SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)
(Accredited with "A" grade by NAAC)|(An ISO 9001:2015 Certified Institution)

SUNDARAKKOTTAI, MANNARGUDI – 614 016.

Master of Computer Applications- Course Structure under CBCS

(For the Candidates admitted from the Academic year 2020-2021)

Semester	Course	Course Title	Ins. Hrs/ Week	Credit	Exam Hrs	Marks		Total Mark
						Int.	Extn.	
I	Core Course (CC) – I	Programming in Java	5	4	3	25	75	100
	Core Course (CC) – II	Database Systems and Data Mining	5	4	3	25	75	100
	Core Course (CC) – III	Design and Analysis of Algorithms	5	4	3	25	75	100
	Core Course (CC) – IV	Mathematical Foundations of Computer Science	5	4	3	25	75	100
	Core Practical (CP) – I	Java Programming Lab	3	2	3	40	60	100
	Core Practical (CP)– II	Database and Data Mining Lab	3	2	3	40	60	100
	Elective Course (EC) – I		4	4	3	25	75	100
	Total		**30**	**24**	**-**	**-**	**-**	**700**
II	Core Course (CC) – V	Python Programming	5	4	3	25	75	100
	Core Course (CC) – VI	Distributed Technologies	5	4	3	25	75	100
	Core Course (CC) – VII	Operating Systems	5	4	3	25	75	100
	Core Course (CC) – VIII	Accounting and Financial Management	5	4	3	25	75	100
	Core Practical (CP) – III	Python Lab	3	2	3	40	60	100
	Core Practical (CP) – IV	Distributed Technologies Lab	3	2	3	40	60	100
	Elective Course (EC) – II		4	4	3	25	75	100
	Extra Disciplinary Courses (EDC) - I*		3	2	3	25	75	100
	Total		**33**	**26**	**-**	**-**	**-**	**800**
III	Core Course (CC) –IX		5	4	3	25	75	100
	Core Course (CC) –X		5	4	3	25	75	100
	Core Course (CC) – XI		5	4	3	25	75	100
	Core Course (CC) – XII		5	4	3	25	75	100
	Core Practical (CP) – V		3	2	3	40	60	100
	Core Practical (CP) –VI		3	2	3	40	60	100
	Elective Course (EC) - III		4	4	3	25	75	100

	Extra Disciplinary Courses (EDC) - II*		3	2	3	25	75	100
	Industrial Internship Programme (Mandatory)#		-	4	-	-	-	-
	Total		**33**	**30**	**-**	**-**	**-**	**800**
IV	Core Project	Project work	24	10	3	25	75	100
	Total		**24**	**10**	**-**	**-**	**-**	**100**
			-		-	-	-	-
Grand Total			**120**	**90**	**-**	**-**	**-**	**2400**

- Extra credits for SWAYAM courses (2 credits for 4 week, 4 credits for 8 week, 6 credits for 12 week course during MCA course Duration)
- *For MCA Programme, students should select EDC papers offered by other departments
- # Students summit report of Industrial Internship Programme completed during first year summer vacation

Subject	**No. of Courses**	**Total Credits**
Core course	12	48
Core Practical	6	12
Elective Course	3	12
Extra Disciplinary Course	2	4
Project	1	10
Industrial Internship Programme	-	4
Total	24	**90**

Note:				
1. Theory	Internal	25 marks	External	75 marks
2. Practical		40 marks		60 marks
3. Separate passing minimum is prescribed for Internal and External				

a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10marks)
b) The passing minimum for University Examinations shall be 40% out of 75marks (i.e. 30marks)
c) The passing minimum not less than 50% in the aggregate.

S.No.	Semester	Elective Courses (EC) (Any one from the list)
1.	I	Digital Computer Fundamentals/Computer Architecture / Management Information System
2.	II	Probability and Statistics/ Optimization Techniques/ Theory of Computation
3.	III	

EXTRA DISCIPLINARY COURSES (EDC) OFFERED BY THE DEPARTMENT

S.No.	Semester	Extra Disciplinary Courses (EDC) (Any one from the list)
1.	II	Internet of Things/ Web design
2.	III	

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: I-CC- I: PROGRAMMING IN JAVA

Ins. Hrs. /Week : 5 **Course Credit: 4** **Course Code :**

OBJECTIVES:

- To learn about the basis of java programming and Classes, and to understand Inheritance and Exception Handling
- To learn the Multithreaded and Collection Classes in java, and to understand Files concept (Input/ Output Streams)
- To able to develop Applet Application

UNIT I

An overview of Java – Java Buzzwords- Data Types, Variables and Arrays - Operators – Control Statements- Introducing Classes: Class Fundamentals – Declaring Objects – Introducing Methods – Constructors – The this keyword – Garbage Collection – Overloading Methods – Overloading Constructors - A Closer Look at Argument Passing - Recursion– Understanding static – final – Nested and Inner classes.

UNIT II

Inheritance: Inheritance Basics – Using super – Method overriding –Dynamic Method Dispatch- Using Abstract Classes - Final with Inheritance- Object class. Packages and Interfaces: Declaring Packages – Access Protection– Importing Packages – Defining, Implementing, Applying Interfaces - Exception Handling: Exception Types –Using try, catch – throw – throws – finally –multiple catch and nested try statements- Creating User defined Exception classes.

UNIT III

Multithreaded Programming: The Java Thread Model – Creating a Thread –Creating Multiple Threads- Thread Priorities- Synchronization – Inter thread communication. String Handling – The Collection Interfaces and Collection Classes: List, Set, Map, Enumeration and Iterator interfaces-ArrayList, LinkedList, Vector, Stack, Properties, HashTable, StringTokenizer, and Date classes.

UNIT IV

Files and IO Streams: File – The Byte Streams: InputStream, Output Stream, FileInputStream, FileOutputStream, PushbackInputStream and PrintStream – The Character Streams: Reader, Writer. File Reader and FileWriter – Serialization. Networking- Networking classes and interfaces: InetAddress class - TCP/IP Client and Server sockets–

Datagrams – URL and URL Connection classes.

UNIT V

Introduction to Applet class- Applet Architecture- the HTML APPLET tag – Passing parameters to Applets – Event handling: The Delegation Event Model, Event Classes, Event Listener Interfaces - Working with Graphics, Color and Font classes - Understanding Layout managers- Swing Component classes: JApplet, JFrame and JDialog - Text Fields, Buttons, Combo boxes, List, Tabbed and Scroll Panes. Understanding Layout managers. Introduction to JDBC-Application Database Connection-Applet Database connections-internal database connection

COURSE OUTCOME:

Students will be able to

1. Learn about the basis of java programming and Classes
2. Understand Inheritance and Exception Handling
3. Learn the Multithreaded and Collection Classes in java
4. Understand Files concept (Input/output Streams)
5. Develop Applet Application

TEXT BOOKS:

1. Herbert Schildt, The Complete Reference Java 2, Eleventh Edition, McGraw-Hill Education Pvt. Ltd.,2019.

2. Donald Bales, java Programming with Oracle JDBC, Released November 2001, and Publisher: O'Reilly Media, Inc. ISBN: 9780596000882

REFERENCE BOOK(S):

1. Herbert Schildt with Joe O' Neil, Java – Programmer's Reference, TMH, 2000.

E_RESOURCES:

1. www.HerbSchildt.com
2. http://learnjavaonline.org
3. www.Tutorialspoint.com

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: I-CC- II: DATABASE SYSTEMS AND DATA MINING

Ins. Hrs. /Week : 5 **Course Credit: 4** **Course Code :**

OBJECTIVES:

- To understand the fundamental elements of relational database management systems, and SQL
- To learn the basic concepts of Relational database design, relational data model, entity-relationship model, ER Model and advanced SQL and improve the database design by normalization and to learn about object oriented databases, XML and PostgreSQL
- To understand Data mining concepts and to learn about classification and cluster analysis

UNIT I: INTRODUCTION AND SQL

Introduction – Purpose of Database Systems – View of Data-Data Model-Data Base Languages- Data Storage And Querying –Database Users-Relational Databases: Introduction of Relational Model- Structure of Relational Model- Database Schema –Keys- Relational Query Languages- Relational Operations- SQL: SQL query Language –SQL Data Definition –Basic Structure of SQL Query –Additional basic operations- set operations-Aggregate operations –Nested Sub Queries- modification of the database-Intermediate SQL: Join Expression-Views- Integrity Constraints-SQL Data Types and Schemas-Authorization.

UNIT II: ADVANCED SQL AND DATABASE DESIGN

Advanced SQL: Accessing SQL for a Programming Languages –functions and procedures-triggers-recursive queries-OLAP-Database Design: Overview of Design Process-Entity Relationship Model-Constraints-ER Diagrams-Relational Data base Design: Features of Good Relational Designs- Atomic Domains and First Normal Form-Functional Dependencies –Multi Value Dependency- More Normal Forms- Comparison of ER model and Relational model.

UNIT III: SPECIALTY DATABASES

Object Based Databases –Overview-Complex Data Types-Structured Types and Inheritance in SQL-Table Inheritance-Array and Multi Sets in SQL-Object Identity and Reference Types in SQL-implementing O-R Features-Object Relational Mapping -Object Oriented Vs Object Relational –XML: Motivation-Structure of XML Data-XML Document Schema-Querying And Transformation-Application Program Interfaces to XML-Storages of XML Data-XML Applications –Case Study: PostgreSQL. Distributed Databases: Homogeneous and

Heterogeneous Databases-Distributed Data Storage-Distributed Transaction-Distributed Query Processing-Cloud Based Databases.

UNIT IV: INTRODUCTION TO DATA MINING

Introduction to data mining: What is data mining?- Why data mining now?- the data mining process software development approach, the CRISP-DM approach- data mining applications-data mining techniques-limitations of data mining- Association Rule Mining: basics-the task and a naïve algorithm-The Apriori algorithm-Direct hashing and Pruning-Dynamic itemset counting.

UNIT V: CLASSIFICATION AND CLUSTER ANALYSIS

Decision tree –building decision tree-split algorithm based on information theory- split algorithm based on the Gini index-over fitting and pruning- decision tree rules-naive based method-estimating predictive accuracy of classification methods –improving accuracy of classification methods-other evaluation criteria for classification methods-classification software. Desired features of cluster analysis –types of cluster analysis methods- Partitional methods –hierarchical methods –density based methods –dealing with large databases –quality and validity of cluster analysis methods- cluster analysis software

COURSE OUTCOME:

Upon completion of the course, students will be able to

1. Understand the fundamental elements of relational database management systems, and SQL
2. Learn the basic concepts of Relational database design, relational data model, entity-relationship model, ER Model and advanced SQL and improve the database design by normalization.
3. Learn about object oriented databases, XML and postgreSQL
4. Understand Data mining concepts
5. Learn about classification and cluster analysis

TEXT BOOKS:

1. Henry F. Korth, and Abraham Silberschatz,,Sudarshan “Database system Concepts”, McGraw Hill, 6th Edition, 2010
2. C.J. Date, “An Introduction to Database Systems”,3rd Edition, Addison Wesley 1983
3. G.K. Gupta, Introduction to Data mining with case studies, Prentice Hall India, 2006

REFERENCE BOOK(S):

1. Hector Garcia Molina, Jeffrey D Ullman, Jennifer Wisdom, Database Systems: The Complete Book. Pearson Education 2013.
2. Pipin C. Desai, *“*An Introduction to data base systems*”*,Galgotia Publications Private Limited, 1991.

E_RESOURCES:

1. https://www.pdfdrive.com/database-management-system-dbms-tutorial-d17429678.html
2. http://www.lincoste.com/ebooks/english/pdf/computers/database_management_systems.pdf

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: I-CC- III: DESIGN AND ANALYSIS OF ALGORITHMS

Ins. Hrs. /Week : 5 **Course Credit: 4** **Course Code :**

OBJECTIVES:

- Reinforce basic design concepts (e.g., pseudo code, specifications, top-down design)
- Knowledge of Mathematical aspects, and Knowledge of Analyzing Sorting and Searching Algorithm.
- Knowledge of algorithm design strategies and Familiarity with an assortment of important algorithms methods.

UNIT I: BASIC CONCEPTS OF ALGORITHMS

Introduction – Notion of Algorithm – Fundamentals of Algorithmic Solving – Important Problem types – Fundamental Data Structures-Fundamentals of the Analysis Framework – Asymptotic Notations and Basic Efficiency Classes.

UNIT II: MATHEMATICAL ASPECTS AND ANALYSIS OF ALGORITHMS

Mathematical Analysis of Non-recursive Algorithm – Mathematical Analysis of Recursive Algorithm – Example: Fibonacci Numbers – Empirical Analysis of Algorithms – Algorithm Visualization.

UNIT III: ANALYSIS OF SORTING AND SEARCHING ALGORITHMS

Brute Force – Selection Sort and Bubble Sort – Sequential Search and Brute-force string matching – Divide and conquer – Merge sort – Quick Sort – Binary Search – Binary Tree Traversal and Related Properties – Decrease and Conquer – Insertion Sort – Depth first Search and Breadth First Search.

UNIT IV: ALGORITHMIC TECHNIQUES

Transform and conquer – Presorting – Balanced Search trees – AVL Trees – Heaps and Heap sort – Dynamic Programming – Warshall's and Floyd's Algorithm – Optimal Binary Search trees – Greedy Techniques – Prim's Algorithm – Kruskal's Algorithm – Dijkstra's Algorithm – Huffman trees.

UNIT V: ALGORITHM DESIGN METHODS

Backtracking – n-Queen's Problem – Hamiltonian Circuit problem – Subset-Sum problem – Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem- Approximation Algorithm for NP-Hard Problem.

COURSE OUTCOME:

Students will be able to

1. Analyze the basic concepts of algorithms and Basic efficiency classes
2. Analyze mathematical foundation in analysis of algorithms
3. Analyze sorting and searching algorithm for solving problem
4. Understand different algorithmic technique
5. Understand different algorithmic design strategies

TEXT BOOKS:

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, 2012- 3rd Edition

REFERENCE BOOK(S):

1. T.H Cormen, C.E Leiserson, R.L Rivest and C.Stein, "Introduction to Algorithms",PHI Pvt.Ltd 2009- 3rd Edition.
2. Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis", Pearson Education Asia, 2008 – 3rd Edition.
3. A.V.Aho, J.E. Hopcroft and J.D.Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education Asia, 2003.

E_RESOURCES:

1. https://www.amazon.in/dp/B00XN47AS0/ref=dp-kindle-redirect?_encoding=UTF8&btkr=1
2. https://books.google.co.in/books?id=6eIPgTo8AaIC&printsec=frontcover&redir_esc=y#v=onepage& q&f=false

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: I-CC- IV: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Ins. Hrs. /Week : 5 **Course Credit: 4** **Course Code :**

OBJECTIVES:

- To understand the concept of set theory and to explore the knowledge in propositional logic
- To study the proof deduction principles and to understand the concept of graph theory
- To gain knowledge to apply recurrence relation in computer science.

UNIT I: SET THEORY

Set: Definition- Inclusion and Equality of sets – Power set – Operations on Set – Ordered pairs and n-tuples Cartesian products. Relation: Definition – Properties – Relation Matrix – Graph of a Relation – Partition and covering of a set Equivalence relation – Compatibility relations – Partial ordering. Functions: Definition – Composition of function – Inverse functions – Binary and n-ary Operations.

UNIT II: PROPOSITIONAL LOGIC

Propositions– Evaluation of constant propositions – Evaluation of propositions in a state – Precedence rules for operators – Tautologies – Propositions as sets of states – Transforming English sentence to propositional form – Laws of Equivalence – Rules of substitution and Transitivity.

UNIT III: PROOFS DEDUCTION

A formal system of Axioms and inference rules – Introduction to deductive proofs – Inference rules – Proofs and subproofs – Developing Natural deduction proofs.

UNIT IV: GRAPH THEORY

Graph-finite & infinite graphs-Incidence & degree-Isolated vertex, Pendant vertex & Null graphs Sub graphs- isomorphism, walks, paths and circuits-connected graphs, Disconnected graphs & components-Euler graphs-operations on graphs- Hamiltonian Paths and circuits.

UNIT V: RECURRENCE RELATION

Numeric functions – Generating functions – Recurrence Relation – Liner Recurrence Relations with constant coefficients – Homogeneous solutions – Particular solutions – Total solutions – Solution by the method of generating functions .

COURSE OUTCOME:

1. Students will be able to understand the concept of set theory
2. Students will be able to explore the knowledge in propositional logic
3. Students will be able to study the proof deduction principles
4. Students will be able to understand the concept of graph theory
5. Students will be able to gain knowledge to apply recurrence relation in computer science.

TEXT BOOKS:

1. J.P. Tremblay, R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw-Hill **[Unit I]**
2. David Gries, 'The Science of Programming' Narosa Publishing House, 1981 **[Unit II, Unit III]**
3. G.J.Narsing deo,'Graph theory with applications to engineering and computer science' Prentice hall India learning private limited [**unit IV]**
4. C.L. Liu, Elements of Discrete Mathematics, Second Edition, Tata McGraw-Hill book Company [**Unit V**]

REFERENCE BOOK(S):

1. K.H. Rosen, Discrete Mathematics and its Applications, Mc-Graw Hill Book Company, 1999
2. D.Shanthi Sophia Bharathi, 'Discrete Structures of Computer Science',Charulatha publications,Chennai.

E_RESOURCES:

1. https://www.pdfdrive.com/mathematical-foundation-of-computer-science-d18828981.html

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: I-CP- I: JAVA PROGRAMMING LAB

Ins. Hrs. /Week : 3 **Course Credit: 2** **Course Code :**

OBJECTIVES:

- To get hands on experience in Programming using Java applications.

1. Assume that a bank maintains 2 kinds of account for its customers' one called savings account and the other current account' The savings account provides compound interest and withdraw facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account falls below this level a service charge is imposed. Create a class Account that stores customers name' account number and type of account. From this derive the classes current-acct and saving-acct to make them more specific to their requirements. Introduce the necessary methods in order to achieve the following tasks:
    a. Accept deposit form a customer and update the balance.
    b. Display any deposit interest
    c. Compute and deposit interest.
    d. Permit withdrawal and update the balance.
    e. Check for the minimum balance' impose penalty' if necessary and update the balance.

2. Use constructors and methods to initialize the class members. Write a program that accepts a shopping list of five items from the command line and stores them in a vector and accomplish the following:
    a. To delete an item in the list.
    b. To add an item at a specified location in the list.
    c. To add an item at the end of the list.
    d. To print the contents of the vector.

3. Implementation of the concept of multiple inheritance using interfaces and designs a package to contain the class students and another package to contain the interfaces sports.

4. Develop a simple real-life application program to illustrate the use of multithreads.

5. Create a try block that is likely to generate three types of exception and then incorporate necessary catch blocks to catch and handle them appropriately.

6. Develop a simple program using ArrayList An array list is created, and then objects of type **String** are added to it. The list is then displayed. Some of the elements are removed and the list is displayed again.
7. Write a Java applet' which will create the layout below: FORMAT Enter your Name:
   Enter your Age:
   Select City: *Delhi *Madras
   Select SIW: *Oracle *Visual Basic *Java OK CANCEL
8. Handle the following simple validations. The name entered should be less than 25 characters wide. Age entered should be done as the user exits the fields as well as when OK button is pressed. Hint use the Boolean action (Event evt' object arg)
9. Write an Applet which will play two sound notes in a sequence continuously use the Play ( ) methods available in the applet class and the methods in the Audio clip interface.
10. Write a Java applet program to demonstrate Calendar using calendar methods.
11. Write an Applet program to constructs several colors and draws various objects.

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: I-CP-II: DATABASE AND DATA MINING LAB

Ins. Hrs. /Week : 3 **Course Credit: 2** **Course Code :**

OBJECTIVE:

- To get hands on experience in developing queries using SQL and Data mining lab by using WEKA tool.

DATABASE LAB EXERCISE

1. Simple queries: selection, projection, sorting on a simple table
    a. Small-large number of attributes
    b. Distinct output values
    c. Renaming attributes
    d. Simple-complex conditions (AND, OR, NOT)
    e. Partial Matching operators (LIKE, %, _, *,?)
    f. ASC-DESC ordering combinations
    g. Checking for Nulls
2. Multi-table queries (JOIN OPERATIONS)
    a. Simple joins (no INNER JOIN)
    b. Aliasing tables – Full/Partial name qualification
    c. Inner-joins (two and more (different) tables)
    d. Inner-recursive-joins (joining to itself)
    e. Outer-joins (restrictions as part of the WHERE and ON clauses)
    f. Using where & having clauses
3. Nested queries
    a. In, Not In
    b. Exists, Not Exists
    c. Dynamic relations (as part of SELECT, FROM, and WHERE clauses)
    d. Set Oriented Operations
    e. Union
    f. Difference
    g. Intersection
    h. Division
4. DDL & TCL Commands.
    a. Creating objects: tables, views, users, sequences, Collections etc.
    b. Privilege management through the Grant/Revoke commands
    c. Transaction processing using Commit/Rollback
    d. Save points.
5. PL/SQL Programming I
    a. Programs using named and unnamed blocks
    b. Programs using Cursors, Cursor loops and records

6. PL/SQL Programming II
    a. Creating stored procedures, functions and packages
    b. Error handling and Exception
    c. Triggers and auditing triggers
7. User Defined Types
    a. Creating Objects
    b. Creating User Defined Operators
8. Create a database for Train Reservation System in SQL and connect with any front end using ODBC connectivity.

DATA MINING LAB EXERCISE

1. Create data-set in **.arff** file format. Demonstration of preprocessing on WEKA data-set
2. Demonstration of Association rule process on data-set contact lenses.arff / supermarket (or any other data set) using Apriori
3. Demonstration of classification rule process on WEKA data-set using j48 algorithm
4. Demonstration of classification rule process on WEKA data-set using Naive Bayes algorithm
5. Demonstration of clustering rule process on data-set iris.arff using simple k-means

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: I-EC-I:1 DIGITAL COMPUTER FUNDAMENTALS

Ins. Hrs. /Week : 4 **Course Credit: 4** **Course Code :**

OBJECTIVES:

- The student should learn the Fundamental components used in a Digital Computer which is essential for the programme
- To understand number representation and conversion between different representation in digital electronic circuits
- To understand laws and theorems of Boolean algebra and simplifying the logic circuits and to analyze logic processes and implement logical operations using combinational logic circuits and sequential circuits

UNIT -1

Number Systems and Codes: Binary Number System – Binary to Decimal Conversion – Decimal to Binary Conversion – Binary Addition – Binary Subtraction – Binary Multiplication and Division – Octal Numbers
– Hexadecimal Numbers – Binary Codes – Error Detecting Codes – Error Correcting Codes.

UNIT II

Logic Gates and Circuits: Boolean Algebra and Logic Gates – AND, OR, NOT, NAND, NOR, Exclusive OR gates– Applications of XOR Gate– The Exclusive NOR Gate – Positive and Negative Logic – Logic Chararcteristics – Bipolar Logic Families – Integrated Circuits – Boolean Algebra: Definitions – Fundamentals of Boolean Algebra – Boolean Functions – Minterms and Maxterms – Laws and Theorems of Boolean Algebra – DeMorgan's Theorem – Universal Building Blocks (UBB) .

UNIT III

Boolean Algebra: Simplifying Logic Circuits – Sum of Products – Sum of Products and Product of Sums Forms – Karnaugh Maps – Product of Sums Simplification – NAND and NOR Implementation –Don't Care Conditions – Overlapping Groups – Rolling the Map – Eliminating Redundant Groups.

UNIT IV

Combinational Logic Circuits: Introduction – Adders – The Half Adder – The Full Adder – Subtractors – BCD Adder – Multiplexers – Demultiplexers – Decoders – Encoders – Floating Point Number System – Range of Stored Numbers.

UNIT V

Sequential Logic Circuits: Flip Flops – RS Flip Flop – Clocked RS Flip Flop – D Flip Flop – JK Flip Flop – T Flip Flop – Triggering of Flip Flops – Master Slave Flip Flop – Conversion of D Flip Flop – Conversion of T Flip Flop – Transfer Circuit – Clock – Counters and Shift Registers: Counters – Asynchronous or Ripple Counter – Ring Counter – Twisted Ring Counter – State Diagrams and State Tables – Magnitude Comparator – Programmable Arrays of Logic Cells – Shift Registers.

COURSE OUTCOME:

Students will be able to

1. Convert different type of codes and number systems which are used in digital communication and computer systems.
2. Employ the codes and number systems converting circuits and Compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance and efficiency.
3. Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.
4. Design different types of with and without memory element digital electronic circuits for particular operation, within the realm of economic, performance, efficiency, user friendly and environmental constraints.
5. Develop a digital logic and apply it to solve real life problems.

TEXT BOOKS:

1. Principles of Digital Electronics, Dr. K. Meena, PHI Learning Private Limited, New Delhi, 2009.
2. Floyd, Thomas L: "Digital Computer Fundamentals", 10th Edition, 1997. University Book Stall.
3. Digital Electronics principles and Integrated Circuits by Anil K.Maini, Wiley India Pvt.Ltd

REFERENCE BOOK(S):

1. Digital Logic Design, M. Morris Mano, Pearson Education, 2010
2. V.Rajaraman,2002, Fundamentals of Computers, Third Edition, PHI, New Delhi.
3. Malvino, Paul Albert and Leach, Donald P: "Digital Principles and Applications" 4th Edition, 2000. TMH.
4. Malvino, Paul Albert and Leach, Donald P: "Digital Computer Fundamentals" 3rd Edition, 1995. TMH.
5. Bartee, Thomas C: "Digital Computer Fundamentals" 6th Edition, 1995. TMH.

E_RESOURCES:

1. http://jenko.eu/marjan/fpp_izredni/knjiga_df/df_00_preface.pdf
2. https://academia.edu/40308061/Digital_Fundamentals_11th_Edition_by_Thomas_L_Floyd
3. https://people.cs.clemson.edu/~yfeaste/855Assignments/presentations/Team6-Combinational%20Logic%20Circuit.pdf
4. https://www.cs.ou.edu/~fagg/classes/ame3623_s05/lectures/class_sequential.pdf
5. http://bwrcs.eecs.berkeley.edu/Classes/IcBook/SLIDES/slides6.pdf
6. https://nptel.ac.in/content/storage2/courses/106108099//Digital%20Systems.pdf

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: I-EC-I:2 COMPUTER ARCHITECTURE

Ins. Hrs. /Week : 4 **Course Credit: 4** **Course Code :**

OBJECTIVES:

- To analyze the decimal, binary, octal and hexadecimal number systems along with their conversion techniques and to describe other binary codes, alphanumeric codes and error detection codes with conversion techniques
- Explaining the logic gates AND, OR, NOT, NOR, NAND, XOR and XNOR with their truth tables and Explaining Combinational Circuit such as Half adder, full adder, Half subtracter and Full subtracter, binary Adder with circuit diagrams and truth table
- To explain the Synchronous, Asynchronous, BCD and Ring counters using Circuit diagram and truth table

UNIT I

Number Systems – Decimal, Binary, Octal and Hexadecimal Systems – Conversion from one system to another – Binary Addition, Subtraction, Multiplication and Division – Binary Codes– 8421, 2421, Excess-3, Gray, BCD – Alphanumeric Codes – Error Detection Codes.

UNIT II

Basic Logic Gates – Universal Logic – Boolean Laws and Theorems – Boolean Expressions – Sum of Products – Product of Sums – Simplification of Boolean Expressions –Karnaugh Map Method (up to 4 Variables) – Implementation of Boolean Expressions using GateNetworks.

UNIT III

Combinational Circuits – Multiplexers – Demultiplexers – Decoders – Encoders – Arithmetic Building Blocks – Half and Full Adders – Half and Full Subtractors – Parallel adder –2's Complement Adder – Subtractor – BCD Adder.

UNIT IV

Sequential Circuits – Flip Flops – RS, Clocked RS, D, JK, T and Master-Slave Flip Flops – Shift Register – Counters – Asynchronous counter(or)Ripple counter, MOD-n and Synchronous Counters – BCD Counter – Ring Counter.

UNIT V

Central Processing Unit: General Register Organization – Bus System-Control word-Stack Organization – Register Stack- Instruction Formats – Addressing Modes – Data Transfer and Manipulation – Program Interrupt– Reduced Instruction Set Computer(RISC)and CISC Architecture – CISC characteristics – RISC Characteristics.

COURSE OUTCOME:

Students will be able to

1. Analyze the decimal, binary, octal and hexadecimal number systems along with their conversion techniques.
2. Describe other binary codes, alphanumeric codes and error detection codes with conversion techniques.
3. Explaining Combinational Circuit such as Half adder, full adder, Half subtracter and Full subtracter, binary Adder with circuit diagrams and truth table.
4. Explain the Synchronous, Asynchronous, BCD and Ring counters using Circuit diagram and truth table.
5. Explain about Reduced Instruction Set Computer (RISC) and CISC Architecture, CISC characteristics, RISC Characteristics.

TEXT BOOKS:

1. Donald P. Leach, Albert Paul Malvino and GoutamSaha, Digital Principles and Applications, TataMcGraw Hill, Sixth Edition, Third Reprint, 2007. Unit:I : Chapter-5 Section (5.1-5.8) Unit:II : Chapter-2 Section (2.1-2.2), Chapter-3 Section (3.1, 3.2, 3.5, 3.7) Unit: III: Chapter-4 Section (4.1- 4.3, 4.6), Chapter-6 Section (6.7, 6.8)
2. Thomas C. Bartee, Digital Computer Fundamentals, Tata McGraw-Hill, Sixth Edition, Twenty FifthReprint, 2006. Unit:III : Chapter-5 Section (5.1, 5.3, 5.10, 5.11) Unit:IV : Chapter-4 Section (4.1-4.9)
3. Morris Mano M, Computer System Architecture, Prentice Hall of India, Third Edition,2008. Unit: I: Chapter-3 Section (3.5-3.6) Unit: V: Chapter-8 Section (8.2-8.8)

REFERENCE BOOK(S):

1. Morris Mano. M, Digital Logic and Computer Design, Prentice Hall of India, 2008.
2. Linda Null, Julia Lobur, The Essentials of Computer Organization and Architecture, Fourth Edition 2014

E_RESOURCES:

1. http://home.ustc.edu.cn/~leedsong/reference_books_tools/Computer%20Organization%20and%20Ar chitecture%2010th%20-%20William%20Stallings.pdf

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SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS), SUNDARAKKOTTAI, MANNARGUDI - 614016.

DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: I-EC-I:3 MANAGEMENT INFORMATION SYSTEM

Ins. Hrs. /Week : 4 **Course Credit: 4** **Course Code :**

OBJECTIVES:

- To expose the students to the managerial issues relating to information systems and help them identify and evaluate various options in this regard
- To Understand the leadership role of Management Information Systems in achieving business competitive advantage through informed decision making
- To Analyse and synthesize business information and systems to facilitate evaluation of strategic alternatives and to communicate strategic alternatives to facilitate decision making effectively

UNIT I

Introduction: MIS-Definition of MIS, Organizational structure of MIS, Importance of MIS, Evolution of MIS, Computers and MIS, Logical Foundations of MIS, Typical Management Information Systems, Future of MIS

UNIT II

MIS structure – **Management activity**: Introduction, Information requirement by level of management activity, Types of decision by management activity, Information Systems for Operation Control, Information Systems for Management Operation Control, Information systems for Strategic Planning

UNIT III

MIS structure – **Organizational function:** Sales and Marketing Subsystems, Production Subsystem, Logistics Subsystem, Personnel Subsystem, Financial and Accounting Subsystem, Information Processing Subsystem, Top Management Subsystem, Some issue of MIS.

UNIT IV

Developing MIS: System concept, Overview of MIS development, Management Information System Design- Defining the problem, System objective, System constraints, Information need, Information source, Documentation.

UNIT V

System Analysis and Design: Software development Life Cycle: Initiation/ Planning, System Analysis, Design, Coding and Testing, Implementation and Training, Prototyping, Rapid Application Development (RAD).

COURSE OUTCOME:

Students will be able to

1. Relate the basic concepts and technologies used in the field of management information systems.
2. Compare the processes of developing and implementing information systems.
3. Outline the role of the ethical, social, and security issues of information systems.
4. Translate the role of information systems in organizations, the strategic management processes, with the implications for the management.
5. Apply the understanding of how various information systems like DBMS work together to accomplish the information objectives of an organization

TEXT BOOKS:

1. Management Information Systems, 2nd Edition, David & Olsen, TMH
2. Management Information Systems, 2nd Edition, D.P Goyal, Mcmillan India Ltd.
3. Management Information Systems, 10th edition, James A.O'Brien, George M.Markers,Ramesh Behl McGraw Hill Education

REFERENCE BOOK(S):

1. Management Information System, 10th Edition, Loudon & Loudon, EEE
2. Management Information Systems by Jaiswal and Mittal, Oxford University Press
3. Management Information Systems by C.S.V.Murthy.

E_RESOURCES:

1. https://www.slideshare.net/rajeshrvth60/management-information-system-ppt-60013428
2. https://www.slideshare.net/HarishChand5/management-information-system-full-notes
3. https://www.sigc.edu/department/mba/studymet/ManagmentInformationSystem.pdf

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: II-CC-V: PYTHON PROGRAMMING

Ins. Hrs. /Week : 5 **Course Credit: 4** **Course Code :**

OBJECTIVES:

- To impart knowledge about data analysis using python programming.
- To learn about functions and strings of python programming and to learn about case studies of Word play , data structure selection and Tkinter etc.,
- To know about oops, GUI, Web and database programming

UNIT I

The way of the program - Variables, Expression and Statements- Functions – Case Study: interface design.

UNIT II

Conditionals and Recursion, Fruitful functions, Iteration, Strings- Case Study: word play.

UNIT III

Lists, Tuples, Dictionaries, Case Study: Data Structure selection

UNIT IV

Files-classes and objects –classes and functions –classes and methods- inheritance - Case Study: Tkinter

UNIT V

Regular Expression- GUI Programming- Web Programming- Database Programming

COURSE OUTCOME:

Upon completion of the course, students will be able to

1. Read, write, execute by hand simple Python programs
2. Structure simple Python programs for solving problems
3. Decompose a Python program into functions
4. Represent compound data using Python lists, tuples
5. Create GUI, Web and data base programming

TEXT BOOKS:

1. Allen B.Downey, “Think Python: How to Think like a Computer Scientist”,2Edition, 2012.
2. Chun Wesley J "Core Python Programming” Pearson education, 2nd Edition, 2007.

REFERENCE BOOK(S):

1. Charles Dierbach, “Introduction to Computer Science using Python: A Computational Problem- Solving Focus, Wiley India Edition, 2013.
2. Timothy A. Budd, “Exploring Python”, Mc-Graw Hill Education (India) Private Ltd., 2015.

E_RESOURCES:

1. https://downloads.mysql.com/docs/connector-python-en.pdf
2. http://index-of.es/Python/Core.Python.Programming.2nd.Edition.Wesley.Chun.2006.pdf
3. http://index-of.es/Python/Exploring%20Python.pdf

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: II-CC-VI: DISTRIBUTED TECHNOLOGIES

Ins. Hrs. /Week : 5 **Course Credit: 4** **Course Code :**

OBJECTIVES:

- To know the architectures of Distributed systems
- To understand and compare the technologies associated with J2EE and DOTNET.
- To understand ADO.NET.

UNIT I

Client server architecture: 2-tier model - 3-tier model - n-tier model - J2EEarchitecture - DOTNET architecture - MVC architecture.

UNIT II

Presentation services: Servlet - JSP - Javamail - Interaction services: Exploring the RMI Mechanism-
Introducing CORBA- CORBA Applications in the Enterprise – Building an XML Foundation.

UNIT III

Component model: EJB : Session Beans: Stateless and Stateful - Entity Beans- CMP and BMP - Message Driven Beans.

UNIT IV

ASP.NET : Introduction - architecture - ASP.NET Runtime - ASP.NET Parser-- Assembly - Page class. Web Server Controls - HTML Controls –AdRotator and Calendar controls - Validation Controls - Security Management.

UNIT V

ADO.NET: System. Data, SQL Client and Xml namespaces - Provider objects and Consumer objects - Disconnected data access – Grid View& Form View.

COURSE OUTCOME:

Students will be able to

1. Describe client server architecture
2. Implement presentation services and interaction services.
3. Construct component model using EJB
4. Describe the basic structure of ASP.NET and use the main features
5. Describe ADO.NET and its features

TEXT BOOKS:

1. Justin Couch, Daniel H.Steinberg, "J2EE Bible", Wiley India (P) Ltd, New Delhi, 2002. [Unit I and Unit II]
2. Paul Tremblett, "Instant Enterprise Java y - Beans", Tata McGraw Hill Publishing Company, New Delhi, 2001. [Unit III]
3. Platt S David, "Introducing Micorsoft .Net", Prentice Hall of India, New Delhi, 2003. [Unit IV and Unit V]

REFERENCE BOOK(S):

1. Stephanie Bodoff, Dale Green, Eric Jendrock, "The J2EE tutorial",Addison-Wesley, 2002.
2. Hitesh Seth, "Microsoft .NET: kick start", Sams Publishing, 2004.
3. J2EE the Complete Reference-Jim Kengh TheMcgraw Hill edition 2002.
4. Asp.Net "The Complete Reference" Mathew MacDonald The Mcgraw Hill edition 2002.

E_RESOURCES:

1. https://netbeans.org/kb/trails/java-ee.html
2. https://www.informit.com/articles/article.aspx?p=26660
3. https://www.dotnettricks.com/books
4. https://www.javatpoint.com/entity-bean

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: II-CC-VII: OPERATING SYSTEMS

Ins. Hrs. /Week : 5 **Course Credit: 4** **Course Code :**

OBJECTIVES:

- To understand the basic components of a computer operating system, and the interactions among the various components
- To understand and get knowledge of process control, threads, deadlock
- To understand and get knowledge of Memory Management, scheduling, virtual memory, File Management of an operating system

UNIT I

Computer System Overview- Operating Systems Objectives and functions – Operating System and User
/ Computer Interface, Operating System as a Resource Manager: Ease of Evolution Operating Systems. Evolution of Operating Systems – Serial Processing, Simple Batch System, Multi Programmed Batch Systems, Time Sharing Systems-Developments Leading to Modern Operating Systems - Microsoft Windows Overview-Traditional Unix Systems- Modern Unix Systems – Linux - Android.

UNIT II

Process Description and Control: Process Description, Process Control – Execution of Operating System.
Threads: Processes and Threads. Concurrency – Principles of Concurrency, Mutual Exclusion – Software support, Dekker's Algorithm – Mutual Exclusion – Hardware support, Message Passing. Deadlock and starvation: Deadlock prevention, Deadlock Detection, Deadlock Avoidance – An Integrated deadlock Strategy-Dining Philosopher Problem.

UNIT III

Memory Management: Memory Management Requirements. Memory Partitioning: Fixed Partitioning, Dynamic Partitioning- Placement Algorithm, Relocation –Segmentation. Virtual Memory – Paging – Address Translation in a Paging System. Segmentation – Organization, Address Translation in a Segmentation System – Combined Paging and Segmentation – Virtual Memory – Operating System Software: Fetch Policy, Placement Policy and replacement Policy, Page buffering ,Resident Set Management.

UNIT IV

Scheduling – Types of Scheduling, scheduling Algorithms: scheduling criteria, FIFO, Round

Robin, Shortest Process next, Shortest Remaining Time, Highest response ratio and Feedback scheduling Performance comparison – Fair – Share Scheduling. I/O Management and disk scheduling – Organization of the I/O function – The Evolution of the I/O Function, Logical structure of the I/O function- I/O Buffering- Disk Cache.

UNIT V

File Management :Files and File Systems, File Management Systems, File System Architecture, File Management Functions-File Directories – File Sharing – Secondary Storage Management : File allocation – UNIX File Management-Linux Virtual File system-Windows File Systems-Android File Management.

COURSE OUTCOME:

Upon successful completion of this course, students are expected to have the ability to

1. Describe and explain the fundamental components of a computer operating system
2. Define, restate, discuss, and explain Process Description, Concurrency, deadlock
3. Define, restate, discuss, and explain memory management, virtual memory
4. Define, restate, discuss, and explain scheduling and its types
5. Define, restate, discuss, and explain File Management in Operating Systems

TEXT BOOKS:

1. William Stallings, "Operating Systems : Internals and Design Principles", Ninth Edition, Pearson Global Edition, 2018.

REFERENCE BOOK(S):

1. Ann McHoes, Ida M. Flynn, Understanding Operating Systems, Seventh Edition, Cengage Learning, 2013.
2. Deital H.M. "An Introduction to Operating Systems", Addison Wesley Publishing 4. Silberchatz A., Peterson J.L., Galvan P. "Operating System Concepts", Third Edition, Addison Wesley Publishing Co., 1992.
3. Charles Crowley, "Operating Systems-A Design Oriented Approach", IRWIN Publications Chicago, 1997.

E_RESOURCES:

1. https://www.tutorialspoint.com/operating_system/operating_system_tutorial.pdf

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: II-CC-VIII:ACCOUNTING AND FINANCIAL MANAGEMENT

Ins. Hrs. /Week : 5 **Course Credit: 4** **Course Code :**

OBJECTIVES:

- To present the whole range of book keeping & accountancy and to give comprehensive coverage to management accounts.
- To Analyze and interpret the financial statements with ratios and they can know the financial position of the company with the help of the ratio
- To Know Cost Accounting, its Methods and Techniques, classifications of cost, Cost volume, profit analysis, marginal costing and decision making

UNIT I

Accounting Principles and Concepts – Double entry book keeping- Journal – Ledger- Trial Balance- Depreciation, Depletion and Amortization - Accounting for depreciation.

UNIT II

Trading, Manufacturing and profit and Loss account – Income and expenditure- Accounting record and system- assets and liabilities.

UNIT III

Analysis and interpretation of financial statements with ratios

UNIT IV

Cost Accounting- Methods and Techniques of Cost Accounting- classifications of cost - Material Cost- Labour Cost – Overhead- fixed and variable cost- Cost- volume – profit analysis - marginal costing and decision making.

UNIT V

Budgeting and budgetary control – types of budgets- Preparation of various functional budgets- Preparations of cash budgets- flexible budgets- Advantages of Budgeting and Budgetary control.

COURSE OUTCOME:

The students will be able to

1. Describe the meaning, objectives and advantages of accounting
2. Identify and understand the Objectives, advantages and need of Book Keeping
3. State the need and objective of preparing trial balance and Final Accounts
4. Analyze and interpret the financial statements with ratios and they can know the financial position of the company with the help of the ratio
5. Know Cost Accounting, its Methods and Techniques, classifications of cost, Cost volume, profit analysis, marginal costing and decision making

TEXT BOOKS:

1. T.S. Grewal, "Double Entry Book Keeping", All India Sultan Chand (Recent Edition)
2. S.N. Maheswari "Principles of Management Accounting ", Sultan Chand, New Delhi (RecentEdition)
3. Shukla, Grewal& Gupta, "Advanced Accounts "Sultan Chand Publications

REFERENCE BOOK(S):

1. S.K. Gupta & R.K. Sharma- Practical Problems in Management Accounting (Recentedition)
2. Khan and Jain "Financial Management" Tata McGraw Hill (RecentEdition)

E_RESOURCES:

1. https://www.pdfdrive.com/financial-and-management-accounting-d5126265.html

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: II-CP-III: PYTHON LAB

Ins. Hrs. /Week : 3 **Course Credit: 2** **Course Code :**

OBJECTIVES:

- To get hands on experience in Basics of Python programming, Decision Making and Functions, Object Oriented Programming in Python, files and Database operations in Python

LIST OF PROGRAMS:

1. Write a program to demonstrate different number data types in Python.
2. Write a program to perform different Arithmetic Operations on numbers in Python.
3. Input an array of n numbers and find separately the sum of positive numbers and negative numbers.
4. Write a program to insert a number in a sorted array.
5. Write a program to create, append, and remove lists in python.
6. Write a program to demonstrate working with tuples in python.
7. Write a program to demonstrate working with dictionaries in python.
8. Write a Python Program to check whether the given string is palindrome or not using built in string manipulation methods.
9. Write a Python Program to read a word and prints the number of letters, vowels and percentage of vowels in the word using dictionary
10. Write a Python Program to check a given sentence is a pangram or not using function/Module.
11. Write a Python Event driven Program for file operations Press 1: to open file in read mode 2: open the file in write mode 3: current position of the file pointer #4: Reposition the pointer at the beginning 5: exit.
12. Write an Object oriented Python program to create two Time objects: currentTime, which contains the current time; and breadTime, which contains the amount of time it takes for a bread maker to make bread. Then we'll use addTime to figure out when the bread will be done. Write the printTime function to display the time when the bread will be done by the bread maker.
13. Write a python program for accessing Hospital Information System Using MYSQL Database.

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: II-CP-IV: DISTRIBUTED TECHNOLOGIES LAB

Ins. Hrs. /Week : 3 **Course Credit: 2** **Course Code :**

OBJECTIVES:

- To get hands on experience in developing applications for distributed environment.

LIST OF PROGRAMS:

1. Distributed applications using RMI
    a. Simple RMI application
    b. RMI application with a server and more than one clients
    c. RMI application with Database Connectivity
2. Servlets - Returning Information received from the client.
3. Servlets and JDBC - Constructing a response by accessing a database.
4. JSP - use of scriptlet.
5. JSP - use of java beans.
6. EJB - Session Bean.
7. ASP.NET - Server & Client side controls.
8. ASP.NET and ADO.NET - use of disconnected data object.
9. ASP.NET: Databind Controls.
10. DOM usage on the server side.
11. AJAX: Dynamic client - server interaction example.

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: II-EC-II:1 PROBABILITY AND STATISTICS

Ins. Hrs. /Week : 4 **Course Credit: 4** **Course Code :**

OBJECTIVES:

- To inculcate the basics of Probability, Curve-Fitting
- To Learn about Correlation, Regression
- To study about Queuing Theory

UNIT I

Probability: Definitions of probability, Addition theorem, Conditional probability, Multiplication theorem, Baye's theorem of probability and Geometric probability. Random variables and their properties, Discrete Random variable, Continuous Random variable, Probability Distribution joint probability distributions their properties.

UNIT II

Probability Distributions / Discrete distributions: Binomial, Poisson and their properties. (Definition, mean, variance, fitting of the distribution.) Continuous distributions: Uniform, Normal,. Curve fitting using Principle of Least Squares.

UNIT III

Multivariate Analysis: Correlation, correlation coefficient, Rank correlation, Regression Analysis, Multiple Regression, X2– test for goodness of fit.

UNIT IV

Sample, populations, statistic, parameter, Sampling distribution, standard error, unbiasedness, efficiency, Maximum likelihood estimator, notion & interval estimation. Testing of Hypothesis: Formulation of Null hypothesis, critical region, level of significance, power of the test.

UNIT V

Queuing theory: Queue description, characteristics of a queuing model, study state solutions of M/M/1: α Model, M/M/1 ; N Model.

COURSE OUTCOME:

After completion of the course the students will be able to

1. Study the Conditional Probability
2. Know Probability Distribution
3. Learn about Correlation, Regression.
4. Study about Testing of Hypothesis.
5. Knowing about Queuing theory

TEXT BOOKS:

1. T.Veerarajan, “Probability, Statistics and Random Processes”, Tata McGraw Hill

REFERENCE BOOK(S):

1. Yuri Suhov, Mark Kelber, Probability and Statistics by Example, Cambridge University Press, 2014.
2. Kishor S. Trivedi, “Probability & Statistics with Reliability, Queuing and Computer Applications”, Prentice Hall of India, 1999

E_RESOURCES:

1. http://www.utstat.toronto.edu/mikevans/jeffrosenthal/book.pdf

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester:II-EC-II:2 OPTIMIZATION TECHNIQUES

Ins. Hrs. /Week : 4 **Course Credit: 4** **Course Code :**

OBJECTIVES:

- To understand the basic concepts of operations research
- To impart the knowledge on Operation research techniques and their applications
- To educate on the advancement of linear programming techniques

UNIT I

Linear Programming: Introduction – History of OR-Meaning of OR- Formulation of LP Models-Graphical solution-– Simplex Method – Artificial Variables – M – Technique –Two phase method

UNIT II

Transportation problem: North West corner rule-Least cost method-VAM – MODI Method-Assignment problem: Hungarian Assignment method.

UNIT III

Game theory- Inventory Models: Determine Models – EOQ – Finite and Infinite Delivery Rates without Back- Ordering.

UNIT IV

PERT / CPM: Arrow (Network) Diagram Representation – Time estimates – Critical Path – Floats – Construction of Time chart and Resource Leveling.

UNIT V

Sequencing problem -Replacement Theory: Introduction – Various replacement situations – Replacement Policy- Individual Replacement Policy – Group Replacement Policy.

COURSE OUTCOME:

Students will be able to

1. Acquire the systematic understanding of optimization techniques
2. Understanding the concept of queuing models
3. Analyse and optimize the inventory systems
4. Learnt the concept of network
5. Understanding the concept of replacement theory

TEXT BOOKS:

1. Kanti Swarup P.K. Gupta and Man Mohan, "Operation Research", Sultan & Chand Publishers New Delhi, 2004

REFERENCE BOOK(S):

1. Hamdy A Taha, 'Operations Research – An Introduction ' Seventh edition ,Prentice hall of India private limited ,New Delhi-2005
2. Don.T. Philps, A.Ravindran, James. J. Solberg, "Operations Research – Principles and Practice John Wiley & Sons,1976.

E_RESOURCES:

1. https://www.pdfdrive.com/optimization-techniques-and-applications-with-examples-e191490412.html

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: II-EC-II:3 THEORY OF COMPUTATION

Ins. Hrs. /Week : 4 **Course Credit: 4** **Course Code :**

OBJECTIVES:

- To understand theoretical concepts of computing
- To understand theoretical concepts context-free grammars and pushdown automata
- To apply the ideas in compiler design, programming concepts and modern computer.

UNIT I: AUTOMATA THEORY:

Set, Relation and Function– Introduction to Formal Proof– Additional Forms of proof – Inductive proofs – Alphabets, Strings and Language – Finite representation of language– Chomsky hierarchy.

UNIT II: FINITE AUTOMATA AND REGULAR EXPRESSION:

Deterministic Finite Automata – Nondeterministic Finite Automata – Finite Automata with Epsilon Transitions – Regular Expression– Finite Automata and Regular Expressions– Equivalence of Regular languages.

UNIT III: CONTEXT-FREE GRAMMARS AND PUSHDOWN AUTOMATA

Context-Free Grammars – Parse Trees – Applications of Context-free Grammars– Ambiguity in Grammars and Languages – Definition of Pushdown Automata – The languages of Pushdown Automata – Equivalence of PDA and CFG –Deterministic Pushdown Automata.

UNIT IV: CONTEXT-FREE LANGUAGES AND TURING MACHINE

Definition– Languages that are and are not Context-free – Normal Forms – Pumping Lemma for Context- Free Languages – Closure and Decision Properties of Context Free Languages – Definition of Turing Machines – Computing with Turing Machine – Extensions of Turing Machine – Random Access Turing Machine – Nondeterministic Turing Machine.

UNIT V: UNDECIDABILITY AND COMPUTATIONAL COMPLEXITY

The Church-Turing Thesis – Universal Turing Machine – The Halting Problem – Unsolvable Problems about Turing Machines – Class P, Class NP – NP-completeness.

COURSE OUTCOME:

Students will be able to

1. Understand the set theory concepts and proofing techniques
2. Construct the finite automata
3. Context free grammars and construct the pushdown automata
4. To know Turing machine
5. To identify solvable and unsolvable problems

TEXT BOOKS:

1. J.E.Hopcroft, R.Motwani and J.D Ullman, "Introduction to Automata Theory, Languages and Computations", Second Edition, Pearson Education, 2009
2. H.R.Lewis and C.H.Papadimitriou, "Elements of The theory of Computation", Second Edition, Pearson Education/PHI, 2007

REFERENCE BOOK(S):

1. J.Martin, "Introduction to Languages and the Theory of Computation", Third Edition, TMH, 2008
2. Alfred V. Aho, Monica S. Lam, Ravi Sethi, and Jeffrey D. Ullman, "Compilers: Principles, Techniques, & Tools", Second Edition Boston: Addison-Wesley, 2007

E_RESOURCES:

1. https://cglab.ca/~michiel/TheoryOfComputation/TheoryOfComputation.pdf
2. https://www.cs.virginia.edu/~robins/Sipser_2006_Second_Edition_Problems.pdf

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DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: II-EDC-I:1 INTERNET OF THINGS

Ins. Hrs. /Week : 3 **Course Credit: 2** **Course Code :**

OBJECTIVES:

- To apply the ideas of IoT
- To appreciate IoT as a fast growing paradigm on Research in Computer Science and to use the same for research.
- To understand Design Methodology

UNIT I

Introduction- Physical design-Logical design- IoT Technologies: Wireless sensor networks-Cloud computing-Big data Analytics-Communication Protocol-Embedded Systems.

UNIT II

Internet of Things 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 Design Methodology: Purpose& Requirement Specifications-Process Specification-Domain Model Specification- Service Specification.

UNIT IV

IoT Physical Server and Cloud Offerings: Introduction to cloud Storage Models & Communication APIs- WAMP-Python Web Application Framework-Amazon Web Service for IoT.

UNIT V

Data Analytics for IoT: Introduction-Apache Hadoop-Using Hadoop Map Reduce for Batch Data Analysis- Apache Oozie-Apache Spark-Apache Storm-Structural Health Monitoring Case Study.

COURSE OUTCOME:

Students will be able

1. Understand IoT Technologies.
2. Understand building blocks of Internet of Things and characteristics.
3. Understand IoT design methodology.
4. Understand the application areas of IoT ·
5. Understand Data Analytics.

TEXT BOOKS:

1. ArshdeepBahga, Vijay Madisetti, “Internet of Things – A hands-on approach”, Universities Press, 2015.
2. Omar Elloumi,David Bosewarthick,OlivierHersent,”Internet of Things:Key Applications and Protocols”,Wiley Publication,2012.

E_RESOURCES:

1. http://cloudbus.org/papers/IoT-Book2016-C1.pdf
2. https://www.pdfdrive.com/internet-of-things-iot-in-5g-mobile-technologies-d176075929.html

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SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS), SUNDARAKKOTTAI, MANNARGUDI - 614016.

DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS

Semester: II-EDC-I:2 WEB DESIGN

Ins. Hrs. /Week : 3 **Course Credit: 2** **Course Code :**

OBJECTIVES:

To teach web programming using HTML and DHTML

To design web page using HTML

To understand VB script and Java Script, XHTML, XML and CSS.

UNIT I
Introduction to HTML – Introduction to Common HTML-Links and Addressing: Linking Basics, URLs, Linking in HTML, Anchor Attributes Images and Anchors.

UNIT II
HTML and Images- Introduction to Layout: Backgrounds and Colors and text- Layout with Tables- Layout with Frames.

UNIT III
Style sheets – Basic Interactivity and HTML using Forms

UNIT IV
Introduction to Scripting and HTML – DHTML.

UNIT V
Introduction to Server-side programmed: Overview of Client/Server programming on the web, server-side programming, Common Gateway Interface- XML: Basic XML, Way to use XML.

COURSE OUTCOME:

Students will be able to

1. Understand introduction of HTML
2. Design web pages using HTML
3. Use VB Script, Javascript
4. Apply Cascade Style Sheet.
5. Write server-side program using XML

TEXT BOOKS:

1. Thomas A.Powell, The Complete Reference HTML, Tata McGraw-Hill, Second Edition, 1999

REFERENCE BOOK(S):

1. C Xavier, World wide web design with HTML, Tata McGraw-Hill, 2000
2. Joel Sklar, Principles of Web design, Course Technology, 2000.

E_RESOURCES:

1. https://stevebraysduis.files.wordpress.com/2014/02/web-design-with-html-and-css-digital-classroom.pdf

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SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016.

(For the Candidates admitted in the academic year 2020 – 2021)

DEPARTMENT OF COMPUTER APPLICATIONS

MASTER OF COMPUTER APPLICATIONS (MCA)

Semester: III-CC-IX: Smart Device Programming

Ins. Hrs./Week: 6 **Course Credit:** 4 **Course Code: 21PCA313**

OBJECTIVES

- To learn the basic and important design concepts and issues of development of mobile applications
- To understand the capabilities and limitations of mobile devices
- To create applications for smart devices using Android

UNIT- I: Introduction to Android **(15 Hours)**

History of Android – Versions of Android – Android Architecture – App Architecture – Components – Intents – Manifest – App Package -Activities - Services –Broadcast Receivers – Content Providers – Installing the Android SDK – Installing an Android Platform – Creating an Android Virtual Device – Starting the AVD.

UNIT- II: Services in Android **(15 Hours)**

Creating and Displaying Views –Monitoring Click Actions – Locking Activity Orientation – Dynamic Orientation Locking – Manually Handling Rotation –Menu Actions – Customizing Back Button – Emulating the Home Button –Build in Views – Basic Widgets –Creating Dialogs that Persist – Implementing Situation – Specific Layouts – Customizing Keyboard Actions – Browser View (web kit) – Making List View Section .

UNIT- III: Interacting with Device Hardware and Media **(15 Hours)**

Interacting Device Location – Mapping Locations – Annotating Maps – Capturing Images and Videos – Making a Custom Camera Overlay – Recording Audio – Adding Speech Recognition – Playing Back Audio/Video

UNIT- IV: Persisting Data **(15 Hours)**

Marking a Preference Screen – Persisting Simple Data – Reading and Writing Files – Using Files as Resources – Managing a Database – SQLite Databases –Querying a Database – Sharing your Database – Working with cursors Sharing your other Data.

UNIT- V: Interacting with the Systems **(15 Hours)**

Notifying from the Background – Creating Timed and Periodic Tasks – Scheduling a Periodic Task –Running Persistent Background Operations –Launching System Application – other Applications – Interacting with Contacts –Picking Device Media – Saving to the Media Store Working with Libraries: Creating Java Library JARs – Creating Android Library Projects

Total Lecture Hours- 75

COURSE OUTCOME

Students will be able to

1. Facilitate Android Architecture and installation process
2. Enhance Android technology and business trends impacting mobile applications
3. Familiar with the interaction services
4. Familiar with the Data base technology
5. Design and develop user Interfaces for the Android platform by applying Java programming concepts to Android application development

TEXT BOOK(S)

1. Dave Smith and Jeff Friesen. 2011. Android Recipes: A Problem – Solution Approach. Second Edition, Rakmo Press (P) Ltd., New Delhi.
2. Reto Meier.2012. Professional Android 4. First Edition, WroxPress, Birmingham, UK.

REFERENCE BOOK(S)

1. KarimYaghmour. 2013.Embedded Android: Porting, Extending, and Customizing.First Edition, Shroff/O'Reilly Media, Newton, USA.
2. Ed Burnrtte. 2015.Hello, Android: Introducing Google's Mobile Development Platform, Fourth Edition,ShroffPublishers and Distributors private Ltd., Mumbai.
3. Chris Haseman. 2008. Android Essentials.First Edition, Apress Publication, New York, USA.
4. Mark L Murphy. 2009. Beginning Android.Dreamtech Press, New Delhi.
5. Erik Hellman. 2014. Android Programming: Pushing the Limits. Wiley IndiaPvt.Ltd., New Delhi.

E-RESOURCES

1. http://developer.android.com/Android Developer's Guides/
2. https://www.geeksforgeeks.org/introduction-to-android-development/
3. https://www.tutlane.com/tutorial/android/android-introduction
4. http://people.cs.deu.edu.tr/semih/Android_Books/Apress%20Android%20Recipes,%20A%20Problem-Solution%20Approach%20(2011).pdf
5. https://www.elprocus.com/what-is-android-introduction-features-applications/

Semester: III-CC-X: Cloud Computing and Data Science

Ins. Hrs./Week: 6 **Course Credit:** 4 **Course Code: 21PCA314**

OBJECTIVES

- To impart knowledge on Introduction to Cloud Computing
- To comprehend the Evolution of SaaS, Anatomy of Cloud Infrastructure, Workflow Management Systems and Clouds
- To understand the concepts of Data Science and R Programming

UNIT- I: Introduction to Cloud Computing (15 Hours)

Roots of Cloud Computing – Layers and Types of Cloud – Features of a cloud– Infrastructure Management –Infrastructure as a Service Provider–Platform as a Service Providers – Challenges and Risks – Migrating into a cloud:Broad Approaches to Migrating into the Cloud – Seven Step Model of Migration into a Cloud.

UNIT- II: Cloud Services (15 Hours)

The Evolution of SaaS– The Challenges of SaaS Paradigm – Approaching the SaaSIntegration Enigma – New Integration Scenarios – The Integration Methodologies – SaaSIntegration Products, Platforms and Services – B2Bi Services – Background ofEnterprise cloud computing paradigm – Issues for Enterprise Applications on theCloud – Transition Challenges – Enterprise Cloud Technology and Market Evolution –Business drivers toward a marketplace for Enterprise cloud computing – The CloudSupply Chain.

UNIT- III: Data Science and Algorithms (15 Hours)

Big Data and Data Science Hype – Datafication– The Current Landscape – ThoughtExperiment – Statistical Inference, Exploratory Data Analysis, and the Data ScienceProcess: Statistical Thinking in the Age of Big Data – Exploratory Data Analysis – The Data Science Process. Algorithms: Machine Learning Algorithms-Linear Regression – K-Nearest Neighbors –KMeans

UNIT- IV: Introduction to R Programming (15 Hours)

Basic interaction with R– Using R as a Calculator – Functions – Control Structures – Data Pipelines – Reproducible Analysis – Creating an R – Markdown in R-Studio –The YAML Language –The Markdown Language –Running R code in Markdown Documents.

UNIT- V: Data Manipulation and Visualizing Data (15 Hours)

Data Already in R – Reading Data – Examples – Manipulating Data with dplyr– Tidying Data with tidyr.Visualizing Data:Basic Graphics –The Grammar of Graphics and the ggplot2 package – Figures with Multiple plots –Working with Large Data sets.

Total Lecture Hours- 75

COURSE OUTCOME

Students will beable to

1. Understand the Cloud Computing as an emerging area of public and scientific
2. Use and apply Cloud Computing in the current social and researchcontexts
3. Understand of basic ideas of Data Science and Algorithms
4. Understand the concepts of R Programming
5. Understand Data Manipulation and Visualization in R

TEXT BOOK(S)

1. RajkumarBuyya, JamesBroberg, and AndrzejGoscinski. 2011.Cloud Computing - Principles and Paradigms. John Wiley & Sons, Inc., Hoboken, New Jersey, USA.
2. Rachel Schutt and Cathy O'Neil. 2013.Doing Data Science: Straight Talk from the Frontline.First Edition, O'Reilly Media publications, Newton, USA.
3. Thomas Mailund. 2017. Beginning Data Science in R:Data Analysis, Visualization, and Modelling for the Data Scientist. First Edition, Apress publication, New York, USA.

REFERENCEBOOK(S)

1. George Reese. 2009. Cloud Application Architectures.First Edition, O'Reilly Media publications, Newton, USA.
2. John Ritting house, JamesRansome. 2009. Cloud Computing: Implementation, Management, and Security. CRC Press, Boca Raton, USA
3. John W. Foreman. 2014. Data Smart: Using Data Science to Transform Information into Insight. John Wiley & Sons, New Jersey, USA.
4. Matt Wiley, Joshua F. Wiley.2016. Advanced R: Data Programming and the Cloud.First Edition, Apress,New York, USA
5. Vladimir Batagelj, Hans-Hermann Bock, AnukaFerligoj, Ale Iberna. 2006. Data Science and Classification, Springer, New York, USA.

E-RESOURCES

1. https://www.javatpoint.com/cloud-computing-tutorial
2. https://www.programmer-books.com/introducing-data-science-pdf/
3. https://www.w3schools.com/r/
4. http://www.r-tutor.com/r-introduction
5. https://builtin.com/data-science

Semester: III-CP-V: Smart Device Programming Lab

Ins. Hrs./Week: 5 **Course Credit:** 2 **Course Code: 21PCA315P**

OBJECTIVES

- To get hands on experience in developing applications for smart devices
- To develop the Android based applications
- To develop applications using data storage

XML

1. XML document creation in android application
2. Style sheets:creation in android application using CSS
3. Style sheets: creation in android applicationusing XSL
4. XSL templatescreation in android application
5. Validation using in android DTD
6. SAX and DOM

Android

1. Different Layout design including nested layout for a single biodata.
2. Arithmetic Operation for two numbers
3. Business Calculator
4. Create activity based applications
5. Implement program using UI components
6. Write applications utilizing database and SQLite commands
7. Install application in emulator
8. Design and Develop mobile application using HTML 5.0 and JavaScript

Total Lab Hours- 45

COURSE OUTCOME

Students will be able to

1. Install Android studio and SDK
2. Configure Android Studio for android virtual device simulator
3. Implements programs for linking Activities with intents
4. Install an application on a mobile device
5. Generate signed APK for play store submission

REFERENCE BOOK(S)

1. Dave Smith and Jeff Friesen. 2011. Android Recipes: A Problem – Solution Approach. Second Edition, Rakmo Press (P) Ltd., New Delhi.
2. Reto Meier.2012. Professional Android 4. First Edition, WroxPress, Birmingham, UK.
3. KarimYaghmour. 2013. Embedded Android: Porting, Extending, and Customizing.First Edition, Shroff/O'Reilly Media, Newton, USA.
4. Ed Burnrtte. 2015.Hello, Android: Introducing Google's Mobile Development Platform, Fourth Edition,Shroff Publishers and Distributors private Ltd., Mumbai.
5. Chris Haseman. 2008. Android Essentials.First Edition, Apress Publication, New York, USA.

E-RESOURCES

1. http://developer.android.com/Android Developer's Guides/
2. https://www.geeksforgeeks.org/introduction-to-android-development/
3. https://www.tutlane.com/tutorial/android/android-introduction
4. http://people.cs.deu.edu.tr/semih/Android_Books/Apress%20Android%20Recipes,%20A%20Problem-Solution%20Approach%20(2011).pdf
5. https://www.elprocus.com/what-is-android-introduction-features-applications/

Semester: III-CP-VI: Cloud Computing and Data Science Lab

Ins. Hrs./Week: 5 **Course Credit:** 2 **Course Code: 20PCA316P**

OBJECTIVES

- To learn the design and development process involved in creating a cloud based application
- To learn the R programming language
- To learn visualization and classification model

Cloud Computing

1. Working of Google Drive to Make Spread Sheet and Notes
2. Installation and Configuration of Just Cloud
3. Install Virtual box/VMware Workstation with Different Flavors of Linux or Windows OS on top of Windows7 or 8.
4. Install Google App Engine. Create Hello World App and Other Simple Web Applications Using Python/Java.
5. Install Hadoop Single Node Cluster and Run Simple Applications like Word count.

Data Science

1. R as Calculator Application
2. Descriptive Statistics in R
3. Reading and Writing Different Types of Datasets
4. Visualizations Examples
5. Classification Model

Total Lab Hours- 45

COURSE OUTCOME

Students will be able to

1. Understand the Cloud Computing applications
2. Apply Cloud Computing in the current social and research contexts
3. Know basic ideas of Data Science and Algorithms
4. Implement the concepts of R Programming
5. Use data Manipulation and visualization in R

TEXT BOOK(S)

1. RajkumarBuyya, James Broberg, and AndrzejGoscinski. 2011.Cloud Computing - Principles and Paradigms. John Wiley & Sons, Inc., Hoboken, New Jersey, USA.
2. Rachel Schutt and Cathy O'Neil. 2013.Doing Data Science: Straight Talk from the Frontline.First Edition, O'Reilly Media publications, Newton, USA.
3. Thomas Mailund. 2017. Beginning Data Science in R:Data Analysis, Visualization, and Modelling for the Data Scientist. First Edition, Apress publication, New York, USA.
4. George Reese. 2009. Cloud Application Architectures. First Edition, O'Reilly Media publications, Newton, USA.
5. Vladimir Batagelj, Hans-Hermann Bock, AnukaFerligoj, Ale Iberna. 2006. Data Science and Classification, Springer, New York, USA.

E-RESOURCES

1. https://www.javatpoint.com/cloud-computing-tutorial
2. https://www.programmer-books.com/introducing-data-science-pdf/
3. https://www.w3schools.com/r/
4. http://www.r-tutor.com/r-introduction
5. https://builtin.com/data-science

Semester: III-EC-III:1 Soft Computing

Ins. Hrs./Week: 4 **Course Credit:** 4 **Course Code: 21PCAE3A**

OBJECTIVES

- To understand Fuzzy Set Theory
- To differentiate Neural Networks, Neuro Fuzzy Modeling
- To apply ComputationalIntelligence

UNIT- I: Fuzzy Set Theory (12 Hours)

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Definition and Terminology – Set – Theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

UNIT-II:Optimization (12 Hours)

Derivative based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton's Method – Step Size Determination – Derivative Free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

UNIT-III:Neural Networks (12 Hours)

Supervised Learning Neural Networks – Perceptrons – AdalineBackpropagation Multilayer perceptrons – Radial Basis Function Networks – Unsupervised Learning and Other Neural Networks – Competitive Learning Networks – Kohonen Self – Organizing Networks – Learning Vector Quantization – Hebbian Learning.

UNIT-IV: Neuro Fuzzy Modeling (12 Hours)

Adaptive Neuro – Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm– Learning Methods that Cross fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework – Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

UNIT-V: Application of Computational Intelligence (12 Hours)

Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

Total Lecture Hours- 60

COURSE OUTCOME

Students will beable to

1. Understand fuzzy set theory
2. Understand the concept of optimization
3. Understand neural networks
4. Understand the concept of neuro-fuzzy modeling
5. Understand computational intelligence

TEXT BOOK(S)

1. J.S.R.Jang, C.T. Sun and E. Mizutani. 2004.Neuro-Fuzzy and Soft Computing.First Edition, Pearson Education, London, UK.

REFERENCE BOOK(S)

1. Davis E. Goldberg. 1989.Genetic Algorithms Search, Optimization and Machine Learning. Thirteenth Edition, Addison Wesley, Boston, USA.
2. L Fortuna,Rizzotto G, Lavorgna M, Nunnari G. Xibilia M.G, R Caponetto. 2001. Soft Computing: New Trends and Applications. Springer, New York, USA.
3. RajasekaranSandPai G A V. 2003. Neural Networks, Fuzzy Logic and Genetic Algorithms. PHI learning Pvt.Ltd., New Delhi.
4. SarojKaushik, SunitaTewari. 2018. Soft Computing.First Edition, McGraw Hill Education, New Delhi.
5. Timothy J. Ross. 1977. Fuzzy Logic with Engineering Application. McGrawHill Education, New Delhi.

E-RESOURCES

1. https://en.wikipedia.org/wiki/Soft_computing
2. http://fuzzy.cs.ovgu.de/nfdef.html
3. http://hilbert.mat.uc.pt/~softcomplex/Docs/RobertBabuska03.pdf
4. https://www.vssut.ac.in/lecture_notes/lecture1423723637.pdf
5. https://www.cet.edu.in/noticefiles/274_soft%20computing%20LECTURE%20NOTES.pdf

Semester: III-EC-III:2 Mobile Computing

Ins. Hrs./Week: 4 **Course Credit:** 4 **Course Code: 21PCAE3B**

OBJECTIVES

- To understand the concepts of Mobile Communication and its architectures
- To know the working of mobile devices
- To differentiatesynchronization process and operating systems in Mobile Computing

UNIT-I:Introduction (12 Hours)

Mobile Communications – An Overview: Mobile Computing – Mobile Computing Architecture – Mobile Devices – Mobile System Networks – Data Dissemination – Mobility Management – Security.

UNIT-II:Mobile Devices and Limitations (12 Hours)

Mobile Devices and Systems: Mobile Phones – Digital Music Players – Handheld Pocket Computers – Handheld Devices with Operating Systems – Smart Systems – Limitations of Mobile Devices – AutomotiveSystems.

UNIT-III:Mobile Services (12 Hours)

GSM and Similar Architectures : GSM Services and System Architecture – Radio Interfaces – Protocols – Localization – Calling – Handover – Security – New Data Devices – General Packet Radio Service – High Speed Circuit Switched Data.

UNIT-IV:Synchronization (12 Hours)

Data Synchronization in Mobile Computing Systems: Synchronization – Synchronization Software for Mobile Devices – Synchronization Protocols – Mobile Devices Server and Management: Mobile Agent – Application Server – Gateways –Portals – Service Discovery – Device Management – Mobile File Systems – Security.

UNIT-V:Mobile Operating System (12 Hours)

Mobile Operating Systems: Operating System – Palm OS – Windows CE – Symbian OS – Linux for Mobile Devices.

Total Lecture Hours- 60

COURSE OUTCOMES

Students will be able to

1. Familiarize the concepts and architectures
2. Understand the building concept of different mobile devices
3. Understand the concepts of GSM
4. Understand the synchronization
5. Understand the different mobile operating systems

TEXT BOOK(S)

1. Raj Kamal. 2011.Mobile Computing.Second Edition, Oxford University Press, UK.

REFERENCE BOOK(S)

1. AsokeK Talukder, Hasan Ahmed. 2017. Mobile Computing: Technology, Applications and Service Creation.Second Edition, McGraw Hill Education, New Delhi.
2. KumkumGarg. 2010.Mobile Computing. First Edition, Pearson Education, London, UK.
3. JaimeLloretMauri. 2016. Advances in Mobile Computing and Communications, Perspectives and Emerging Trends in 5G Networks. First Edition, CRC Press, Boca Raton, USA.
4. PattnaikPrasant Kumar, Mall Rajib. 2015. Fundamentals of Mobile Computing. Second Edition, PHI Learning Pvt. Ltd., New Delhi.
5. Thampi G T.2014.Mobile Communication and Computing.DreamtechPress, New Delhi.

E-RESOURCES

1. https://www.tutorialspoint.com/mobile_computing/mobile_computing_overview.html
2. http://cuj.ac.in/E_Lecture/DCS/L2%20Introduction.pdf
3. https://www.ptcdb.edu.ps/site/bawad/wp-content/uploads/sites/16/2016/02/Chapter-01-Mobile-Computing.pdf
4. http://www.miet.edu/course/wp-content/uploads/2019/05/MC-new.compressed.pdf
5. http://alphace.ac.in/downloads/notes/cse/10cs831.pdf

Semester: III-EC-III:3 Compiler Design

Ins. Hrs./Week: 4 **Course Credit:** 4 **Course Code: 21PCAE3C**

OBJECTIVES

- To understand the various phases of a compiler
- To develop skills in designing acompiler
- To develop skills incode Generator and Optimization

UNIT-I:Introduction (12 Hours)

Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens

UNIT-II: Grammars (12 Hours)

Role of the parser, Writing Grammars – Context – Free Grammars – Top Downparsing– Recursive Descent parsing – Predictive parsing – bottom –up parsing – shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser – Canonical LRParser-LALRParser

UNIT-III:Intermediate Languages (12 Hours)

Intermediate Languages – Declarations Statements– Assignment Statements – Boolean Expressions – Case Statements – Back patching – procedure calls

UNIT-IV:Code Generator (12 Hours)

Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next use Information – A simple Code generator – DAG representation of Basic Blocks – Peephole optimization

UNIT-V:Optimization (12 Hours)

Introduction – Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – ParameterPassing

Total Lecture Hours- 60

COURSE OUTCOME

Students will able to

1. Familiarize the various phases of a compiler
2. Develop skills in designing acompiler
3. Understand the concept of intermediate languages
4. Design code generator
5. Understand storage allocation

TEXT BOOK(S)

1. Alfred Aho, Ravi Sethi, Jeffy D Ullman.2006. "Compilers – Principles, Techniques and Tools. Second Edition, Pearson Education, London, UK.

REFERENCE BOOK(S)

1. Kakde OG.2015. Compiler Design. Fourth edition, Laxmi Publications, Chennai.
2. Kenneth C. Louden. 2003.CompilerConstruction: Principles and Practices. Third Edition, Thompson Learning, Boston, USA.
3. HenkAlblas and Albert Nymeyer. 2001. Practice and Principles of Compiler Building with C, Third Edition, PHI Learning, New Delhi.
4. Rajkumar Y,Sudha Rani S, Karthi M.2019. Compiler Design.Dreamtech Press, New Delhi.
5. Torben A Egidius Mogensen.2011. Introduction to Compiler Design. Springer, Germany.

E-RESOURCES

1. https://www.tutorialspoint.com/compiler_design
2. https://www.geeksforgeeks.org
3. https://www.youtube.com/playlist?list=PLWPirh4EWFpGa0qAEcNGJo2HSRC5_KMT6
4. http://hjemmesider.diku.dk/~torbenm/Basics/basics_lulu2.pdf
5. http://hjemmesider.diku.dk/~torbenm/Basics/basics_lulu2.pdf

Semester: III-EDC-II:1 Hardware and System Assembly

Ins. Hrs./Week: 4 **Course Credit:** 2 **Course Code: 21PCAED2A**

OBJECTIVES

- To understand the basic concepts of Computer
- To understand the internal hardware, Peripheral devices
- To understand the concept of web

UNIT-I: Introduction **(9 Hours)**

What is a computer? – Types of computers – Hardware and Software – Basic Operations – Data Sizes and Speeds

UNIT-II: Internal Hardware **(9 Hours)**

The Motherboard – Processor (CPU) – Memory – Mass Storage – Disks – Hardware overview – Upgrade or Replace?

UNIT-III: Peripheral and I/O Hardware **(9 Hours)**

Storage devices – Input devices– Output devices– New & Future Possibilities – Things you must have

UNIT- IV:System Software **(9 Hours)**

Software Categories & Licenses – System Software – Application Software – Malware – Security & System Administration

UNIT- V: Installation of the Applications **(9 Hours)**

Install DOS and windows– Troubleshoot the Windows Applications –firmware updating – install motherboard component driver – install the peripheral devices Applications – Hand-held Devices.

Total Lecture Hours- 45

COURSE OUTCOME

Students will able to

1. Familiarize the type of computers and its Speed
2. Understand the internal Hardware
3. Understand the I/O Peripheral
4. Understand the System Software
5. Understand the web

TEXT BOOK(S)

1. PritiSinha, Pradeep K, Sinha. 2004. Computer Fundamentals Concepts, Systems & Applications. Sixth Edition, BPB Publications, New Delhi.
2. Jacob Beckerman. 2014. How to Build a Computer: Learn Select Parts, Assemble, and Install: A Step by Step Guide to Your First Homebuilt.First Edition,JIBB Publishing.

REFERENCE BOOKS

1. Arnold S. Berge. 2005. Hardware and Computer Organization (Embedded Technology). First Edition,Newnes.
2. Edward K. Blum, Alfred V Aho.2011. Computer Science: The Hardware, Software and Heart of It. Springer, Germany.
3. Jean Andrews.2016. A+ Guide to Hardware (Standalone Book).Ninth Edition,Cengage Learning, Boston, USA.
4. Kevin Wilson. 2018. Computer Hardware: The Illustrated Guide to Understanding Computer Hardware (Computer Fundamentals).self-publication.
5. Robert Bruce Thompson, Barbara Fritchman Thompson.2003. PC Hardware in a Nutshell.Third Edition,O'Reilly Media, Newton, USA.

E-RESOURCES

1. https://www.tutorialspoint.com/computer_fundamentals/computer_quick_guide.htm
2. https://en.wikipedia.org/wiki/Computer_hardware
3. https://www.techopedia.com/definition/3515/operating-system-os.
4. https://ncert.nic.in/textbook/pdf/kecs101.pdf
5. https://bie.tg.nic.in/Pdf/computerHardware.pdf

Semester: III-EDC-II:2 Working With Photoshop

Ins. Hrs./Week: 4 **Course Credit:** 2 **Course Code: 21PCAED2B**

OBJECTIVES

- To understand the basics of Adobe Photoshop
- To understand digital photo re-touching, work with standard tools and advanced features
- To navigate in the workspace by using standard and custom set-ups, work with layers and masks, understanding proper color output, prepare images for professional print or web design

UNIT- I: Introduction to Photoshop (9 Hours)

The Photoshop environment – Creating Custom work space – file browser – image Magnification – Displaying drawing guide – Display option – compact mode – Rotating the image – viewing slide show – Keywords.

UNIT-II:Painting and Retouching (9 Hours)

Color settings – Color primer – Understanding color gamut – The RGB color model – The CMYK color model – Editing color settings – Selecting colors – Starting to paint –Color panel –Brush tool – Changing opacity –Brush Presets –Airbrush feature – Applying color to an image – Changing blending modes – The Eyedropper tool– Retouching images –Clone Stamp tool – Repairing fold lines – The History panel – The Spot Healing Brush – The Healing Brush Using the Patch tool – Clone Source panel –Cloning from another source.

UNIT-III:Manipulating Images (9 Hours)

Adding image area – Viewing the on-screen ruler – Converting the Background into a layer – Scaling the background – Content-Aware Fill – Content-Aware Move – Content-Aware retouching.

UNIT- IV:Color Correcting an Image (9 Hours)

Choosing your color settings – Working in RGB – Reading a histogram – Making the Curve adjustment – Defining the highlight and shadow – Locating the White and Black Point – Inputting the white and black point values – Adjusting the midtones– Setting the neutral – Sharpening your image – Taking care of red eye – Using the Camera Raw plug-in – Using Camera Raw controls – Saving a DNG file – Reopening a DNG file

UNIT- V:Introduction to Photoshop Layers (9 Hours)

Discovering layers – Selecting layers – Moving layers – Changing the visibility of a layer – Using masks in a layer – Preserve transparency – Creating a composition – Moving images in from other documents – Creating a layer mask– Editing the layer mask – Cloning layers – Aligning and distributing layers – Applying filters to layers – Creating a type layer – Applying a layer style – Creating a clipping mask – Filtering your layers.

Total Lecture Hours- 45

COURSE OUTCOME

Students will able to

1. Familiarize the Photoshop concepts
2. Design and Paint a Picture
3. Manipulate the Image
4. Understand the color concepts
5. Understand the Layering concept in Photoshop

TEXT BOOK(S)

1. Andrew Faulkner , Conrad Chavez. 2017.Adobe Photoshop CC Classroom in a Book. Illustrated Edition, Adobe Press.

REFERENCE BOOK(S)

1. Eddie Tapp. 2006. Photoshop Workflow Setups: Eddie Tapp on Digital Photography, O'Reilly Media, Newton, USA.
2. Kate Binder. 2006. Easy Adobe Photoshop Elements 4.Illustrated Edition, O'Reilly Media, Newton, USA.
3. Lynch R. 2006.The Hidden Power of Photoshop Elements 4. Wiley Publication, New Jersey, USA.
4. Peter Bauer. 2007. Photoshop CS3 for Dummies. Wiley Publications, New Jersey, USA.
5. Philip Andrews. 2007. Advanced Photoshop Elements 5.0 for Digital Photographers. Focal Press, Waltham, USA.

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1. https://www.guru99.com/
2. https://www.w3schools.in/category/photoshop/
3. https://www.pegaweb.com/
4. https://en.wikipedia.org/wiki/Adobe_Photoshop
5. https://www.photoshopessentials.com/basics/

Semester: III-CC-XI: Advanced Software Engineering

Ins. Hrs./Week: 6 **Course Credit:** 4 **Course Code: 21PCA417**

OBJECTIVES

- To understand Software Engineering and process models
- To implement software project design and quality management
- To gain knowledge about web engineering and familiar with DevOps practices

UNIT- I: Introduction and the Software Process (15 Hours)

Software and software engineering – the software process – process models – agile development – Modeling – Principles that guide practice – understanding requirements – requirements modeling: scenarios-information and analysis classes – requirements modeling: flow behavior-patterns and WebApps.

UNIT- II: Software Design (15 Hours)

Design Concepts– Design Process – Design Concepts – Design Model – Architectural Design –Architectural styles – Architectural Design – Assessing Alternative Architectural Design – Component Level Design –User Interface Design – Pattern Based Design –Web App Design.

UNIT- III: Quality Management (15 Hours)

Quality concepts– software quality – the software quality dilemma – Achieving software quality – software testing fundamentals – software quality assurance– software testing strategies– testing conventional applications– formal modeling and verification– software configuration management.

UNIT- IV: Managing Software Projects (15 Hours)

Projects management concepts– process and project metrics– Estimation for software projects–project scheduling– Risk management– Maintenance and Reengineering– Software process improvement– Emerging trends in software engineering.

UNIT- V: DevOps and Web Engineering (15 Hours)

DevOps: Motivation– Cloud as a platform –Operations – Deployment Pipeline: Overall Architecture Building and Testing – Deployment – Case study: Migrating to Micro services – The need for Web Engineering: An Introduction – Web Effort Estimation –Web Productivity Measurement & Benchmarking.

Total Lecture Hours- 75

COURSE OUTCOME

Students will be able to

1. Understand the advantages of various Software Development Lifecycle Models
2. Gain knowledge on project management approaches Perform formal analysis on specifications and Use UML diagrams for analysis and design
3. Architect and design using architectural styles and design patterns
4. Understand software testing approaches
5. Understand theDevOps practices and apply web engineering concepts

TEXT BOOK(S)

1. Emilia Mendes, Nile Mosley (Eds). 2006. Web Engineering. Springer.
2. Len Bass, Ingo Weber and Liming Zhu. 2016.DevOps: A Software Architect‘s Perspective.Pearson Education, London, UK.
3. Roger S Pressman. 2017.Software Engineering: A Practitioner’s Approach.Seventh Edition, McGraw-Hill, New York, USA.

REFERENCES BOOK(S)

1. Bernd Bruegge, Alan H Dutoit. 2004. Object-Oriented Software Engineering using UML, Patterns and Java.Second Edition, Pearson Education, London, UK.
2. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli. 2010. Fundamentals of Software Engineering.Second Edition, PHI Learning Pvt. Ltd, New Delhi.
3. Craig Larman. 2005. Applying UML and Patterns.Third Edition, Pearson Education, London, UK.
4. Rajib Mall. 2009. Fundamentals of Software Engineering.Third Edition, PHI Learning Pvt. Ltd., New Delhi.
5. Stephen R Schach. 2007. Software Engineering.Seventh Edition, McGraw-Hill, New York, USA.

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1. http://ce.sharif.edu/courses/98-99/2/ce474-2/resources/root/Roger%20S.%20Pressman_%20Bruce%20R.%20Maxin%20-%20Software%20Engineering_%20A%20Practitioner%E2%80%99s%20Approach-McGraw-Hill%20Education%20(2014).pdf
2. http://ptgmedia.pearsoncmg.com/images/9780134049847/samplepages/9780134049847.pdf
3. https://iran-lms.com/images/images/Books/PDF/Object-Oriented-Software-Engineering-Using-UML-Patterns-and-Java-Prentice-Hall-2010-Bernd-Bruegge-Allen-H.-Dutoit.pdf
4. http://index-of.co.uk/Engineering/Software%20Engineering%20(9th%20Edition).pdf
5. http://www.jru.edu.in/wp-content/uploads/moocs/e-books/computer-science-and-IT/Advanced_Software_Engineering.pdf

Semester: III-CC-XII: Organizational Behaviour

Ins. Hrs./Week: 6 **Course Credit:** 4 **Course Code: 21PCA418**

OBJECTIVES

- To understand Organizational and environmental design and culture
- To understand concepts of Perception, Personality, Employee attitudes
- To understand communicationDecision making in organization,performance and leadership process

UNIT-I:Fundamentals of Organization Behaviour (15 Hours)

Understanding Organization Behaviour –Fundamental Concepts – Contingency Approach – Limitation of Organization Behaviour– AnOrganization Behaviour System – Model of Organization Behaviour– ManagingCommunications:communications Fundamentals – Upward and DownwardCommunication – Other Form ofCommunication – Informal Communication.

UNIT-II:Social Systems and Organizational Culture (15 Hours)

Social Systems and Organizational Culture: Understanding a Social System – SocialCulture – Role – Status – Organizational Culture – Motivation: Model – MotivationalDrives –Human Needs – Behaviour Modification – Goal Setting. Appraising:Organizational Behaviourandperformance Appraisal – Economic Incentive Systems

UNIT-III:Leadership (15 Hours)

Leadership – The Nature of Leadership – Behaviour Approaches to Leadership Style – Contingency approaches to Leadership Style – Individual and Interpersonal Behaviour:Nature ofEmployee Attitudes – Effects of Employee Attitudes – Studying JobSatisfaction. InterpersonalBehaviour: Conflict in Organizations – Power and Politics.

UNIT-IV: Rights (15 Hours)

Organizations and Individuals: Rights to Privacy – Discipline – QWL – IndividualResponsibilities. Informal and Formal Groups: Group Dynamics –Nature of InformalGroup – Formal Group – Team and Team Building: Organizational Context for Teams –Teamwork – TeamBuilding.

UNIT-V: Stress and Counselling (15 Hours)

Change and its Effects: Change at Work- Resistance to Change – ImplementingChangeSuccessfully – Understanding Organization Development. Stress and counselling:Employee Stress– Employee Counselling – Type of counselling.

Total Lecture Hours-75

COURSE OUTCOME

Students will beable to

1. Enumerate Organizational Behavior
2. Explain organizational culture
3. Know leadership quality
4. Understand the Team work and Group
5. Understand changes and effects of organization

TEXT BOOK(S)

1. John W Newstrom. 2007.Organizational Behavior: Human Behavior at Work.Twelfth Edition, Tata Mc-Graw Hill Education Private Limited, New Delhi.

REFERENCE BOOK(S)

1. Fred Luthans. 2015. Organizational Behavior: An Evidence based Approach.ThirteenthEdition, Information Age Publishing Inc. North Carolina, USA.
2. Joseph E. Champoux. 2020. Organizational Behavior: Integrating Individuals, Groups and Organizations. SixthEdition,Routledge publications, London,UK.
3. Ricky W. Griffin, Jean M. Phillips, Stanley M. Gully. 2017.Organizational Behavior: Managing People and Organizations.Twelfth Edition, Cengage Learning, Boston, USA.
4. Schermerhorn, Osborn, UhlBien, Hunt. 2012. Organizational Behavior. Twelfth Edition, Wiley Publisher, New Jersey, USA.
5. Stephen P. Robbins. 2010.Organizational Behavior.Thirteenth Edition, PHI Pvt. Ltd, New Delhi.

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2. https://www.geektonight.com/organisational-behaviour-notes-pdf
3. https://2012books.lardbucket.org/pdfs/an-introduction-to-organizational-behavior-v1.1.pdf
4. https://old.mu.ac.in/wp-content/uploads/2014/04/Management-PAPER-II-Organizational-Behavior-final-book.pdf

https://www.macmillanihe.com/resources/sample-chapters/9781137429445_sample.pdf

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