PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

I. To prepare students to excel in the computing profession by providing solid technical foundations in the field of computer applications.

II. To provide students various computing skills like the analysis, design and development of innovative software products to meet the industry needs.

III. To motivate students to pursue lifelong learning and to do research as computing professionals and scientists.

IV. To motivate students to communicate and function effectively in teams in multidisciplinary fields within the global, societal and environmental context.

PROGRAM OUTCOMES (POS):

On successful completion of the program:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in
diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**PROGRAM SPECIFIC OBJECTIVES (PSOs):**

1. Enable the students to select the suitable data model, appropriate architecture and platform to implement a system with good performance.

2. Enable the students to design and integrate various system based components to provide user interactive solutions for various challenges.

**MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OBJECTIVES:**

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ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
MASTER OF COMPUTER APPLICATIONS
REGULATIONS – 2017
CHOICE BASED CREDIT SYSTEM
CURRICULA AND SYLLABI

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EMPLOYABILITY ENHANCEMENT COURSE (EEC)
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MA5161 MATHEMATICAL FOUNDATIONS FOR COMPUTER APPLICATIONS  L    T    P    C
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OBJECTIVES:
The primary objective of this course is to provide mathematical background and sufficient experience on various topics of discrete mathematics like matrix algebra, logic and proofs, combinatorics, graphs, algebraic structures, formal languages and finite state automata. This course will extend student’s Logical and Mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.

UNIT I MATRIX ALGEBRA  12
Matrices - Rank of a matrix - Solving system of equations - Eigenvalues and Eigenvectors - Cayley - Hamilton theorem - Inverse of a matrix.

UNIT II BASIC SET THEORY  12
Basic definitions - Venn diagrams and set operations - Laws of set theory - Principle of inclusion and exclusion – Partitions - Permutation and combination – Relations - Properties of relations - Matrices of relations - Closure operations on relations - Functions - Injective, subjective and objective functions.

UNIT III MATHEMATICAL LOGIC  12
Propositions and logical operators - Truth table - Propositions generated by a set - Equivalence and implication - Basic laws - Some more connectives - Functionally complete set of connectives - Normal forms - Proofs in propositional calculus - Predicate calculus.

UNIT IV FORMAL LANGUAGES  12
Languages and grammars - Phrase structure grammar - Classification of grammars - Pumping lemma for regular languages - Context free languages.

UNIT V FINITE STATE AUTOMATA  12
Finite state automata - Deterministic finite state automata (DFA) - Non deterministic finite state automata (NFA) - Equivalence of DFA and NFA - Equivalence of NFA and Regular Languages.

TOTAL : 60 PERIODS

OUTCOMES:
After completing this course, students should demonstrate competency in the following skills:

- Basic knowledge of matrix, set theory, functions and relations concepts needed for designing and solving problems.
- Logical operations and predicate calculus needed for computing skill
- Design and solve Boolean functions for defined problems.
- Apply the acquired knowledge of formal languages to the engineering areas like Compiler Design
- Apply the acquired knowledge of finite automata theory and to design discrete problems to solve by computers.
REFERENCES:

MC5101 COMPUTER ORGANISATION L T P C 3 0 0 3

OBJECTIVES:
- To understand the various number systems
- To become familiar with Boolean algebra
- To study the different types of combinational and sequential circuits
- To comprehend the basis operations that happen in a CPU
- To learn the data path and control path implementation
- To become familiar with the memory hierarchy design and I/O design

UNIT I DIGITAL FUNDAMENTALS 8

UNIT II COMBINATIONAL AND SEQUENTIAL CIRCUITS 10

UNIT III BASIC STRUCTURE OF COMPUTER 9

UNIT IV PROCESSOR DESIGN 9
Processor basics – CPU Organization – Data Path Design – Control Design – Basic concepts – Hardwired control – Micro Programmed control – Pipe control – Hazards super scale operations

UNIT V MEMORY AND I/O SYSTEMS 9
Memory technology – Memory Systems- Virtual Memory – Caches – Design Methods – Associative memories – Input /output system – Programmed I/O – DMA and interrupts – I/O devices and Interfaces

TOTAL : 45 PERIODS
OUTCOMES:
At the end of this course, the students will be able to:
- Perform conversions and arithmetic operations in various number systems
- Simplify using laws of Boolean algebra and Karnaugh map method
- Design various combinational and sequential circuits
- Differentiate between various addressing modes
- Trace the flow of execution of an instruction in a processor
- Differentiate between the various mapping policies used in cache memories
- Discuss the implementation of virtual memory
- Discuss the various types of I/O transfers

REFERENCES:

MC5102 PROBLEM SOLVING AND PROGRAMMING  L  T  P  C  3 0 0 3

OBJECTIVES:
- To understand the basic concepts of problem solving approaches and to develop the algorithms.
- Apply the techniques of structured (functional) decomposition to break a program into smaller pieces and describe the mechanics of parameter passing.
- To design, implements, test, and apply the basic C programming concepts.

UNIT I INTRODUCTION TO COMPUTER PROBLEM SOLVING  8

UNIT II PROGRAMMING AND ALGORITHMS  9
UNIT III  BASICS OF ‘C’, INPUT / OUTPUT & CONTROL STATEMENTS


UNIT IV  ARRAYS, STRINGS, FUNCTIONS AND POINTERS


UNIT V  USER-DEFINED DATATYPES & FILES


TOTAL: 45 PERIODS

OUTCOMES:

- Able to design a computational solution for a given problem.
- Able to break a problem into logical modules that can be solved (programmed).
- Able to transform a problem solution into programs involving programming constructs.
- To write programs using structures, strings, arrays, pointer and files for solving complex computational problem.
- Able to introduce modularity using functions and pointers which permit ad hoc run-time polymorphism.

REFERENCES:

MC5103
DATABASE MANAGEMENT SYSTEMS

OBJECTIVES:
- To understand the fundamentals of data models and conceptualize and depict a database system using ER diagram.
- To make a study of SQL and relational database design.
- To know about data storage techniques and query processing.
- To impart knowledge in transaction processing, concurrency control techniques and recovery procedures.

UNIT I    INTRODUCTION

UNIT II    RELATIONAL MODEL AND QUERY EVALUATION

UNIT III   TRANSACTION PROCESSING

UNIT IV    FILES AND INDEXING

UNIT V    SPECIAL PURPOSE DATABASES

TOTAL: 45 PERIODS

OUTCOMES:
- Understand the basic concepts of the database and data models.
- Design a database using ER diagrams and map ER into Relations and normalize the relations.
- Acquire the knowledge of query evaluation to monitor the performance of the DBMS.
- Develop a simple database applications using normalization.
- Acquire the knowledge about different special purpose databases and to critique how they differ from traditional database systems.
REFERENCES:

MC5104

DATA STRUCTURES

OBJECTIVES:
- Be familiar with basic techniques of algorithm analysis.
- Be exposed to the concept of ADTs.
- Learn linear data structures-List, Stack and Queue.
- Learn nonlinear data structures-Tree and Graphs.
- Be exposed to sorting, searching and hashing algorithms

UNIT I INTRODUCTION

UNIT II LINEAR DATA STRUCTURES – LIST

UNIT III LINEAR DATA STRUCTURES - STACK, QUEUE

UNIT IV NON LINEAR DATA STRUCTURES - TREES AND GRAPHS

UNIT V SORTING, SEARCHING AND HASH TECHNIQUES

TOTAL: 45 PERIODS
OUTCOMES:
- Able to analyze algorithms and determines their time complexity.
- Able to understand the concepts of data types, data structures and linear structures.
- Able to apply data structures to solve various problems
- Able to understand non-linear data structures. Able to apply different Sorting, Searching and Hashing algorithms.

REFERENCES:

DATA STRUCTURES LABORATORY

MC5111

OBJECTIVES:
- To develop skills in design and implementation of data structures and their applications
- To learn and implement linear, non linear and tree data structures
- To study, implement and analyze the sorting technique.

LIST OF EXPERIMENTS
1. Array- Insertion and Deletion
2. Application using array of structures
3. Array Implementation of Stack
4. Array Implementation of Queue
5. Infix to postfix conversion
6. Singly Linked List operations
7. Polynomial manipulation- addition, subtraction
8. Binary Tree Traversal
9. Quick Sort
10. Binary Search

TOTAL: 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Work with basic data structures that are suitable for the problems to be solved efficiently.
- Design and implement linear, and tree and its applications.
- Design sorting technique, its algorithm design and analysis.
MC5112 DATABASE MANAGEMENT SYSTEMS LABORATORY  

OBJECTIVES:
- To understand the concepts of DBMS.
- To familiarize with SQL queries.
- To write stored procedures in DBMS.
- To learn front end tools to integrate with databases.

LIST OF EXPERIMENTS:
1. Creation of base tables and views
2. Data Manipulation INSERT, DELETE and UPDATE in Tables. SELECT, Sub Queries and
3. Data Control Commands
4. High level language extensions – PL/SQL or Transact SQL – Packages
5. Use of Cursors, Procedures and Functions
6. Embedded SQL or Database Connectivity
7. Oracle or SQL Server Triggers – Block Level – Form Level Triggers
8. Working with Forms, Menus and ReportWriters for a application project in any domain

TOTAL: 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Design and Implement databases
- Formulate complex queries using SQL
- Design and Implement applications that have GUI and access databases for backend connectivity

MC5113 COMMUNICATION SKILL LABORATORY

OBJECTIVES:
- To provide opportunities to learners to practice their communicative skills to make them become proficient users of English.
- To enable learners to fine-tune their linguistic skills (LSRW) with the help of technology to communicate globally.
- To enhance the performance of learners at placement interviews and group discussions and other recruitment procedures.

LIST OF EXPERIMENTS:
1. PC based session (Weightage 40%)
   A. English Language Lab
      1. Listening Comprehension:(5) Listening and typing – Listening and sequencing of sentences – Filling in the blanks - Listening and answering questions.
      2. Reading Comprehension:(5) Filling in the blanks - Close exercises – Vocabulary building - Reading and answering questions.

2. **B. Discussion of audio-visual materials (Samples to learn and practice)** (6)
   1. **Resume / Report Preparation / Letter Writing** (1)
      Structuring the resume / report - Letter writing / Email Communication - Samples.
   2. **Presentation skills:** (1)
      Elements of effective presentation – Structure of presentation - Presentation tools – Voice Modulation – Audience analysis - Body language – Video samples
   3. **Soft Skills:** (2)
      Time management – Articulateness – Assertiveness – Psychometrics – Innovation and Creativity - Stress Management & Poise - Video Samples
   4. **Group Discussion:** (1)
      Why is GD part of selection process? - Structure of GD – Moderator – led and other GDs Strategies in GD – Team work - Body Language - Mock GD – Video samples
   5. **Interview Skills:** (1)
      Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews – Video samples.

3. **II. Practice Session (Weightage – 60%)**
   **Resume / Report Preparation / Letter writing:** (2)

4. **SOFT SKILLS** (6)

5. **PRESENTATION SKILLS** (6)
   Preparing slides with animation related to the topic – organizing the material - Introducing oneself to the audience – introducing the topic – answering questions – individual presentation practice— presenting the visuals effectively – 5 minute presentation

6. **GROUP DISCUSSION SKILLS** (5)
   Participating in group discussions – understanding group dynamics - brainstorming the topic — questioning and clarifying – GD strategies (expressing opinions, accepting or refusing others opinions, turn taking) – activities to improve GD skills – viewing recorded GD - mock GD.

7. **INTERVIEW SKILLS** (5)
   Interview etiquette – dress code – body language – mock interview – attending job interviews – answering questions confidently – technical interview – telephone/Skype interview - practice in different types of questions – one to one interview & panel interview – FAQs related to job interview - Emotional and cultural intelligence

**TOTAL: 45 PERIODS**
OUTCOMES:
Upon Completion of the course, the students will be able to:
• Students will be able to make presentations and participate in group discussions with high level of self-confidence.
• Students will be able to perform well in the interviews
• They will have adequate reading and writing skills needed for workplace situations

MC5201
OBJECT ORIENTED PROGRAMMING

OBJECTIVES:
• To learn how C++ supports Object Oriented principles such as abstraction, polymorphism etc
• To understand and apply the principles hiding, localization and modularity in software development.
• Use the generic programming features of C++ including the STL.
• Design and implement reliable and maintainable object-oriented applications of moderate complexity composed of several classes.

UNIT I FUNDAMENTALS OF OBJECT ORIENTED PROGRAMMING

UNIT II IMPLEMENTING ADTS AND ENCAPSULATION
Aggregate Type struct – Structure Pointer Operators – Unions – Bit Fields – Data Handling and Member Functions – Classes – Constructors and Destructors – Static Member – this Pointer – reference semantics – implementation of simple ADTs.

UNIT III POLYMORPHISM

UNIT IV TEMPLATES AND FILE HANDLING

UNIT V INHERITANCE

TOTAL : 45 PERIODS
OUTCOMES:

- Able to understand and design the solution to a problem using object-oriented programming concepts.
- Able to use proper class protection mechanism to provide security.
- Able to demonstrate the use of virtual functions to implement polymorphism.
- Understand and implement the features of C++ including templates, exceptions and file handling for providing programmed solutions to complex problems.
- Able to reuse the code with extensible Class types, User-defined operators and function Overloading.

REFERENCES:

UNIT IV  EMBEDDED C PROGRAMMING  

UNIT V  EMBEDDED SYSTEM DEVELOPMENT  
Meeting real time constraints – Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers. Introduction to Internet of Things - Design issues – Design methodologies – Case studies using IoT – Complete design of example systems.

REFERENCES:

MC5203  SOFTWARE ENGINEERING  
L T P C  3 0 0 3

OBJECTIVES:
• To provide an insight into software life cycle and various software process models
• To estimate the resources for developing the application and to prepare the schedule
• To know the various designing concepts and notations for modeling the software.
• To prepare the test cases for the project, apply various testing techniques, strategies and metrics to evaluate the software.
• To construct software with high quality and reliability.

UNIT I  INTRODUCTION  

UNIT II  SOFTWARE DESIGN  

UNIT III  SOFTWARE TESTING AND MAINTENANCE  
UNIT IV  SOFTWARE METRICS  

UNIT V  SCM & WEB ENGINEERING  

OUTCOMES:  
- Able to understand the problem domain to choose process models and to develop SRS  
- Able to model software projects using appropriate design notations  
- Able to measure the product and process performance using various metrics  
- Able to evaluate the system with various testing techniques and strategies  
- Able to analyze, design, verify, validate, implement, and maintain software systems.

REFERENCES:  

MC5204  OPERATING SYSTEMS  
L  T  P  C  
3  0  0  3

OBJECTIVES:  
- To be aware of the evolution and fundamental principles of operating system, processes and their communication  
- To understand the various operating system components like process management, memory management and  
- To know about file management and the distributed file system concepts in operating systems  
- To be aware of components of operating system with relevant case study.

UNIT I  INTRODUCTION  
Introduction -Types of operating systems operating systems structures-Systems components- operating systems services-System calls-Systems programs-Processes-process concept- process scheduling-operation on processes-co-operating processes-Inter process communications-CPU Scheduling-Scheduling criteria-Scheduling algorithms-Multiple-processor Scheduling.
UNIT II PROCESS SYNCHRONIZATION

UNIT III MEMORY MANAGEMENT
Memory Management-Swapping-Contiguous Memory allocation-Paging-Segmentation-Virtual Memory-Demand paging-Page Replacement-Thrashing.

UNIT IV DISK SCHEDULING AND DISTRIBUTED SYSTEMS

UNIT V CASE STUDIES
Linux System-design Principles-process management-File Systems-Windows 7- history-design Principles –system components –Virtual machine OS.

TOTAL : 45 PERIODS

OUTCOMES:
- Able to understand the operating system components and its services
- Implement the algorithms in process management and solving the issues of IPC
- Able to demonstrate the mapping between the physical memory and virtual memory
- Able to understand file handling concepts in OS perspective
- Able to understand the operating system components and services with the recent OS

REFERENCES:
OBJECTIVES:

- To provide knowledge and understanding in the fundamental principles of Computer Graphics and Mathematical concepts related to Computer graphical operations.
- To provide in-depth knowledge of display systems, image synthesis and shape modelling of 3D applications.
- To understand the basic concepts related to Multimedia including data standards, algorithms and software.
- To Experience the development of Multimedia application to display their ability by using Multimedia tools.

UNIT I  BASIC CONCEPTS  9

UNIT II  3D GRAPHICS  9

UNIT III  MULTIMEDIA BASICS 9

UNIT IV  MULTIMEDIA COMMUNICATION 9

UNIT V  MULTIMEDIA APPLICATION DEVELOPMENT 9

TOTAL : 45 PERIODS

OUTCOMES:

- Gain proficiency in various algorithms of 2D Computer graphics and trend their use in various real-life systems.
- Enhance the perspective of Modern computer system with modelling, analysis and interpretation of 3D visual information.
- Able to understand different forms of Multimedia and gain knowledge about Audio and Video.
- Able to understand the Networks used for Multimedia and to communicate with Multimedia Applications.
- Able to design and implement a number of Multimedia Applications and to do Research in Multimedia Industry.
REFERENCES:

MC5211

OBJECT ORIENTED PROGRAMMING LABORATORY

0 0 4 2

OBJECTIVES:
- To develop skills in object oriented programming
- To learn generic data structures using templates
- To learn virtual functions and file handling in C++

LIST OF EXPERIMENTS
1. Write a C++ Program to illustrate Enumeration and Function Overloading
2. Write a C++ Program to illustrate Scope and Storage class
3. Implementation of ADT such as Stack and Queues
4. Write a C++ Program to illustrate the use of Constructors and Destructors and Constructor Overloading
5. Write a Program to illustrate Static member and methods
6. Write a Program to illustrate Bit fields
7. Write a Program to overload as binary operator, friend and member function
8. Write a Program to overload unary operator in Postfix and Prefix form as member and friend function
9. Write a Program to illustrate Iterators and Containers
10. Write a C++ Program to illustrate function templates
11. Write a C++ Program to illustrate template class
12. Write C++ Programs and incorporating various forms of Inheritance
13. Write a C++ Program to illustrate Virtual functions
14. Exception Handling
15. File Handling – Read, Write, Update

TOTAL: 60 PERIODS
OUTCOMES:
Upon Completion of the course, the students will be able to:
- Develop programs in object oriented paradigm
- Implement data structure using C++
- Suggest appropriate data structure for any given data set
- Modify or suggest new data structure for an application.
- File handling in object oriented environment.

MC5212 GRAPHICS AND MULTIMEDIA LABORATORY

OBJECTIVES:
- To study the graphics techniques and algorithms
- To understand the concept of geometric, mathematical and algorithmic concepts necessary
  for programming computer graphics
- To enable the students to develop their creativity using Multimedia concepts and various I/O
  technologies
- To apply Multimedia data processing and analysis techniques to real world applications

LIST OF EXPERIMENTS
1. Creation of 2Dimensional objects using Graphics functions
2. 2Dimensional Transformations
3. 2Dimensional Composite Transformations
4. Clipping and Windowing of a 2Dimensional Object
5. 3Dimensional Simple Transformations
6. 3Dimensional Composite Transformations
7. Parallel and Perspective Projections
8. Visible Surface Detection of a 3Dimensional Object
   a) Color to Gray scale conversion of an image
   b) Image optimization
9. c) Image manipulation using Filters
   d) Creation of GIF animated images
   a) Image Compression
   b) Guide layer effects in an image
10. c) Frame by Frame Animation
    d) Product Advertisement with Multimedia effects

TOTAL: 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Function as designers, applying Mathematics knowledge for various calculations,
  involving tools for analyzing the world, accessing and interpreting the
  information and representing what they know to others.
- Gain knowledge about the creation of text, image, graphic and animation files.
- Learn about authoring tools for packaging multimedia systems and to use a
  variety of common software packages to complete the experiments.
LIST OF SOFTWARE:
1. C/C++/Java
2. OpenGL 4.1 (Precompiled GLUT libraries 4.1 – Open source)
3. Any open source software like GIMP 2.8/ Flash 11.9 /Photoshop

LIST OF EXPERIMENTS
1. 8051 Microcontroller Based 8-bit Addition & Subtraction
2. 8051 Microcontroller Based 8-bit Multiplication & Division
3. 8051 Microcontroller Based I/O Interfacing to verify timer operations
4. Real Time Systems Program Using RTOS (like LED Display)
5. Basics of UNIX commands and Shell Programming
6. Implement the following CPU scheduling algorithms a) Round Robin b) SJF c) FCFS d) Priority
7. Process creation, Process synchronization & Interprocess communication using semaphores
8. Pipes and message in UNIX environment

TOTAL: 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Perform arithmetic operation using 8085 microprocessor and 8051microcontroller along with I/O interfacing.
- Improved Employability and entrepreneurship capacity due to knowledge up gradation on recent trends in embedded systems design.
- Create system calls, processes and implement IPC.
- Compare the performance of various CPU Scheduling Algorithm
OBJECTIVES:

- Understand and apply linear data structures - List, Stack and Queue.
- Understand the graph algorithms.
- Learn different algorithms analysis techniques.
- Apply data structures and algorithms in real time applications
- Able to analyze the efficiency of algorithm

UNIT I  LINEAR DATA STRUCTURES  

UNIT II  NON-LINEAR TREE STRUCTURES  

UNIT III  GRAPHS  

UNIT IV  ALGORITHM DESIGN AND ANALYSIS  

UNIT V  ADVANCED ALGORITHM DESIGN AND ANALYSIS  

OUTCOMES:

- Describe, explain and use abstract data types including stacks, queues and lists
- Design and Implement Tree data structures and Sets
- Able to understand and implement non linear data structures - graphs.
- Able to understand various algorithm design and implementation.

TOTAL : 45 PERIODS
REFERENCES:

MC5302 COMPUTER NETWORKS

OBJECTIVES:
- To understand networking concepts and basic communication model
- To understand network architectures and components required for data communication.
- To analyze the function and design strategy of physical, data link, network layer and transport layer
- To acquire basic knowledge of various application protocol for internet security issues and services.

UNIT I NETWORK FUNDAMENTALS

UNIT II DATA LINK LAYER

UNIT III NETWORK LAYER
UNIT IV TRANSPORT LAYER

UNIT V APPLICATIONS AND SECURITY
Applications DNS- SMTP – WWW –SNMP- Security –threats and services - DES- RSA.

OUTCOMES:
- Able to trace the flow of information from one node to another node in the network
- Able to identify the components required to build different types of networks
- Able to understand the functionalities needed for data communication into layers
- Able to choose the required functionality at each layer for given application
- Able to understand the working principles of various application protocols and fundamentals of security issues and services available.

REFERENCES:

MC5303 WEB PROGRAMMING ESSENTIALS

OBJECTIVES:
- To understand the concepts and architecture of the World Wide Web.
- To understand and practice markup languages
- To understand and practice embedded dynamic scripting on client side Internet Programming
- To understand and practice web development techniques on client-side.

UNIT I INTRODUCTION TO WWW
UNIT II  UI DESIGN


Cascading Style Sheet (CSS3): The need for CSS - Basic syntax and structure Inline Styles - Embedding Style Sheets - Linking External Style Sheets - Introduction to CSS3 - Backgrounds - Manipulating text - Margins and Padding - Positioning using CSS - Responsive Web Design - Introduction to LESS/SASS

UNIT III  OVERVIEW OF JAVASCRIPT

Introduction - Core features - Data types and Variables - Operators, Expressions, and Statements Functions - Objects - Array, Date and Math Related Objects - Document Object Model - Event Handling - Controlling Windows & Frames and Documents - Form validations.

UNIT IV  ADVANCED FEATURES OF JAVASCRIPT


UNIT V  PHP

Introduction - How web works - Setting up the environment (LAMP server) - Programming basics Print/echo - Variables and constants – Strings and Arrays – Operators, Control structures and looping structures – Functions – Reading Data in Web Pages - Embedding PHP within HTML - Establishing connectivity with MySQL database.

OUTCOMES:
• 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 front end web page and connect to the back end databases

REFERENCES:

TOTAL :45 PERIODS
MC5304  PROGRAMMING WITH JAVA  

OBJECTIVES:
- To provide an overview of working principles of internet, web related functionalities
- To understand and apply the fundamentals core java, packages, database connectivity for computing
- To enhance the knowledge to server side programming.
- To Understand the OOPS concept & how to apply in programming.

UNIT I  JAVA FUNDAMENTALS  

UNIT II  COLLECTIONS AND ADVANCE FEATURES  

UNIT III  ADVANCED JAVA PROGRAMMING  

UNIT IV  OVERVIEW OF DATA RETRIEVAL & ENTERPRISE APPLICATION DEVELOPMENT  

UNIT V  JAVA INTERNALS AND NETWORKING  

TOTAL : 45 PERIODS

OUTCOMES:
- Implement Java programs.
- Make use of hierarchy of Java classes to provide a solution to a given set of requirements found in the Java API
- Use the frameworks JSP, Hibernate, Spring
- Design and implement server side programs using Servlets and JSP.

REFERENCES:
MC5305  OBJECT ORIENTED ANALYSIS AND DESIGN  L  T  P  C
3  2  0  4

OBJECTIVES:
- To provide a brief, hands-on overview of object-oriented concepts and its life cycle for software development.
- To learn for modelling the software and to design them using UML diagrams.
- To understand the problem domain and to identify the objects from the problem specification.
- To understand, how to apply design axioms and corollaries for the classes and object relational systems.
- To gain knowledge about open source tools for Computer Aided Software Engineering.

UNIT I  INTRODUCTION  9+6

UNIT II  METHODOLOGY AND UML  9+6

UNIT III  OBJECT ORIENTED ANALYSIS  9+6

UNIT IV  OBJECT ORIENTED DESIGN  9+6
UNIT V CASE TOOLS
Railway domain : Platform assignment system for the trains in a railway station - Academic domain: Student Marks Analysing System - ATM system - Stock maintenance - Quiz System - E-mail Client system - Cryptanalysis – Health Care Systems. Use Open source CASE Tools: StarUML/ UML Graph for the above case studies.

L : 45, T : 30 TOTAL: 75 PERIODS

OUTCOMES:
• Able to understand the object oriented concepts and to apply object oriented life cycle model for a project.
• Able to design static and dynamic models using UML diagrams.
• Able to perform object oriented analysis to identify the objects from the problem specification.
• Able to identify and refine the attributes and methods for designing the object oriented system.
• Able learn the open source CASE tools and to apply them in various domains.

REFERENCES

MC5311 DATA STRUCTURES AND ALGORITHMS LABORATORY L T P C 0 0 4 2

OBJECTIVES:
• To develop skills in design and implementation of data structures.
• To learn and implement linear, non linear and tree data structures.
• To learn Set ADT and Graph data structures and its applications.
• To study, implement and analyze the different sorting techniques.

LIST OF EXPERIMENTS
1. Array implementation of stack
2. Linked list implementation of Queue
3. Polynomial Addition using Linked List
4. Binary Search tree operations
5. AVL Tree operations
6. Graph Traversals
7. Shortest Path using Dijkstra’s Algorithm
8. Minimum Spanning Tree using Prim’s Algorithm
9. Dictionary application using any of the data structure
10. Divide and Conquer Method - Merge Sort
11. Back Tracking - 8-Queen’s Problem

TOTAL: 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Work with basic data structures that are suitable for the problems to be solved efficiently.
- Design and implement linear, tree, and graph structures and its applications
- Design various sorting techniques, its algorithm design and analysis

MC5312 WEB PROGRAMMING LABORATORY

OBJECTIVES:
- Try and develop the most important technologies that are being used today by web developers to build a wide variety of web applications.
- To build web applications using proven developer tools and message formats.
- To understand and practice web development techniques on client-side
- Web applications using technologies such as HTML, CSS, Javascript, AJAX, JQuery and JSON.

LIST OF EXPERIMENTS
1. Create your own Resume using HTML 5 Tags
2. Debug and validate your HTML document (Resume) using W3C validator and fix the issues.
   (https://validator.w3.org/#validate_by_upload).
3. Add Styles to your Resume using CSS 3 Properties.
   - Add External, Internal and Inline CSS styles to know the priority.
   - Add CSS3 Animation to your profile.
4. (a) Add functionalities that use any 2 of HTML 5 API’s.
   (b). Create a student Registration form for Job Application and validate the form fields using JavaScript.
5. (a) Create a CGPA Calculator in Web Browser using HTML, CSS and JavaScript. Use functions in JavaScript.
   (b) Create a Quiz Program with adaptive questions using JavaScript.
6. Create a Pan Card Validation form using Object Oriented JavaScript, consider the 10th character to be an alphabet.
   - Get the user’s First Name, Last Name and other required fields as input
   - Assume the last digit of the Pan Number to be an alphabet
   - Validate the PAN Number.
7. (a) Create an online Event Registration form and validate using JQuery
   (b) Create an online video Player which will allow you to play videos from the system and also create custom playlist using JQuery.
8. Construct a JSON Structure for a bookstore and validate it using JSON Validator such as http://jsonlint.com/ and parse the Json file to list the books under the category “Fiction”. Use Javascript or jQuery for parsing.

9. Create a Single Page application allowing to search for a movie and displaying the trailer, poster for various movies.
   - Create an admin login to upload the trailer, poster, keyword and details of the movie.
   - Use Bootstrap and JQuery for designing the User Interface.
   - Form Submission should be handled through Ajax.

10. Using PHP and MySQL, develop a program to accept book information viz. Accession number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the search results with proper headings.

11. Develop a Social Media Web Application using HTML5, CSS3, JQuery, AJAX & PHP.

TOTAL: 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Develop simple web applications using scripting languages.
- Implement server side and client side programming develop web applications with various web technology concepts.
- Design a Web application using various technologies such as AJAX, JQuery and JSON.
- Develop an application for social media using HTML5, CSS3, JQuery, AJAX & PHP

MC5313
PROGRAMMING WITH JAVA LABORATORY

OBJECTIVES:
Try and develop the most important technologies that are being used today by web developers to build a wide variety of web applications.
To develop Java based web programming.
To understand and apply the fundamentals core java, packages, database connectivity for computing
To enhance the knowledge to server side programming
To provide knowledge on advanced features like Swing, JavaBeans, Sockets.

LIST OF EXPERIMENTS
1. Writing Java programs by making use of class, interface, package, etc for the following
   - # Different types of inheritance study
   - # Uses of ‘this’ keyword
   - # Polymorphism
   - # Creation of user specific packages
   - # Creation of jar files and using them
   - # User specific exception handling
2. Writing window based GUI applications using frames and applets such as Calculator application, Fahrenheit to Centigrade conversion etc.
3. Application of threads examples
4. Create a Personal Information System using Swing
5. Event Handling in Swing
6. Reading and writing text files
7. Writing an RMI application to access a remote method
8. Writing a Servlet program with database connectivity for a web based application such as students result status checking, PNR number enquiry etc.
9. Creation and usage of Java bean
10. Create an Application to search Phone Number using contact Name Using Hash Map.
11. Create an Application which finds the Duplicates in E-mail using Set Interface.
12. FTP Using Sockets.

TOTAL: 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Apply the Object Oriented features of Java for programming on the internet
- Implement, compile, test and run Java program,
- Make use of hierarchy of Java classes to provide a solution to a given set of requirements found in the Java API
- Understand the components and patterns that constitute a suitable architecture for a web application using java servlets
- Demonstrate systematic knowledge of backend and front end by developing an appropriate application.
- Implement socket programming and Client side scripting in Java

MC5401 RESOURCE MANAGEMENT TECHNIQUES L T P C
3 0 0 3

OBJECTIVES:
- To provide the concept and an understanding of basic concepts in Operations Research Techniques for Analysis and Modeling in Computer Applications.
- To understand , develop and solve mathematical model of linear programming problems
- To understand , develop and solve mathematical model of Transport and assignment problems
- To Understand network modeling for planning and scheduling the project activities

UNIT I LINEAR PROGRAMMING MODELS 9
Mathematical Formulation - Graphical Solution of linear programming models – Simplex method – Artificial variable Techniques.

UNIT II TRANSPORTATION AND ASSIGNMENT MODELS 9

UNIT III INTEGER PROGRAMMING MODELS 9
Formulation – Gomory’s IPP method – Gomory’s mixed integer method – Branch and bound technique.
UNIT IV  SCHEDULING BY PERT AND CPM

UNIT V  QUEUEING MODELS
Characteristics of Queuing Models – Poisson Queues - (M / M / 1) : (FIFO / ∞ /∞), (M / M / 1) : (FIFO / N / ∞), (M / M / C) : (FIFO / ∞ / ∞), (M / M / C) : (FIFO / N / ∞) models.

TOTAL : 45 PERIODS

OUTCOMES:
- Understand and apply linear, integer programming to solve operational problem with constraints
- Apply transportation and assignment models to find optimal solution in warehousing and travelling,
- To prepare project scheduling using PERT and CPM
- Identify and analyze appropriate queuing model to reduce the waiting time in queue.
- Able to use optimization concepts in real world problems

REFERENCES:
5. N. D Vohra, Quantitative Techniques in Management, Tata Mcgraw Hill, 2010

MC5402  MOBILE COMPUTING  L T P C
3 0 0 3

OBJECTIVES:
- To learn the basic concepts, aware of the GSM, SMS, GPRS Architecture.
- To have an exposure about wireless protocols -WLN, Bluetooth, WAP, ZigBee issues.
- To Know the Network, Transport Functionalities of Mobile communication.
- To impart knowledge about Mobile Application Development Platform
- To impart the knowledge about basic components needed for Mobile App development

UNIT I  WIRELESS COMMUNICATION FUNDAMENTALS, ARCHITECTURE
UNIT II   MOBILE WIRELESS SHORT RANGE NETWORKS  9
Introduction-WLAN Equipment-WLAN Topologies-WLAN Technologies-IEEE 802.11
Architecture-WLAN MAC-Security of WLAN, Power Management-Standards- WAP
Architecture- Bluetooth enabled Devices Network-Layers in Bluetooth Protocol-Security in
Bluetooth- IrDA- ZigBee.

UNIT III   MOBILE IP NETWORK LAYER, TRANSPORT LAYER  9
IP and Mobile IP Network Layer- Packet delivery and Handover Management-Location
Management- Registration- Tunneling and Encapsulation-Route Optimization- Mobile
Transport Layer-Conventional TCP/IP Transport Layer Protocol-Indirect, Snooping, Mobile
TCP.

UNIT IV   MOBILE APPLICATION DEVELOPMENT USING ANDROID  9
Mobile Applications Development - Understanding the Android Software Stack – Android
Application Architecture –The Android Application Life Cycle – The Activity Life Cycle-
Creating Android Activity -Views- Layout -Creating User Interfaces with basic views- linking
activities with Intents.

UNIT V   MOBILE APPLICATION DEVELOPMENT USING ANDROID  9
Services-Broadcast Receivers – Adapters – Data Storage, Retrieval and Sharing.-Location
based services- Development of simple mobile applications .  TOTAL : 45 PERIODS

OUTCOMES:
• Gain the knowledge about various types of Wireless Data Networks and Voice Networks.
• understand the architectures, the challenges and the Solutions of Wireless Communication
• Realize the role of Wireless Protocols in shaping the future Internet.
• Able to develop simple Mobile Application Using Android

REFERENCES:
6. Martin Sauter, —From GSM to LTE: An Introduction to Mobile Networks and Mobile
Broadband II, John Wiley and Sons, 2011.
8. Reto Meier,Professional Android 2 Application Development, Wrox’s Programmer to
Programmer series.
MC5403 ADVANCED DATABASE AND DATA MINING  

OBJECTIVES:
- To understand the underlying principles of Relational Database Management System.
- To understand Data mining principles and techniques and Introduce DM as a cutting edge business intelligence.
- To learn to use association rule mining for handling large data.
- To understand the concept of classification for the retrieval purposes.
- To know the clustering techniques in details for better organization and retrieval of data.
- To identify Business applications and Trends of Data mining.

UNIT I  RELATIONAL MODEL

UNIT II  DATA MINING & DATA PREPROCESSING
Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

UNIT III  ASSOCIATION RULE MINING
Introduction - Data Mining Functionalities - Association Rule Mining - Mining Frequent Itemsets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint-Based Association Mining.

UNIT IV  CLASSIFICATION & PREDICTION
Classification vs. Prediction – Data preparation for Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures.

UNIT V  CLUSTERING

TOTAL : 45 PERIODS

OUTCOMES:
- Create relational data models.
- Preprocess the data for mining applications.
- Apply the association rules for mining the data.
- Design and deploy appropriate classification techniques.
- Cluster the high dimensional data for better organization of the data.
- Discover the knowledge imbibed in the high dimensional system.
- Evolve Multidimensional Intelligent model from typical system.
- Evaluate various mining techniques on complex data objects.
REFERENCES:
1. Berson, Alex & Smith, Stephen J, Data Warehousing, Data Mining, and OLAP, TMH Pub. Co. Ltd, New Delhi, 2012

MC5404 WEB APPLICATION DEVELOPMENT L T P C 3 2 0 4

OBJECTIVES:
- To acquire knowledge on the usage of recent platforms in developing web applications
- To understand architecture of J2EE and design applications using J2EE, Strut and hybernate
- To understand framework of Spring, Hibernate and struts.
- To Design and develop interactive, client-side, server-side executable web applications

UNIT I J2EE PLATFORM 9+6

UNIT II SPRING 9+6
Web Services - Consuming a RESTfull Web Service Java desktop application /JSP. Building REST Service with spring -Spring Security Architecture – Accessing relational data using JDBC with spring- Uploading Files using spring application- Validating form input - Handling form submission -Creation of Batch Service -Securing web application -Integrating Data - Accessing data with MongoDB- Creating asynchronous method-Using WebSocket to build an interactive web application.
UNIT III STRUTS AND HIBERNATE

STRUTS

HIBERNATE
HIBERNATE ORM-Persistence-Relational Database-The object relational impedance mismatch -Using Native Hibernate API’s and hbm.xml-Using the java persistence API’s-Hibernate Validator – HIBERNATE OGM – configuration of tools -HIBERNATE SEARCH - Enabling full text search capabilities in entities -Indexing-Searching -Introduction to Full text search.

UNIT IV PYTHON

UNIT V DJANGO

OUTCOMES:
- Design and implement Internet systems for enhancing education and engineering design
- Understand functionality of Internet system
- Design a system according to customer needs using the available Internet technologies
- Design and develop interactive, client-side, server-side executable web applications.
- Develop a rapid application in many areas on most platforms.
- Build better Web apps more quickly and with less code

REFERENCES:
OBJECTIVES:
- Know the components and structure of mobile application development frameworks like Android /windows /ios.
- Understand how to work with various mobile application development frameworks.
- Learn the basic and important design concepts and issues of development of mobile applications.
- Understand the capabilities and limitations of mobile devices.
- Write applications for the platforms used, simulate them, and test them on the mobile hardware where possible.

LIST OF EXPERIMENTS
1. Develop an application that uses Layout Managers.
2. Develop an application that uses event listeners.
3. Develop an application that uses Adapters ,Toast.
4. Develop an application that makes use of database.
5. Develop an application that makes use of RSS Feed.
6. Implement an application that implements Multi threading.
7. Develop a native application that uses GPS location information.
8. Implement an application that writes data to the SD card.
9. Implement an application that creates an alert upon receiving a message.
10. Develop a game application.

TOTAL: 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Install and configure Android application development tools.
- Design and develop user Interfaces for the Android platform.
- Apply Java programming concepts to Android application development.
- Familiar with technology and business trends impacting mobile applications.
- competent with the characterization and architecture of mobile applications.

OBJECTIVES:
- To design applications using J2EE, Struts and Hybernate.
- To develop a web application with n-tier architecture.
- To develop a simple application using Spring MVC.
- To develop a web service using JSON and XML formats.

LIST OF EXPERIMENTS:
1. Develop a car showroom inventory web application with 2-tier architecture. Use JSP and JDBC.
2. Develop a real estate web application with n-tier architecture. Use JSP, Servlets and JDBC.
The application should be able to add and search all properties such as rental/own, individual/ apartment and duplex/semi-duplex.

3. Develop a standalone java application or a web application to manage books in an online library, support CURD operations.

4. Develop a simple Spring MVC application that take user input and checks the input using standard validation annotations.

5. Develop a simple database application using Spring JDBC/Struts with CURD functionality.

6. Develop any web application which authenticates Spring LDAP.

7. Design a student identity management web application using struts framework. The application should be able to provide an identity such as student id, access to department assets with department id, access to lab assets with lab id.

8. Create an simple online bookstore using Spring MVC

9. Build an application that uses Spring's RestTemplate to retrieve a random Spring Boot quotation at http://gturnquist-quoters.cfapps.io/api/random

10. Create weather service using spring/struts which will return the temp in JSON format and XML format.

TOTAL: 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Design and develop interactive, client-side, server-side executable web applications.
- Develop a simple online application using Spring MVC
- Create applications using web services such as JSON, WSDL and SOAP
- Develop a simple database application using Spring JDBC/Struts with CURD functionality

MC5501 CLOUD COMPUTING

OBJECTIVES:
- To introduce the broad perceptive of cloud architecture and model
- To understand the concept of Virtualization and design of cloud Services
- To be familiar with the lead players in cloud.
- To understand the features of cloud simulator
- To apply different cloud programming model as per need.
- To learn to design the trusted cloud Computing system

UNIT I CLOUD ARCHITECTURE AND MODEL

UNIT II VIRTUALIZATION
UNIT III  CLOUD INFRASTRUCTURE AND IoT
Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture
Development – Design Challenges - Inter Cloud Resource Management – Resource
Provisioning and Platform Deployment – Global Exchange of Cloud Resources-Enabling
Technologies for the Internet of Things – Innovative Applications of the Internet of Things.

UNIT IV  PROGRAMMING MODEL
Parallel and Distributed Programming Paradigms – MapReduce, Twister and Iterative
MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support -
Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open
Nebula, OpenStack, Aneka, CloudSim.

UNIT V  SECURITY IN THE CLOUD
Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security
Management and Access Control – Autonomic Security

TOTAL : 45 PERIODS

OUTCOMES:
• Compare the strengths and limitations of cloud computing
• Identify the architecture, infrastructure and delivery models of cloud computing
• Apply suitable virtualization concept.
• Choose the appropriate cloud player, Programming Models and approach.
• Address the core issues of cloud computing such as security, privacy and
  interoperability.
• Design Cloud Services and Set a private cloud

REFERENCES
1. George Reese, “Cloud Application Architectures: Building Applications and
Infrastructure in the Cloud” O’Reilly
3. James E. Smith, Ravi Nair, “Virtual Machines: Versatile Platforms for Systems and
Processes”, Elsevier/Morgan Kaufmann, 2005
4. John W. Rittinghouse and James F. Ransome, “Cloud Computing: Implementation,
Management, and Security”, CRC Press, 2010
5. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing,
From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers,
2012
India, 2011
Computing – A Business Perspective on Technology and Applications”, Springer
Approach”, TMH, 2009
TMGH, 2013
Secure Cloud Computing”, Wiley – India, 2010
MC5502 BIG DATA ANALYTICS

OBJECTIVES:

- To explore the fundamental concepts of big data analytics
- To learn to analyze the big data using intelligent techniques.
- To understand the various search methods and visualization techniques.
- To learn to use various techniques for mining data stream.
- To understand the applications using Map Reduce Concepts

UNIT I INTRODUCTION TO BIG DATA


UNIT II MINING DATA STREAMS


UNIT III HADOOP ENVIRONMENT


UNIT IV DATA ANALYSIS SYTEMS AND VISUALIZATION


UNIT V FRAMEWORKS AND APPLICATIONS


OUTCOMES:

- Work with big data platform and Understand the fundamentals of various big data analysis techniques
- Analyze the big data analytic techniques for useful business applications.
- Design efficient algorithms for mining the data from large volumes.
- Analyze the HADOOP and Map Reduce technologies associated with big data analytics
- Explore the applications of Big Data

TOTAL : 45 PERIODS
REFERENCES:

MC5503 SOFTWARE TESTING AND QUALITY ASSURANCE 3 0 0 3

OBJECTIVES:
- To know the behavior of the testing techniques and to design test cases to detect the errors in the software
- To get insight into the levels of testing in the user environment
- To understand standard principles to check the occurrence of defects and its removal.
- To learn the functionality of automated testing tools to apply in the specialized environment.
- To understand the models and metrics of software quality and reliability.

UNIT I TESTING TECHNIQUES & TEST CASE DESIGN 9
UNIT II LEVELS OF TESTING


UNIT III TESTING FOR SPECIALIZED ENVIRONMENT


UNIT IV TEST AUTOMATION


UNIT V SOFTWARE TESTING AND QUALITY METRICS


TOTAL : 45 PERIODS

OUTCOMES:

- Able to test the software by applying various testing techniques.
- Able to debug the project and to test the entire computer based systems at all levels.
- Able to test the applications in the specialized environment using various automation tools.
- Able to evaluate the web applications using bug tracking tools.
- Able to apply quality and reliability metrics to ensure the performance of the software

REFERENCES:


CLOUD AND BIG DATA LABORATORY

MC5511

OBJECTIVES:

- Be exposed to tool kits for cloud and hadoop environment.
- Be familiar with migration of Virtual Machines from one node to another
- Learn to run virtual machines of different configuration.
- Learn to use Hadoop Distributed File System (HDFS) to set up single and multi-node clusters.

LIST OF EXPERIMENTS:
Use Eucalyptus or Open Nebula or Open Stack 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 word count program to demonstrate the use of Map - Reduce tasks.
9. Unstructured data into NoSQL data and do all operations such as NoSQL query with API.
10. K-means clustering using map reduce
11. Page Rank Computation

TOTAL: 60 PERIODS

OUTCOMES:

Upon Completion of the course, the students will be able to:

- Use the cloud and big data tool kits.
- Design and Implement applications on the Cloud environment.
- Set up and implement Hadoop clusters
- Use the map reduce tasks for various applications

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:

SOFTWARE:
Eucalyptus or Open Nebula or equivalent

HARDWARE:
Standalone desktops 30 Nos
OBJECTIVES:
- To apply various testing techniques and to detect the errors in the software.
- To generate and apply the test cases using the automated testing tool.
- To learn the functionality of automated testing tools to apply in the specialized environment.

LIST OF EXPERIMENTS
1. Using Selenium IDE, Write a test suite containing minimum 4 test cases.
2. Install Selenium server and demonstrate it using a script in Java/PHP.
3. Write and test a program to login a specific web page.
4. Write and test a program to update 10 student records into table into Excel file.
5. Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects).
6. Write and test a program to provide total number of objects present / available on the page.
7. Write and test a program to get the number of list items in a list / combo box.
8. Write and test a program to count number of check boxes on the page checked and unchecked count.

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Able to test the software by applying various testing techniques.
- Able to debug the project and to test the entire computer based systems at all levels.
- Able to test the applications in the specialized environment using various automation tools.
- Able to evaluate the web applications using bug tracking tools.
- Able to apply quality and reliability metrics to ensure the performance of the software.

UNIT I INTRODUCTION TO SOFT COMPUTING
UNIT II  GENETIC ALGORITHMS
Introduction, Building block hypothesis, working principle, Basic operators and terminologies such as individual, gene, encoding, fitness function and reproduction, Genetic modelling: Significance of Genetic operators, Inheritance operator, cross over, inversion & deletion, mutation operator, bitwise operator, GA optimization problems, JSPP (Job Shop Scheduling Problem), TSP (Travelling Salesman Problem), Differences & similarities between GA & other traditional methods, Applications of GA.

UNIT III  NEURAL NETWORKS
Machine learning using Neural Network, Adaptive Networks – Feed Forward Networks Defuzzification – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance Architectures – Advances in Neural Networks – Case study : Identification and control of linear and nonlinear dynamic systems using MATLAB.

UNIT IV  FUZZY LOGIC

UNIT V  NEURO-FUZZY MODELING

TOTAL : 45 PERIODS

OUTCOMES:
- Implement machine learning through neural networks.
- Gain Knowledge to develop Genetic Algorithm and Support vector machine based machine learning system.
- Write Genetic Algorithm to solve the optimization problem.
- Understand fuzzy concepts and develop a Fuzzy expert system to derive decisions.
- Able to Model Neuro Fuzzy system for data clustering and classification.

REFERENCES:
MC5002 ACCOUNTING AND FINANCIAL MANAGEMENT

OBJECTIVES:

- To understand the basic principles of Double entry system and preparation of balance sheet.
- To understand the process of estimating the cost of a particular product.
- To Prepare the estimate for various business activities such as purchase, sale, production and cash budgets.
- To ensure decision making process of an organization.

UNIT I FINANCIAL ACCOUNTING

UNIT II ACCOUNTING

UNIT III BUDGETS AND BUDGETING CONTROL
Budgets and Budgetary Control-Meaning-Types-Sales Budget-Production Budget-Cost of Production Budget-Flexible Budgeting-Cash Budget-Master Budget-Zero Base Budgeting-Computerized Accounting

UNIT IV INVESTMENT DECISION AND COST OF CAPITAL

UNIT V FINANCING DECISION AND WORKING CAPITAL MANAGEMENT

TOTAL: 45 PERIODS

OUTCOMES:

- Able to understand the balance sheet preparation and do analysis.
- Able to understand the budget preparation and control of a company.
- Helps to decide about the state of affairs of a particular firm / company.
- Ensures the preparation of fiscal policies of the organization.
- Ensures the factors to be considered in investment policies.
REFERENCES:

MC5003 SOFTWARE PROJECT MANAGEMENT

OBJECTIVES:
- To know of how to do project planning for the software process.
- To learn the cost estimation techniques during the analysis of the project.
- To understand the quality concepts for ensuring the functionality of the software

UNIT I SOFTWARE PROJECT MANAGEMENT CONCEPTS

UNIT II SOFTWARE EVALUATION AND COSTING

UNIT III SOFTWARE ESTIMATION TECHNIQUES

UNIT IV RISK MANAGEMENT
UNIT V  GLOBALIZATION ISSUES IN PROJECT MANAGEMENT


TOTAL : 45 PERIODS

OUTCOMES:
- Understand the activities during the project scheduling of any software application.
- Learn the risk management activities and the resource allocation for the projects.
- Can apply the software estimation and recent quality standards for evaluation of the software projects.
- Acquire knowledge and skills needed for the construction of highly reliable software project.
- Able to create reliable, replicable cost estimation that links to the requirements of project planning and managing.

REFERENCES:

MC5004  SECURITY IN COMPUTING

OBJECTIVES:
- To understand the basics of cryptography
- learn to find the vulnerabilities in programs and to overcome them,
- know the different kinds of security threats in networks and its solution
- know the different kinds of security threats in databases and solutions available
- learn about the models and standards for security

UNIT I  ELEMENTARY CRYPTOGRAPHY

UNIT II  PROGRAM SECURITY
UNIT III SECURITY IN NETWORKS

9

UNIT IV SECURITY IN DATABASES

9

UNIT V SECURITY MODELS AND STANDARDS

9

TOTAL : 45 PERIODS

OUTCOMES:
- Apply cryptographic algorithms for encrypting and decryption for secure data transmission
- Understand the importance of Digital signature for secure e-documents exchange
- Understand the program threats and apply good programming practice
- Get the knowledge about the security services available for internet and web applications
- Understand data vulnerability and sql injection
- Gain the knowledge of security models and published standards

REFERENCES:
MC5005 AD-HOC AND SENSOR NETWORKS L T P C
3 0 0 3

OBJECTIVES:
• To understand the basics of Ad-hoc & Sensor Networks
• To learn various fundamental and emerging protocols of all layers in ad-hoc network
• To study about the issues pertaining to major obstacles in establishment and efficient management of ad-hoc and sensor networks
• To understand the nature and applications of ad-hoc and sensor networks
• To understand various security practices and protocols of Ad-hoc and Sensor Networks

UNIT I ADHOC NETWORKS FUNDAMENTALS & COMMUNICATION PROTOCOLS

UNIT II ADHOC NETWORK ROUTING AND MANAGEMENT

UNIT III SENSOR NETWORK COMMUNICATION PROTOCOLS

UNIT IV SENSOR NETWORK MANAGEMENT AND PROGRAMMING

UNIT V ADHOC AND SENSOR NETWORK SECURITY

TOTAL : 45 PERIODS

OUTCOMES:
Work with existing Ad-hoc and sensor network protocols and standards.
• Create a Sensor network environment for different type of applications
• Design ad-hoc and sensor network architectures using QoS and Congestion control mechanisms
• Interpret the various control fields of the protocol in each layer
• Select appropriate routing algorithms for different network environments
• Program ad-hoc and sensor network for various applications
• Deploy security mechanisms in the wireless ad-hoc and sensor networks.

REFERENCES:

MC5006 PROFESSIONAL ETHICS

OBJECTIVES:
• To Understand the concepts of computer ethics in work environment.
• To understand the threats in computing environment
• To Understand the intricacies of accessibility issues
• To ensure safe exits when designing the software projects

UNIT I COMPUTER ETHICS INTRODUCTION AND COMPUTER HACKING

UNIT II ASPECTS OF COMPUTER CRIME AND INTELLECTUAL PROPERTY RIGHTS
UNIT III REGULATING INTERNET CONTENT, TECHNOLOGY AND SAFETY

UNIT IV COMPUTER TECHNOLOGIES ACCESSIBILITY ISSUES

UNIT V SOFTWARE DEVELOPMENT AND SOCIAL NETWORKING

TOTAL: 45 PERIODS

OUTCOMES:
- Helps to examine situations and to internalize the need for applying ethical principles, values to tackle with various situations.
- Develop a responsible attitude towards the use of computer as well as the technology.
- Able to envision the societal impact on the products/ projects they develop in their career
- Understanding the code of ethics and standards of computer professionals.
- Analyze the professional responsibility and empowering access to information in the work place.

REFERENCES:
OBJECTIVES:

- To understand the basic concepts of health care system.
- To know about creating and maintaining health care information systems
- To ensure access of clinical information system on the fly
- To know social media analytics for health care data.
- To learn temporal data mining and visual data analytics for health care.

UNIT I INTRODUCTION

Introduction to health care information – Health care data quality – Health care information regulations, laws and standards.

UNIT II HEALTH CARE INFORMATION SYSTEMS

History and evolution of health care information systems – Current and emerging use of clinical information systems – system acquisition – System implementation and support.

UNIT III INFORMATION TECHNOLOGY

Information architecture and technologies that support health care information systems – Health care information system standards – Security of health care information systems.

UNIT IV MINING AND SOCIAL MEDIA ANALYTICS FOR HEALTH CARE DATA

Resources – Terminology Acquisition and Management – Information Extraction – Text Mining Environments – Applications – Social Media Analysis for Public Health Research – Analysis of Social Media use in Healthcare

UNIT V TEMPORAL DATA MINING AND VISUAL ANALYTICS FOR HEALTH CARE


TOTAL : 45 PERIODS

OUTCOMES:

- Develop an understanding of basic research skills applicable to the design, evaluation and implementation of appropriate Healthcare Information Systems (HIS);
- Define and analyse the impact, strengths and weaknesses of various HIS in any healthcare settings
- Extract health care data in temporal data mining.
- Perform sensor data and visual data analytics.

REFERENCES:

MC5008  GEOLOGICAL INFORMATION SYSTEMS  L  T  P  C
3  0  0  3

OBJECTIVES:
- Understand the basic concepts of Geological information systems.
- To provide an exposure to spatial database structures and their utility in GIS.
- Understand the process of scanning, digitizing and georeferencing.
- To introduce the raster and vector geoprocessing capabilities of GIS.

UNIT I  SPATIAL DATA REPRESENTATION  9
GIS – Definition and related terminology- Digital representation of geospatial data – raster –
vector – object oriented – geo database model-analysis.

UNIT II  DATA - DIGITIZATION AND PREPARATION  9
Data – Sources and types. Maps and scales – advantages and limitations. Coordinates,
Datum and projection system. Raster data. Characteristics and file formats. Vector data
characteristics. Scanner: Principles, On Screen Digitization-post scanning-importing-

UNIT III  RASTER DATA ANALYSIS  9
Raster Geospatial Data Analysis-Local operations: Reclassification, Logical and Arithmetic
overlay operations – Neighbourhood operations: Aggregation, Filtering, Slope and Aspect
map – Extended neighbourhood operations: - Statistical Analysis, Proximity, Connectivity
operations, Buffering, Viewshed analysis – Regional operations: Area, Perimeter, Shape,
Identification of region and Classification-output functions of Raster geoprocessing.

UNIT IV  VECTOR DATA PROCESSING  9
Non-topological analysis: Attribute database query, SQL, Summary statistics-statistical
computation-calculation-quantification- Address geocoding, -Topological analysis Feature
based topological functions-overlay-buffering- Layer based topological function-
Output functions.

UNIT V  GIS MODELLING AND APPLICATIONS  9
with case study- spatial data mining-DEM- introduction and applications.

TOTAL : 45 PERIODS

OUTCOMES:
- Understand GIS concepts and spatial data representation.
- Able to design spatial data input in raster form as well as vector form.
- Understand vector data analysis and output functions.
- Understand raster data geoprocessing.
- Able to design a GIS model for real world problem.
REFERENCES:

MC5009 HUMAN RESOURCE MANAGEMENT  L  T  P  C
3  0  0  3

OBJECTIVES:
- To understand the importance of human resources.
- To describe the steps involved in the human resource planning process.
- To understand the stages of employee socialization and training needs.
- To know about the purposes of performance management systems and appraisal.
- To know the list of occupational safety and health administration enforcement priorities.

UNIT I UNDERSTANDING HRM WITH LEGAL & ETHICAL CONTEXT 9

UNIT II STAFFING, RECRUITING AND FOUNDATIONS OF SELECTION 9

UNIT III TRAINING AND DEVELOPMENT 9

UNIT IV PERFORMANCE EVALUATION, REWARDS AND BENEFITS 9
UNIT V  SAFE AND HEALTHY WORK ENVIRONMENT


TOTAL : 45 PERIODS

OUTCOMES:
- Identify the primary external influences affecting HRM.
- Outline the components and the goals of staffing, training and development.
- Understand the selection procedure in various organizations.
- Understand the practices used to retain the employees and able to evaluate their performance.
- Able to identify the stress and the cause of burn out

REFERENCES:
### OBJECTIVES:
- To understand the fundamentals of Internet of Things
- To learn about the basics of IOT protocols
- To build a small low cost embedded system using Raspberry Pi.
- To apply the concept of Internet of Things in the real world scenario

### UNIT I  INTRODUCTION TO IoT
Internet of Things - Physical Design- Logical Design- IoT Enabling Technologies - IoT Levels & Deployment Templates - Domain Specific IoTs - IoT and M2M - IoT System Management with NETCONF-YANG- IoT Platforms Design Methodology.

### UNIT II  IoT ARCHITECTURE
M2M high-level ETSI architecture - IETF architecture for IoT - OGC architecture - IoT reference model - Domain model - information model - functional model - communication model - IoT reference architecture

### UNIT III  IoT PROTOCOLS

### UNIT IV  BUILDING IoT WITH RASPBERRY PI & ARDUINO

### UNIT V  CASE STUDIES AND REAL-WORLD APPLICATIONS
Real world design constraints - Applications - Asset management, Industrial automation, smart grid, Commercial building automation, Smart cities - participatory sensing - Data Analytics for IoT – Software & Management Tools for IoT Cloud Storage Models & Communication APIs - Cloud for IoT - Amazon Web Services for IoT.

**TOTAL :45 PERIODS**

### OUTCOMES:
Upon completion of the course, the student should be able to:
- Analyze various protocols for IoT
- Develop web services to access/control IoT devices.
- Design a portable IoT using Raspberry Pi
- Deploy an IoT application and connect to the cloud.
- Analyze applications of IoT in real time scenario
REFERENCES:

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OBJECTIVES:
- To learn the importance of semantic web.
- To appreciate the merits of semantic web over traditional web.
- To know the methods to discover, classify and build ontology for more reasonable results in searching.
- To learn and appreciate RDF and its taxonomy.
- To describe OWL and its usage in semantic web.
- To implement applications that can access, use and manipulate the ontology

UNIT I INTRODUCTION

UNIT II ONTOLOGICAL ENGINEERING

UNIT III DESCRIBING WEB RESOURCES
RDF Overview-The basic elements of RDF-RDF triples-Fundamental rules of RDF-Aggregation and distributed information-RDF tools-RDFS, Taxonomy, and Ontology-Need for RDFS-Core elements of RDFS

UNIT IV WEB ONTOLOGY LANGUAGE
Requirements for Ontology Languages-OWLSublanguages-Description of the OWL Language-Layering of OWL-Examples for OWL-OWL in OWL-Namespaces, Classes of Classes, Class Equivalence, Building Classes from Other Classes, Restricting Properties of Classes.
OUTCOMES:

- Understand semantic web basics, architecture and technologies.
- Compare conventional web with semantic web.
- Able to understand the semantic relationships among the data elements using Resource Description Framework (RDF)
- Able to design and implement real-world applications that “discovers” the data and/or other web services via the semantic web

REFERENCES:


OBJECTIVES:

- To learn XML concepts and exposed to build applications based on XML
- To gain knowledge about SOAP, HTTP and UDDI to create web services
- To understand the SOA architecture and principles of Service Oriented Architecture.
- To learn about the role of SOA in J2EE, .NET and web services.
- To know about the Cloud Computing architecture and services.

UNIT I XML AND WEB SERVICES

UNIT II WSDL, SOAP and UDDI

UNIT III SOA BASICS
MC5013 GAME PROGRAMMING

OBJECTIVES:

- To get subsequent understanding of game design and development, which includes the processes, mechanics, issues in game design, game engine development, modeling, techniques, handling situations, and logic.
- To create interactive games

UNIT I GRAPHICS FOR GAME PROGRAMMING

UNIT II  GAME DESIGN PRINCIPLES  9
Game Logic, Game AI, Path Finding, Game Theory, Character development, Story Telling, Narration, Game Balancing, Core mechanics, Principles of level design, Genres of Games, Collision Detection.

UNIT III  GAMING ENGINE DESIGN  9
Renderers, Software Rendering, Hardware Rendering, and Controller based animation, Spatial Sorting, Level of detail, collision detection, standard objects, and physics.

UNIT IV  GAMING PLATFORMS AND FRAMEWORKS  9
Flash, DirectX, OpenGL, Java, Python, XNA with Visual Studio, Mobile Gaming for the Android, iOS, Game engines - Adventure Game Studio, DX Studio, Unity.

UNIT V  GAME DEVELOPMENT  9
Developing 2D and 3D interactive games using OpenGL, DirectX – Isometric and Tile Based Games, Puzzle games, Single Player games, Multi Player games.

TOTAL : 45 PERIODS

OUTCOMES:
- Illustrate an understanding of the concepts behind game programming techniques.
- Implement game programming techniques to solve game development tasks.
- Construct a basic game engine using open-source programming libraries.

REFERENCES:
OBJECTIVES:
- To understand the fundamentals of computational intelligence
- To know about the various knowledge representation methods
- To understand the features of neural network and its implementation
- To study about various data clustering methods
- To gain knowledge in evolutionary computation and neuro-fuzzy systems

UNIT I  INTRODUCTION TO COMPUTATIONAL INTELLIGENCE  9

UNIT II  KNOWLEDGE REPRESENTATION METHODS  9

UNIT III  NEURAL NETWORKS AND LEARNING ALGORITHMS  9

UNIT IV  DATA CLUSTERING METHODS AND ALGORITHMS  9

UNIT V  EVOLUTIONARY COMPUTATION AND NEURO-FUZZY SYSTEMS  9
A simple project using any one of the above domains with tools like MATLAB, Python 2 and Weka tool 3.7.

TOTAL : 45 PERIODS
OUTCOMES:
- Implement computational intelligence through applications
- Understand knowledge representation methods and apply approximate reasoning
- Apply evolutionary algorithm to solve the optimization problem
- Gain research Knowledge to develop applications using hybrid systems
- Able to Model Flexible Fuzzy Inference systems for dynamic nonlinear data sets

REFERENCES:
2. Andries Engelbrecht, Computational Intelligence: An Introduction, 2007

CP5015 PRINCIPLES OF PROGRAMMING LANGUAGES L T P C
3 0 0 3

OBJECTIVES:
- To understand and describe syntax and semantics of programming languages.
- To understand Data, Data types, and Bindings.
- To learn the concepts of functional and logical programming.
- To explore the knowledge about concurrent Programming paradigms.
UNIT I ELEMENTS OF PROGRAMMING LANGUAGES

UNIT II DATA TYPES-ABSTRACTION
Introduction - Primitive Data Types- Character String Types- User-Defined Ordinal Types- Array types- Associative Arrays-Record Types- Tuple Types-List Types -Union Types - Pointer and Reference Types -Type Checking- Strong Typing -Type Equivalence - Theory and Data Types-Variables-The Concept of Binding -Scope - Scope and Lifetime - Referencing Environments - Named Constants- The Concept of Abstraction- Parameterized Abstract Data Types- Encapsulation Constructs- Naming Encapsulations

UNIT III FUNCTIONAL PROGRAMMING

UNIT IV LOGIC PROGRAMMING

UNIT V CONCURRENT PROGRAMMING

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the students will be able to
- Describe syntax and semantics of programming languages
- Explain data, data types, and basic statements of programming languages
- Design and implement subprogram constructs, Apply object - oriented, concurrency, pro
- and event handling programming constructs
- Develop programs in LISP, ML, and Prolog.
REFERENCES: