PERIYAR UNIVERSITY
PERIYAR PALKALAI NAGAR
SALEM 636 011

MASTER OF COMPUTER APPLICATIONS (M.C.A)
SEMESTER PATTERN
Under Choice Based Credit System

REGULATIONS AND SYLLABUS
FOR AFFILIATED COLLEGES
(Effective from the Academic year 2021-2022 onwards)
1. OBJECTIVE OF THE PROGRAMME

Enable the students to pursue lifelong multidisciplinary learning, function effectively on teams to accomplish a common goal and become innovative through technical advancement.

To meet dynamic global needs, the syllabus is focused on technical concepts, to enrich the knowledge of students.

2. CONDITION FOR ADMISSION

Candidates who have passed in any one of the following or equivalent are eligible to apply:

i) Bachelor’s degree (under 10+2+3/4) in any subject with Mathematics at +2 level.

ii) Bachelor’s degree (under 10+2+3/4 or 10+3 year Diploma + 3 year later entry BE) in any subject with Mathematics / Business Mathematics / Statistics as one of the subjects.

3. DURATION OF THE PROGRAMME

The duration of the degree of Master of Computer Applications shall consist of two academic years divided into four semesters.

4. EXAMINATIONS

The examination shall be of three hours duration for each course at the end of each semester. The candidate failing in any subject(s) will be permitted to appear in the subsequent examination.

The practical / project should be an individual work. The University examination for practical / project work will be conducted by the internal and external examiners jointly at the end of each semester.
5. STRUCTURE OF M.C.A PROGRAMME UNDER CBCS PATTERN FOR AFFILIATED COLLEGES (FROM 2021 AND THEREAFTER)

Curriculum and Scheme of Examinations

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*Human Rights marks are out of 100, but the total for Add On Course is 100**
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* Human Rights mark is excluded for aggregation

**ELECTIVES**

**Elective Course–I**
- Computer Architecture
- Computer Graphics
- Design and Analysis of Algorithms
- E-Technologies

**Elective Course–II**
- Artificial Intelligence
- Theory of Computation
- Machine Learning
- Web Services

**Elective Course–III**
- Cloud Computing
- Embedded System
- Social Computing
- Virtual Reality

**Elective Course–IV**
- Cyber Security
- Data Visualization
- Deep Learning
- Grid Computing
EDC-EXTRA DISCIPLINARY COURSE
Students are expected to opt EDC (Non major elective) offered by other departments.

1. Principles of Information Technology
2. Fundamentals of Computers and Communications
3. E-Commerce

CIA – CONTINUOUS INTERNAL ASSESSMENT
EA – EXTERNAL ASSESSMENT

6. EXAMINATIONS

THEORY:
EVALUATION OF CONTINUOUS INTERNAL ASSESSMENT

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(No passing minimum)

EVALUATION OF EXTERNAL ASSESSMENT

QUESTION PAPER PATTERN

Time: 3 Hours

Max. Marks: 75

PART- A: 15x1 = 15 marks
Answer all the questions
Three questions from each unit (Multiple Choice Questions)

PART- B: 2x5 = 10 marks
Answer any TWO questions
One question from each unit

PART- C: 5x10 = 50 marks
Answer all the questions
One question from each unit (either or type)

The Passing minimum shall be 50% out of 75 marks (38 marks)

PRACTICAL / MINI PROJECT:
EVALUATION OF CONTINUOUS INTERNAL ASSESSMENT

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EVALUATION OF EXTERNAL ASSESSMENT
I) PRACTICAL
QUESTION PAPER PATTERN

Time: 3 Hours  Max. Marks: 60

There will be two questions with or without subsections to be asked for the practical examination. Every question should be chosen from the question bank prepared by the examiner(s). Every sixth student should get a new question i.e. each question may be used for at most five students.

Distribution of Marks

- Each question : 30 Marks
- Problem Understanding : 05 Marks
- Program writing : 10 Marks
- Debugging : 10 Marks
- For Correct Results : 05 Marks

II) INDUSTRY LITERACY MINI PROJECT DEVELOPMENT

- Viva-voce (Jointly) : 30 Marks
- Modification : 30 Marks

Students should write about their Mini Project briefly.

i. Aim
ii. Features
iii. Modules
iv. Modification

III) PROJECT WORK

- Continuous Internal Assessment : 100 Marks
- Evaluation & Viva-Voce (External) : 300 Marks

7. REGULATIONS OF PROJECT WORK

- Students should do their Project work in a MNC Company / Research Institution during the IV semester
- The Candidate should submit the filled in format as given in Annexure-I to the department for approval during the 1st week of December.
- Periodically the project should be reviewed.
- The Student should submit three copies of their Project Report.
- A Sample format is enclosed in Annexure-II.
- Format of the Title page and Certificate are enclosed in Annexure III.
- The students may use power point presentation during their viva voce examination.
8. PASSING MINIMUM

The candidate shall be declared to have passed in the Theory / Practical / Project Work examination, if the candidate secures not less than 50% marks in EA and also in Total of the prescribed marks. However submission of a record notebook is a must.

9. CLASSIFICATION OF SUCCESSFUL CANDIDATES

Candidates who obtain 75% and above in the aggregate shall be deemed to have passed the examination in First Class with Distinction provided they pass all the examinations prescribed for the programme at the first appearance. Candidates, other than the above, who secure not less than 60% of the aggregate marks in the whole examination, shall be declared to have passed the examination in First Class. The remaining successful candidates shall be declared to have passed in Second Class.

Candidates who pass all the examinations prescribed for the programme in first instance and within a period of two academic years from the year of admission are only eligible for University Ranking.

10. MAXIMUM DURATION FOR THE COMPLETION OF THE PROGRAMME

The maximum duration to complete the programme shall be three academic years after normal completion of the programme.

11. COMMENCEMENT OF THIS REGULATION

These regulations shall take effect from the academic year 2021-22, that is, for students who are admitted to the first year of the programme during the academic year 2021-22 and thereafter.

12. TRANSITORY PROVISION

Candidates who were admitted to the MCA programme of study before 2021-2022 shall be permitted to appear for the examinations under those regulations for a period of three years after completion of the programme. Thereafter, they will be permitted to appear for the examination only under the regulations then in force.
PERIYAR UNIVERSITY

Name of the College : 
Programme : 
Name of the Student : 
Register Number : 
Title of the Project Work : 
Address of Organization / Institution : 

Name of the External Guide : 
Designation : 
Place : 
Date : Signature of External Guide (with seal)

Name of the Internal Guide : 
Qualification : 
Teaching Experience : 
Place : 
Date : Signature of Internal Guide

Principal

[Approved or not Approved]
[ University Use]
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## APPENDICES

A. DATA FLOW DIAGRAM

B. TABLE STRUCTURE

C. SAMPLE CODING

D. SAMPLE INPUT

E. SAMPLE OUTPUT
A. Format of the title page

TITLE OF THE PROJECT WORK

A Project Work submitted in partial fulfillment of the requirements for the degree of

Master of Computer Applications

to the

Periyar University, Salem - 11

By

NAME OF THE STUDENT

REG. NO.

COLLEGE NAME

(AFFILIATED TO PERIYAR UNIVERSITY)

PLACE with Pin Code

MONTH – YEAR
B. Format of the Certificate

Name and Address of the Internal Guide

Place
Date

CERTIFICATE

This is to certify that the Project Work entitled ........................................
........................................ submitted in partial fulfillment of the requirements of the degree of Master of Computer Applications to the Periyar University, Salem is a record of bonafide work carried out by ..................... Reg. No ......................... under my supervision and guidance.

Head of the Department

Date of Viva-voce:

Internal Examiner  External Examiner
SEMESTER I
Core Course-I-JAVA PROGRAMMING

OBJECTIVES:

• To Understand the OOPS concept and how to apply in programming
• To understand and apply the fundamentals core java, packages, and database connectivity
• Helps to develop web based applications and Learn the advanced concepts of Java

UNIT – I


UNIT – II


UNIT – III


UNIT – IV

UNIT – V


TEXT BOOKS

REFERENCE BOOKS
3. C.Muthu, “Programming with Java,” Vijay Nicole Imprints Private Ltd., 2004

COURSE OUTCOMES:

• Able to understand Object Oriented Programming concepts, java and Applet programming.
• Develops learners knowledge to create client / server application, developing Java Beans and Servlet applications.
SEMESTER I

Core Course-II- RELATIONAL DATABASE MANAGEMENT SYSTEM

OBJECTIVES:

• To understand the architecture and functioning of relational, distributed and object oriented databases
• To learn the use of structural query language and its syntax, transactions and techniques for query optimization

UNIT - I


UNIT - II


UNIT - III

Indexing and Hashing – Query Processing – Transaction Processing – Concurrency Control and Recovery.

UNIT - IV

Advanced Database Concepts and Emerging Applications: Distributed Databases – Object Oriented Databases - Object Relational Databases- Data mining and Data Warehousing.

UNIT – V

DBMS Case Studies: Application of DB concepts in Hospitals or any small and medium scale Industry– Application of DBMS in Marketing (For Unit V, students are expected to do a survey and study and submit a report)
REFERENCE BOOKS


ONLINE RESOURCES / TUTORIALS

1. http://nptel.ac.in/courses/106106093/
4. http://www.w3schools.in/dbms/
6. https://onlinecourses.nptel.ac.in/noc21_cs04/preview
7. https://onlinecourses.swayam2.ac.in/aic20_sp36/preview
8. https://onlinecourses.swayam2.ac.in/cec21_cs11/preview
9. https://onlinecourses.swayam2.ac.in/nou21_lb02/preview
10. https://onlinecourses.nptel.ac.in/noc21_cs52/preview

COURSE OUTCOMES:

On completion of the course, students will able to

• Know about the various Data models and works on Database Architecture
• Knowledge patterns, Object Oriented Databases are well equipped.
SEMESTER I
CORE COURSE – III - DISCRETE MATHEMATICS

OBJECTIVES:

- Define proposition & logical connectives.
- Describe the logical equivalence and implications.
- To study predicate and quantifier.
- Discuss Fundamental principle of counting, permutation and combination

UNIT-I


UNIT-II


UNIT-III


UNIT –IV


UNIT-V

TEXT BOOK


REFERENCE BOOKS


COURSE OUTCOMES:

After completion of this course, students will be able to

- Apply concept of Predicate Calculus in computer science like design of computing machines, artificial intelligence, definition of data structures for programming languages etc. (Application)
- Apply the knowledge of Boolean algebra in computer science for its wide applicability in switching theory, building basic electronic circuits and design of digital computers. (Knowledge, Application)
- Understand the application of various type of graphs in real life problem.(Knowledge, Comprehension)
OBJECTIVES:

- To study communication network protocols, different communication layer structure
- To learn security mechanism for data communication

UNIT - I


UNIT - II


UNIT - III


UNIT - IV

Network layer - design issues - Routing algorithms - Congestion control algorithms – Quality of Service – Network layer of Internet- IP protocol – IP Address – Internet Control Protocol.

UNIT - V

TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES:

- Remember the basic concept about the fundamentals of computer networks.
- Understand Error detection and correction in Data link layer.
- Analyze the ADSL and Medium Access Layer.
- Understand about the service provided by the Network layer and apply algorithms.
- Analyze Error control, flow control in Transport Layer.
SEMESTER I

Core Course - V - LAB – I JAVA PROGRAMMING LAB

1. Write a java application program to demonstrate class with constructors.
2. Write a java application program to demonstrate inheritance, interface and package.
3. Write a java application program to implement exception and Multi threading concept.
4. Write a program to read, write and copy a file using byte streams or character streams.
5. Develop a banking system using AWT and event handling.
6. Develop a programs using Swing to display the personal detail of an employee.
7. Implement TCP/IP and UDP protocol for message communication.
8. Using JDBC develop a student information system.
9. Implement client/server communication using servlets.
10. Develop a web page using JSP.
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 a database and perform the operations Views, Synonyms, Sequence, Indexes, Save
4. Creating an Employee database to set various constraints.
5. Creating relationships between the databases.
6. Write a PL/SQL block for a database and retrieve records from the database using cursor.
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.
9. Creation of procedures for a database and perform some operations.
10. Creation of database and perform the following operations:
    a. Insert a record to a database using triggers
    b. Group the records from a database using functions.
SEMESTER II
Core Course –VII – DATA MINING TECHNIQUES

OBJECTIVES:

- To introduce the fundamental concepts of Data Mining techniques
- To understand the various algorithms used for Information Retrieval from Datasets

UNIT-I

UNIT-II

UNIT-III
Frequent Patterns, Associations and Classifications: Basic Concepts – The Apriori Algorithm – Definition of Classification – Decision tree Induction – Bayesian Classification Method - Rule Based Classification – Classification by Back Propagation – Lazy Learners – K-Nearest Neighbor– other Classification Methods.

UNIT-IV
Cluster Analysis: Definition – Requirements for Cluster Analysis – Categorization of major Clustering Techniques - Partitioning Methods – Hierarchical Methods – Grid Based Methods – Model Based Clustering - Outlier Analysis.

UNIT-V
Data Mining Trends and Applications: Spatial Data Mining – Multimedia Data Mining – Web Data Mining – Data Mining Applications – Data Mining Trends.
TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES:
• After completing this course, Students will be familiar with basic data mining concepts
• Can solve the real world problems through data mining approach
• Can find the hidden and useful information from the large dataset
SEMESTER II
Core Course – VIII – PYTHON PROGRAMMING

OBJECTIVES:
- The main aim of the course is to introduce multi paradigms of programming language using python programming language
- The course introduces core components of different paradigms of programming language like interactive, logic and functional
- The Course introduces core components of object oriented and web programming based on python language

UNIT - I
Introduction to Multi paradigm approach using Python: Overview of programming paradigms-Imperative, Functional, logic and object oriented Introduction to Python programming Language- Features, Downloading and Installing, Running Python, Python Documentation, Python Basics- The print statement, comment, statements and syntax, variable assignments ,identifier.

UNIT – II
Objects, Numbers and Sequences in Python: Python Objects- Standard types, Other built-in types, Internal types, Numbers- Integer, Double precision floating point, complex numbers, operators, Sequences- String, List and Tuples.

UNIT – III
Conditional, loops and files: If, else, elif, conditional expressions, while, for, break , continue, pass, File objects, File built in functions, standards files, command line arguments

UNIT - IV
Functional programming: Creating Functions, Passing Functions, Functional Programming, Scope of variables, Introduction to Modules, Modules and Files, Importing Modules, Module Built-in functions, packages, Other features of modules

UNIT – V
TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES:

- Able to understanding Python scripting language
- Clear Understanding of the built-in objects of Python and object-oriented concepts
- Express different Decision Making statements and Functions
- Be exposed to advanced applications such as Web applications
SEMESTER II

Core Course – IX – ADVANCED OPERATING SYSTEM

OBJECTIVES:

- To learn the fundamentals of Operating Systems
- To gain knowledge on Distributed operating system concepts that includes architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols.
- To gain insight on to the distributed resource management components viz. the algorithms for implementation of distributed shared memory, recovery and commit protocols
- To know the components and management aspects of Real time, Mobile operating systems

UNIT - I


UNIT – II


UNIT – III


UNIT - IV


UNIT – V

REFERENCE BOOKS


COURSE OUTCOMES:

- Discuss the various synchronization, scheduling and memory management issues
- Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system
- Discuss the various resource management techniques for distributed systems
- Identify the different features of real time and mobile operating systems
- Install and use available open source kernel
- Modify existing open source kernels in terms of functionality or features used
SEMESTER II

Core Course - X - LAB – III DATA MINING LAB

(Using any Open Source Data Mining Tool)

1. To get the Input from user and Perform Numerical Operations [MAX, MIN, AVG, SUM, SQRT, ROUND].
2. Implement the FP– Growth algorithm.
3. To get the input from user and perform Addition and Subtraction, Multiplication.
4. To Perform Statistical Operations [Mean, Median, Mode and Standard Deviation].
5. To generate a decision tree for the given data set.
6. Develop an application to extract association mining rules.
7. Develop an application for implementing one of the clustering techniques.
8. To Perform K-means Clustering Operations and Visualize it.
9. Develop an application for implementing Naive Bayes classifier.
10. To Perform Market Basket Analysis using Apriori algorithm.
1. Write a Python program to get the smallest number from a list.

2. Write a Python program to count the number of strings where the string length is 2 or more and the first and last character are same from a given list of strings.

3. Write a Python program to get a list, sorted in increasing order by the last element in each tuple from a given list of non-empty tuples.

4. Write a Python program to print a specified list after removing the 0th, 4th and 5th elements.
   
   a. Sample List : ['Red', 'Green', 'White', 'Black', 'Pink', 'Yellow']
      Expected Output : ['Green', 'White', 'Black']

5. Write a Python program to compute the difference between two lists.
   Sample data: ['red', 'orange', 'green', 'blue', 'white'], ['black', 'yellow', 'green', 'blue']
   Expected Output:
   Color1-Color2: ['white', 'orange', 'red']
   Color2-Color1: ['black', 'yellow']

6. Write a Python program to concatenate elements of a list.

7. Write a Python program to read a matrix from console and print the sum for each column. Accept matrix rows, columns and elements for each column separated with a space(for every row) as input from the user.

8. Write a Python program to check if first digit/character of each element in a given list is same or not.

9. Write a Python program to check if a given string contains an element, which is present in a list.

10. Write a Python program to compute the average of nᵗʰ elements in a given list of lists with different lengths.
SEMESTER III
Core Course - XII – INTERNET OF THINGS

OBJECTIVES:

• Understand the IOT Terminology and Technology
• Describe IOT applications
• Analyze Protocol standardization for IOT
• Identify the role of cloud computing in IOT
• To apply the concept of Internet of Things in the real world scenario

UNIT - I


UNIT – II


UNIT – III


UNIT - IV


UNIT – V

TEXT BOOKS

REFERENCE BOOKS
2. Cuno Pfister, “Getting Started with the Internet of Things”, O’Reilly, 2011

COURSE OUTCOMES:
- Demonstrate the design, communication model and enabling technologies for IoT.
- Explore the system management and domain for various applications of IoT.
- Categorize the various protocols that are used for developing IoT applications.
- Deploy an IoT application and connect to the cloud.
- Develop IoT applications for real time scenario.
OBJECTIVES:

On completion of the course, the students will

- be able to develop the .Net based applications

UNIT I


UNIT II

Core C# Programming Constructs: Environment class – System. Console class - String-Data type Conversion - C# iteration constructs-Decision Constructs - methods - arrays-structure - understanding values types and reference types - C# nullable.

UNIT III

Object Oriented Programming with C#: Introducing the C# class type - understanding constructor - this keyword - static keyword - defining pillars of OOP - C# access modifiers-inheritance and polymorphism-understanding exception handling-understanding object lifetime - working with interfaces – delegates – events - Introducing LINQ.

UNIT IV


UNIT V

Data Access with ADO.NET: ADO.Net Architecture – Advantages - ADO.Net Objects. Handling Databases in code: Connection class-Command class – DataAdapter – DatasetClass - DataReader class - DataTable Class - DataRow, DataColumn classes – Datarelation Class. Handling Data Manipulation in code: Record navigation-record updation - inserting record - deleting record.
TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES:
At the end of the course the students must be able to:
- Understand the development and deployment cycles of enterprise applications.
- Utilize the .NET framework to build distributed enterprise applications.
- Understand the c# Programming Constructs.
- Develop web applications using a combination of client-side and server-side technologies.
- Understand and experiment with the deployment of enterprise applications.
SEMESTER III

Core Course - XIV – BIG DATA ANALYTICS

OBJECTIVES:

- To impart knowledge in Fundamentals, Big Data Analytics, Technologies and databases, Hadoop and Map Reduce Fundamentals

UNIT - I

Introduction to big data: Data, Characteristics of data and Types of digital data: Unstructured- Semi-structured and Structured- Sources of data- Working with unstructured data- Evolution and Definition of big data- Characteristics and Need of big data- Challenges of big data- Data environment versus big data environment.

UNIT – II

Big data analytics: Overview of business intelligence- Data science and Analytics- Meaning and Characteristics of big data analytics- Need of big data analytics- Classification of analytics- Challenges to big data analytics- Importance of big data analytics- Basic terminologies in big data environment.

UNIT – III


UNIT - IV

Hadoop foundation for analytics: History- Needs- Features- Key advantage and Versions of Hadoop- Essential of Hadoop ecosystems- RDBMS versus Hadoop-Key aspects and Components of Hadoop- Hadoop architectures.

UNIT – V

HadoopMap Reduce and YARN framework: Introduction to MapReduce- Processing data with Hadoop using MapReduce- Introduction to YARN- Components, Need and Challenges of YARN- Dissecting YARN- MapReduce application- Data serialization and Working with common serialization formats- Big data serialization formats.
TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES:
At the end of the course the students must be able to:

- Understand big data analytics as the next wave for businesses looking for competitive
- Understand the financial value of big data analytics
- Explore tools and practices for working with big data
- Understand how big data analytics can leverage into a key component
- Know about the research that requires the integration of large amounts of data
SEMESTER III
Core Course-XV-PROGRAMMING IN C#.NET LAB

1. Develop a project to update and delete few records using Disconnected Access.
2. Develop a project to view the records using GridView, DetailsView, FormViewControls.
3. Develop a project to generate a crystal report from an existing database.
4. Design a web page that makes uses of Ad Rotator Control.
5. Design a web page involving Multi View or Wizard Control.
6. Make use of Image Control involving two hot spots in a web page.
7. Establish the security features in a simple web site with five pages.
8. Use state management concepts in a mobile web application.
9. Develop a web service that has an ASP.Net client.
10. Develop a web service to fetch a data from a table and send it across to the client.
Core Course-XVI – INDUSTRY LITERACY - MINI PROJECT

OBJECTIVES:

- To undergo an Internship with any company to plan, analyze, design and implement a software project done within a stipulated period of time

The students are expected to undergo an Internship programme with any Industry / organization during the summer vacation of their II Semester with a stipulated period of minimum 20 days. The company must be a standard and registered body under Private / Public Act.

The student must submit a report to the Guide allotted to them during the III semester and the student has to appear for viva voce examination. The project report may contain the following:

1. Introduction
2. Data Collection / system study
3. System development
4. Implementation
   - Source code
   - Sample input
   - Sample output
5. Conclusion
SEMESTER – IV

Core Course - XVII - PROJECT WORK AND VIVA-VOCE

The students are expected to do their dissertation for one full semester by attaching themselves with a well reputed Organization/Research Institution and should submit the filled in format as given in Annexure-I to the department for approval of their Guide during the First Week of December. Periodically the project should be reviewed. The three copies of the project report should be submitted as per the format provided in Annexure II. Format of the Title page and Certificate are enclosed in Annexure III
Elective Course – I COMPUTER ARCHITECTURE

OBJECTIVES:

• To understand the fundamental knowledge for digital systems, the structure, function and characteristics of computer systems
• To identify and compare different methods for computer I/O
• To understand the basic principle of the assembly language and micro operations
• To identify the pipelining as a basic technique for increasing CPU performance as well as design, planning and control of pipeline units

UNIT - I


UNIT - II

Classification and design parameters - Memory Hierarchy - Internal Memory: RAM - SRAM and DRAM - Interleaved and Associative Memory. Cache Memory: Design Principles - Memory mappings - Replacement Algorithms - Cache performance - Cache Coherence - Virtual Memory - External Memory: Magnetic Discs - Optical Memory - Flash Memories - RAID Levels

UNIT - III


UNIT - IV

Micro-Operations - Functional Requirements - Processor Control - Hardwired Implementation - Micro-programmed Control - Multi-Processor Organization - Parallel Processing: Concept and Block Diagram - Types (SISD, SIMD, Interconnect network, MIMD, MISD) - Future Directions for Parallel Processors - Performance of Processors

UNIT - V

Pipelining Data Path - Time Space Diagram – Hazards - Instruction Pipelining - Arithmetic Pipelining.
TEXT BOOK
2. Computer Organization & Architecture, William Stallings, 8e, Pearson Education

REFERENCE BOOKS
1. Computer Organisation and architecture- Pal Chaudhary
2. Structured computer organization- Tanenbaum

COURSE OUTCOMES:
On completion of the course, student will be able to:

• Demonstrate computer architecture concepts related to design of modern processors, memories and I/Os
• Understand the potential of a hierarchical memory system
• To develop logic for assembly language programming
• Develop design skills of Instruction Sets
• Know how to design a pipelined data path
Elective Course - I- COMPUTER GRAPHICS

OBJECTIVES:

- To understand the development of graphics with mathematics
- To comprehend the fundamental concepts about display devices, input devices and graphics system.
- To imbibe knowledge of display systems, image synthesis, shape modeling of 2D and 3D applications

UNIT – I


UNIT – II


UNIT – III

Two–Dimensional Viewing: The Clipping Window – Clipping Algorithms–Two Dimensional Line Clipping–Polygon Fill–Area Clipping – Curve Clipping – Text Clipping. Interactive Input Methods and Graphical User Interfaces: Logical Classification of Input Devices – Interactive Picture Construction Techniques.

UNIT – IV


UNIT – V

TEXT BOOK

REFERENCE BOOKS

COURSE OUTCOMES:
On the successful completion of the course, student will be able to:

- To understand the activities involved in modeling, rendering, shading and animation of computer graphics
- To use OpenGL to create interactive computer graphics
- To understand a typical graphics pipeline and make pictures with their computer
Elective Course - I- DESIGN AND ANALYSIS OF ALGORITHMS

OBJECTIVES:

- To learn about Complexity Analysis and various algorithmic design methodologies
- To critically analyse the efficiency of alternative algorithmic solutions for the same problem
- To understand different algorithm design techniques
- To understand the limitations of Algorithmic power

UNIT - I


UNIT - II


UNIT - III


UNIT - IV


UNIT - V

TEXT BOOKS

REFERENCE BOOKS

COURSE OUTCOMES:
At the end of the course, the students should be able to:
- Design algorithms for various computing problems
- Analyze the time and space complexity of algorithms
- Critically analyze the different algorithm design techniques for a given problem
- Find optimal solution by applying various methods
- Modify existing algorithms to improve efficiency
- Compare between different data structures. Pick an appropriate data structure for a design situation
Elective Course - I- E-TECHNOLOGY

OBJECTIVES:

- Understand concept of Ecommerce and its types
- Be familiarized with technologies for Ecommerce
- Understand different types of Online Payment systems
- Understand Selling and marketing on web
- Be familiarized with concept of E-business and E-business Models
- Understand various E-business Strategies

UNIT-I


UNIT-II


UNIT-III


UNIT-IV


UNIT-V

REFERENCE BOOKS


COURSE OUTCOMES:

- Define and differentiate various types of Ecommerce
- Describe Hardware and Software Technologies for Ecommerce
- Explain payment systems for E-commerce
- Describe the process of Selling and Marketing on web
- Define and Describe E-business and its Models
- Discuss various E-business Strategies
Elective – II – ARTIFICIAL INTELLIGENCE

OBJECTIVES:

- To develop a structured and detailed unified science of human and computational intelligence
- To know the various methods of knowledge representation
- To understand the basics of Natural Language processing and Expert System

UNIT - I


UNIT – II


UNIT – III


UNIT - IV


UNIT – V

TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES:

After completing this course the student will be able to

- Understand the computation intelligence
- Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning
Elective – II – THEORY OF COMPUTATION

OBJECTIVES:

- Understand various Computing models like Finite State Machine, Pushdown Automata, and Turing Machine
- Be aware of Decidability and Un-decidability of various problems

UNIT – I


UNIT – II


UNIT – III


UNIT – IV


UNIT – V

TEXT BOOK


REFERENCE BOOKS


COURSE OUTCOMES:

- Explain the models of computation, including formal languages, grammars and automata, and their connections

- Analyze and design finite automata, pushdown automata, Turing machines, formal languages, and grammars
Elective – II – MACHINE LEARNING

OBJECTIVES:

- To Learn about Machine Intelligence and Machine Learning applications
- To implement and apply machine learning algorithms to real-world applications
- To identify and apply the appropriate machine learning technique to classification, pattern recognition, optimization and decision problems
- To understand how to perform evaluation of learning algorithms and model selection

UNIT – I


UNIT - II


UNIT - III


UNIT - IV

Instant Based Learning: K- Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning.

UNIT - V

TEXT BOOK


REFERENCE BOOKS


COURSE OUTCOMES:

- Remember the fundamental issues and challenges of machine learning: data, model selection, model complexity
- Have an understanding of the strengths and weaknesses of many popular machine learning approaches
- Analyze mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning
- Design the various machine learning algorithms
- Implement various machine learning algorithms in a range of real-world applications
ELECTIVE – II – WEB SERVICES

OBJECTIVES:

- To provide students with conceptual knowledge and skills required to develop web applications and web services
- To understand the evolution and emergence of web services
- To know about the fundamentals of SOAP and web services
- To understand the overview of Web Services Interoperability

UNIT - I


UNIT - II


UNIT - III

Discovering Web Services: Service discovery - role of service discovery in a SOA - service discovery mechanisms - UDDI: UDDI Registries - uses of UDDI Registry - Programming with UDDI - UDDI data structures - Publishing API - Publishing information to a UDDI Registry - searching information in a UDDI Registry - limitations of UDDI.

UNIT - IV


UNIT - V

TEXT BOOKS
3. XML, Web Services, and the Data Revolution, F.P. Coyle, Pearson Education.

REFERENCE BOOKS
2. Java web services, D.A. Chappell and T. Jewell, O’Reilly, SPD

COURSE OUTCOMES:
On completion of the course, student will be able to:

- Define what is a web service
- Describe the formats for requests to and response from a web service that uses a SOAP interface
- Identify and describe the responsibilities for the design patterns that are appropriate for the design of a system using a web
Elective – III – CLOUD COMPUTING

OBJECTIVES:

- To provide students with basics of cloud computing concepts, technologies and architecture
- To understand the applications and implementations

UNIT - I


UNIT - II


UNIT - III


UNIT - IV


UNIT - V

TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES:

- Remember the Cloud Computing environments & computing platforms
- Understand the Cloud data Services
- Analyze Cloud Application Design and Development
- Apply the Python data Types and Structures
- Remember and understand the Big Data Analytics and key Management
Elective – III – EMBEDDED SYSTEMS

OBJECTIVES:

- To understand about Embedded processor Modeling, Bus Communication in processors, Input/output interfacing
- To know about processor scheduling algorithms, and Real time operating system

UNIT - I


UNIT - II


UNIT - III


UNIT - IV


UNIT - V

TEXT BOOK


REFERENCE BOOKS


COURSE OUTCOMES:

- Acquire knowledge about devices and buses used in embedded networking.
- Develop programming skills in embedded systems for various applications.
- Acquire knowledge about basic concepts of circuit emulators.
- Acquire knowledge about Life cycle of embedded design and its testing.
Elective – III – SOCIAL COMPUTING

OBJECTIVES:
• Understand the important features of social computing
• Learn to analyze the data left behind in social media

UNIT - I

Mining Twitter: twitter in all the rage – Exploring Twitter’s API, Analyzing the 140 characters. Mining Facebook: Exploring Facebook’s social Graph API – Analyzing social graph connections. Mining Google+: Exploring the Google+ API. Mining web pages: Scraping, Parsing and crawling the Web.

UNIT - II


UNIT - III

Community Maintained Resources, Supporting technologies for community maintained resources, User motivations-Location based social interaction , location technology, mobile location sharing- Social Information Sharing and social filtering, Automated recommender system – Social Media in the public sector, Analyzing public sector social media.

UNIT - IV


UNIT - V

TEXT BOOK


REFERENCE BOOKS


COURSE OUTCOMES:

- Understand the range of social computing applications and concepts.
- Understand and apply concepts of computational models underlying social computing.
- Carry out simple forms of social analytics, involving network and language models, applying existing analytic tools on social information.
- Design and launch social computing applications.
- Understand the broad aspects of, and implement, richer social computing models in social computing applications.
- Evaluate emerging social computing applications, concepts, and techniques in terms of key principle.
ELECTIVE – III – VIRTUAL REALITY

OBJECTIVES:

- To understand Geometric modeling and Virtual environment
- To study about Virtual Hardwares and Softwares
- To develop Virtual Reality applications

UNIT – I


UNIT – II


UNIT – III


UNIT – IV


UNIT – V

TEXT BOOK


REFERENCE BOOKS


COURSE OUTCOMES:

• Remember the virtual reality Concepts
• Have an understanding of the Virtual environment
• Implement Virtual Hardware and software
• Design Virtual Reality toolkits
• Able to develop Virtual Reality applications
Elective – IV – CYBER SECURITY

OBJECTIVES:

• To highlight the importance of Cyber Security, Security principles, Cyber Security Challenges and Ethical Practices
• To classify cyber-attacks, present different vulnerability weaknesses, Intrusions and the methods to handle them
• To introduce the learners the fundamentals in the upcoming technologies, forensic investigations, precautions against different frauds and scams and legal implications

UNIT – I
Introduction to Cyber Space - Introduction to Information Systems - Need for Cyber Security - Introduction to Cyber Attacks - Classification of Cyber Attacks - Classification of Malware, Threats - Vulnerability Assessment – (Intrusion Detection Systems - Intrusion Prevention Systems)*.

UNIT – II

UNIT – III

UNIT – IV

UNIT – V
Cyber Law-Basics - Information Technology Act 2000 - Amendments to IT Act 2000 - Evidentiary value of Email/SMS, Cybercrimes and Offenses dealt with IPC - RBI Act and IPR Act in India - Jurisdiction of Cyber Crime, (Cyber Security Awareness Tips)*.

* Indicates Self-study components
E-BOOKS


REFERENCE BOOKS


ONLINE RESOURCES / TUTORIALS

1. https://onlinecourses.swayam2.ac.in/cec21_cs09/preview
2. https://onlinecourses.swayam2.ac.in/nou21_cs01/preview
4. https://www.sans.org/security-resources/
5. https://online.stanford.edu/professional-education/cybersecurity

COURSE OUTCOMES:

- Outline the security rudiments, comprehend the Cyber Security challenges and discriminate between different Intrusion handling Methods
- Judge and evaluate different biometrics and suggest suitable ones. Analyze the different types of security models, Audit and Assessment processes
- Assess different security types and practice appropriate security mechanisms to minimize the risks
- Justify the importance of cybercrime investigation in detecting frauds and scams, scrutinize various steps and methods involved in the investigation process and prepare appropriate reports
ELECTIVE – IV – DATA VISUALIZATION

OBJECTIVES:
- To understand the significance of data and to communicate this information clearly and efficiently
- To understand the visual representations of data and visualization techniques

UNIT - I
Introduction: Context of data visualization – Definition, Methodology, Visualization design objectives. Key Factors – Purpose, visualization function and tone, visualization design options – Data representation, Data Presentation, Seven stages of data visualization, widgets, data visualization tools.

UNIT - II
Creating visual representations - visualization reference model - visual mapping - visual analytics - Design of visualization applications - Classification of visualization systems

UNIT - III

UNIT - IV
Visualization of groups - trees - graphs - clusters - networks - software - Metaphorical visualization

UNIT - V
Security Data Visualization - Port scan visualization - Vulnerability assessment and exploitation - Firewall log visualization - Intrusion detection log visualization - Attacking and defending visualization systems - Creating security visualization system.
TEXT BOOK
2. Matthew Ward, Georges Grinstein and Daniel Keim, “Interactive Data Visualization Foundations, Techniques, Applications”, 2010

REFERENCE BOOK

COURSE OUTCOMES:
On completion of the course, student will be able to:
- Understand better analysis, quick action, identifying patterns and grasping the latest Trends
- Understand the more specific methods to visualize data
Elective – IV – DEEP LEARNING

OBJECTIVES:

- To understand the evolution of deep architectures
- To apply deep learning principles to Natural Language Processing
- To assess the challenges of multimodality and reinforcement learning

UNIT -I

UNIT -II

UNIT –III

UNIT –IV

UNIT – V
TEXT BOOK


REFERENCE BOOK


COURSE OUTCOMES:

- To understand the fundamentals of deep learning.
- To know the main techniques in deep learning and the main research in this field.
- Applying knowledge and understanding.
- Be able to design and implement deep neural network systems.
Elective – IV – GRID COMPUTING

OBJECTIVES:

- To understand how grid computing helps in solving large scale scientific problems
- To learn program concepts of grid and cloud
- Understand the security issues in grid and cloud environment

UNIT – I


UNIT – II


UNIT – III


UNIT – IV


UNIT – V

TEXT BOOK

REFERENCE BOOKS
1. Kai Hwang, Geoffrey C. Fox, Jack J. Dongarra, “Distributed and Cloud Computing: Clusters,

COURSE OUTCOMES:
• Understanding the fundamentals of grid computing.
• Discussing the basics of grid monitoring
• Learning the concepts of grid security and resource management
• Understanding the concepts of grid portals
• Understanding the advanced grid middleware
EXTRA DISCIPLINARY PAPERS
COMPUTER SCIENCE

List of Extra Disciplinary Courses (Non-Major Electives) offered by the Department of Computer Science/Applications for other PG programmes

EDC – I - PRINCIPLES OF INFORMATION TECHNOLOGY

OBJECTIVES:

- To learn the basic concept and skills associated with information technology
- To know the Computer hardware and software technologies
- To gain the knowledge of organizing data
- To assess the current role of Information Science in an organization
- To understand how IT relates to organizational goals

UNIT-I

Business Environment: Business and Information technology – business in the information age– about information technology–what is an information system– Information Technology in the Modern Organization.

UNIT-II


UNIT-III


UNIT-IV

Functional, Enterprises, and Inter organizational Systems: Information system to support business functions – transaction processing information systems – accounting and finance system – marketing and sales system – production and operations management system – Integrated information system and enterprises resource planning–inter organizational/Global information system. –Electronic Commerce

UNIT-V

TEXTBOOK


REFERENCE BOOK


COURSE OUTCOMES:

• Able to understand the basics of information technology
• Gaining the knowledge of Hardware and Software technologies
• Learning the method of organizing data
• Assessing the role of Information Science to an organization.
• Understanding the role of IT in organizations
EDC – II - FUNDAMENTALS OF COMPUTERS AND COMMUNICATIONS

OBJECTIVES:

• To know the basics of Computers
• To learn the internal Components of Computers
• To understand the OS and its types
• To study the basics of networks and Internet
• To get a clear idea on DBMS and its concepts

UNIT-I


UNIT-II


UNIT-III


UNIT-IV


UNIT-V

TEXT BOOK

REFERENCE BOOKS

COURSE OUTCOMES:
- Understanding the basics and internal parts of Computers
- Gaining the knowledge on OS and its types
- Studying the basics of networks and Internet
- Learning the databases and DBMS concepts
EDC - III - E-COMMERCE

OBJECTIVES:

- To know the mercantile and consumer process model
- To understand the Consumer's and Merchant's perspective
- To get an in depth idea on electronic data interchange
- To gain the knowledge on Internet, growth of internet and its commercial uses

UNIT-I

UNIT-II

UNIT-III

UNIT-IV

UNIT–V
Internet and World Wide Web: origin of the Internet – New uses for the Internet – Commercial use of the Internet–Growth of the Internet – Advertising on the Internet.
TEXT BOOKS


REFERENCE BOOKS


COURSE OUTCOMES:

- Learning the introduction on e-commerce
- Understanding the mercantile and consumer process models
- Analysing the consumers and merchant's perspective on e-commerce
- Getting an idea on Electronic Data Interchange
- Gaining the knowledge on Internet