SIXTH SEMESTER

CODE	COURSE TITLE	L	T	P	C
CS302	Unix System Programming	3	1	0	4
CS304	Web Technology	3	0	0	3
CS306	Database Management Systems	3	0	0	3
CS308	Artificial Intelligence and Experts Systems	3	0	0	3
HM302	Corporate Communication	3	1	0	4
	Elective – I	3	0	0	3
CS314	Web Technology Laboratory	0	0	3	2
CS316	Database Systems Laboratory	0	0	3	2
TOTAL CREDITS **24**					

LIST OF ELECTIVE FOR SIXTH SEMESTER: (ONE)

1. CS352   DESIGN AND ANALYSIS OF PARALLEL ALGORITHMS
2. CS354   ADVANCED MICROPROCESSOR SYSTEMS
3. CS356   OBJECT ORIENTED ANALYSIS AND DESIGN
4. MA302   NUMERICAL COMPUTING

SIXTH SEMESTER

CS302 – UNIX SYSTEM PROGRAMMING

Credits: 4

Objectives
- To understand the fundamental design of the unix operating system
- To become fluent with the systems calls provided in the unix environment
- To be able to design and build an application/service over the unix operating system

Unit-I Introduction
UNIX and ANSI Standards, X/Open Standards, POSIX APIs, POSIX Development Environment, API Common Characteristics, File types, Attributes, Inodes in UNIX System V, APIs to Files, UNIX Kernel support for files, Relationship of C Stream Pointers and File Descriptors, Directory Files, Hard and Symbolic Links.

Unit-II UNIX File APIs
General File APIs, File and Record Locking, Directory File APIs, Device File APIs, FIFO file APIs, Symbolic Kink File APIs, General File Class, regfile Class for Regular Files, dirfile Class for Directory File, FIFO file Class, Device File Class, Symbolic Link File Class, File Listing Program.

Unit-III UNIX Processes
The Environment of a UNIX Process, main function, Process termination, command-line arguments, Environment List, Memory Layout of a C Program, Shared Libraries, Memory Allocation, Environment Variables, setjmp and longjmp functions, getrlimit, setrlimit functions, UNIX Kernel Support for Processes.

Unit-IV Process Control and Signals
Process Identifiers, fork, vfork, exit, wait, waitpid, race conditions, exec functions, changing user ids, Interpreter files, systems function, Process Accounting, User Identification, Process Times, Signals : The Unix Kernel Support for Signals, Signal Mask, sigaction, the SIGCHLD signal and waitpid function, the sigsetjmp and siglongjmp functions, Kill, Alarm, Interval Timers.

Unit-V Daemon Processes and Inter Process Communication
Daemon Processes, Daemon Characteristics, Daemon Conventions, client-servier Model. Inter Process Communication, Pipes,popen, pclose,FIFOs, Message Queues, Semaphores.

Outcomes
- Ability to understand and reason out the working of Unix Systems
- To be able to build an application/service over a Unix system.

Teaching and Evaluation guidelines
- 30% on An Application (Higher Order Thinking), and 50% on diagrams and architecture (Medium Order Thinking), and 20% on Definition (Lower Order Thinking).

Text Books

1. W. Richard Stevens, "Advanced Programming in the UNIX Environment", 2nd Edition, Pearson Eductation/PHI, 2005.
2. Terrance Chan, "Unix System Programming Using C++", Prentice Hall India, 1999.

Reference Books

1. Marc J Rochkind, "Advanced Unix Programming", 2nd Edition, Pearson Education, 2005.
2. Maurice J Bach, "The design of the UNIC Operating System", Pearson Education/PHI, 1987.
3. D A Patterson and J L Hennessy, "Computer Architecture: A Quantitative Approach", Harcourt Asia, Morgan Kaufmann, 1999.

CS304 – WEB TECHNOLOGY

Credits: 3

Objective
- To understand the basics of Web Designing using HTML, DHTML, and CSS
- To learn the basics about Client side scripts and Server side scripts

Unit – I Basics of Markup Language
HTML- List, Tables, Images, Forms, Frames, Cascading Style sheets. XML- Document type definition, XML Schemas, Document Object model

Unit – II Introduction to JavaScript
Java Script -Control statements, Functions, Arrays, Objects, Events, Dynamic HTML with Java Script, Ajax

Unit – III wed Servers and its Applications
Web servers – IIS (XAMPP, LAMPP) and Tomcat Servers. Java Web Technologies- Servlets, JavaServer Pages, Java Server Faces, Web Technologies in Netbeans, Building a Web Application in Netbeans, JSF Components, Session Tracking, Cookies

Unit – IV Introduction to PHP
PHP- Basics, String Processing and Regular Expressions, Form Processing and Business Logic, Using Cookies, Dynamic Content, Operator Precedence Chart

Unit – V Front End to Database Connectivity
Database Connectivity with Servlets, JSP, PHP. Case Studies- Student information system, Health Management System

Outcomes
- Ability to design and develop client side scripting techniques
- Ability to build real world applications using client side and server side scripting languages

Text books
1. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, "Internet & World Wide Web How to Program", Deitel series, 5th edition, 2012
2. Jason Gilmore, "Beginning PHP and MySQL From Novice to Professional", 4th Edition, Apress Publications, 2010

Reference Books
1. Robert W. Sebesta, "Programming with World Wide Web", Pearson, 4th edition, 2008
2. David William Barron, "The World of Scripting Languages", Wiley Publications, 2000

CS306 - DATABASE MANAGEMENT SYSTEMS

Credits: 3

Objectives
- To understand the different database models and language queries to access databases
- To understand the normalization forms in building an effective database tables
- To protect the data and the database from unauthorized access and manipulation

Unit-I Databases
Need - Concepts - Architecture - Data independence - Data modeling: Entity-relationship model - Weak entity sets - Mapping ER model to Relational model.

Unit-II Concepts
Integrity constraints - Relational algebra - Relational calculus - Tuple relational calculus - Domain relational calculus - Overview of QBE.

Unit-III SQL Queries
Nested queries - Aggregate operators - Null values - Embedded SQL - Database security - Views - Queries on views.

Unit-IV Schema Refinement
Functional dependencies - Normalization - Decomposition - Armstrong's axioms - 3NF- BCNF-4NF - Multi-valued dependencies.

Unit-V Object-oriented data model
Object identity and pointers - Object definition and manipulation language - Object-oriented databases - Object relational databases - ER Diagramming model for OO relationships - Recent trends.

Outcomes
- Ability to define, manipulate, and control a relational database management system
- Ability to design SQL based Client-Server applications
- Ability to build a database management system that satisfies relational theory

Teaching and Evaluation guidelines
- 50% on Application (Higher Order Thinking), and 30% on Methods and Techniques (Medium Order Thinking), and 20% on Tool functions (Lower Order Thinking).

Text Books
1. A.Silberchatz, F.Korth, S.Sudarshan, "Database System Concepts", VI Edition, McGraw Hill, 2010.
2. R.Elmasri, S.B.Navathe, "Fundamentals of Database Systems", VI Edition, Pearson Education, 2011.

CS308-ARTIFICIAL INTELLIGENGE AND EXPERT SYSTEMS

Credits: 3

Objectives
- To know about basic concepts of NLP and Machine Learning
- To obtain a thorough knowledge of various knowledge representation schemes
- To have an overview of various AI applications
- To study about various heuristic and game search algorithms
- To know about various Expert System tools and applications

Unit-I Search Strategies
Hill climbing - Backtracking - Graph search - Properties of A* algorithm - Monotone restriction - Specialized production systems - AO* algorithm.

Unit-II Searching game trees
Minimax procedure - Alpha-beta pruning - Introduction to predicate calculus.

Unit-III Knowledge Representation
Reasoning - STRIPS - Structured representation of knowledge - Dealing with uncertainty.

Unit-IV Introduction to Expert Systems
Inference - Forward chaining - Backward chaining - Languages and tools - Explanation facilities - Knowledge acquisition.

Unit-V Natural Language Processing
Introduction - Understanding - Perception - Machine learning.

Outcomes
- Technical knowhow of AI applications, heuristics, Expert Systems, NLP, and Machine Learning techniques
- Acquaintance with programming languages such as LISP and PROLOG.

Text Books
1. G.Luger, W.A. Stubblefield, "Artificial Intelligence", Third Edition, Addison-Wesley Longman, 1998
2. N.J. Nilsson, "Principles of Artificial Intelligence", Narosa Publishing House, 1980

HM302- CORPORATE COMMUNICATION

Credits: 4

Objectives
- To introduce the students to the corporate world and its culture
- To prepare for participation in seminars, group discussions, and interviews
- To prepare students to present the ideas effectively
- To enable the students write research papers and technical proposals

Unit-I Importance of communication in the corporate world
Corporate culture & communication - Process of communication – Networks & channels of communication – Barriers to communication – Strategies to overcome them - Use of technology in successful communication – Role of psychology in communication- Internal & External Communication.

Unit-II Fluent Oral Communication Techniques
Speech mechanics – Mental process of speaking – Extempore speech practice – Body Language – Group discussion practice – Group dynamics – Seminar skills and interview strategies – Presentation skills – Use of Power point -- Techniques to make people listen.

Unit-III Developing listening skills
Importance of listening in the corporate world -Listening for information and content – Kinds of listening Factors affecting this – Methods to overcome them – Retention of facts, data & figures- Role of Speaker in listening.

Unit-IV Writing for Technical Purposes
Reader-writer relationship - Varieties of styles and registers- Mechanics of technical writing – Reports of different kinds – Oral and written reports – Executive summary and abstract –Memos & IOMs-- Use of charts, graphs etc.

Unit-V Writing for Business Purposes
Circulars and notices – Proposals , Agenda and Minutes – Marketing language – Corporate Branding - 'You' tone - Captions & Eye catchers - Interoffice memos Communication in a crisis.

Outcomes
- Gain confidence in dealing with different culture of people from across the globe
- Systematically put forward the ideas in an effective manner to the global world

Text Books
1. Raymond V. Lesikar & Marie E. Flatley, " Basic Business Communication ", Tata McGraw-Hill, 2005
2. M. Monippally, " Business Communication Strategies ", Tata McGraw-Hill, 2001

Reference Books
1. David Lindsay," A Guide to Scientific Writing ", Macmillan, 1995
2. Patrick Hanks & Jim Corbett, " Business Listening Tasks " , (CUP), 1986

3. Leo Jones & Richard Alexander, " New International Business English ", Cambridge University Press, 1996
4. James A. Wiggins, Beverly B. Wiggins & James Vander Zanden, " Social Psychology " , McGraw Hill, 1987
5. Dr. Eric Berne, "What do you say after you say Hello", Corgi books.

CS314 – WEB TECHNOLOGY LABORATORY

Credits: 2

Objective
- To develop skills in Web Designing using HTML, DHTML, and CSS.
- To implement application protocols such as HTTP request, FTP, SMTP, POP3 in Java Socket Programming
- To develop programming skills in using client side and server side scripting languages

EXPERIMENTS
1. Designing a static web page using HTML
2. Designing a dynamic webpage using JAVASCRIPT
3. Programs using Java Applets
4. Working with AWT and different layouts in Java
5. Programs for creating simple chat application using Datagram sockets and Datagram Packets
6. Java socket programming to implement HTTP request, FTP, SMTP, POP3
7. Develop any management scheme using PHP and MySQL (eg, Hospital Management, Library Management, etc,.)
8. Display digital clock in website using Ajax.
9. Programming using Java servlets to create three-tier applications

Outcomes
- Programming skill set in developing internet applications.
- Know how on developing sophisticated web sites and web applications.

CS316 - DATABASE SYSTEMS LABORATORY

Credits: 2

Objectives
- To understand basic concepts and terminology related to DB and storage management
- To program simple database applications in MySQL

EXPERIMENTS

Exercises are based on MySQL
1. Applications involving vendor development systems, storage management system, financial management etc.
2. Creation and querying of database tables
3. Design of tables by normalization and dependency analysis
4. Writing application software with host language interface

Outcomes
- Ability to write queries for design and manipulation of database tables using MySQL
- Apply normalization procedures in the database tables

CS352-DESIGN AND ANALYSIS OF PARALLEL ALGORITHMS

Credits: 3

Objectives

- To learn about parallel computing models, design and analyze parallel algorithms f or PRAM machines and Interconnection networks.

Unit-I Introduction to Parallel Computers

SIMD - EREW, CREW - SM-SIMD algorithms - Shared memory SIMD - Tree and mesh interconnection computers.

Unit-II Sorting

Sorting on a linear array - Sorting on a mesh - Sorting on EREW SIMD computer - MIMD enumeration sort - MIMD quick sort - Sorting on other networks.

Unit-III Matrix operations

Mesh transpose - Shuffle transpose - EREW transpose - Mesh multiplication - Cube multiplication - Matrix by vector multiplication - Tree multiplication.

Unit-IV Numerical problems

Linear equations - SIMD algorithm - Roots of nonlinear equations - MIMD algorithm - Partial differential equations - Computing Eigen values.

Unit-V Graph problems

Computing the connectivity matrix - Finding connected components - Traversal - Minimal alpha-beta tree - Storage requirements.

Outcomes

- To enable the student to design and analyze parallel algorithms

Teaching and Evaluation guidelines

- 30% on Problems (Higher Order Thinking), and 40% on Comparisons, Issues, and Analysis (Medium Order Thinking), and 30% on Definition (Lower Order Thinking).

Text Book

1. S. G. Akl, "The Design and Analysis of Parallel Algorithms", Prentice Hall of India, 1989.

Reference Book

1. S. Lakshmivarahan and S. K. Dhall, "Analysis and Design of Parallel Algorithms - Arithmetic and Matrix Problems", McGraw Hill, 1990

CS354-ADVANCED MICROPROCESSOR SYSTEMS

Credits: 3

Objectives
- To describe the function of the microprocessor and detail its basic operation
- To understand the concepts of advanced architecture in the microprocessors
- To describe the function and purpose of each program-visible registers in microprocessor
- To describe the memory access in real mode and protected mode

Unit – I 80286 Architecture
Instruction set - Addressing modes - Real mode - Protected mode - 80386 Architecture - Address segmentation - Paging - Segment registers.

Unit – II Basic 486 Architecture
486 memory system and memory management - Features of Pentium memory and I/O systems - Pentium memory management - Introduction to Pentium Pro features.

Unit – III Introduction to PCs
Study of PC system layout - SCSI, CD-ROM & multimedia - Development of PC - PC components - Features and system design - Motherboards - Buses - BIOS.

Unit – IV IDE Interface
Magnetic storage principles - Hard disk storage - Floppy disk storage - Optical Storage - Physical drive installation and configuration - Video hardware - Audio hardware.

Unit – V
Input devices - Power supply chassis - Building/upgrading systems - PC diagnostics - Testing and maintenance.

Outcomes
- Ability to understanding of the functionality of 80286 architecture to design advanced microprocessors systems
- Ability to design and use new interface techniques principle to access the peripherals.
- Ability to familiarize with the internal structure of motherboard and its components

Teaching and Evaluation guidelines
- 30% on An Application (Higher Order Thinking), and 50% on Methods and Techniques for interfacing (Medium Order Thinking), and 20% on Assembly level of programming (Lower Order Thinking).

Text Book
1. D. V. Hall, "Microprocessor and Interfacing Programming and Hardware", McGraw Hill, II Edition, 1999.

References
1. B. B. Brey, "The Intel Microprocessors 8086/8088, 80186/ 80188, 80286, 80386, 80486 and Pentium and Pentium Pro Processor", Prentice Hall of India, V Edition, 2006.

CS356 - OBJECT ORIENTED ANALYSIS AND DESIGN

Credits: 3

Objectives
- To understand basic OO analysis and design skills through an elaborate case study
- To understand the UML design diagrams\
- To understand design based on requirements.
- To impart of converting design to code.
- To apply the appropriate design patterns

UNIT I - OOAD Basics
Introduction – Overview of object oriented system development – Object basics-The Unified Process – Modeling concepts – Modeling as a design technique – Analysis and modeling – UML diagrams – Use case Modeling – Class modeling – State modeling – Interaction Modeling.

UNIT II - Requirements & More Modeling
Object Constraint Language - Inception – Evolutionary Requirements– Domain Models –System Sequence Diagrams – Operation Contracts

UNIT III - Design And Principles Of Design
Requirements to Design –Design Patterns – Logical Architecture – Package diagram – Design patterns – Model, View, Control pattern – Detailed design – Object design with GRASP pattern – Detailed class diagram with Visibility.

UNIT IV - Mapping To Code
Mapping designs to code – Test Driven development and refactoring – UML Tools and UML as blueprint.

UNIT V - More Patterns
More Patterns – Analysis update – Objects with responsibilities – Applying design patterns – Architectural Analysis – Logical Architecture Refinement – Package Design – Persistence framework with patterns.

Outcomes
- Ability to demonstrate a thorough knowledge of one object oriented method down to detailed design.
- Ability to implement a detailed object oriented design in an object oriented language
- Ability to Critically evaluate issues of patterns and structure in object oriented development

Teaching and Evaluation guidelines:
40% on Methods and Techniques (Medium Order Thinking), 30 % on Application (Higher Order Thinking), and 30% on Tool functions (Lower Order Thinking).

Text Books
1. Michael Blaha and James Rumbaugh, "Object-oriented modeling and design with UML", Prentice-Hall of India, 2012.

2. Craig Larman. "Applying UML and Patterns – An introduction to Object-Oriented Analysis and Design and Iterative Development", 3rd ed, Pearson Education, 2008.

Reference Books

1. Ali Bahrami, "Object Oriented Systems Development", McGraw-Hill, 1999.
2. Booch, Grady. Object Oriented Analysis and Design. 2nd ed. Pearson Education 2000.
3. Fowler, Martin. UML Distilled. 3rd ed. Pearson Education. 2004.
4. Lunn, Ken. Software development with UML. Palgrave Macmillan. 2003.
5. O'Docherty, Mike. Object-Oriented Analysis & Design. Wiley. 2005.

MA302 - NUMERICAL COMPUTING

Credits: 3

Objectives
- To learn about existence and uniqueness criteria for numerical methods
- To solve systems of linear equations by direct methods
- To use iterative methods to solve systems of non-linear equations

Unit 1 - Non-Linear Systems: Various types of errors - Bisection method – Regula-falsi method - Newton-Raphson method - Horner's Method - Graffe's method - Newton's method for solving $f(x,y) = 0$ and $g(x,y) = 0$.

Unit 2 - Linear Systems - Gaussian elimination - **Iterative methods** - Sufficient conditions for convergence - LU decomposition method - Power method to find the dominant eigenvalue and eigenvector.

Unit 3 - Interpolation and Curve Fitting: Newton's forward and backward interpolation – Newton divided difference formula, Lagranges interpolation formula, Linear and non-linear curve fitting by the Method of least squares.

Unit 4 - Numerical Differentiation and Integration - Trapezoidal rule, Simpson's one-third rule - Simpson's three-eighth rule - Double integration using trapezoidal and Simpson's one-third rule.

Unit 5 - Numerical Solution of Differential Equations - Euler's method - Taylor's method - Runge-Kutta method of fourth order - Numerical solution of Laplace equation - One-dimensional heat flow equation and wave equation by finite difference methods.

Outcomes
- Ability to comprehend numerical algorithms
- Skill set in implementing algorithms to solve mathematical problems

Teaching and Evaluation guidelines
- 30% on An Application (Higher Order Thinking), and 50% on practice (different type of problems) (Medium Order Thinking), and 20% on Definition (Lower Order Thinking).

Text Books
1. M.K. Jain, S.R.K. Iyengar, R.K. Jain., Numerical Methods for Scientific and Engineering Computation, New age Int. Publications, 2003.
2. CHENEG and KINCAID, "Introduction to Numerical Computing", Tata McGraw-Hill, 1998.

Reference Books
1. C.F.GERALD and P.O.WHEATLEY, "Applied Numerical Analysis", Mc Graw-Hill, 1981