Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-501	Database Management Systems	2	1	0	3	3

Objectives :-

The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

Learning Outcomes:

Upon successful completion of this course, students should be able to:
• Describe the fundamental elements of relational database management systems
• Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
• Design ER-models to represent simple database application scenarios
• Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.

UNIT-I (9 Hr.)

Basic Concepts: - DBMS Concepts and architecture, Introduction, Review of file organization techniques, Database approach v/s Traditional File accessing approach, Advantages of database systems, Data models, Schemas and instances, Data independence, Functions of DBA and designer, Entities and attributes, Entity types, Value, Sets, Key attributes, Relationships, Defining the E-R diagram of database,

UNIT-II (9 Hr.)

Data models and Relational Databases: - Various data models, Basic concepts of Hierarchical data model, Network data model, and Relational data model, Comparison between the three types of models, Relational Data models: - Domains, Tuples, Attributes, Relations, Characteristics of relations, Keys, Key attributes of relation, Relational database, Schemas, Integrity constraints, Intension and Extension,

UNIT-III (8 Hr.)

Relational Query languages & SQL: - Relational algebra and relational calculus, Relational algebra operations like select, Project, Join, Division, outer union. SQL: - Data definition in

SQL, update statements and views in SQL, QUEL & QBE, Data storage and definitions, Data retrieval queries and update statements.

UNIT-IV (7 Hr.)

Database Design:- Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and lossless join, problems with null valued and dangling tuples, multi-valued dependencies.

UNIT-V (7 Hr.)

Advance Concepts:- Introduction of Distributed databases, protection, security and integrity constraints, concurrent operation on databases, recovery and transaction processing, basic concepts of object oriented data base system and design.

References:

1. Elmasri, Navathe, “Fundamentals Of Database Systems”, Addision Wesley
2. Korth, Silbertz, Sudarshan, “Database Concepts”, McGraw Hill
3. Toledo; Data base management systems;TMH
4. Panneeselvam “Database Management System” PHI
5. Date C J, “An Introduction To Database System”, Addision Wesley
6. Ashutosh Kumar Dubey “Data Base Management Concepts” Katson Publication

Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-501	Database Management Systems	0	0	2	1	2

LIST OF EXPERIMENTS:-

1. Study of DBMS, RDBMS and ORDBMS.
2. To study Data Definition language Statements.
3. To study Data Manipulation Statements.
4. Study of SELECT command with different clauses.
5. Study of SINGLE ROW functions (character, numeric, Data functions).
6. Study of GROUP functions (avg, count, max, min, Sum).
7. Study of various type of SET OPERATORS (Union, Intersect, Minus).
8. Study of various type of Integrity Constraints.
9. Study of Various type of JOINS.
10. To study Views and Indices.

Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-502	Computer Graphics	2	1	0	3	3

Objectives :-

This course will introduce students to all aspects of computer graphics including hardware, software and applications. Students will gain experience using a graphics application programming interface (OpenGL) by completing several programming projects.

Learning Outcomes:

At the end of this course students should:

Have a basic understanding of the core concepts of computer graphics.
Be capable of using OpenGL to create interactive computer graphics.
Understand a typical graphics pipeline.
Have made pictures with their computer

UNIT–I (9 Hr.)

Introduction and Overview of Graphics Systems:- Introduction to Computer Graphics, Application area of Computer Graphics, Introduction to Raster scan & Random scan displays, refreshing, flickering, interlacing, colour monitors, display processors resolution, working principle of dot matrix, inkjet laser printers, working principles of keyboard, mouse scanner, digitizing camera, track ball, tablets and joysticks, graphical input techniques etc.

UNIT–II (7 Hr.)

Scan conversion techniques, image representation, line drawing, simple DDA, Bresenham's Algorithm, Circle drawing, general method, symmetric DDA, Bresenham's Algorithm, curves, parametric function, Beizier Method, B-spline Method.

UNIT–III (9 Hr.)

2-D Transformation: - Translation, Rotation, Scaling, Shearing, Reflection, Inverse Transformation, Homogenous coordinate system, Matrices Transformation, Composite Transformation. Windowing & Clipping:- World Coordinate System, Screen Coordinate System, Viewing Transformation, Line Clipping & Polygon Clipping Algorithms

UNIT–IV (7 Hr.)

3-D Transformations: - Translation, Rotation and Scaling, Parallel & Perspective Projection:- Types of Parallel & Perspective Projection, Hidden Surface elimination:- Depth comparison, Back face detection algorithm, Painter's Algorithm, Z-Buffer Algorithm, Curve generation,

Bezier and Bspline methods. Basic Illumination Model:- Diffuse reflection, Specular reflection, Phong Shading, Gouraud shading, Ray Tracing, Color models like RGB, YIQ, CMY, HSV.

UNIT–V (8 Hr.)

Multimedia :- Characteristics of a multimedia presentation, Uses of Multimedia, Text:– Types, Unicode Standard, text Compression, Text file formats, Audio Components of an audio system, Digital Audio, Digital Audio processing, Sound cards, Audio file formats, Audio Processing software, Video: -Video color spaces, Digital Video, Digital Video processing, Video file formats. Animation:- Uses of Animation, Principles of Animation, Computer based animation, 3D Animation, Animation file formats, Animation software's.

REFERENCES:-

1. Rogers, "Procedural Elements of Computer Graphics", Tata McGraw Hill

2. Donald Hearn and M.Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003

Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-502	Computer Graphics	0	0	2	1	2

LIST OF EXPERIMENTS:-

1. To implement Bresenham‟s algorithms for circle and ellipse drawing.

2. Program for Line Drawing using Bresenham‟s algorithm using C and OpenGL.

3. To perform 2D Transformations such as translation, rotation, scaling, reflection and sharing.

4. To implement Cohen–Sutherland 2D clipping and window–viewport mapping.

5. To perform 3D Transformations such as translation, rotation and scaling.

6. To visualize projections of 3D images and Hidden Surface Elimination.

7. To convert between color models.

8. To implement text compression algorithm.

9. Program to implement basic graphics primitives in OpenGL.

10. Program for Line Drawing using DDA algorithm using C and OpenGL

Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-503	PHP TECHNOLOGY	2	1	0	3	3

Objectives: -

The main objective of this course is to introduce the major concept areas of language translation and compiler design and to develop an awareness of the function and complexity of modern compilers. This course is a study of the theory and practice required for the design and implementation of interpreters and compilers for programming languages.

Learning Outcomes:

At the end of the course, students will have basic understanding of the web technology and be able to architect, write, debug, and run complete web applications using PHP and MySQL.

UNIT-I (8 Hr.)

Introduction to PHP: Evaluation of Php, Basic Syntax, Defining variable and constant, Php Data type, Operator and Expression. Handling HTML Form With PHP: Capturing Form Data, Dealing with Multi-value filed, Generating File uploaded form , Redirecting a form after submission.

UNIT-II (8 Hr.)

Decisions and loop: Making Decisions, Doing Repetitive task with looping, Mixing Decisions and looping with Html. Function: What is a function, Define a function, Call by value and Call by reference, Recursive function.

UNIT-III (8 Hr.)

String: Creating and accessing String, Searching & Replacing String, Formatting String, String Related Library function. Array: Anatomy of an Array, Creating index based and Associative array, Accessing array Element, Looping with Index based array, Looping with associative array using each() and for each(), Some useful Library function.

UNIT-IV (8 Hr.)

Working with file and Directories: Understanding file& directory, Opening and closing a file, Coping, renaming and deleting a file, Working with directories, Building a text editor, File Uploading & Downloading. State management: Using query string(URL rewriting), Using Hidden field, Using cookies, Using session.

UNIT-V (8 Hr.)

String matching with regular expression: What is regular expression, Pattern matching in

Php, Replacing text, Splitting a string with a Regular Expression. Generating Images with PHP: Basics of computer Graphics, Creating Image, Manipulating Image, Using text in Image.

REFERENCES:

1. Learning PHP, MySQL, books by „ O‟ riley Press.

2. PHP & MySQL: Novice to Ninja by Kevin Yank.

3. PHP for the Web: Visual QuickStart Guide (4th Edition) by Larry Ullman.

Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-503	PHP TECHNOLOGY	0	0	2	1	2

List of experiments:

1. Write a PHP program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.
2. Write a PHP program to display a digital clock which displays the current time of the server.
3. Write the PHP programs to do the following: a. Implement simple calculator operations. b. Find the transpose of a matrix. c. Multiplication of two matrices. d. Addition of two matrices.
4. Write a PHP program named states.py that declares a variable states with value "Mississippi Alabama Texas Massachusetts Kansas".
5. write a PHP program that does the following: a. Search for a word in variable states that ends in xas. Store this word in element 0 of a list named states List. b. Search for a word in states that begins with k and ends in s. Perform a case insensitive comparison. Store this word in element1 of statesList. c. Search for a word in states that begins with M and ends in s. Store this word in element 2 of the list. d. Search for a word in states that ends in a. Store this word in element 3 of the list.
6. Write a PHP program to sort the student records which are stored in the database using selection sort

Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-504(A)	Formal Language & Automata Theory	3	1	0	4	4

Objectives: -

The main objective of this course is to introduce the major concept areas of language translation and and to develop an awareness of the function and complexity of modern compilers. This course is a study of the theory and practice required for the design and implementation of interpreters and compilers for programming languages.

UNIT – I (8 Hr.)

Introduction of the theory of computation, Finite state automata– description of finite automata,properties of transition functions, Transition graph, designing finite automata, FSM, DFA, NFA, 2-way finite automata, equivalence of NFA and DFA, Mealy and Moore machines.

UNIT – II (8 Hr.)

Regular grammars, regular expressions, regular sets, closure properties of regular grammars, Arden‟s theorem, Myhill-Nerode theorem, pumping lemma for regular languages, Application of pumping lemma, applications of finite automata, minimization of FSA.

UNIT – III (8 Hr.)

Introduction of Context Free Grammar, derivation trees, ambiguity, simplification of CFGs, normal forms of CFGs, Chomsky Normal Form and Greibach Normal forms, Pumping lemma for CFLs, Decision algorithms for CFGs, Designing CFGs, Closure properties of CFL‟s.

UNIT – IV (8 Hr.)

Introduction of PDA, formal definition, closure property of PDA, examples of PDA, Deterministic Pushdown Automata, NPDA, conversion PDA to CFG, conversion CFG to PDA.

UNIT – V (8 Hr.)

Turing machines: basics and formal definition, language acceptability by TM, examples of TM, variants of TMs: multitape TM, NDTM, Universal Turing Machine, offline TMs, equivalence of single tape and multitape TMs. Recursive and recursively enumerable languages, decidable and undecidable problems – examples, halting problem, reducibility. Introduction of P, NP, NP complete, NP hard problems and Examples of these problems.

REFERENCES:

1. Hopcroft & Ullman "Introduction to Automata theory, languages & Computation" , Narosha Publishing house.
2. Lewish Papadimutrau "Theory of Computation" , Prentice Hall of India, New Delhi.
3. Peter linz, "An Introduction to formal language and automata", Third edition, Narosa publication.
4. Marvin L. Minskay "Computation : Finite & Infinite Machines", PHI.
5. Mishra & Chander Shekhar "Theory of Computer Science (Automate, Language & Computations), PHI.

Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA- 504(B)	SIMULATION & MODELING	3	1	0	4	4

Objectives: -

The aim of this course is to introduce various system modelling and simulation techniques, and highlight their applications in different areas. It includes modelling, design, simulation, planning, verification and validation. After learning the simulation techniques, the students are expected to be able to solve real world problems which cannot be solved strictly by mathematical approaches. This course begins by demonstrating the usefulness of simulation as a tool for problem solving in business, industry, government, and society.

Learning Outcomes:

• Knowledge and understanding

Understand different methods for random number generation
Have a clear understanding of the need for the development process to initiate the real problem.
Have a clear understanding of principle and techniques of simulation methods informed by research direction.

• Cognitive skills (thinking and analysis)

(a) Be able to describe the components of continuous and discrete systems and simulate them.

(b) Be able to model any system from different fields

(c) Be able to implement numerical algorithm to meet simple requirements, expressed in English.

(d) Be able to discuss the simulation methods and select the suitable technique on the problems.

UNIT-I (9 Hr.)

Introduction to Modelling and Simulation: Nature of Simulation Systems, Models and Simulation, Continuous and Discrete Systems, system modelling, concept of simulation, Components of a simulation study, Principles used in modelling, Static and Dynamic physical

models, Static and Dynamic Mathematical models, Introduction to Static and Dynamic System simulation, Advantages, Disadvantages and pitfalls of Simulation.

UNIT-II (8 Hr.)

System Simulation and Continuous System Simulation: Types of System Simulation, Monte Carlo Method, Comparison of analytical and Simulation methods, Numerical Computation techniques for Continuous and Discrete Models, Distributed Lag Models, Cobweb Model, Continuous System models, Analog and Hybrid computers, Digital-Analog Simulators, Continuous system simulation languages, Hybrid simulation, Real Time simulations.

UNIT –III (8 Hr.)

System Dynamics & Probability concepts in Simulation: Exponential growth and decay models, logistic curves, Generalization of growth models, System dynamics diagrams, Multi segment models, Representation of Time Delays. Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform Continuously Distributed Random Numbers, Rejection Method.

UNIT-IV (8 Hr.)

Simulation of Queueing Systems and Discrete System Simulation: Poisson arrival patterns, Exponential distribution, Service times, Normal Distribution Queuing Disciplines, Simulation of single and two server queue, Application of queuing theory in computer system, Discrete Events, Generation of arrival patterns, Simulation programming tasks, Gathering statistics, Measuring occupancy and Utilization , Recording Distributions and Transit times.

UNIT-V (7 Hr.)

Introduction to Simulation languages and Analysis of Simulation output GPSS: Action times, Succession of events, Choice of paths, Conditional transfers, program control statements, SIMSCRIPT: Organization of SIMSCRIPT Program, Names & Labels, SIMSCRIPT statements, Estimation methods, Relication of Runs, Batch Means, Regenerative techniques, Time Series Analysis, Spectral Analysis and Autoregressive Processes.

REFERENCES:

1. Gorden G., System simulation, Prentice Hall.

2. Seila, Simulation Modeling, Cengage Learning.

3. Law .,Simulation Modeling And Analysis, McGraw Hill.

4. Deo, System Simulation with Digital Computer, PHI.

5. Harrington, Simulation Modeling methods, McGraw Hill.

6. Severance, " System Modeling & Simulation, Willey Pub.

Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA- 505(A)	E-COMMERCE & GOVERNANCE	3	1	0	4	4

Objectives: -

The main objective of this course are to :-

Examine the different definitions of e-commerce and e-governance
Describe major players in e-commerce
Explain the key drivers of e-commerce
Attempt a classification of e-commerce
Mention the role played by governments in the development of e-commerce
Examine the prerequisites for e-governance
Identify the skills needed for the successful functioning of e-governance
Describe the different models of e-governance

Learning Outcomes:

On completing this module, you should know clearly the meaning of the terms E-commerce and E-governance. You should also be aware of the various e- governance initiatives in India. You also need to have an idea of the role libraries, especially public libraries, can play in such initiatives.

UNIT-I (8 Hr.)

Introduction to e-commerce: History of e-commerce, e-business models B2B, B2C, C2C, C2B, legal, environment of e-commerce, ethical issues, electronic data interchange, value chain and supply chain, advantages and disadvantages of e-commerce.

UNIT-II (8 Hr.)

Electronic Payment Systems: Credit cards, debit cards, smart cards, e-credit accounts, e-money, Marketing on the web, marketing strategies, advertising on the web, customer service and support, introduction to m-commerce, case study: e-commerce in passenger air transport.

UNIT-III (8 Hr.)

E-Government, theoretical background of e-governance, issues in e-governance applications, evolution of e-governance, its scope and content, benefits and reasons for the introduction of egovernance, e-governance models broadcasting, critical flow, comparative analysis, mobilization and lobbying, interactive services / G2C2G.

UNIT-IV (8 Hr.)

E-readiness, e-government readiness, E- Framework, step & issues, application of data

warehousing and data mining in e-government, Case studies: NICNET-role of nationwide networking in egovernance, e-seva.

UNIT-V (8 Hr.)

E-Government systems security: Challenges and approach to e-government security, security concern in e-commerce, security for server computers, communication channel security, security for client computers.

REFERENCES:

1. Gary P. Schneider, "E-commerce", Cengage Learning India.
2. C.S.R. Prabhu, "E-governence: concept and case study", PHI Learning Private Limited.
3. V. Rajaraman, "Essentials of E-Commerce Technology", PHI Learning Private Limited.
4. David Whiteley, "E-commerce study, technology and applications", TMH.

Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-505(B)	**Signal & Systems**	**3**	**1**	**0**	**4**	4

Objectives-

he main objectives of this course are :-

Understanding the fundamental characteristics of signals and systems.
Understanding the concepts of vector space, inner product space and orthogonal series.
Understanding signals and systems in terms of both the time and transform domains, taking advantage of the complementary insights and tools that these different perspectives provide.

Outcomes :-

Analyze system properties based on impulse response and Fourier analysis.
CO5: Apply the Laplace transform and Z- transform for analyze of continuous-time and discrete-time signals and systems.
CO6: Understand the process of sampling and the effects of under sampling.

Unit I- (8 Hr.)

Introduction to Signal & Systems: Signals, classification of signals, basic continuous time and discrete time signals, continuous LTI, discrete LTI systems , impulse and step functions, impulse response stability, linearity, stability, time invariance, Eigen values and Eigen functions, discrete convolution ,properties of discrete and continuous LTI systems ,systems described by difference and differential equations.

Unit II- (8 Hr.)

Fourier Analysis of Continuous Time Signals and Systems: Fourier series, Fourier series representation of continuous periodic signal & its properties, Fourier transform and its properties, parseval's theorem, frequency response of LTI systems.

Unit III- (8 Hr.)

Fourier Analysis of Discrete Time Signals & Systems: Discrete-time Fourier series, discrete time Fourier transform (including DFT) and properties, frequency response of discrete time LTI systems, continuous time fourier transform for periodic and non-periodic signals, properties of CTFT.

Unit IV- (8 Hr.)

Laplace & Z-Transform Transform: Laplace transform and its inverse: definition, existence conditions, region of convergence and properties, application of Laplace transform for the analysis of continuous time LTI system, Z-Transform, properties of Z-transform inversion of Z-transform, two dimensional Z- transform, convergence of Z-transform, region of convergence and properties, application of Z-transform for the analysis of discrete time LTI systems, solving eq. using Z transform.

Unit V- (8 Hr.)

State Space Analysis: Concept of state, state space representation discrete time LTI systems , state space representation of continuous time LTI systems ,solutions of state equation for discrete time LTI systems , solutions of state equation for continuous time LTI systems ,FFT. Sampling: Sampling theorem, ideal & real sampling, reconstruction of signal from its samples, aliasing sampling in frequency domain, sampling of discrete-time signals.

References:

1. Alan V. Oppenheim, Alan S. Willsky and H. Nawab, Signals and Systems, Prentice Hall, 1997
2. Simon Haykin, Communication Systems, 3rd Edition, John Wiley, 1995.
3. Signals & Systems, 2nd Edition, by Alan Oppenheim, Alan Wilsky, S. Nawab. Prentice Hall, 1997.
4. Signals and Systems, by Simon Haykin and Barry Van Veen. Wiley, 1999.

Subject Code	Subject Name	L	T	P	Total credit	Hours/week
CSA-506	**Industrial Training-I**	**0**	**0**	**4**	**4**	4

Course Outcomes:

At the end of this course students will gain the ability to

- Analyze the response application software used in industries
- Learn about various measures , and techniques for different operation performed in application software
- Understand statistical data analysis
- Understand computerized data acquisition.
- Conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis.
- Learn design, implement and test the prototype/algorithm in order to solve the conceived problem.
- Write comprehensive report on training work.

Guidelines:

- The industrial training is also a kind of team activity. Here development and design work with a focus on learning application environment.
- The software analysis in industries should be 50% of the total work.
- Industrial training cater a system required in laboratory or real life.
- Student is expected to learn out specifications, methodology, resources required, critical issues involved in design and implementation of software.
- The student is expected to exert on testing of the proposed results as per the industry.