DCT based mode, Lossless mode, and hierarchical mode. MPEG, Huffman Encoding, LWZ compression.

Readings:

1. Principles of interactive computer Graphics; W.M. Newman & Robert F Sproull.
2. Computer Graphics By Rogers TMH
3. Introduction to Computer Graphics Anirban Mukhopadhyay & Arup Chattopadhyay
4. Schaum's outlines -computer Graphics Mc Graw Hill International Edition.5
5. Principles of Multimedia by Ranjan Parekh TMH
6. "Multimedia Systems Design", P. K. Andleigh & K. Thakrar, Prentice Hall Pvt. Ltd

COURSE OUTCOME:

Students will be able to:

- To describe the general software architecture of programs that use 3D computer graphics.
- To discuss hardware system architecture for computer graphics.
- To use a current 3D graphics API (e.g., OpenGL or DirectX).
- To use the underlying algorithms, mathematical concepts, supporting computer graphics.

CIPCTT2

Compiler Design

COURSE OBJECTIVE:

- To understanding the fundamental principles in compiler design
- To make the student to understand the process involved in a compiler, create an overall view of various types of translators, linkers, loaders, and phases of a compiler.
- To understand syntax analysis, various types of parsers especially the top down approach, awareness among students the various types of bottom up parsers, understand the syntax analysis and, intermediate code generation, type checking, the role of symbol table and its organization, Code generation, machine independent code optimization and instruction scheduling.

1. **Basics of Compilers and Lexical Analysis:** Compilers and Translators, Bootstrap compiler, Phases of Compiler, Compiler writing tools, Bootstrapping, Overview of one pass compiler, Finite Automaton, Basics of DFA, NFA, Regular sets and Regular expressions.

2. **Syntax analysis & Parsing techniques:** Basics of context free grammars and derivation of parse trees, Top down parsing and its implementation, Operator precedence parsing, Predicative top down parser, Bottom up parsing, Handling of right sentential form, LR parser, Canonical collection of sets, Construction of parsing action and GOTO table, Construction of LALR parsing table, Handling ambiguous grammar.

3. **Syntax directed definition and Translation:** L-attributed definition, Syntax directed translation scheme, Intermediate code generation, Representing three address statements, Syntax directed translation scheme to specify the translation of various programming language construct, Implementing increment and decrement operators, Array reference, Switch/case.

4. **Symbol table management & Error Handling:** Various approaches to symbol table organization, Representation of scope information in symbol table, Storage allocation activation of procedure and record, Static allocation and stack allocation. Error recovery, Error recovery in LR parsing, Predicative parsing error recovery.

5. **Code Optimization and Code Generation :** Introduction, Loop optimization, Eliminating induction variable, Eliminating local common sub expression, DAG, Eliminating global common sub expression, loop unrolling, loop jamming, Problems hindering code generation, Straightforward code generation, Using DAG for code generation, Peephole optimization.

References:

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman. "Compilers Principles, Techniques and Tools". Pearson Education, 2008.
2. O.G.Kakde, "Compiler Design", 2005, Laxmi Publication.
3. AdeshK.Pandey, "Concepts of Compiler Design", First Edition, S.K.Kataria&SonsPublication.
4. Steven S. Muchnick, "Advanced Compiler Design Implementation", Morgan Koffman, 1997.
5. AllenHolub, "Compiler Design in C", Prentice Hall of India

COURSE OUTCOME:

Student must be able

- To understand major concept areas of language translation and compiler design
- To develop an awareness of the function and complexity of compilers.
- To provide practical, hands on experience in compiler design
- To Identify the similarities and differences among various parsing techniques and grammar transformation techniques

CIPCTD1

Data Mining and Data Warehousing

COURSE OBJECTIVE:

- To introduce students to basic applications, concepts, and techniques of data mining.
- Understand and implement classical models and algorithms in data warehouses and data mining
- Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering
- Master data mining techniques in various applications like social, scientific and environmental context
- Develop skill in selecting the appropriate data mining algorithm for solving practical problems.
- To gain experience doing independent study and research.

1. **Data Mining:** Meaning, necessity, steps, Normal searching Vs. knowledge extraction

2. **Data Mining on different types of databases:** Relational, Data Warehouses, Transactional, Objectoriented, Object relational, Spatial, Temporal and time series, Text and multimedia, Heterogeneous and legacy.

3. **Data Warehouse:** Meaning, definition, OLTP vs. OLAP, Data cube, star schema, snow flakeschema, fact constellations, basic concepts in writing of DMQL, Three Tier Architecture of data warehouse, data mart, Indexing.

4. **Data Preprocessing:** Data cleaning, Data integration, Chi-square test, Data transformation, Data reduction, Dimensionality reduction: Principal component analysis (PCA), factor analysis (FA), Data compression: discrete Fourier Transform (DFT), discrete cosine transform (DCT), discrete Wavelet transform (DWT).

5. **Classification, Clustering and Prediction:** Meaning, k-nearest neighbourhood (k-NN), neural network based classification, Support vector machine (SVM) classifier, Naïve Bayes classifier and Decision tree. Performance measures of classification :confusion matrix, accuracy, F1 score, specificity, sensitivity, ROC and AUC. Clustering: types of variables, distance measures, types of Clustering, Partitioning Method: k-means, k-medoid clustering, unsupervised: Hierarchical clustering, DBSCAN, Prediction using Regression, nonlinear regression and Neural Network, Performance Measures for prediction. Types of training: holdout method, cross validation, leave-one-out method.

6. **Association rule mining:** Market basket analysis, support, confidence, Apriori algorithm with an example.

Readings:

1. Data Mining: Concepts and Techniques, Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishes (Elsevier, 2nd edition), 2006

2. Data Mining Methods for Knowledge Discovery, Cios, Pedrycz, Swiniarski, Kluwer Academic Publishers, London – 1998.

COURSE OUTCOME:

After successfully completing the course students will be able to

- Understand the functionality of the various data mining and data warehousing component
- Appreciate the strengths and limitations of various data mining and data warehousing models
- Explain the analyzing techniques of various data
- Describe different methodologies used in data mining and data warehousing.
- Compare different approaches of data warehousing and data mining with various technologies.

CIPCTD2

Network Security

COURSE OBJECTIVE:

- The main goal of this course is to enable the students to develop the necessary skills for developing robust & high performance scalable network applications.
- To learn about raw sockets and socket programming.
- To understand simple network management protocols and basics of TCP & UDP sockets.
- To understand the principles and practices of cryptography and network security
- To understand the practical applications that have been implemented and are in use to provide network Security

1. **Foundations of Cryptography and security:** Security trends, The OSI Security architecture, Security attack, services and mechanism, Ciphers and secret messages, Mathematical tools for cryptography: substitution techniques, modular arithmetic, Euclid's algorithm, finite fields, polynomial arithmetic.

2. **Symmetric Cipher:** Symmetric cipher model, Design Principles of Block Ciphers, Theory of Block Cipher Design, Feistel cipher network structure, Data Encryption Standard (DES), Strength of DES, Triple DES, Modes of operation. Advance encryption Standard (AES)- Evaluation criteria of AES, AES cipher, key distribution.

3. **Public Key cryptography and Hash function:** Prime numbers and testing for primality, factoring large numbers, Principles of public key cryptosystem, RSA algorithm. Key management: Diffie-Hellman, Key exchange, Hash and Message authentication Code (MAC), Hash and MAC algorithms, Digital signature.

4. **IP and Web security protocols:** Authentication application: Kerberos, Public key infrastructure. E-mail: Pretty Good Privacy (PGP), S/MIME. IP security, Web Security: Secure Socket layer (SSL) and Transport layer security, Secure Electronic Transaction (SET).

5. **System Security:** Firewall, and Intrusion Detection system (IDS), Malicious Software.

Readings

1. Cryptography and Network Security By William Stallings, 4th Edition Pearson Publication
2. Applied cryptography - protocols and algorithm By Bruce Schneier, Springer Verlag 2003

3. Cryptography and Network Security By AtulKahate , TMH Publication.
4. Cryptography and Network Security By Behrouz A. Forouzan, First Edition, TMH Publication.
5. Network Security:Private Communication in Public World By Charlie Kaufman,RadiaPerlmanand Mike Speciner ,PHI Publication.

COURSE OUTCOME:

After successful completion of the course, students will be

- Familiar with protocols, network interfaces, and Design/performance issues in local area networks and wide area networks.
- Familiar with basics of Socket and Socket programming.
- Familiar with contemporary issues in networking technologies.
- Familiar with network tools and network programming.
- Familiar with client server programming, Conventional encryption algorithms for confidentiality and their design principles, Public key encryption algorithms and their design principles
- Able to use of message authentication codes, hash functions , digital signature and public key certificates

OPEN ELECTIVE

OPEN ELECTIVE-1- (CIPCTO1)

Linux operating System and Shell Programming

COURSE OBJECTIVE:

The objective of this course is to understand and make effective use of linux utilities and shell scripting language to solve problems. It also implement in C some standard linux utilities like MV,CP,LS etc. and develop the skills the necessary for systems programming including file system.

1. **INTRODUCTION TO LINUX:** History, The Linux Architecture, Features of Linux, Internal and External Commands, Command Structure, difference between Linux and Unix, various Linux distributions, basic commands. **UTILITIES:** file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, Text processing utilities and backup utilities, Security commands. The vi editor, security by file Permissions.

2. **INTRODUCTION TO SHELLS:** Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell Edition Environment Customization. Filters. **GREP:** Operation, grep Family, Searching for File Content. **SED:** Scripts, Operation, Addresses, commands, Applications. **AWK:** Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications.

3. **INTERACTIVE KORN SHELL:** Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, Options, Startup Scripts, Command History, Command Execution Process. **KORN SHELL PROGRAMMING:** Basic Script concepts, Expressions, Decisions Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

4. **INTERACTIVE C SHELL:** C shell features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, On-Off Variables, Startup and Shutdown Scripts, Command History, Command Execution Scripts. **C SHELL PROGRAMMING:** Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

5. FILE MANAGEMENT: File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask.

References:

1. Sumitabha Das, “Unix Concepts and Applications”, 4th Edition. TMH, 2006. (1, 2 units)
2. Behrouz A. Forouzan, Richard F. Gilbery, “Unix and shell Programming”, 1st Edition, Cengage Learning India, 2003.
2. Beginning Linux Programming, 4th Edition, N. Matthew, R. Stones, Wrox, Wiley India Edition.
3. Graham Glass, King Ables, “Unix for programmers and users”, 3rd Edition, Pearson Education, 2009.
5. N.B Venkateswarlu, “Advanced Unix programming”, 2nd Edition, BS Publications, 2010.
6. Yashwanth Kanitkar, “Unix Shell programming”, 1st Edition, BPB Publisher, 2010.
7. Linux: Complete Reference, 6th Edition, Richard Petersen, Tata McGraw-Hill

COURSE OUTCOMES:

The student will be

- Able to understand the basic commands of linux operating system and can write shell scripts.
- Able to create file systems and directories and operate them.
- Able to work on file management system with file management commands.

OPEN ELECTIVE-II(CIPCTO2)

Relational Data Base Management System

COURSE OBJECTIVE:

The objective of this course work is to understand and uses of the basic concept of database management system. This course explores how to update database content with SQL and transaction handling.

1. **Overview of Database Management** :Data, Information and knowledge, Increasing use of data as a corporate resource, data processing verses data management, file oriented approach verses database oriented approach to data management; data independence, database administration roles, DBMS architecture, different kinds of DBMS users, importance of data dictionary, contents of data dictionary, types of database languages. Data models: network, hierarchical, relational. Introduction to distributed databases.

2. **Relational Model**: Entity - Relationship model as a tool for conceptual design-entities attributes and relationships. ER diagrams; Concept of keys: candidate key, primary key, alternate key, foreign key; Strong and weak entities, Case studies of ER modeling Generalization; specialization and aggregation. Converting an ER model into relational Schema. Extended ER features.

3. **Structured Query Language** :Relational Algebra: select, project, cross product different types of joins(inner join, outer joins, self join); set operations, Tuple relational calculus, Domain relational calculus, Simple and complex queries using relational algebra, stand alone and embedded query languages, Introduction to SQL constructs (SELECT...FROM, WHERE... GROUP BY... HAVING...ORDERBY...), INSERT, DELETE, UPDATE, VIEW definition and use, Temporary tables, Nested queries, and correlated nested queries, Integrity constraints: Not null, unique, check, primary key, foreign key, references, Triggers. Embedded SQL and Application Programming Interfaces.

4. **Relational DatabaseDesign**: Normalization concept in logical model; Pitfalls in database design, update anomalies: Functional dependencies, Join dependencies, Normal forms (1NF, 2NF, 3NF). Boyce Codd Normal form, Decomposition, Multi-Valued Dependencies, 4NF, 5NF. Issues in physical design; Concepts of indexes, File organization for relational tables, De-normalization.

5. **Introduction to Query Processing and Protecting the Database & Data Organizations**: Parsing, translation, optimization, evaluation and overview of Query

Processing. Protecting the Data Base -Integrity, Security and Recovery. Domain Constraints, Referential Integrity, Assertion, Triggers, Security& Authorization in SQL.

References:

1. Database system concept By H. Korth and A. Silberschatz, TMH.
2. Data Base Management System By Alexies&Mathews ,Vikas publication.
3. Data Base Management System By C. J. Date ,Narosha Pub.

COURSE OUTCOME:

The students will be

- Able to learn about database models.
- Able to learn how to write simple as well as complex queries for retrieving data from database
- Able to learn how to update, insert and delete data.
- Able to Learn about functions and procedure and gain understanding on different Views
- Able to learn how to work with Triggers and design a database
- Able to learn how to ensure integrity related to multiple an related database updates.

OPEN ELECTIVE-III(CIPCTO3)

Data Structure using C

COURSE OBJECTIVE:

The objective of this course is to understand the basic concepts of data structures and algorithms with C programming. This course describe the concept and application of stack, Queues, Trees and Graphs, It also explores the concepts about searching and sorting techniques.

1. **Introduction to Data Structures:** Definition of Data structure and Abstract data type. Basics of Algorithm. Classification of Data structures: Linear, Non-linear. Arrays: Definition & types of array, Memory representation of one & two dimensional array, Operations on DS. Linked List: Singly Linked list- Operation on it; doubly linked list- Operation on it; Circular linked list - Operation on it. Overview of C, loops, Functions: call by value and call by reference, Recursive function. Structure: Structure and applications of Structure in various DS. Pointer and applications of Pointer in dynamic memory allocation.

2. **Stacks, Queues:** Stacks; Array representation of stack; Linked representation of stack; Various polish notation's-Prefix, Postfix, infix; Evaluation of a postfix & Prefix expression; Conversion from one another; Application of stack; Queues; Linked representation of queues; Dqueues; Circular queue; Priority queue.

3. **Trees:** Binary trees; Types of binary tree Representation of binary tree in memory; traversing binary tree; Binary search trees; Searching and inserting in binary search trees; Deleting in a binary search, tree; AVL search trees and operation on it . B trees: searching, insertion, deletion; Heap.

4. **Graphs :** Terminology & representation; Warshall algorithm; Shortest path; Minimum spanning tree; Kruskal & Dijkstra algorithm; Linked representation of graph; Operation on graph; Traversing a graph.

5. **Searching and Sorting:** Searching algorithm: linear search, binary search; sorting algorithms: Bubblesort, Insertion sort, Selection sort, Quick Sort, Merge sort and Heap sort.

References:

1. Programming in C "Yashwant Kanetkar", BPB Publications, Tenth Edition.
2. The C Programming Language "Kemigham and Ritchie [Prentice Hall]"
3. Data Structure By Lipshutz, McGraw Hill.
4. Data Structure By Standish, Addison-Wesley.
5. Data structures Through C by G. S. Baluja.

COURSE OUTCOME:

The students will

- Be able to analyze algorithms and algorithm correctness.
- Have the ability to describe and their application of stack, queue graph and tree operation.
- Be able to use of searching and sorting techniques in different fields.

OPEN ELECTIVE-IV(CIPCTO4)

Introduction to Information Technology

COURSE OBJECTIVE:

The objective of this course work is to provide basic concept of computer and its application. This course is also designed to familiar with a number of utility software, programming languages, basic concept of networking and overview of latest IT trends and technology.

1. **Introduction-** Basics concept of IT, Concept of data and information, Generations and Classification of Computers, Organization of computers: CPU, Memory, Input and Output devices, File organizations.

2. **Software and Computer Languages-** Software, Types of software: System software, Application software, Utility software, Firmware. Generations and Types of Programming Languages, Programming Paradigms: procedural oriented and object oriented programming, Computer Security.

3. **Communications and Internet-** Data communications, Analog and digital signal, Communication media, Network topology, Network categories, The OSI model and TCP/IP model, Internet addressing, Internet Service Provider (ISP), Web browsers, URL, WWW, HTTP, E-mail, File transfer, Domain Name System (DNS), Wireless technology: GPS, Wi-Fi.

4. **Applications of IT-** IT in Home, Entertainment, Business, Industry, Science, Engineering and Medicine, Online banking, Online shopping, E-Learning, E-commerce, M-Commerce, E-Government.

5. **Latest IT Trends-** Artificial intelligence, Data warehousing, Data mining, Overview of geographic information system (GIS), Cloud computing, Information and communications technology (ICT), Parallel computing, Introduction to web services.

References:

1. Fundamental of Computer 5th Edition By V. Rajaraman, PHI Publication.
2. Introduction to Information Technology by V. Rajaraman, PHI Publication.
3. Information technology today By S. Jaiswal.
4. Fundamental of IT: Leon and Leon, Leon Tec World.
5. Introduction to Information Technology by Aksoy and DeNardis, Cengage Learning.

COURSE OUTCOME:

The student will be

- Able to apply knowledge of computers and utilities of number of software that is useful for students.
- Able to analyze use of programming languages and solution of the problem using programming languages. Able to analyze the application of networking and familiar with latest trends and technology

OPEN ELECTIVE-V(CIPCTO5)

Soft Computing

COURSE OBJECTIVE:

- To develop the skills to gain a basic understanding of neural networks.
- To Introduce students to different artificial neural networks and learning rules to from an application perspective
- To familiar with significant technological trends in neural networks and deep learning
- To develop inclination towards research.

Introduction – What is soft computing? Different tools of soft computing and its comparison, area of application.

Artificial Neural Network :Overview of biological Neurosystem, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms- Supervised, Unsupervised and reinforcement Learning, ANN training Algorithms- perceptions, Training rules, Delta, Back propagation algorithm, Multilayer perceptron model, RBF (Radial basis function) neural network, Recurrent neural network, Self-Organizing Map (SOM), Introduction to convolution neural network (CNN) and deep learning.

Genetic Algorithm (GA): Basic Terminologies in Genetic Algorithms - Individuals, Genes, Fitness, Populations, Working Principle, Encoding methods, Fitness function, GA Operators- Reproduction; Crossover; Mutation, Convergence of GA, particle swarm optimization(PSO).

Fuzzy Logic – Type-1 Fuzzy logic: Basic definitions and terminology, Set theoretic operations, Membership function, Fuzzification and Defuzzification methods, Fuzzy inference System, Fuzzy rule Base, Fuzzy control system.

Reference Books:

1. Uncertain rule-based fuzzy logic systems: Introduction and new directions by Jerry M.Mendel ,Prentice Hall of India .

2. Intelligent hybrid System : Neural Network ,Fuzzy Logic and GeneticAlgorithmby Da Ruan ,Kluwer Academics publishers
3. Neural Network ,Fuzzy logic and Genetic Algorithm :Synthesis and applicationby S. Rajshekhra and G.A. Vijay Laxmi ,PHI publication.
4. Fuzzy logic with engineering applications by Timothy J Ross, Wiley Publication
5. Neural network by Simon Haykins: Prentice Hall of India.

COURSE OUTCOME:

Students will be able to

- Build, train and apply neural networks for different applications
- Identify the key parameters of the neural network architectures.
- Gain the knowledge and skill to apply neural networks in various real lifeproblems.
Level up his/her technical career, and take the definitive step in the world of AI.

CIPDPF1
MAJOR PROJECT

GUIDELINES FOR PROJECT WORK (M.Sc)

A project report has to be submitted as per the rules described. Some additional guidelines regarding the Project Report are:

Number of Copies:

The student should submit One hardbound copy of the Project Report with one RW/CD/DVD.

Acceptance / Rejection of Project Report:

The student must submit a project report to the Head of Department/Project Guide for approval. The Head of Department/Project Guide holds the right to accept the project or suggest modifications for resubmission.

Format of the Project Report :

The student must adhere strictly to the following format for the submission of the Project Report

a. Paper

The Report shall be typed on white paper, A4 size or continuous computer stationary bond, for the final submission. The Report to be submitted to the University must be original and subsequent copies may be photocopied on any paper.

b. Typing

The typing shall be of standard letter size, double-spaced and on one side of the paper only, using black ribbons and black carbons.

c. Margins

The typing must be done in the following margins

Left – 35 Right – 20

Top – 35 Bottom – 20

d. Binding

The Report shall be Rexene bound in black. Plastic and spiral bound Project Reports not be accepted.

e. Front Cover:

The front cover should contain the following details:

TOP : The title in block capitals of 6mm to 15mm letters.

CENTER : Full name in block capitals of 6mm to 10mm letters.

BOTTOM : Name of the University, year of submission- all in block capitals of 6mm to 10mm letters on separate lines with proper spacing and centering.

f. Blank Sheets

At the beginning and end of the report , two white black bound papers should be provided, one for the purpose of binding and other to be left blank.

Abstract

Every report should have an Abstract following the Institute's Certificate. The abstract shall guide the reader by highlighting the important material contained in the individual chapters, section, subsection etc.

The report should contain the following:

Certificate from Company

Institute Certificate: Successful completion of project by competent authority.

Acknowledgments

Abstract

List of

Figures

Tables

Nomenclature and Abbreviations

Contents of the Project Report

1. Company Profile (only for M.I.S. projects)
2. Introduction to the project
3. Scope of work.
4. Existing System and Need for System.
5. Operating Environment - Hardware and Software.
6. Proposed System.
 - 6.1 Objectives to be fulfilled
 - 6.2 User Requirements
 - 6.3 Requirements Determination Techniques and Systems Analysis Methods Employed.
 - 6.4 Prototyping.
 - 6.5 System Features
 - Design of Input
 - Design of Output screens and reports -
Module specifications
 - D.F.D.'s and ER's -
System flow charts -Data
Dictionary -Structure charts -
Database /File layouts -User
Interfaces -Coding system
 - Design of Control Procedures -
Design of Exception Handling
7. Testing procedures and Implementation Phases
8. Acceptance Procedure
9. Post-Implementation Review
10. User Manual
 - Menu
explanation -
User guide
 - Expected problems/errors and their solutions
11. Problems encountered
12. Drawbacks and Limitations
13. Proposed Enhancements
14. Conclusions
15. Bibliography

Annexure:

- Sample documents (manual or computer generated) -

Source code listing in a separate file
-Output reports

List of Tables:

The Contents shall be followed by a „List of Tables“ indicating the table number, table title and the corresponding page number(s). The table number shall be in decimal point notation indicating the chapter number and the table number in that chapter.

NOTE : Any reference within the text shall be given by quoting relevant number.eg: „Table5.2“

List of Figures:

The „List of Figures, shall follow the „List of Tables“ indicating the figure numbers, figure titles and corresponding page number. The figure numbers shall be in decimal point notation.

Nomenclature and Abbreviations:

The „Nomenclature and Abbreviations“ shall follow the „List of Figures“ and contain the list of symbols and abbreviations and their long names used. The nomenclature should be given for ER“s, DFD“s, STRUCTURED CHARTS, and RUN CHARTS and for all other symbols in the techniques used. The nomenclature for every technique should appear on a separate sheet. As far as possible, accepted standard symbols shall be used.

Chapter Numbering:

The Chapters shall be numbered in Arabic numerals. Section and subsections of any chapters shall be in decimal notation. All chapters shall begin on a new page. The titles for the chapters and the title shall be properly centered at the top of the page and have three spaces between them.

Company Profile:

This chapter should highlight the company details. This would be chapter 1 and should include the main stream activity of the company, the product line of the company and the details of the department where the student was working. This should not exceed two pages or 800 words.

N.B. : Only relevant for M.I.S. Projects.

Introduction:

The „Introduction“ shall highlight the purpose of project work It will also define the chapters to be followed in the Project Report.

Existing System and the Need for the System:

If there is some system already in use, then a brief detail of it must be included, to help the examiner understand the enhancements carried out by the student in the existing system. Based on this, the student should exemplify the need for the computerization should be given.

N.B. : Only where relevant.

Proposed System :

1. **Objectives** : Clearly define the objective(s) of the system in a few lines.
2. **User Requirements:** State the requirements of the use in an unambiguous manner.
3. **Requirements Determination Techniques and System Analysis Methods**

Employed:

Use the formal methods to describe the requirements of the use. Like Fact Finding Methods, Decision Analysis, Data Flow Analysis etc.

4. Prototyping : If the prototypes has been developed prior to the detailed design , then give details of the prototype.

5. System Features :

5.1 Design of Input :Inputs, Data Dictionary, Screens.

5.2 Design of Output :Outputs, Reports etc.

5.3 Design of Control Procedures : Structured charts, Module Specifications, Run charts etc.

5.4 Design of Exception Handling : Error handling and recovery procedures.

The choice of including topics in this chapter entirely depends on the student. The freedom given for this chapter is obvious. Students will be working on various types of projects. A typical M.I.S. developmentproject must include DFD"s and structured charts etc. Thus a student is allowed to employ the techniques of his/her own choice suitable to his/her work. However, there is a guideline that the student must employthe techniques taught during the M.Sc course.