### Semester I

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OBJECTIVE:
- To facilitate the understanding of the principles and to cultivate the art of formulating physical problems in the language of mathematics.

UNIT I MATRICES

UNIT II FUNCTIONS OF SEVERAL VARIABLES

UNIT III ANALYTIC FUNCTION
Analytic functions – Necessary and sufficient conditions for analyticity – Properties – Harmonic conjugates – Construction of analytic function – Conformal Mapping – Mapping by functions w = a + z , az, 1/z , - Bilinear transformation.

UNIT IV COMPLEX INTEGRATION
Line Integral – Cauchy’s theorem and integral formula – Taylor’s and Laurent’s Series – Singularities – Residues – Residue theorem – Application of Residue theorem for evaluation of real integrals – Use of circular contour and semicircular contour with no pole on real axis.

UNIT V LAPLACE TRANSFORMS

TOTAL: 45 PERIODS

OUTCOMES:
- To develop the use of matrix algebra techniques this is needed by engineers for practical applications.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow of electric current.
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

TEXT BOOKS:

REFERENCES:
OBJECTIVE:
To enrich the understanding of various types of materials and their applications in engineering and technology.

UNIT I     CONDUCTING MATERIALS     9

UNIT II    SEMICONDUCTING MATERIALS     9

UNIT III   MAGNETIC AND SUPERCONDUCTING MATERIALS     9
Superconductivity : properties – Type I and Type II superconductors – BCS theory of superconductivity(Qualitative) - High T_c superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.

UNIT IV    DIELECTRIC MATERIALS     9

UNIT V    ADVANCED ENGINEERING MATERIALS     9
Metallic glasses: preparation, properties and applications. Shape memory alloys (SMA): Characteristics, properties of NiTi alloy, application, Nanomaterials- Preparation -pulsed laser deposition – chemical vapour deposition – Applications – NLO materials –Birefringence- optical Kerr effect – Classification of Biomaterials and its applications

TOTAL: 45 PERIODS

OUTCOMES
The students will be able to understand the fundamentals of materials and their applications in Engineering and Technology

TEXT BOOKS:
1. M. Arumugam, Materials Science, Anuradha publishers, 2010

REFERENCES:
4. A. Marikani, Engineering Physics, PHI Learning Pvt., India, 2009
OBJECTIVES:
The students should be made to:
- Learn the organization of a digital computer.
- Be exposed to the number systems.
- Learn to think logically and write pseudo code or draw flow charts for problems.
- Be exposed to the syntax of C.
- Be familiar with programming in C.
- Learn to use arrays, strings, functions, pointers, structures and unions in C.

UNIT I  INTRODUCTION  8

UNIT II  C PROGRAMMING BASICS  10
Problem formulation - Problem Solving - Introduction to 'C' programming - fundamentals - structure of a 'C' program - compilation and linking processes - Constants, Variables - Data Types - Expressions using operators in 'C' - Managing Input and Output operations - Decision Making and Branching - Looping statements - solving simple scientific and statistical problems.

UNIT III  ARRAYS AND STRINGS  9
Arrays - Initialization - Declaration - One dimensional and Two dimensional arrays. String - String operations - String Arrays. Simple programs - sorting - searching - matrix operations.

UNIT IV  FUNCTIONS AND POINTERS  9
Function - definition of function - Declaration of function - Pass by value - Pass by reference - Recursion - Pointers - Definition - Initialization - Pointers arithmetic - Pointers and arrays - Example Problems.

UNIT V  STRUCTURES AND UNIONS  9
Introduction - need for structure data type - structure definition - Structure declaration - Structure within a structure - Union - Programs using structures and Unions - Storage classes, Pre-processor directives.

OUTCOMES:
At the end of the course, the student should be able to:
- Design C Programs for problems.
- Write and execute C programs for simple applications

TEXT BOOKS:
REFERENCES:

PTCS6202 PROGRAMMING AND DATA STRUCTURES - I L T P C
3 0 0 3

OBJECTIVES:
The student should be made to:
- Be familiar with the basics of C programming language.
- Be exposed to the concepts of ADTs
- Learn linear data structures – list, stack, and queue.
- Be exposed to sorting, searching, hashing algorithms

UNIT I C PROGRAMMING FUNDAMENTALS - A REVIEW 9
Conditional statements – Control statements – Functions – Arrays – Preprocessor - Pointers - Variation in pointer declarations – Function Pointers – Function with Variable number of arguments

UNIT II C PROGRAMMING ADVANCED FEATURES 9
Structures and Unions - File handling concepts – File read – write – binary and Stdio - File Manipulations

UNIT III LINEAR DATA STRUCTURES – LIST 9
Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation — singly linked lists- circularly linked lists- doubly-linked lists – applications of lists –Polynomial Manipulation – All operation (Insertion, Deletion, Merge, Traversal)

UNIT IV LINEAR DATA STRUCTURES – STACKS, QUEUES 9
Stack ADT – Evaluating arithmetic expressions- other applications- Queue ADT – circular queue implementation – Double ended Queues – applications of queues

UNIT V SORTING, SEARCHING AND HASH TECHNIQUES 9

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Use the control structures of C appropriately for problems.
- Implement abstract data types for linear data structures.
- Apply the different linear data structures to problem solutions.
- Critically analyse the various algorithms.

TEXT BOOKS:

REFERENCES:
PTCS6201 DIGITAL PRINCIPLES AND SYSTEM DESIGN L T P C
3 0 0 3

OBJECTIVES:
The student should be made to:
- Learn the various number systems.
- Learn Boolean Algebra
- Understand the various logic gates.
- Be familiar with various combinational circuits.
- Be familiar with designing synchronous and asynchronous sequential circuits.
- Be exposed to designing using PLD

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 9

UNIT II COMBINATIONAL LOGIC 9

UNIT III SYNCHRONOUS SEQUENTIAL LOGIC 9

UNIT IV ASYNCHRONOUS SEQUENTIAL LOGIC 9

UNIT V MEMORY AND PROGRAMMABLE LOGIC 9

TOTAL: 45 PERIODS

OUTCOMES:
At the end of this course, the student will be able to:
- Perform arithmetic operations in any number system.
- Simplify the Boolean expression using K-Map and Tabulation techniques.
- Use boolean simplification techniques to design a combinational hardware circuit.
- Design and Analysis of a given digital circuit – combinational and sequential.
- Design using PLD.

TEXT BOOK:
PTCS6301 PROGRAMMING AND DATA STRUCTURES - II

OBJECTIVES:
The student should be made to:
- Be familiar with the C++ concepts of abstraction, encapsulation, constructor, polymorphism, overloading and Inheritance.
- Learn advanced nonlinear data structures.
- Be exposed to graph algorithms
- Learn to apply Tree and Graph structures

UNIT I OBJECT ORIENTED PROGRAMMING FUNDAMENTALS

C++ Programming features - Data Abstraction - Encapsulation - class - object - constructors - static members – constant members – member functions – pointers – references - Role of this pointer – Storage classes – function as arguments.

UNIT II OBJECT ORIENTED PROGRAMMING CONCEPTS


UNIT III C++ PROGRAMMING ADVANCED FEATURES


UNIT IV ADVANCED NON-LINEAR DATA STRUCTURES


UNIT V GRAPHS


TOTAL: 45 PERIODS
OUTCOMES:
At the end of the course, the student should be able to:
- Design problem solutions using Object Oriented Techniques.
- Apply the concepts of data abstraction, encapsulation and inheritance for problem solutions.
- Use the control structures of C++ appropriately.
- Critically analyse the various algorithms.
- Apply the different data structures to problem solutions.

TEXT BOOKS:

REFERENCES:

PTCS6302 DATABASE MANAGEMENT SYSTEMS

OBJECTIVES:
- To expose the students to the fundamentals of Database Management Systems.
- To make the students understand the relational model.
- To familiarize the students with ER diagrams.
- To expose the students to SQL.
- To make the students to understand the fundamentals of Transaction Processing and Query Processing.
- To familiarize the students with the different types of databases.
- To make the students understand the Security Issues in Databases.

UNIT I INTRODUCTION TO DBMS
File Systems Organization - Sequential, Pointer, Indexed, Direct - Purpose of Database System- Database System Terminologies-Database characteristics- Data models – Types of data models – Components of DBMS- Relational Algebra. LOGICAL DATABASE DESIGN: Relational DBMS - Codd’s Rule - Entity-Relationship model - Extended ER Normalization – Functional Dependencies, Anomaly- 1NF to 5NF- Domain Key Normal Form – Denormalization

UNIT II SQL & QUERY OPTIMIZATION

UNIT III TRANSACTION PROCESSING AND CONCURRENCY CONTROL
UNIT IV  TRENDS IN DATABASE TECHNOLOGY

UNIT V  ADVANCED TOPICS
DATABASE SECURITY: Data Classification-Threats and risks – Database access Control – Types of Privileges – Cryptography- Statistical Databases.- Distributed Databases-Architecture-Transaction Processing-Data Warehousing and Mining-Classification-Association rules-Clustering-Information Retrieval- Relevance ranking-Crawling and Indexing the Web- Object Oriented Databases-XML Databases.

OUTCOMES:
At the end of the course, the student should be able to:

- Design Databases for applications.
- Use the Relational model, ER diagrams.
- Apply concurrency control and recovery mechanisms for practical problems.
- Design the Query Processor and Transaction Processor.
- Apply security concepts to databases.

TEXT BOOK:

REFERENCES:

PTCS6303  COMPUTER ARCHITECTURE
OBJECTIVES:
- To make students understand the basic structure and operation of digital computer.
- To understand the hardware-software interface.
- To familiarize the students with arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations.
- To expose the students to the concept of pipelining.
- To familiarize the students with hierarchical memory system including cache memories and virtual memory.
- To expose the students with different ways of communicating with I/O devices and standard I/O interfaces.
UNIT I OVERVIEW & INSTRUCTIONS

UNIT II ARITHMETIC OPERATIONS
ALU - Addition and subtraction – Multiplication – Division – Floating Point operations – Subword parallelism.

UNIT III PROCESSOR AND CONTROL UNIT
Basic MIPS implementation – Building datapath – Control Implementation scheme – Pipelining – Pipelined datapath and control – Handling Data hazards & Control hazards – Exceptions.

UNIT IV PARALLELISM
Instruction-level-parallelism – Parallel processing challenges – Flynn’s classification – Hardware multithreading – Multicore processors

UNIT V MEMORY AND I/O SYSTEMS
Memory hierarchy - Memory technologies – Cache basics – Measuring and improving cache performance - Virtual memory, TLBs - Input/output system, programmed I/O, DMA and interrupts, I/O processors.

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
• Design arithmetic and logic unit.
• Design and anlayse pipelined control units
• Evaluate performance of memory systems.
• Understand parallel processing architectures.

TEXT BOOK:

REFERENCES:
OBJECTIVES:
The student should be made to:
- Be familiarized with good programming design methods, particularly Top - Down design.
- Getting exposure in implementing the different data structures using C++
- Appreciate recursive algorithms.

LIST OF EXPERIMENTS:
IMPLEMENTATION IN THE FOLLOWING TOPICS:
1. Constructors & Destructors, Copy Constructor.
2. Friend Function & Friend Class.
3. Inheritance.
4. Polymorphism & Function Overloading.
5. Virtual Functions.
6. Overload Unary & Binary Operators Both as Member Function & Non Member Function.
7. Class Templates & Function Templates.
8. Exception Handling Mechanism.
10. File Stream classes.
11. Applications of Stack and Queue
12. Binary Search Tree
13. Tree traversal Techniques
14. Minimum Spanning Trees
15. Shortest Path Algorithms

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Design and implement C++ programs for manipulating stacks, queues, linked lists, trees, and graphs.
- Apply good programming design methods for program development.
- Apply the different data structures for implementing solutions to practical problems.
- Develop recursive programs using trees and graphs.

LIST OF EQUIPMENTS FOR A BATCH OF 30 STUDENTS:
Standalone desktops with C++ compiler 30 Nos.
(or)
Server with C++ compiler supporting 30 terminals or more.

REFERENCE:
spoken-tutorial.org
OBJECTIVES:
The student should be made to:

- Learn to create and use a database
- Be familiarized with a query language
- Have hands on experience on DDL Commands
- Have a good understanding of DML Commands and DCL commands
- Familiarize advanced SQL queries.
- Be Exposed to different applications

LIST OF EXPERIMENTS:
1. Creation of a database and writing SQL queries to retrieve information from the database.
2. Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.
3. Creation of Views, Synonyms, Sequence, Indexes, Save point.
4. Creating an Employee database to set various constraints.
5. Creating relationship between the databases.
7. Write a PL/SQL block to satisfy some conditions by accepting input from the user.
8. Write a PL/SQL block that handles all types of exceptions.
10. Creation of database triggers and functions
11. Mini project (Application Development using Oracle/ Mysql )
   a) Inventory Control System.
   b) Material Requirement Processing.
   c) Hospital Management System.
   d) Railway Reservation System.
   e) Personal Information System.
   f) Web Based User Identification System.
   g) Timetable Management System.
   h) Hotel Management System

REFERENCE:
spoken-tutorial.org

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Design and implement a database schema for a given problem-domain
- Populate and query a database
- Create and maintain tables using PL/SQL.
- Prepare reports.

LIST OF EQUIPMEN T S FOR A BATCH OF 30 STUDENTS

HARDWARE:
Standalone desktops 30 Nos.
(or)
Server supporting 30 terminals or more.

SOFTWARE:
Front end: VB/VC ++/JAVA or Equivalent
Back end: Oracle / SQL / MySQL/ PostGress / DB2 or Equivalent
OBJECTIVES:
The student should be made to:
- Understand the division of network functionalities into layers.
- Be familiar with the components required to build different types of networks
- Be exposed to the required functionality at each layer
- Learn the flow control and congestion control algorithms

UNIT I FUNDAMENTALS & LINK LAYER
Building a network – Requirements - Layering and protocols - Internet Architecture – Network software – Performance ; Link layer Services - Framing - Error Detection - Flow control

UNIT II MEDIA ACCESS & INTERNETWORKING
Media access control - Ethernet (802.3) - Wireless LANs – 802.11 – Bluetooth - Switching and bridging – Basic Internetworking (IP, CIDR, ARP, DHCP,ICMP )

UNIT III ROUTING
Routing (RIP, OSPF, metrics) – Switch basics – Global Internet (Areas, BGP, IPv6), Multicast – addresses – multicast routing (DVMRP, PIM)

UNIT IV TRANSPORT LAYER
Overview of Transport layer - UDP - Reliable byte stream (TCP) - Connection management - Flow control - Retransmission – TCP Congestion control - Congestion avoidance (DECbit, RED) – QoS – Application requirements

UNIT V APPLICATION LAYER
Traditional applications -Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web Services – DNS - SNMP

OUTCOMES:
At the end of the course, the student should be able to:
- Identify the components required to build different types of networks
- Choose the required functionality at each layer for given application
- Identify solution for each functionality at each layer
- Trace the flow of information from one node to another node in the network

TEXT BOOK:

REFERENCES:
OBJECTIVES:
The student should be made to:
- Study the basic concepts and functions of operating systems.
- Understand the structure and functions of OS.
- Learn about Processes, Threads and Scheduling algorithms.
- Understand the principles of concurrency and Deadlocks.
- Learn various memory management schemes.
- Study I/O management and File systems.
- Learn the basics of Linux system and perform administrative tasks on Linux Servers.

UNIT I OPERATING SYSTEMS OVERVIEW

UNIT II PROCESS MANAGEMENT

UNIT III STORAGE MANAGEMENT
Main Memory-Contiguous Memory Allocation, Segmentation, Paging, 32 and 64 bit architecture Examples; Virtual Memory- Demand Paging, Page Replacement, Allocation, Thrashing; Allocating Kernel Memory, OS Examples.

UNIT IV I/O SYSTEMS

UNIT V CASE STUDY
Linux System- Basic Concepts; System Administration-Requirements for Linux System Administrator, Setting up a LINUX Multifunction Server, Domain Name System, Setting Up Local Network Services; Virtualization- Basic Concepts, Setting Up Xen, VMware on Linux Host and Adding Guest OS.

OUTCOMES:
At the end of the course, the student should be able to:
- Design various Scheduling algorithms.
- Apply the principles of concurrency.
- Design deadlock, prevention and avoidance algorithms.
- Compare and contrast various memory management schemes.
- Design and Implement a prototype file systems.
- Perform administrative tasks on Linux Servers.
TEXT BOOK:

REFERENCES:
5. http://nptel.ac.in/

PTEC6504 MICROPROCESSOR AND MICROCONTROLLER L T P C 3 0 0 3

OBJECTIVES:
The student should be made to:
- Study the Architecture of 8086 microprocessor.
- Learn the design aspects of I/O and Memory Interfacing circuits.
- Study about communication and bus interfacing.
- Study the Architecture of 8051 microcontroller.

UNIT I THE 8086 MICROPROCESSOR 9
Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming – Modular Programming - Linking and Relocation - Stacks - Procedures – Macros – Interrupts and interrupt service routines – Byte and String Manipulation.

UNIT II 8086 SYSTEM BUS STRUCTURE 9

UNIT III I/O INTERFACING 9

UNIT IV MICROCONTROLLER 9
Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming.

UNIT V INTERFACING MICROCONTROLLER 9

TOTAL: 45 PERIODS
OUTCOMES:
At the end of the course, the student should be able to:
- Design and implement programs on 8086 microprocessor.
- Design I/O circuits.
- Design Memory Interfacing circuits.
- Design and implement 8051 microcontroller based systems.

TEXT BOOKS:

REFERENCE:
1. Doughlas V.Hall, “Microprocessors and Interfacing, Programming and Hardware;TMH,2012

PTCS6411 NETWORKS LABORATORY

OBJECTIVES:
The student should be made to:
- Learn socket programming.
- Be familiar with simulation tools.
- Have hands on experience on various networking protocols.

LIST OF EXPERIMENTS:
1. Implementation of Stop and Wait Protocol and Sliding Window Protocol.
2. Study of Socket Programming and Client – Server model
3. Write a code simulating ARP /RARP protocols.
4. Write a code simulating PING and TRACEROUTE commands
5. Create a socket for HTTP for web page upload and download.
6. Write a program to implement RPC (Remote Procedure Call)
7. Implementation of Subnetting .
8. Applications using TCP Sockets like
   a. Echo client and echo server
   b. Chat
   c. File Transfer
9. Applications using TCP and UDP Sockets like
   d. DNS
   e. SNMP
   f. File Transfer
10. Study of Network simulator (NS).and Simulation of Congestion Control Algorithms using NS
11. Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer.
   i. Link State routing
   ii. Flooding
   iii. Distance vector

REFERENCE:
spoken-tutorial.org.

TOTAL: 45 PERIODS
OUTCOMES:
At the end of the course, the student should be able to
- Use simulation tools
- Implement the various protocols.
- Analyse the performance of the protocols in different layers.
- Analyze various routing algorithms

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

SOFTWARE
- C / C++ / Java / Equivalent Compiler 30
- Network simulator like NS2/Glomosim/OPNET/ Equivalent

HARDWARE
Standalone desktops 30 Nos

PTCS6413 OPERATING SYSTEMS LABORATORY

OBJECTIVES:
The student should be made to:
- Learn shell programming and the use of filters in the UNIX environment.
- Be exposed to programming in C using system calls.
- Learn to use the file system related system calls.
- Be exposed to process creation and inter process communication.
- Be familiar with implementation of CPU Scheduling Algorithms, page replacement algorithms and Deadlock avoidance

LIST OF EXPERIMENTS:
2. Shell Programming.
3. Implement the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
4. Implement all file allocation strategies
   a) Sequential b) Indexed c) Linked
5. Implement Semaphores
6. Implement all File Organization Techniques
   a) Single level directory b) Two level c) Hierarchical d) DAG
7. Implement Bankers Algorithm for Dead Lock Avoidance
8. Implement an Algorithm for Dead Lock Detection
9. Implement all page replacement algorithms
   a) FIFO b) LRU c) LFU
10. Implement Shared memory and IPC
11. Implement Paging Technique of memory management.
12. Implement Threading & Synchronization Applications

REFERENCE:
spoken-tutorial.org

TOTAL: 45 PERIODS

19
OUTCOMES:
At the end of the course, the student should be able to
- Implement deadlock avoidance, and Detection Algorithms
- Compare the performance of various CPU Scheduling Algorithm
- Critically analyze the performance of the various page replacement algorithms
- Create processes and implement IPC

LIST OF EQUIPMENTS FOR A BATCH OF 30 STUDENTS:
Standalone desktops with C / C++ / Java / Equivalent compiler 30 Nos.
(or)
Server with C / C++ / Java / Equivalent compiler supporting 30 terminals

PTCS6403 SOFTWARE ENGINEERING L T P C 3 0 0 3

OBJECTIVES:
The student should be made to:
- Understand the phases in a software project
- Understand fundamental concepts of requirements engineering and Analysis Modelling.
- Understand the major considerations for enterprise integration and deployment.
- Learn various testing and maintenance measures

UNIT I SOFTWARE PROCESS AND PROJECT MANAGEMENT 9

UNIT II REQUIREMENTS ANALYSIS AND SPECIFICATION 9

UNIT III SOFTWARE DESIGN 9

UNIT IV TESTING AND IMPLEMENTATION 9

UNIT V PROJECT MANAGEMENT 9

TOTAL: 45 PERIODS
OUTCOMES:
At the end of the course, the student should be able to
- Identify the key activities in managing a software project.
- Compare different process models.
- Concepts of requirements engineering and Analysis Modeling.
- Apply systematic procedure for software design and deployment.
- Compare and contrast the various testing and maintenance.

TEXT BOOK:

REFERENCES:

PTCS6501 INTERNET PROGRAMMING

OBJECTIVES:
The student should be made to:
- Learn Java Programming.
- Understand different Internet Technologies.
- Be exposed to java specific web services architecture.

UNIT I JAVA PROGRAMMING

UNIT II WEBSITES BASICS, HTML 5, CSS 3, WEB 2.0
Web 2.0: Basics-RIA Rich Internet Applications - Collaborations tools - Understanding websites and web servers: Understanding Internet – Difference between websites and web server- Internet technologies Overview –Understanding the difference between internet and intranet; HTML and CSS: HTML 5.0 , XHTML, CSS 3.

UNIT III CLIENT SIDE AND SERVER SIDE PROGRAMMING
UNIT IV  PHP and XML  8

UNIT V  INTRODUCTION TO AJAX and WEB SERVICES  9

TOTAL (L:45+T:15): 60 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Implement Java programs.
- Create a basic website using HTML and Cascading Style Sheets.
- Design and implement dynamic web page with validation using JavaScript objects and by applying different event handling mechanisms.
- Design rich client presentation using AJAX.
- Design and implement simple web page in PHP, and to present data in XML format.
- Design and implement server side programs using Servlets and JSP.

TEXT BOOKS:

REFERENCES:

PTCS6502  OBJECT ORIENTED ANALYSIS AND DESIGN  L T P C  3 0 0 3

OBJECTIVES:
The student should be made to:
- Learn the basics of OO analysis and design skills.
- Learn the UML design diagrams.
- Learn to map design to code.
- Be exposed to the various testing techniques.
UNIT I  UML DIAGRAMS

UNIT II  DESIGN PATTERNS

UNIT III  CASE STUDY
Case study – the Next Gen POS system, Inception -Use case Modeling - Relating Use cases – include, extend and generalization - Elaboration - Domain Models - Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies - Aggregation and Composition.

UNIT IV  APPLYING DESIGN PATTERNS
System sequence diagrams - Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement - UML class diagrams - UML interaction diagrams - Applying GoF design patterns.

UNIT V  CODING AND TESTING

OUTCOMES:
At the end of the course, the student should be able to:
• Design and implement projects using OO concepts.
• Use the UML analysis and design diagrams.
• Apply appropriate design patterns.
• Create code from design.
• Compare and contrast various testing techniques.

TEXT BOOK:

REFERENCES:
2. Erich Gamma, a nd Richard Helm, Ralph Johnson, John Vlissides, “Design patterns: Elements of Reusable Object-Oriented Software”, Addison-Wesley, 1995.
OBJECTIVES:
The student should be made to:
- Learn the basics of OO analysis and design skills.
- Be exposed to the UML design diagrams.
- Learn to map design to code.
- Be familiar with the various testing techniques

LIST OF EXPERIMENTS:
To develop a mini-project by following the 9 exercises listed below.
1. To develop a problem statement.
2. Identify Use Cases and develop the Use Case model.
3. Identify the conceptual classes and develop a domain model with UML Class diagram.
4. Using the identified scenarios, find the interaction between objects and represent them using UML Sequence diagrams.
5. Draw relevant state charts and activity diagrams.
6. Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
7. Develop and test the Technical services layer.
8. Develop and test the Domain objects layer.
9. Develop and test the User interface layer.

Suggested domains for Mini-Project:
1. Passport automation system.
2. Book bank
3. Exam Registration
4. Stock maintenance system.
5. Online course reservation system
6. E-ticketing
7. Software personnel management system
8. Credit card processing
9. e-book management system
10. Recruitment system
11. Foreign trading system
12. Conference Management System
13. BPO Management System
14. Library Management System
15. Student Information System

OUTCOMES:
At the end of the course, the student should be able to
- Design and implement projects using OO concepts.
- Use the UML analysis and design diagrams.
- Apply appropriate design patterns.
- Create code from design.
- Compare and contrast various testing techniques

TOTAL: 45 PERIODS
LIST OF EQUIPMENTS FOR A BATCH OF 30 STUDENTS

Suggested Software Tools:
Rational Suite (or) Argo UML (or) equivalent, Eclipse IDE and Junit

Requirement for a batch of 30 students

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<th>S.No</th>
<th>Description of Equipment</th>
<th>Quantity Required</th>
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<td>Open Source Alternatives:</td>
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PTCS6512   INTERNET PROGRAMMING LABORATORY
L T P C
0 0 3 2

OBJECTIVES:
The student should be made to:
• Be familiar with Web page design using HTML/XML and style sheets
• Be exposed to creation of user interfaces using Java frames and applets.
• Learn to create dynamic web pages using server side scripting.
• Learn to write Client Server applications.
• Be familiar with the frameworks JSP Strut, Hibernate, Spring
• Be exposed to creating applications with AJAX

LIST OF EXPERIMNENTS:

IMPLEMENT THE FOLLOWING:

WEBPAGE CONCEPTS
a) Create a web page with the following using HTML
   a. To embed a map in a web page
   b. To fix the hot spots in that map
   c. Show all the related information when the hot spots are clicked.

b) Create a web page with the following.
   a. Cascading style sheets.
   b. Embedded style sheets.
   c. Inline style sheets. Use our college information for the web pages.

c) Create and save an XML document at the server, which contains 10 users Information. Write a Program, which takes user Id as an input and returns the User details by taking the user information from the XML document.

SOCKETS & SERVLETS
a) Write programs in Java using sockets to implement the following:
   i. HTTP request
   ii. FTP
   iii. SMTP
   iv. POP3

b) Write a program in Java for creating simple chat application with datagram sockets and datagram packets.
c) Write programs in Java using Servlets:
   i. To invoke servlets from HTML forms
   ii. To invoke servlets from Applets

d) Write programs in Java to create three-tier applications using servlets for conducting on-line examination for displaying student mark list. Assume that student information is available in a database which has been stored in a database server.
e) Write a program to lock servlet itself to a particular server IP address and port number. It requires an init parameter key that is appropriate for its servlet IP address and port before it unlocks itself and handles a request
f) Session tracking using hidden form fields and Session tracking for a hit count
g) Install TOMCAT web server. Convert the static webpages of programs 1&2 into dynamic web pages using servlets (or JSP) and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.

ADVANCE CONCEPTS:

a) Implement a simple program using following frameworks
   a. JSP Struts Framework b. Hibernate c. Spring
b) Explore the following application in AJAX: Searching in real time with live searches, Getting the answer with auto complete, Chatting with friends ,Dragging and dropping with Ajax, Getting instant login feedback, Ajax-enabled popup menus, Modifying Web pages on the fly.
c) Write a web services for finding what people think by asking 500 people’s opinion for any consumer product
d) Write a web services for predicting for any product sales

TOTAL: 45 PERIODS

REFERENCE:
spoken-tutorial.org.

OUTCOMES:

At the end of the course, the student should be able to
- Design Web pages using HTML/XML and style sheets
- Create user interfaces using Java frames and applets.
- Create dynamic web pages using server side scripting.
- Write Client Server applications.
- Use the frameworks JSP Strut, Hibernate, Spring
- Create applications with AJAX

LIST OF EQUIPMENTS FOR A BATCH OF 30 STUDENTS
SOFTWARE:
Java, Dream Weaver or Equivalent, MySQL or Equivalent, Apache Server

HARDWARE:
Standalone desktops 30 Nos

PTIT6601 MOBILE COMPUTING L T P C
3 0 0 3

OBJECTIVES:
The student should be made to:
- Understand the basic concepts of mobile computing
- Be familiar with the network protocol stack
- Learn the basics of mobile telecommunication system
- Be exposed to Ad-Hoc networks
- Gain knowledge about different mobile platforms and application development
UNIT I  INTRODUCTION

UNIT II  MOBILE INTERNET PROTOCOL AND TRANSPORT LAYER

UNIT III  MOBILE TELECOMMUNICATION SYSTEM
Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS).

UNIT IV  MOBILE AD-HOC NETWORKS

UNIT V  MOBILE PLATFORMS AND APPLICATIONS

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Explain the basics of mobile telecommunication system
- Choose the required functionality at each layer for given application
- Identify solution for each functionality at each layer
- Use simulator tools and design Ad hoc networks
- Develop a mobile application.

TEXT BOOK:

REFERENCES:
8. Windows Phone Dev Center : http://developer.windowsphone.com
OBJECTIVES:
The student should be made to:
- Learn the design principles of a Compiler.
- Learn the various parsing techniques and different levels of translation
- Learn how to optimize and effectively generate machine codes

UNIT I  INTRODUCTION TO COMPILERS  5
Translators-Compilation and Interpretation-Language processors -The Phases of Compiler-Errors Encountered in Different Phases-The Grouping of Phases-Compiler Construction Tools - Programming Language basics.

UNIT II  LEXICAL ANALYSIS  9
Need and Role of Lexical Analyzer-Lexical Errors-Expressing Tokens by Regular Expressions- Converting Regular Expression to DFA- Minimization of DFA-Language for Specifying Lexical Analyzers-LEX-Design of Lexical Analyzer for a sample Language.

UNIT III  SYNTAX ANALYSIS  10

UNIT IV  SYNTAX DIRECTED TRANSLATION & RUN TIME ENVIRONMENT  12
Syntax directed Definitions-Construction of Syntax Tree-Bottom-up Evaluation of S-Attribute Definitions- Design of predictive translator - Type Systems-Specification of a simple type checker-Equivalence of Type Expressions-Type Conversions.

RUN-TIME ENVIRONMENT: Source Language Issues-Storage Organization-Storage Allocation- Parameter Passing-Symbol Tables-Dynamic Storage Allocation-Storage Allocation in FORTAN.

UNIT V  CODE OPTIMIZATION AND CODE GENERATION  9

OUTCOMES:
At the end of the course, the student should be able to:
- Design and implement a prototype compiler.
- Apply the various optimization techniques.
- Use the different compiler construction tools.

TEXTBOOK:
REFERENCES:

PTCS6659 ARTIFICIAL INTELLIGENCE L T P C
3 0 0 3

OBJECTIVES:
The student should be made to:
• Study the concepts of Artificial Intelligence.
• Learn the methods of solving problems using Artificial Intelligence.
• Introduce the concepts of Expert Systems and machine learning.

UNIT I INTRODUCTION TO AI AND PRODUCTION SYSTEMS 9
Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics -Specialized production system- Problem solving methods - Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing-Depth first and Breath first, Constraints satisfaction - Related algorithms, Measure of performance and analysis of search algorithms.

UNIT II REPRESENTATION OF KNOWLEDGE 9
Game playing - Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge.

UNIT III KNOWLEDGE INFERENCE 9
Knowledge representation -Production based system, Frame based system. Inference - Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning - Certainty factors, Bayesian Theory-Bayesian Network-Dempster - Shafer theory.

UNIT IV PLANNING AND MACHINE LEARNING 9

UNIT V EXPERT SYSTEMS 9

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
• Identify problems that are amenable to solution by AI methods.
• Identify appropriate AI methods to solve a given problem.
• Formalise a given problem in the language/framework of different AI methods.
• Implement basic AI algorithms.
• Design and carry out an empirical evaluation of different algorithms on a problem formalisation, and state the conclusions that the evaluation supports.
TEXT BOOKS:

REFERENCES:
4. http://nptel.ac.in

PTCS6504 COMPUTER GRAPHICS

OBJECTIVES:
The student should be made to:
- Gain knowledge about graphics hardware devices and software used.
- Understand the two dimensional graphics and their transformations.
- Understand the three dimensional graphics and their transformations.
- Appreciate illumination and color models.
- Be familiar with understand clipping techniques.

UNIT I INTRODUCTION
Survey of computer graphics, Overview of graphics systems – Video display devices, Raster scan systems, Random scan systems, Graphics monitors and Workstations, Input devices, Hard copy Devices, Graphics Software; Output primitives – points and lines, line drawing algorithms, loading the frame buffer, line function; circle and ellipse generating algorithms; Pixel addressing and object geometry, filled area primitives.

UNIT II TWO DIMENSIONAL GRAPHICS
Two dimensional geometric transformations – Matrix representations and homogeneous coordinates, composite transformations; Two dimensional viewing – viewing pipeline, viewing coordinate reference frame; widow-to-viewport coordinate transformation, Two dimensional viewing functions; clipping operations – point, line, and polygon clipping algorithms.

UNIT III THREE DIMENSIONAL GRAPHICS
Three dimensional concepts; Three dimensional object representations – Polygon surfaces- Polygon tables- Plane equations - Polygon meshes; Curved Lines and surfaces, Quadratic surfaces; Blobby objects; Spline representations – Bezier curves and surfaces -B-Spline curves and surfaces. TRANSFORMATION AND VIEWING: Three dimensional geometric and modeling transformations – Translation, Rotation, Scaling, composite transformations; Three dimensional viewing – viewing pipeline, viewing coordinates, Projections, Clipping; Visible surface detection methods.

UNIT IV ILLUMINATION AND COLOUR MODELS
Light sources - basic illumination models – halftone patterns and dithering techniques; Properties of light - Standard primaries and chromaticity diagram; Intuitive colour concepts - RGB colour model - YIQ colour model - CMY colour model - HSV colour model - HLS colour model; Colour selection.
UNIT V ANIMATIONS & REALISM


OUTCOMES:
At the end of the course, the student should be able to:
- Design two dimensional graphics.
- Apply two dimensional transformations.
- Design three dimensional graphics.
- Apply three dimensional transformations.
- Apply Illumination and color models.
- Apply clipping techniques to graphics.
- Design animation sequences.

TEXT BOOKS:

REFERENCES:
6. http://nptel.ac.in/
LIST OF EXPERIMENTS:
1. Develop an application that uses GUI components, Font and Colours
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of database.
6. Develop an application that makes use of RSS Feed.
7. Implement an application that implements Multi threading
8. Develop a native application that uses GPS location information.
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert upon receiving a message.
11. Write a mobile application that creates alarm clock

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Design and Implement various mobile applications using emulators.
- Deploy applications to hand-held devices

LIST OF EQUIPMENTS FOR A BATCH OF 30 STUDENTS
Standalone desktops with Windows or Android or iOS or Equivalent Mobile Application Development Tools with appropriate emulators and debuggers - 30 Nos.

PTCS6701 CRYPTOGRAPHY AND NETWORK SECURITY

OBJECTIVES:
The student should be made to:
- Understand OSI security architecture and classical encryption techniques.
- Acquire fundamental knowledge on the concepts of finite fields and number theory.
- Understand various block cipher and stream cipher models.
- Describe the principles of public key cryptosystems, hash functions and digital signature.

UNIT I INTRODUCTION & NUMBER THEORY
Services, Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography).FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-Modular arithmetic-Euclid’s algorithm-Finite fields- Polynomial Arithmetic –Prime numbers-Fermat’s and Euler’s theorem-Testing for primality -The Chinese remainder theorem- Discrete logarithms.

UNIT II BLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY

UNIT III HASH FUNCTIONS AND DIGITAL SIGNATURES
UNIT IV  SECURITY PRACTICE & SYSTEM SECURITY

UNIT V  E-MAIL, IP & WEB SECURITY

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Compare various Cryptographic Techniques
- Design Secure applications
- Inject secure coding in the developed applications

TEXT BOOKS:

REFERENCES:

PTCS6703  GRID AND CLOUD COMPUTING

OBJECTIVES:
The student should be made to:
- Understand how Grid computing helps in solving large scale scientific problems.
- Gain knowledge on the concept of virtualization that is fundamental to cloud computing.
- Learn how to program the grid and the cloud.
- Understand the security issues in the grid and the cloud environment.

33
UNIT I INTRODUCTION

UNIT II GRID SERVICES

UNIT III VIRTUALIZATION
Cloud deployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software - Pros and Cons of cloud computing – Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data center automation.

UNIT IV PROGRAMMING MODEL

UNIT V SECURITY
Trust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure – Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Apply grid computing techniques to solve large scale scientific problems.
- Apply the concept of virtualization.
- Use the grid and cloud tool kits.
- Apply the security models in the grid and the cloud environment.

TEXT BOOK:

REFERENCES:
1. Jason Venner, “Pro Hadoop- Build Scalable, Distributed Applications in the Cloud”, A Press, 2009
OBJECTIVES:
The student should be made to:

- Be exposed to tool kits for grid and cloud environment.
- Be familiar with developing web services/Applications in grid framework.
- Learn to run virtual machines of different configuration.
- Learn to use Hadoop.

LIST OF EXPERIMENTS:

GRID COMPUTING LAB
Use Globus Toolkit or equivalent and do the following:
1. Develop a new Web Service for Calculator.
2. Develop new OGSA-compliant Web Service.
4. Develop applications using Java or C/C++ Grid APIs.
5. Develop secured applications using basic security mechanisms available in Globus Toolkit.
6. Develop a Grid portal, where user can submit a job and get the result. Implement it with and without GRAM concept.

CLOUD COMPUTING LAB
Use Eucalyptus or Open Nebula or equivalent to set up the cloud and demonstrate.
1. Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.
2. Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.
3. Install a C compiler in the virtual machine and execute a sample program.
4. Show the virtual machine migration based on the certain condition from one node to the other.
5. Find procedure to install storage controller and interact with it.
6. Find procedure to set up the one node Hadoop cluster.
7. Mount the one node Hadoop cluster using FUSE.
8. Write a program to use the API's of Hadoop to interact with it.
9. Write a wordcount program to demonstrate the use of Map and Reduce tasks.

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to
- Use the grid and cloud tool kits.
- Design and implement applications on the Grid.
- Design and implement applications on the Cloud.

LIST OF EQUIPMENTS FOR A BATCH OF 30 STUDENTS:

SOFTWARE:
Globus Toolkit or equivalent
Eucalyptus or Open Nebula or equivalent

HARDWARE
Standalone desktops 30 Nos
OBJECTIVES:
The student should be made to:
- Understand the challenges in parallel and multi-threaded programming.
- Learn about the various parallel programming paradigms, and solutions.

UNIT I  MULTI-CORE PROCESSORS  9

UNIT II  PARALLEL PROGRAM CHALLENGES  9
Performance – Scalability – Synchronization and data sharing – Data races – Synchronization primitives (mutexes, locks, semaphores, barriers) – deadlocks and livelocks – communication between threads (condition variables, signals, message queues and pipes).

UNIT III  SHARED MEMORY PROGRAMMING WITH OpenMP  9

UNIT IV  DISTRIBUTED MEMORY PROGRAMMING WITH MPI  9
MPI program execution – MPI constructs – libraries – MPI send and receive – Point-to-point and Collective communication – MPI derived datatypes – Performance evaluation

UNIT V  PARALLEL PROGRAM DEVELOPMENT  9
Case studies - n-Body solvers – Tree Search – OpenMP and MPI implementations and comparison.

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Program Parallel Processors.
- Develop programs using OpenMP and MPI.
- Compare and contrast programming for serial processors and programming for parallel processors.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination.

The students in a group of 3 to 4 works on a topic approved by the head of the department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.

TOTAL: 135 PERIODS

OUTCOMES:
- On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

OBJECTIVES:
The student should be made to:
- Understand the foundations of CLR execution.
- Learn the technologies of the .NET framework.
- Know the object oriented aspects of C#.
- Be aware of application development in .NET.
- Learn web based applications on .NET (ASP.NET).

UNIT I  INTRODUCTION TO C#  9
Introducing C#, Understanding .NET, overview of C#, Literals, Variables, Data Types, Operators, checked and unchecked operators, Expressions, Branching, Looping, Methods, implicit and explicit casting, Constant, Arrays, Array Class, Array List, String, String Builder, Structure, Enumerations, boxing and unboxing.

UNIT II  OBJECT ORIENTED ASPECTS OF C#  9
Class, Objects, Constructors and its types, inheritance, properties, indexers, index overloading, polymorphism, sealed class and methods, interface, abstract class, abstract and interface, operator overloading, delegates, events, errors and exception, Threading.

UNIT III  APPLICATION DEVELOPMENT ON .NET  9
Building windows application, Creating our own window forms with events and controls, menu creation, inheriting window forms, SDI and MDI application, Dialog Box(Modal and Modeless), accessing data with ADO.NET, DataSet, typed dataset, Data Adapter, updating database using stored procedures, SQL Server with ADO.NET, handling exceptions, validating controls, windows application configuration.
UNIT IV WEB BASED APPLICATION DEVELOPMENT ON .NET
Programming web application with web forms, ASP.NET introduction, working with XML and .NET, Creating Virtual Directory and Web Application, session management techniques, web.config, web services, passing datasets, returning datasets from web services, handling transaction, handling exceptions, returning exceptions from SQL Server.

UNIT V CLR AND .NET FRAMEWORK
Assemblies, Versioning, Attributes, reflection, viewing meta data, type discovery, reflection on type, marshalling, remoting, security in .NET

TOTAL: 45 PERIODS

OUTCOMES:
After completing this course, the student will be able to:
• List the major elements of the .NET framework
• Explain how C# fits into the .NET platform.
• Analyze the basic structure of a C# application
• Debug, compile, and run a simple application.
• Develop programs using C# on .NET
• Design and develop Web based applications on .NET
• Discuss CLR.

TEXT BOOKS:

REFERENCES:

PTGE6757 TOTAL QUALITY MANAGEMENT

OBJECTIVES:
- To facilitate the understanding of Quality Management principles and process.

UNIT I INTRODUCTION

UNIT II TQM PRINCIPLES
Leadership - Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, Quality circles Recognition and Reward, Performance appraisal - Continuous process improvement - PDCA cycle, 5S, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating.
UNIT III TQM TOOLS AND TECHNIQUES I
The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types.

UNIT IV TQM TOOLS AND TECHNIQUES II

UNIT V QUALITY SYSTEMS

TOTAL: 45 PERIODS

OUTCOMES:
- The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

TEXTBOOK:

REFERENCES:

PT IT6702 DATA WAREHOUSING AND DATA MINING

OBJECTIVES:
The student should be made to:
- Be familiar with the concepts of data warehouse and data mining,
- Be acquainted with the tools and techniques used for Knowledge Discovery in Databases.

UNIT I DATA WAREHOUSING

UNIT II BUSINESS ANALYSIS
UNIT III DATA MINING

UNIT IV ASSOCIATION RULE MINING AND CLASSIFICATION
Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction.

UNIT V CLUSTERING AND TRENDS IN DATA MINING

OUTCOMES:
After completing this course, the student will be able to:
- Apply data mining techniques and methods to large data sets.
- Use data mining tools
- Compare and contrast the various classifiers.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

UNIT I  HUMAN VALUES  10

UNIT II  ENGINEERING ETHICS  9

UNIT III  ENGINEERING AS SOCIAL EXPERIMENTATION  9
Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

UNIT IV  SAFETY, RESPONSIBILITIES AND RIGHTS  9

UNIT V  GLOBAL ISSUES  8

TOTAL: 45 PERIODS

OUTCOMES:
- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society

TEXT BOOKS:

REFERENCES:
OBJECTIVES:

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction.
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR).
- To enhance awareness of institutional processes in the country and.
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity.

UNIT I

INTRODUCTION TO DISASTERS

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

UNIT II

APPROACHES TO DISASTER RISK REDUCTION (DRR)

Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake-holders- Institutional Processes and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT III

INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT IV

DISASTER RISK MANAGEMENT IN INDIA

Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.
UNIT V

DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS

Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

TOTAL: 45 PERIODS

OUTCOMES:
The students will be able to

- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.
- Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management

TEXTBOOK:

REFERENCES
1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005

PTCS6003

AD HOC AND SENSOR NETWORKS

OBJECTIVES:
The student should be made to:

- Understand the design issues in ad hoc and sensor networks.
- Learn the different types of MAC protocols.
- Be familiar with different types of adhoc routing protocols.
- Be expose to the TCP issues in adhoc networks.
- Learn the architecture and protocols of wireless sensor networks.

UNIT I

INTRODUCTION

UNIT II MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS

Issues in designing a MAC Protocol - Classification of MAC Protocols - Contention based protocols - Contention based protocols with Reservation Mechanisms - Contention based protocols with Scheduling Mechanisms - Multi channel MAC - IEEE 802.11
UNIT III ROUTING PROTOCOLS AND TRANSPORT LAYER IN AD HOC WIRELESS NETWORKS

Issues in designing a routing and Transport Layer protocol for Ad hoc networks- proactive routing, reactive routing (on-demand), hybrid routing- Classification of Transport Layer solutions-TCP over Ad hoc wireless Networks.

UNIT IV WIRELESS SENSOR NETWORKS (WSNS) AND MAC PROTOCOLS

Single node architecture: hardware and software components of a sensor node - WSN Network architecture: typical network architectures-data relaying and aggregation strategies -MAC layer protocols: self-organizing, Hybrid TDMA/FDMA and CSMA based MAC- IEEE 802.15.4.

UNIT V WSN ROUTING, LOCALIZATION & QOS


OUTCOMES:

Upon completion of the course, the student should be able to:

- Explain the concepts, network architectures and applications of ad hoc and wireless sensor networks
- Analyze the protocol design issues of ad hoc and sensor networks
- Design routing protocols for ad hoc and wireless sensor networks with respect to some protocol design issues
- Evaluate the QoS related performance measurements of ad hoc and sensor networks

TEXT BOOK:


REFERENCES:


PTCS6005 ADVANCED DATABASE SYSTEMS

OBJECTIVES:

The student should be made to:

- Learn different types of databases.
- Be exposed to query languages.
- Be familiar with the indexing techniques.
UNIT I PARALLEL AND DISTRIBUTED DATABASES

UNIT II ACTIVE DATABASES

UNIT III TEMPORAL AND OBJECT DATABASES

UNIT IV COMPLEX QUERIES AND REASONING

UNIT V SPATIAL, TEXT AND MULTIMEDIA DATABASES

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student should be able to:
- Design different types of databases.
- Use query languages.
- Apply indexing techniques.

TEXT BOOK:

REFERENCES:
OBJECTIVES:
- To outline the need for Software Project Management
- To highlight different techniques for software cost estimation and activity planning.

UNIT I  PROJECT EVALUATION AND PROJECT PLANNING  

UNIT II  PROJECT LIFE CYCLE AND EFFORT ESTIMATION  

UNIT III  ACTIVITY PLANNING AND RISK MANAGEMENT  

UNIT IV  PROJECT MANAGEMENT AND CONTROL  

UNIT V  STAFFING IN SOFTWARE PROJECTS  

OUTCOMES:
- At the end of the course the students will be able to practice Project Management principles while developing a software.

TEXTBOOK:

REFERENCES:
OBJECTIVES:
The student should be made to:
- Expose the criteria for test cases.
- Learn the design of test cases.
- Be familiar with test management and test automation techniques.
- Be exposed to test metrics and measurements.

UNIT I INTRODUCTION

UNIT II TEST CASE DESIGN

UNIT III LEVELS OF TESTING

UNIT IV TEST MANAGEMENT

UNIT V TEST AUTOMATION

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course the students will be able to
- Design test cases suitable for a software development for different domains.
- Identify suitable tests to be carried out.
- Prepare test planning based on the document.
- Document test plans and test cases designed.
- Use of automatic testing tools.
- Develop and validate a test plan.
TEXT BOOKS:

REFERENCES:

PTGE6084 HUMAN RIGHTS

OBJECTIVES :
• To sensitize the Engineering students to various aspects of Human Rights.

UNIT I

UNIT II

UNIT III
Theories and perspectives of UN Laws – UN Agencies to monitor and compliance.

UNIT IV
Human Rights in India – Constitutional Provisions / Guarantees.

UNIT V

TOTAL : 45 PERIODS

OUTCOMES:
• Engineering students will acquire the basic knowledge of human rights.

REFERENCES:
OBJECTIVES:
The student should be made to:
- Learn the architecture and programming of ARM processor.
- Be familiar with the embedded computing platform design and analysis.
- Be exposed to the basic concepts of real time Operating system.
- Learn the system design techniques and networks for embedded systems

UNIT I  INTRODUCTION TO EMBEDDED COMPUTING AND ARM PROCESSORS
Complex systems and micro processors– Embedded system design process –Design example: Model train controller- Instruction sets preliminaries - ARM Processor – CPU: programming input and output-supervisor mode, exceptions and traps – Co-processors- Memory system mechanisms – CPU performance- CPU power consumption.

UNIT II  EMBEDDED COMPUTING PLATFORM DESIGN
The CPU Bus-Memory devices and systems–Designing with computing platforms – consumer electronics architecture – platform-level performance analysis - Components for embedded programs- Models of programs- Assembly, linking and loading – compilation techniques- Program level performance analysis – Software performance optimization – Program level energy and power analysis and optimization – Analysis and optimization of program size- Program validation and testing.

UNIT III  PROCESSES AND OPERATING SYSTEMS
Introduction – Multiple tasks and multiple processes – Multirate systems- Preemptive real-time operating systems- Priority based scheduling- Interprocess communication mechanisms – Evaluating operating system performance- power optimization strategies for processes – Example Real time operating systems- POSIX-Windows CE.

UNIT V  SYSTEM DESIGN TECHNIQUES AND NETWORKS
Design methodologies- Design flows - Requirement Analysis – Specifications-System analysis and architecture design – Quality Assurance techniques- Distributed embedded systems – MPSoCs and shared memory multiprocessors.

UNIT V  CASE STUDY
Data compressor - Alarm Clock - Audio player - Software modem-Digital still camera - Telephone answering machine-Engine control unit – Video accelerator.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, students will be able to:
- Describe the architecture and programming of ARM processor.
- Outline the concepts of embedded systems
- Explain the basic concepts of real time Operating system design.
- Use the system design techniques to develop software for embedded systems
- Differentiate between the general purpose operating system and the real time operating system
- Model real-time applications using embedded-system concepts

TEXT BOOK:
REFERENCES:

PTCS6007 INFORMATION RETRIEVAL

OBJECTIVES:
The Student should be made to:

- Learn the information retrieval models.
- Be familiar with Web Search Engine.
- Be exposed to Link Analysis.
- Understand Hadoop and Map Reduce.
- Learn document text mining techniques.

UNIT I INTRODUCTION

UNIT II INFORMATION RETRIEVAL

UNIT III WEB SEARCH ENGINE – INTRODUCTION AND CRAWLING

UNIT IV WEB SEARCH – LINK ANALYSIS AND SPECIALIZED SEARCH

UNIT V DOCUMENT TEXT MINING
Information filtering; organization and relevance feedback – Text Mining -Text classification and clustering - Categorization algorithms: naive Bayes; decision trees; and nearest neighbor - Clustering algorithms: agglomerative clustering; k-means; expectation maximization (EM).

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, students will be able to
- Apply information retrieval models.
- Design Web Search Engine.
- Use Link Analysis.
- Use Hadoop and Map Reduce.
- Apply document text mining techniques.

TEXT BOOKS:

REFERENCES:

PTCS6012 SOFT COMPUTING L T P C 3 0 0 3

OBJECTIVES:
The student should be made to:
- Learn the various soft computing frame works.
- Be familiar with design of various neural networks.
- Be exposed to fuzzy logic.
- Learn genetic programming.
- Be exposed to hybrid systems.

UNIT I INTRODUCTION
UNIT II NEURAL NETWORKS

UNIT III FUZZY LOGIC

UNIT IV GENETIC ALGORITHM

UNIT V HYBRID SOFT COMPUTING TECHNIQUES & APPLICATIONS

TOTAL: 45 PERIODS

OUTCOMES
Upon completion of the course, the student should be able to:
- Apply various soft computing frame works.
- Design of various neural networks.
- Use fuzzy logic.
- Apply genetic programming.
- Discuss hybrid soft computing.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
The student should be made to:
- Learn XML fundamentals.
- Be exposed to build applications based on XML.
- Understand the key principles behind SOA.
- Be familiar with the web services technology elements for realizing SOA.
- Learn the various web service standards.

UNIT I  INTRODUCTION TO XML  9

UNIT II  BUILDING XML- BASED APPLICATIONS  9

UNIT III  SERVICE ORIENTED ARCHITECTURE  9
Characteristics of SOA, Comparing SOA with Client-Server and Distributed architectures – Benefits of SOA -- Principles of Service orientation – Service layers.

UNIT IV  WEB SERVICES  9

UNIT V  BUILDING SOA-BASED APPLICATIONS  9

OUTCOMES:
Upon successful completion of this course, students will be able to:
- Build applications based on XML.
- Develop web services using technology elements.
- Build SOA-based applications for intra-enterprise and inter-enterprise applications.

TEXTBOOKS:

REFERENCES:
OBJECTIVES:
The student should be made to:
- Learn the foundations of Human Computer Interaction.
- Be familiar with the design technologies for individuals and persons with disabilities.
- Be aware of mobile HCI.
- Learn the guidelines for user interface.

UNIT I FOUNDATIONS OF HCI

UNIT II DESIGN & SOFTWARE PROCESS

UNIT III MODELS AND THEORIES
Cognitive models –Socio-Organizational issues and stake holder requirements –Communication and collaboration models-Hypertext, Multimedia and WWW.

UNIT IV MOBILE HCI

UNIT V WEB INTERFACE DESIGN

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student should be able to:
- Design effective dialog for HCI.
- Design effective HCI for individuals and persons with disabilities.
- Assess the importance of user feedback.
- Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.
- Develop meaningful user interface.

TEXT BOOKS:
OBJECTIVES:
The student should be made to:
- Learn the Evolution of Knowledge management.
- Be familiar with tools.
- Be exposed to Applications.
- Be familiar with some case studies.

UNIT I INTRODUCTION
An Introduction to Knowledge Management - The foundations of knowledge management - including cultural issues - technology applications organizational concepts and processes - management aspects - and decision support systems. The Evolution of Knowledge management: From Information Management to Knowledge Management - Key Challenges Facing the Evolution of Knowledge Management - Ethics for Knowledge Management.

UNIT II CREATING THE CULTURE OF LEARNING AND KNOWLEDGE SHARING

UNIT III KNOWLEDGE MANAGEMENT-THE TOOLS
Telecommunications and Networks in Knowledge Management - Internet Search Engines and Knowledge Management - Information Technology in Support of Knowledge Management - Knowledge Management and Vocabulary Control - Information Mapping in Information Retrieval - Information Coding in the Internet Environment - Repackaging Information.

UNIT IV KNOWLEDGEMANAGEMENT-APPLICATION
Components of a Knowledge Strategy - Case Studies (From Library to Knowledge Center, Knowledge Management in the Health Sciences, Knowledge Management in Developing Countries).

UNIT V FUTURE TRENDS AND CASE STUDIES
Advanced topics and case studies in knowledge management - Development of a knowledge management map/plan that is integrated with an organization's strategic and business plan - A case study on Corporate Memories for supporting various aspects in the process life -cycles of an organization.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student should be able to:
- Use the knowledge management tools.
- Develop knowledge management Applications.
- Design and develop enterprise applications.

TEXT BOOK:

REFERENCE:
OBJECTIVES:
The student should be made to:
- Understand the concept of semantic web and related applications.
- Learn knowledge representation using ontology.
- Understand human behaviour in social web and related communities.
- Learn visualization of social networks.

UNIT I INTRODUCTION

UNIT II MODELLING, AGGREGATING AND KNOWLEDGE REPRESENTATION

UNIT III EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL NETWORKS

UNIT IV PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES

UNIT V VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS

OUTCOMES:
Upon completion of the course, the student should be able to:
- Develop semantic web related applications.
- Represent knowledge using ontology.
- Predict human behavior in social web and related communities.
- Visualize social networks.
TEXT BOOKS:

REFERENCES:

PTIT6006 DATA ANALYTICS

OBJECTIVE:
The Student should be made to:
- Be exposed to big data
- Learn the different ways of Data Analysis
- Be familiar with data streams
- Learn the mining and clustering
- Be familiar with the visualization

UNIT I INTRODUCTION TO BIG DATA

UNIT II DATA ANALYSIS

UNIT III MINING DATA STREAMS

UNIT IV FREQUENT ITEMSETS AND CLUSTERING
UNIT V  FRAMEWORKS AND VISUALIZATION

MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications:

TOTAL: 45 PERIODS

OUTCOMES:
The student should be made to:

- Apply the statistical analysis methods.
- Compare and contrast various soft computing frameworks.
- Design distributed file systems.
- Apply Stream data model.
- Use Visualisation techniques

TEXT BOOKS:

REFERENCES:

PTCS6013  FOUNDATION SKILLS IN INTEGRATED PRODUCT DEVELOPMENT

OBJECTIVE:
This program can be offered with all Undergraduate programs/courses for all engineering streams. The FSIPD program aims to improve student’s awareness and understanding of the basic concepts involved in Integrated product Development (IPD) by providing exposure to the key product development concepts. Students, who complete this program, will stand a better chance to be considered for jobs in the Engineering industry.

COURSE OBJECTIVES:
After completing this program, the student will be able to obtain the technical skills needed to effectively play the entry level design engineer role in an engineering organization.

The student will be able to:
- Understand the global trends and development methodologies of various types of products and services
- Conceptualize, prototype and develop product management plan for a new product based on the type of the new product and development methodology integrating the hardware, software, controls, electronics and mechanical systems
- Understand requirement engineering and know how to collect, analyze and arrive at requirements for new product development and convert them in to design specification
- Understand system modeling for system, sub-system and their interfaces and arrive at the optimum system specification and characteristics
- Gain knowledge of the Innovation & Product Development process in the Business Context
UNIT I FUNDAMENTALS OF PRODUCT DEVELOPMENT 9

UNIT II REQUIREMENTS AND SYSTEM DESIGN 9

UNIT III DESIGN AND TESTING 9

UNIT IV SUSTENANCE ENGINEERING AND END-OF-LIFE (EOL) SUPPORT 9

UNIT V BUSINESS DYNAMICS ENGINEERING SERVICES INDUSTRY 9

TOTAL: 45 PERIODS

COURSE OUTCOMES:
The students will be able to
- Define, formulate and analyze a problem
- Solve specific problems independently or as part of a team
- Develop documentation, test specifications and coordinate with various teams to validate and sustain up to the EoL (End of Life) support activities for engineering customer
- Work independently as well as in teams
- Manage a project from start to finish

COURSE MATERIAL AND PEDAGOGY:
- NASSCOM has agreed to prepare / revise the course materials [selected teachers Anna University from major disciplines will be included in the process] as PPT slides for all theUNITS. The PPTs can be printed and given to each student if necessary at a Nominal Fee. This is the best possible material for this special course.
- NASSCOM will train the teachers of Anna University to enable them to teach this course. A training programme for nearly 3500 teachers needs to be organized. The team is exploring use of technology including the EDUSAT facility at Anna University.
The course is to be offered as an elective to all UG Students both in the Constituent Colleges and Affiliated colleges of Anna University.

TEXT BOOKS [INDIAN ECONOMY EDITIONS]:

REFERENCES: