

# **SYLLABUS**

## **MASTER OF COMPUTER SCIENCE**

**Sri Ramakrishna College of Arts and Science - Autonomous**

**(Formerly SNR Sons College)**

**[An Autonomous Institution]**

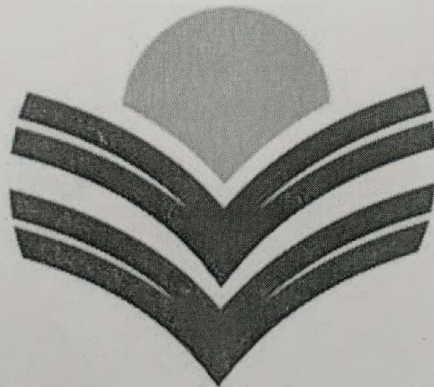
**(Reaccredited with 'A' Grade by NAAC)**

**[An ISO 9001:2008 Certified Institution]**

**(Affiliated to Bharathiar University)**

**(Approved by Govt. of Tamil Nadu, UGC & AICTE)**

**COIMBATORE-641006**



**Effective from 2019-2020 and Onwards**

# Sri Ramakrishna College of Arts and Science (Autonomous)



(Affiliated to Bharathiar University)  
(Re-Accredited with 'A' Grade by NAAC)  
(An ISO 9001:2015 Certified Institution)



Nava India, Coimbatore-641 006, Tamil Nadu, India.

**"Scheme of Examination along with Distribution of Marks and Credits"**

**CBCS & OBE PATTERN**

**POSTGRADUATE PROGRAMMES**

**Programme:** MSc

**Branch:** Computer Science

(For the students admitted during the academic year **2019 – 2020** and onwards)

| Study Components and Course Title   | CIA | Comprehensive Exam |                       | Compre-<br>hensive<br>Exam<br>total | Total | Credit |
|---|-----|--------------------|-----------------------|-------------------------------------|-------|--------|
|   |     | Online             | Descriptive<br>Theory |                                     |       |        |
| I SEMESTER  |     |                    |                       |                                     |       |        |
| CORE I –19MCSC101:<br>Information Security                                    | 30  | 20                 | 50                    | 70                                  | 100   | 4      |
| CORE II –19MCSC102:<br>Research Methodology                                   | 30  | 20                 | 50                    | 70                                  | 100   | 4      |
| CORE III –19MCSC103:<br>Advanced Relational<br>Database Management<br>System  | 30  | 20                 | 50                    | 70                                  | 100   | 4      |
| CORE IV –19MCSC104:<br>Advanced Data<br>Structures and<br>Algorithms with lab | 30* | -                  | -                     | 70*                                 | 100   | 5      |
| CORE V-19MCSC105<br>RDBMS Lab with J2EE<br>and NoSql                          | 30  | -                  | -                     | 70                                  | 100   | 4      |
| 19CME01 :MACE-1   | -   | -                  | -                     | 100                                 | 100   | 2\$    |



|   |     |    |    |     |     |     |
|---|-----|----|----|-----|-----|-----|
| <b>Extra Credit : 19PDCS01:</b><br>Trouble Shooting &<br>Installation Lab   | -   | -  | -  | 50% | 50% | 2\$ |
| <b>II SEMESTER</b>  |     |    |    |     |     |     |
| <b>CORE – VI :19MITC05:</b><br>AI & Expert Systems  | 30  | 20 | 50 | 70  | 100 | 4   |
| <b>CORE – VII :19MCSC03:</b><br>Advanced Operating Systems  | 30  | 20 | 50 | 70  | 100 | 4   |
| <b>CORE – VIII: 19MCSC04:</b><br>Advanced Software<br>Engineering   | 30  | 20 | 50 | 70  | 100 | 4   |
| <b>CORE – IX:19MITC06:</b><br><b>Practical III :</b> Big Data<br>Framework and Hadoop Lab                               | 30* | -  | -  | 70* | 100 | 5   |
| <b>CORE – X: 19MCSC05:</b><br><b>Practical IV :</b><br>Robotic Process Automation<br>Design and Development<br>with Lab | 30* | -  | -  | 70* | 100 | 5   |
| <b>Elective – I : 19MCSE01/<br/>19MCSE02/19MCSE03</b>   | 30  | 20 | 50 | 70  | 100 | 4   |
| <b>19CME02:</b> MACE-2  | -   | -  | -  | 100 | 100 | 2\$ |
| <b>Extra Credit :19MCSC06:</b><br>Literature Survey   | -   | -  | -  | 50% | 50% | 2\$ |
| Mini Project(will announce<br>summer project)   | -   | -  | -  | -   | -   | -   |
| <b>III SEMESTER</b>   |     |    |    |     |     |     |
| <b>CORE – XI: 19MCSC07:</b><br>Cloud Computing  | 30  | 20 | 50 | 70  | 100 | 4   |
| <b>CORE – XII: 19MITC07:</b><br>Online MOOC Course:<br>SWAYAM   | 30  |    |    | 70  | 100 | 4   |
| <b>CORE – XIII: 19MITC08:</b><br><b>Practical – V:</b><br>Machine Learning with<br>Python Lab                           | 30* | -  | -  | 70* | 100 | 5   |
| <b>CORE – XIV: 19MCSC08:</b><br><b>Practical – VI:</b><br>Data Analytics and Open<br>Source Tools Lab                   | 30* | -  | -  | 70* | 100 | 5   |



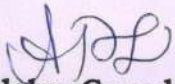
|  |           |    |    |           |       |            |
|--|-----------|----|----|-----------|-------|------------|
| <b>Self-study paper:</b><br><b>19MCSC09:</b> Business Intelligence                                   | 50#       | -  | -  | -         | 50#   | 2\$        |
| <b>IDC -: 19MCSI01:</b><br>Digital Marketing   | -         | -  | -  | -         | 100\$ | 3\$        |
| <b>Elective -II:19MCSE04 /19MCSE05/ 19MCSE06</b>   | 30        | 20 | 50 | 70        | 100   | <b>4</b>   |
| <b>CORE - XV: 19MCS301:</b><br>Mini Project (Summer)   | 80        | -  | -  | 20        | 100   | <b>4</b>   |
| <b>IV SEMESTER</b>   |           |    |    |           |       |            |
| <b>CORE - XVI:19MITC09:</b><br>Data Communicationand Networks  | 30        | 20 | 50 | 70        | 100   | <b>4</b>   |
| <b>CORE - XVII: 19MCSC10:</b><br>Advanced Robotic Process Automation Design and Development with Lab | <b>30</b> | -  | -  | <b>70</b> | 100   | <b>5</b>   |
| <b>CORE -XVIII: 19MCS401:</b><br>Project Work & Viva Voce  | 240       | -  | -  | 60        | 300   | <b>8</b>   |
| <b>Self-study paper</b><br><b>19MITC10:</b> Spoken Tutorial  | -         | -  | -  | -         | 50@   | <b>2\$</b> |

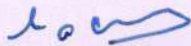
| <b>List of Elective papers (Can choose any one of the paper as electives)</b> |   |  |
|---|---|--|
| <b>Elective - I</b>   | A | Theory of Computation and Compilers        |
|   | B | Mobile Applications                        |
|   | C | Distributed Computing                      |
| <b>Elective - II</b>  | A | Programing Languages and Computer Graphics |
|   | B | Cyber Security                             |
|   | C | Augmented Reality and Virtual Reality      |


| <b>SUMMARY</b>                                     |               |                |                      |               |              |                    |
|--|---------------|----------------|----------------------|---------------|--------------|--------------------|
| <b>Subject</b>                                     | <b>Papers</b> | <b>Credits</b> | <b>Total credits</b> | <b>Papers</b> | <b>Marks</b> | <b>Total Marks</b> |
| <b>CORE (including Projectwork &amp; Vivavoce)</b> | 11            | 4              | 82                   | 18            | 2000         | 2000               |
|  | 5             | 5              |                      |               |              |                    |
|  | 1             | 3              |                      |               |              |                    |
|  | 1             | 10             |                      |               |              |                    |
| <b>Electives</b>                                   | 2             | 4              | 8                    | 2             | 200          | 200                |
| <b>Self-Study</b>                                  | 2             | 2\$            | -                    | -             | -            | 100\$              |
| <b>PDC</b>   | 2             | 1\$            | -                    | -             | -            | 100\$              |
| <b>IDC</b>   | 1             | 3\$            | -                    | -             | -            | 100\$              |
| <b>MACE</b>  | 2             | 2\$            | -                    | -             | -            | 200\$              |
| <b>Total</b>                                       |               |                | 90                   | -             | -            | 2200               |



\$ - NOT INCLUDED IN TOTAL MARKS & CGPA calculations.  
(\* ) - 30-(Theory based CIA Evaluation) and 70-(Practical based CE Evaluation)  
#-Online Internal Evaluation  
@-On Submission of Spoken Tutorial Certificates  
&-External Evaluation Viva-Voce Only  
**Note:** Total credits may vary between 90 – 95

  
**Syllabus Coordinator**  
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**BOS-Chairman**  
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& Science (Autonomous)  
Coimbatore

  
**Academic Council  
Member Secretary**

**19MCSC101 - INFORMATION SECURITY**

|            |                    |
|------------|--------------------|
| Semester   | I                  |
| Credit     | 4                  |
| Paper Type | Core 1             |
| Max. Marks | CIA:30 +<br>CE :70 |

**AIM**

To strengthen internal control and prevent unauthorized and improper access to data, thereby ensuring the appropriate protection of information assets.

**COURSE OBJECTIVES**

- To provide an understanding of principal concepts, major issues, technologies, and basic approaches in information security.
- To introduce the legal, ethical and professional issues in Information Security
- To identify, analyze, and evaluate infrastructure and network vulnerabilities
- To provide the ability to examine and analyze real-life security cases.
- To study information security's importance in our increasingly computer-driven world.

**PREREQUISITE**

- Should have knowledge in security

**NIT - I: Introduction to Information Security****11**

Introduction - History - What is Security - Critical Characteristics of information - NSTISSC Security Model - Components of an Information System - Securing Components - Balancing Information Security and Access - Approaches to Information Security Implementation - SDLC - The Security SDLC - Security Professionals and Organizations.

**11****NIT - II: The Need for Security**

Introduction - business Needs - Threats - Attacks - Secure Software Development.

**Legal, Ethical and Professional Issues in Information Security:** Introduction - Law and Ethics in Information Security - Relevant U.S. Laws - International Laws and Legal Bodies - Ethics and Information Security - Codes of Ethics and Professional Organizations.

**NIT - III: Cryptography****11**

Introduction - Foundation of Cryptography -Cryptography Tools - Attacks on Cryptosystems.

**Risk Management:** An overview of Risk Management - Risk Identification - Risk Assessment - Risk Control Strategies - Selecting a Risk Control Strategy - Quantitative Vs. Qualitative Risk Control Practices - Risk Management Discussion Points.

**11****NIT - IV : Planning for Security**

Introduction - Information Security policy, Standards and Practices - Information Security Blue Print - Continuity Strategies.

**Security Technology:** Introduction - Physical Design - Firewalls -Protecting Remote Connections.

**Implementing Information Security:** Introduction - Technical Topics of Implementation - Non Technical Topics of Implementation.

**NIT - V : Security Technology****11**

Intrusion Detection - and Prevention Systems - Honey Pots, Honey Nets and Padded Cell System - Scanning and Analysis Tools - Access Control Devices.

**Physical Security:** Introduction - Physical Access Control - Fire Security and Safety.

**Security and Personnel:** Introduction - Employment Policies - and Practices - Security Considerations for Non Employees - Internal Control Strategies - Privacy and Security for Personnel Data.



### Course Outcome

- Know how cryptography serves as the central language of information security. -L1
- Know how to apply the Security Baselines and the Roles of Computer Forensics and the Law in Information Security- L1
- Analyze design and implementation of Security Techniques-.L2
- Demonstrate how to detect and reduce threats in Web security-.L2
- Analyze the authentication and encryption needs of an information system and Monitor security conditions and environment -L3

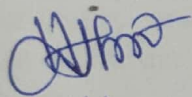
### Text Book

1. Michael E Whitman and H.J. Mattord, "Principles Of Information security", Vikas Publishing House, New Delhi, 2003.

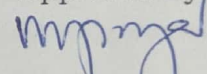
### Reference Books

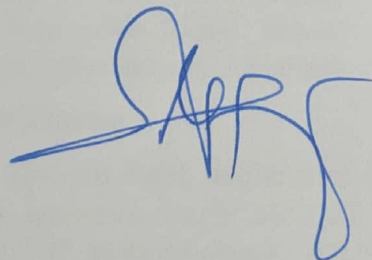
1. Micki Krause, Harold F. Tipton, "Handbook of Information Security Management", Vol 1-3 CRC Press LLC, 2004.
2. Stuart McClure, Joel Scrambray, George Kurtz, "Hacking Exposed", Tata McGrawHil, 2003.

Prepared by

  
(M. Hemenlathe)

Approved By

  
(Dr. V. Krishna Prasad)



**19MCSC102 - RESEARCH METHODOLOGY**

|            |                    |
|------------|--------------------|
| Semester   | I                  |
| Credit     | 4                  |
| Paper Type | Core               |
| Max. Marks | CIA:30 +<br>CE :70 |

**AIM**

To gain familiarity with a phenomenon or to achieve new insights into it

**COURSE OBJECTIVES**

- To familiarize participants with basic of research and the research process.
- To enable the participants in conducting research work and formulating research synopsis and report.
- To familiarize participants with Statistical packages such as SPSS/EXCEL.
- To impart knowledge for enabling students to develop data analytics skills and meaningful interpretation to the data sets so as to solve the business/Research problem.

**UNIT – I: Over View of Research Methodology****11**

Meaning of Research, Characteristics and Types of Research Process. Formulation of Research objectives, Formulation of Hypotheses, Types of Hypotheses, Methods of testing Hypotheses - Research plan and its components, Methods of Research (Survey, Observation, Case study, experimental, historical and comparative methods) Concept of Sampling Design, types and Steps in Sample Design.

**UNIT – II : Data Collection, Processing and its Analysis****11**

Methods of Primary data collection. Collection of data through questionnaires, Schedule. Collection of Secondary data. Processing Operations, Elements of Analysis. Use of library, research books, monograph, periodicals, abstract, documents, review of relevant literature.

**Elements in research methodology:** Identification and formation of research problem (Hypothesis). Research design: CRD (Completely Randomized Design), RBD (Randomized Block Design), and LSD (Latin Square Design). Scientific database: Science Direct and DOAJ (Direct Open Access Journals)

**UNIT – III Functions Of Several Variables****11**

**Scientific body in research:** Ethical, legal, social and scientific issues in research. A brief idea about the funding agencies such as DST (Department of Science and Technology), DBT (Department of Biotechnology), ICMR (Indian Council of Medical Research), CSIR (Council of Scientific & Industrial Research) and UGC (University Grants Commission). Role of IPR (Intellectual Property Rights) in Research and Development.

**Measurement and scaling Technique:** Measurement in research, Measurement Scales, Error sources. Test of sound measurement. Technique of developing measurement tools. Meaning of Scaling and its bases of classification, Scaling techniques.

**UNIT – IV : Interpretation and report writing****11**

Writing of Research Proposal, Report and Research Paper: Meaning and types, Stages in preparation, Characteristics, Structure, Documentation: Footnotes and Bibliography - Editing the final draft-Evaluating the final draft- Checklist for a good proposal/report/research paper, online submission and e-submission. Basic knowledge of organizing conferences, symposia, workshop, exhibition etc.



**UNIT – V : Application of Results and Ethics****11**

Environmental impacts - Ethical issues - ethical committees - Commercialization - Copy right - royalty - Intellectual property rights and patent law - Trade Related aspects of Intellectual Property Rights - Reproduction of published material - Plagiarism - Citation and acknowledgement - Reproducibility and accountability

**COURSE OUTCOMES**

Upon successful completion of course the students will be able to

- Develop on various kinds of research, objectives of doing research, research process, research designs and sampling -L1
- Have basic knowledge on qualitative research techniques -L1
- Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis-L2
- Have basic awareness of data analysis-and hypothesis testing procedures-L3

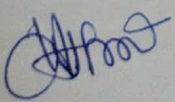
**Total Periods: 55****TEXT BOOKS**

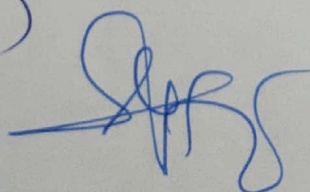
1. Research Methodology-CR Kothari.
2. Research Methodology- C.H. Chaudhary, RBSA Publication.
3. Research Methodology- G.R. Basotia and K.K. Sharma.
4. Statistics By T.R Jain & S C Aggarwal, VK (India) Enterprises, Darya Ganj (New Delhi)

**REFERENCE BOOKS**

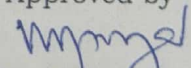
1. Anthony, M., Graziano, A.M. and Raulin, M.L., 2009. Research Methods: A Process of Inquiry, Allyn and Bacon.
2. Carlos, C.M., 2000. Intellectual property rights, the WTO and developing countries: the TRIPS agreement and policy options. Zed Books, New York.
3. Coley, S.M. and Scheinberg, C. A., 1990, "Proposal Writing", Sage Publications.
4. Day, R.A., 1992. How to Write and Publish a Scientific Paper, Cambridge University Press.
5. Fink, A., 2009. Conducting Research Literature Reviews: From the Internet to Paper. Sage Publications
6. Leedy, P.D. and Ormrod, J.E., 2004 Practical Research: Planning and Design, Prentice Hall.
7. Satarkar, S.V., 2000. Intellectual property rights and Copy right. Ess Ess Publications.

Prepared by

  
 (M. Hemalatha)



Approved by

  
 [Dr. V. Krishna Prasad]

**19MCSC103–Advanced Relational Database Management System****COURSE OBJECTIVES**

- To learn the fundamentals of database in centralized environments
- To study SQL and relational database design
- To provide a strong formal foundation in database concepts, technology and practice.
- To understand the fundamental concepts of transaction processing- concurrency control techniques and recovery procedures
- Understand how analytics and big data affect various functions now and in the future.

|            |                    |
|------------|--------------------|
| Semester   | I                  |
| Credit     | 4                  |
| Paper Type | Core               |
| Max. Marks | CIA:30 +<br>CE :70 |

**UNIT-I****10**

Characteristics of database approach, Actors on the scene, Workers behind the scene, Advantages of using DBMS, Data Models, Schemas and Instances; Three-Schema Architecture and Data Independence; Database Languages and Interfaces; The Database System Environment, Centralized and Client-Server Architectures for DBMSs; Classification of Database Management Systems ,Entity-Relationship Model Using High-Level Conceptual Data Models for Database Design; A Sample Database Application; Entity Types,Entity Sets, Attributes and Keys; Relationship Types,Relationship Sets, Roles and Structural Constraints; Weak Entity Types

**UNIT-II****10**

Relational model and Relational Algebra, Relational model oncepts,Relational model constraints and relational database schema update operations , Transactions and dealing with constraint violations, Unary relational operations, Relational algebra Operations from set theory, Binary relational operations, Join and Division, dditional relational operations , Examples of queries in relational algebra , Relational database ,Design using ER to relational mapping

**UNIT-III****11**

Overview of the SQL query language, SQL data Definition , Basic structure of SQL Queries, Additional basic operations, Null values, Aggregate functions, Nested sub queries, Modification of the database, Join expressions, Views , Transactions, ntegrity constraints, SQL data types and schemas, Authorization. Database programming issues and techniques, Embedded SQL.

**UNIT-IV****11**

Informal design guidelines for relation schemas, Functional dependencies, Normal forms based on primary keys, General definitions of 2<sup>nd</sup> and 3<sup>rd</sup> normal forms , Boyce Codd Normal forms, multivalued dependencies and 4<sup>th</sup> normal forms, Join dependencies and v normal forms, Inference rules , Equivalence and minimal cover, Properties of relational decomposition, Algorithms for relational database schema design



**UNIT-V****13**

Transaction concept, A simple transaction model, Transaction atomicity and durability, Serializability, Transaction isolation and atomicity, Transaction isolation levels, implementation of isolation levels. Concurrency control, Lock based protocols, Deadlock handling. Recovery system, Failure classification storage, Recovery and atomicity. Big Data Systems: Big Data Characteristics, Types of Big Data, Big Data Architecture, Introduction to Map-Reduce and Hadoop; Distributed File System, HDFS. NOSQL-Introduction to Mongo DB-Mapping relational database to Mongo DB-Mongo DB Installation and configuration>Create,Insert,drop databases-Limit() and skip() in Mongo DB-Sorting Documents in Mongo DB.

**COURSE OUTCOMES**

- Defining the basic concept of DBMS ✓\
- Analyze database models & entity relationship models. ✓\
- Demonstrate the fundamentals of data models and conceptualize and depict a database system and make use of ER diagram and model ✓2
- Populate and query a database using SQL DML/DDI commands ✓2
- Design and implement a database schema for a given problem-domain ✓3
- Appreciate the impact of big data, MongoDB on the information industry ✓5

**Total Periods: 55****TEXTBOOKS**

1. Elmasri and Navathe: Fundamentals of database Systems , 5<sup>th</sup> edition , Addison Wesley ,2011  
Chapters: 1.1-1.6, 2.1- 2.7, 3.1- 3.5, 5.1-5.3,6.1- 6.5,7.1 (unit 1,2) ,9.1,9.2(unit 3),10.1-10.5,11.3,11.4 (for unit 4)
2. Silberschatz, Korth and Sudharshan Data base System Concepts, 6<sup>th</sup> edition, Tata McGraw Hill, 2011.  
Chapters:3.1-3.9,4.1-4.6(unit3),8.3,8.4(unit4), 14.1-14.9,15.1,15.2,16.1-16.4(unit 5)
3. .MongoDB –The Definitive Guide, Second Edition ,Kristina Oreilly Publication,2013(unit 5)

**REFERENCEBOOKS**

1. C J Date, A Kannan S Swamynatham: An introduction to Database Systems, 8<sup>th</sup> edition, Pearson education,2009
2. Raghu Ramakrishnan, –Database Management SystemsI, Fourth Edition, McGraw-Hill Publications, 2015.
3. G.K.Gupta,"Database Management Systems, Tata McGraw Hill, 2011

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Prepared by  
(Dr. S.B. Mahalakshmi)

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Approved by  
(Dr. V. Krishnapriya)

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## 19MCSC104 - Advanced Data Structures and Algorithms with lab

|            |                    |
|------------|--------------------|
| Semester   | I                  |
| Credit     | 5(T2+P3)           |
| Paper Type | Core               |
| Max. Marks | CIA:30 +<br>CE :70 |

### AIM

The objective of the course is to familiarize students with basic data structures and their use in fundamental algorithms.

### COURSE OBJECTIVES

- To provide a good understanding of the fundamental data structures used in computer science
- To provide a good understanding of how several fundamental algorithms work, particularly those concerned with sorting, searching and graph manipulation
- To educate on the space and time efficiency of most algorithms
- To educate on design of new algorithms or modify existing ones for new applications
- To introduce graph algorithms

### PREREQUISITE

- Students are expected to be proficient in a high level object oriented programming language, preferably Java.

### UNIT - I INTRODUCTION AND BASIC DATA STRUCTURES

08

Problem solving techniques and examples-Abstract Data Type (ADT)- A priori analysis - Asymptotic notations -Time complexity of an algorithm using O notation -Polynomial Vs. Exponential algorithms -Average, Best and Worst case complexities -Analyzing recursive programs The list ADT Arrays- Stacks and Queues: Implementation and Application- Recursion -Evaluation of Expressions., Circular Queues.- Linked Lists: Introduction -Singly linked lists -Circularly linked lists -Doubly linked lists - Applications -polynomial addition

### UNIT - II ADVANCED DATA STRUCTURES

08

Binary Trees: Introduction -Representation of Trees -Binary Tree Traversals. Binary Search Trees: Introduction -Operations. AVL Trees: Definition -Operations. B-Trees: Introduction -m-way search trees -B trees definition and operations. Graphs: Introduction - Definitions -Representation of Graphs -Graph Traversal -Depth-First and Breadth-First Algorithms -Topological Sorting

### UNIT - III SORTING AND HASHING

08

Sorting by Selection- Sorting by Insertion- Sorting by Exchange- Sorting by Diminishing Increment- Heap Sort- Heaps Maintaining the Heap Property-Building a Heap- Heap sort Algorithm-Quick sort Description-Performance of quick sort-Analysis of Quick Sort. Hashing - General idea-Hash functions Separate Chaining-Open Addressing-Rehashing-Extendible Hashing.

### UNIT - IV ALGORITHM DESIGN TECHNIQUES

08

Divide and Conquer: General Method -Binary Search -Merge Sort -Quick Sort. Greedy Method: General Method -Knapsack Problem -Minimum Cost Spanning Tree - Single Source Shortest Path.

### UNIT - V GRAPHS ALGORITHMS

08

Dynamic Programming: General Method -Multistage Graphs -All Pair Shortest Path - Traveling Salesman Problem. Backtracking: General Method -8-Queens Problem -Sum of Subsets -Hamiltonian Cycles. Branch and Bound: The Method -0/1 Knapsack Problem - Traveling Salesperson.

### LIST OF EXERCISES

1. Implementation of Abstract Data Type.
2. Implementation of Linear Data Structures  
-Stack, Queue, Circular Queue using Array and Linked List
3. Implement Applications of Linear data structures-Solve real time problems
4. Implementation of Tree Operations



- Binary Search Tree Operations
- Tree Traversals
- Find the Depth of the nodes
- 5. Implementation of Graph Algorithms
  - Graph Traversals
  - Shortest path Algorithms
  - Minimum Spanning Tree Algorithms
- 6. Implementation of Sorting Methods –Internal Sorting
  - Insertion sort
  - Selection Sort
- 7. Implementation of Sorting Methods –External Sorting
  - Quick Sort
  - Merge Sort
  - Heap Sort

Compare the time and memory consumption for each method.
- 8. Implementation of Searching Techniques
  - Linear Search
  - Binary Search

Compare the time and memory consumption for each method.
- 9. Implementation of Hashing Techniques
  - a. Linear probing
  - b. Quadratic probing
  - c. Random probing
  - d. Double hashing/rehashing
  - e. Chaining
- 10. Implementation of greedy algorithm- Huffman Coding  
Backtracking-8 Queen Problem

#### COURSE OUTCOMES

- Implement abstract data types for linear data structures. L1
- Apply the different nonlinear data structures to problem solutions. L2
- Analyze the sorting and searching techniques L2
- Apply different design techniques L3
- Classify the graph algorithms for finding shortest paths. L2

Total Periods: T40 +P35=75Hrs

#### TEXT BOOKS

1. G.A.V.PAI., "Data Structures and Algorithms-Concepts, Techniques and Applications", - Tata McGraw-Hill Publishing Company, New Delhi, 6<sup>th</sup> reprint 2011.
2. Thomas.H Cormen, Charles S. Leiserson, "Introduction to Algorithms", PHI, MIT Press, Third Edition, 2009.

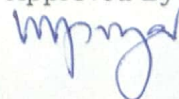
#### REFERENCE BOOKS

1. Ellis Horowitz & Sartaj Shani, "Data and File Structure", Galgotia Publication, 2009

Prepared by

A. Jayalakshmi

Approved By





**19MCSC105 – RDBMS Lab with J2EE and NOSQL**

|            |                    |
|------------|--------------------|
| Semester   | I                  |
| Credit     | 4                  |
| Paper Type | Practical          |
| Max. Marks | CIA:30 +<br>CE :70 |

**COURSE OBJECTIVES**

- To learn and understand Database Programming Paradigms
- To learn and understand SQL, PL/SQL ,NoSQL
- To learn Relational Database (Open source) MongoDB
- To learn and understand Database operations in JDBC

**LIST OF EXPERIMENTS**

1. Implementation of queries using DDL and DML commands.
2. Database design using E-R model and Normalization
3. Write a PL/SQL block to implement the concept of cursor
4. Write a PL/SQL stored procedure and function
5. Write a Database trigger with insert/update/delete statements
6. Study of Open source Database NOSQL
7. Design and Implement any 5 query using MongoDB
8. Implement aggregation and indexing with suitable example using MongoDB.
9. Design and Implement any Database Application using Java and MongoDB as a back end.
10. Implement Database navigation operations (add, delete, edit) using JDBC.

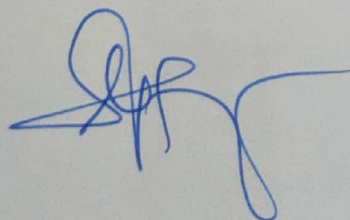
**Total Hours: 55****COURSE OUTCOMES**

Having successfully completed this course, the student will be able to:

- Gain knowledge in Relational Database Programming Languages L1
- Master the basics of database languages and construct queries using SQL, PLSQL, NoSQL Database systems L3
- Know how analytics and big data affect various functions now and in the future L1
- Appreciate the impact of analytics and big data on the information industry L2

Prepared By  
(Dr. S. B. Maha (alashum))

Approved By  
(Dr. V. Krishnapriya)





# MASTERS' ABILITY AND CAREER ENHANCEMENT (MACE – I)

Subject Code: 19CME01

Common to all the PG streams admitted from AY 2019-20

|            |   |
|------------|---|
| Semester   | 1   |
| Credit     | 2   |
| Paper type | Skill based                                 |
| Max. Marks | Total=100<br>(Online:50+Verbal<br>Oral: 50) |

Instruction Hours per Semester: 40

## Aim:

To educate and enrich the students on setting goals, career planning, communication skills and professional grooming. Equip them on the techniques of listening, non-verbal communication, etiquette, written and presentation skills etc.

## Course Objectives

To enable students to,

- Set goals.
- Assess individual communication skills, aptitude and employability skills
- Revise the fundamentals of English grammar
- Enhance their English language.
- Equip with techniques of listening and non-verbal communication
- Enhance techniques such as listening, non-verbal communication, verbal oral & written skills etc.

## Unit I

Assessment of individual levels of communication skills, aptitude and employability skills; Psychometric test, SWOT analysis; Planning on setting goals. Introduction to Career planning; Goal setting – Introduction to Soft Skills - Presentation skills - Intra-personal skills

## Unit II

Enhancement of Basic English vocabulary; Nouns, Verbs, Tenses, Phrases, Synonyms, Antonyms, and Homonyms Descriptive words - Combining sentences

## Unit III

English language enhancement- Business Idioms- Indianisms in English- Common Errors in Pronunciation - Signposts in English- Verbal ability-Articles-Parts of speech-Phrases, clauses and modifiers - errors in tenses – prepositional errors – parallelism errors – mood, conditionals and multiple usages.

#### Unit IV

English listening- hearing Vs. listening - Nonverbal communication – Appearance, dressing and grooming - Tips to maintain good impression at work - business etiquette – basic postures and gestures and table manners, Body language - dealing with people communication - media etiquette - telephone etiquette, email etiquette.

#### Unit V

Basics of Writing Skills – Sentence Construction – Email Writing. Presentation Skills (Writing) – Effective organization of content – Importance of Presentation in both Writing and Speaking. Communication Process and Barriers – Elimination of stage fear – Impromptu speaking

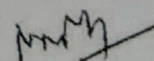
#### Course Outcomes

On the successful completion of the course, the student would be able to-

- Set goals
- Learn fundamentals of English grammar, common errors of pronunciation and parts of speech.
- Understand individual communication skills, aptitude and skills required for employment
- Enhance their English language.
- Listen better, improve their body language, and adopt good manners and etiquettes.
- Write better and communicate effectively.

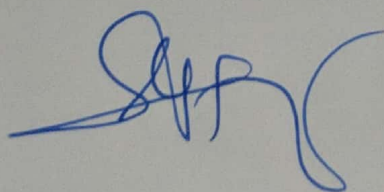
#### References:

- 1) A Modern Approach to Verbal and Nonverbal Reasoning by Dr. R. S. Aggarwal
- 2) A Modern A Modern Approach to Verbal by Dr. R. S. Aggarwal
- 3) A Modern Approach to Nonverbal Reasoning by Dr. R. S. Aggarwal
- 4) A Practical Course in Spoken English by J.K. Gangal
- 5) Effective English Communication for you by V. Shamala
- 6) Developing Communication Skills by Krishna Mohan & Meera Banerji
- 7) English for Competitive Exams by Bhatnagar



Verified By

Course Coordinator





**19PDCS01: TROUBLE SHOOTING & INSTALLATION LAB**

|            |                                       |
|------------|---------------------------------------|
| Semester   | I                                     |
| Credit     | 2\$                                   |
| Paper Type | Professional Development (PDC)        |
| Max. Marks | Total =50%<br>External Viva Voce Only |

**AIM**

This work is aimed at reducing the tediousness and hardship faced by individuals in troubleshooting their computer hardware.

**COURSE OBJECTIVES**

- To help individuals in saving the cost of repairs and time.
- To make troubleshooting easier and comfortable.
- To enable the troubleshooting of computer hardware to be more accurate and effective.

**PREREQUISITE**

- Should have knowledge in Computer System

**UNIT – I: Basics Of Computer Hardware And Software.****6**

Hardware components of computer. -Identifying the Important Hardware Components of PC. i.e., CPU, Motherboard, RAM, HDD, SMPS, K/B, Mouse.-BIOS/CMOS Setup, Booting Sequence/Boot Order.

**Definition and types of Operating Systems** - Windows XP/ 7/8 and 10, Linux.-

Process of Booting the Operating System.- Computer Management, Disk Management, Defragmentation

**UNIT – II: Trouble Shooting Basics / Trouble shooting file sharing problems****6**

Trouble shooting power supply / Trouble shooting HDD.- Trouble shooting SMPS fan / Trouble shooting CPU fan.Trouble shooting monitor / mouse / key board.-Trouble shooting optical drives / Trouble shooting networking.

**UNIT – III: Trouble Shooting Operating System****6**

**Tools:** Important tools used for the fixation using command prompt- Common Windows error and how to fix them

**6****UNIT – IV : Basic Software Troubleshooting**

Demonstration on Windows Using: Safe Mode, Safe Mode Boot options, Last Known Good Configuration, etc

**UNIT – V : Future Technology****6**

Demonstrating Windows Diagnostic Tools- System Restore-Creating Restore point- Restore using Restore point.-Future technology of both hardware and software

**Total Periods: 30Hrs****Course Outcome**

- **Grasp** the fundamental knowledge hardware and software. L<sub>1</sub>
- Have to attain an accurate, and effective and intelligent way of trouble shooting computer hardware and software. L<sub>3</sub>

**Text Book**

1. Chris Rhodes and Andrew Bettany , “ Windows Installation and Update troubleshooting”,Apress, 2016.

Prepared by

(Dr. L.B. Mahalakshmi)

Approved By

M. Prasad



**19MITC05 – AI & EXPERT SYSTEMS****COURSE OBJECTIVES**

- To understand about the basic theory of problem solving paradigms and search strategies in artificial intelligence.
- To make the students familiar with knowledge representation, planning, learning, decision making process
- Familiar in ANN and deep learning concepts.

**PREREQUISITE**

|            |                    |
|------------|--------------------|
| Semester   | II                 |
| Credit     | 4                  |
| Paper Type | Core               |
| Max. Marks | CIA:30 +<br>CE :70 |

**UNIT-I INTRODUCTION AND PROBLEM SOLVING****11**

Definitions of AI - Intelligent Agents. Problem solving by searching: Problem-solving agents- example problems – Search for solutions Uninformed search strategies – Informed search strategies – Heuristic functions.

**UNIT-II LOGIC****11**

Logical agents: Knowledge-based agents – The Wumpus world. Logic – Propositional logic: A very simple logic-Propositional theorem proving. First order logic: Representation – Syntax and semantics of first order logic – Using first order logic-PROLOG basics Inference in first order logic: Propositional versus first order inference– Unification and lifting – Forward chaining – Backward chaining – Resolution.

**UNIT-III PLANNING AND DECISION MAKING****11**

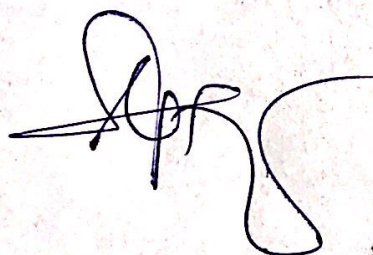
Classical Planning: Definition – Algorithms for planning as state-space search-Planning graphs – Other classical planning approaches. Making simple Decisions-Combining beliefs and desires under Uncertainty-Utility theory-Utility functions-Multi attribute utility functions-Decision networks- The value of information-Decision theoretic expert systems.

**UNIT-IV LEARNING****11**

Quantifying uncertainty: Acting under uncertainty - Probability basics – Bayes' Rule and its use. Probabilistic reasoning: Representing knowledge in uncertain domain- The semantics of Bayesian networks. Forms of learning - Supervised learning - Learning decision trees. Reinforcement Learning: Passive Learning – Active Learning

**UNIT-V ANN AND DEEP LEARNING****11**

Introduction to artificial neural networks, Perceptron's, Multi-layer feed forward network, Application of ANN - Deep feed forward networks – Convolution Neural networks – Applications-Use of Tensor flow. Definition – Features of an expert system – Organization – Characteristics – Prospector – Knowledge Representation in expert systems – Expert system tools – MYCIN – Learning – Common sense – Perception and Action – Expert System.

**Total Periods: 55Hrs**




**COURSE OUTCOMES**

- Develop solutions for problems using various Artificial Intelligence concepts. L1
- To understand about the basic theory of problem solving paradigms and search strategies L2
- Design applications using PROLOG for making inferences. L3
- Demonstrate usage of planning and decision making. L3
- Apply the concepts of learning using Tensor Flow and various learning Algorithm integrating Neural Networks.L2

**TEXT BOOKS**

1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", 3rd Edition, Pearson Education / Prentice Hall of India, 2015.
2. Elaine Rich, Kevin Knight, Shivashankar.B.Nair, "Artificial Intelligence", Tata Mc Graw Hill, Third Edition , 2009
3. Nils J: Nilsson, "Artificial Intelligence: A new Synthesis", Harcourt Asia Pvt. Ltd., 2000
4. Elain Rich and Kevin Knight, 'Artificial Intelligence', Second Edition Tata McGraw Hill, 1995.
5. Janakiraman, K.Sarukesi, 'Foundations of Artificial Intelligence and Expert Systems', Macmillan Series in Computer Science,2005

**REFERENCE BOOKS**

1. George F. Luger, "Artificial Intelligence-Structures and Strategies For Complex Problem Solving", Pearson Education / PHI, 2002
2. David L. Poole, Alan K. Mackworth, "Artificial Intelligence: Foundations of Computational Agents", Cambridge University Press, 2010.
3. Ian Goodfellow, Yoshua Bengio, Aaron Courville, "Deep Learning"A, An MIT Press Book, 2016.
4. Li Deng , Dong Yu, "Deep Learning: Methods and Applications", Now Publishers, 2014.

**OTHER REFERENCES**

1. <http://aima.cs.berkeley.edu>
2. <http://www-formal.stanford.edu/jmc/whatisai/>
3. <http://nptel.ac.in/courses/106106126/4>
4. <https://www.coursera.org/specializations/deep-learning#courses>
5. <https://www.deeplearningbook.org/>
6. <https://medium.freecodecamp.org/an-introduction-to-q-learning-reinforcement-learning-14ac0b4493cc>

Maheshwari  
Prepared by  
(Dr. S.B. Mahalakshmi)

Approved by

Verified by

Saravendran



**19MCSC03 - ADVANCED OPERATING SYSTEMS****COURSE OBJECTIVES**

- To understand the IPC problems and File caching schemes.
- To Gained knowledge in Distributed OS and Unix OS
- Familiar with Linux operating system

|            |                    |
|------------|--------------------|
| Semester   | II                 |
| Credit     | 4                  |
| Paper Type | Core               |
| Max. Marks | CIA:30 +<br>CE :70 |

**UNIT I :OPERATING SYSTEM****11**

Introduction – Evolution of Operating systems – Serial, Simple Batch, Mutiprogrammed Batch , Timesharing, Distributed and Real time operating systems – Computer Hardware review – Interrupts – Operating System Concepts – Processes – Model – Creation - Termination – Process Hierarchy – Process States – Implementation of Processes – Threads – Thread Usage – Implementation of Threads in User Space and Kernel space – Multi threading

**11****UNIT II: INTER PROCESS COMMUNICATION**

Inter Process Communication – Race condition – Critical Region – Mutual Exclusion – Sleep and wakeup – Semaphores – Mutexes – Message Passing. Classical IPC Problems : The Dining Philosophers Problem – The Readers and Writers Problem – The Sleeping Barber Problem – Producer Consumer problem.

**11****UNIT-III:- DISTRIBUTED OPERATING SYSTEM**

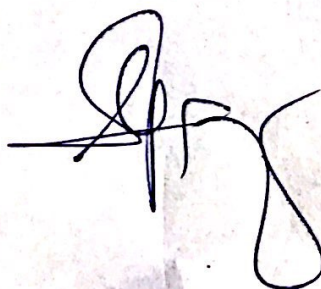
Distributed Operating System Concepts & Design - Fundamentals -Remote Procedure Calls - The RPC Model - Transparency of RPC - Implementing RPC mechanism - Stub Generation - RPC Messages - Server Management - Parameter-Passing Semantics - Call Semantics - communication Protocol for RPCs.- Distributed File System: Introduction - Desirable Features - File Models - File - Accessing Models - File Sharing Semantics - File Caching Schemes - File Replication .

**11****UNIT IV: LINUX**

LINUX : Architecture of Unix Operating System – Introduction to system concepts – kernel data structures – Internal representation of Files – Inodes – Algorithms for allocation and Releasing inode - Structure of a Regular file – Directories – Super block – Algorithm for assigning new Inode and freeing Inode - Allocation of Disk blocks - Process states and transition – Layout of system memory - The context of a Process.

**11****UNIT V: PROCESS CONTROL IN UNIX**

Process Control in Unix – Algorithm for Fork system call – Algorithm for Exit – Algorithm for Wait – Algorithm for Exec – Uses of Exec – Algorithm for Booting the Unix system – Algorithm for Init process - Process scheduling algorithm – Example of Process scheduling in Unix. Example C programs by using fork, exec, wait, exit system calls.

**Total Periods: 55Hrs**




## COURSE OUTCOMES

- To Know about the Operating System Various Basic Concept L1
- Develop solutions for problems using Inter Process Communication concepts. L2
- Apply the RPC mechanism in File System L3
- To Know about the Linux Operating System L1
- Demonstrate usage of process control in UNIX. L3

## TEXT BOOKS

1. Andrew S.Tanenbaum,"Modern Operating Systems", PHI/Pearson Education Asia, Second Edition, 2001

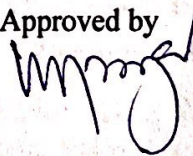
## REFERENCE BOOKS

1. Pradeep K. Sinha, "Distributed operating systems concepts and design" ,Prentice - Hall of India, 2002
2. Maurice J. Bach, "The Design of the Unix Operating System", Prentice-Hall of India, 1998.
3. William Stallings, "Operating Systems", Prentice Hall of India, Second Edition, 2000

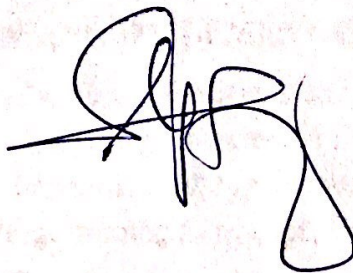
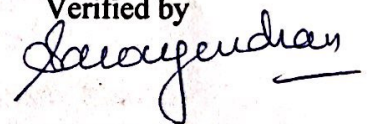


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**19MCSC04 - ADVANCED SOFTWARE ENGINEERING**

|            |                    |
|------------|--------------------|
| Semester   | II                 |
| Credit     | 4                  |
| Paper Type | Core               |
| Max. Marks | CIA:30 +<br>CE :70 |

**COURSE OBJECTIVES**

- To familiarize in Software engineering systems and development models
- To Gain knowledge on system, software and models
- To design software interfaces and implementation
- To adhere knowledge on Quality management
- To apply SDLC in real time project with quality Management
- To be familiar with DevOps practices

**UNIT I : INTRODUCTION TO SOFTWARE ENGINEERING****11**

Software Engineering Discipline, Computer Based Systems, Increasing size and scope of software, Generic vs. Custom- made software products -distinctive characteristics of software products.

**Software Development Models:** Life cycle -Development process-Life cycle models-Linear Sequential-Evolutionary- Classical waterfall - Iterative waterfall – Prototyping – Spiral -Unified models, -Agile development approaches

**UNIT II : SOFTWARE REQUIREMENT SPECIFICATION****11**

Requirement analysis and specification – Requirements gathering and analysis – Software Requirement Specification-Classification of Requirements- Functional and Non- Functional requirements, Priority Categories of Requirements. Requirement Engineering Tasks

**System Models:** Domain Analysis and Modeling, Data Models, Functional Models-structured Analysis Model, Object Oriented Models- State, Use Case Models, Sequence and activity diagrams, Relationship among the Object Oriented Models

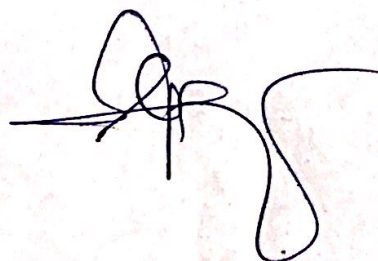
**UNIT-III:- SOFTWARE DESIGN AND IMPLEMENTATION****11**

Architectural Design-Decomposition strategy, Partitions and Layers, Structured System Design- Use of Heuristics for Design Refinements, Object-Oriented Design-Handling Concurrency, User Interface Design, User Interface Standards and Guidelines. Reusable Components, Patterns, Frameworks, Coding – Choice of Programming Language, Coding Standards

**UNIT IV SOFTWARE TESTING****11**

Conventional Testing and SDLC Testing, Organization for Testing, Formal Technical Reviews, Use of Static Analyzers. Testing during Code Integration, Product Testing System Testing, Testing Distributed Implementation, Testing of Real-Time systems, Acceptance Testing.

**Software Quality Management:** Quality Dimensions, Process Quality and Product Quality, Quality Assurance Planning, Quality Measurements, Software Configuration Management-Version management, Software Process Improvement-Capability Maturity Model





**UNIT V: SOFTWARE PROJECT MANAGEMENT****11**

Software Projects, Project Planning, Project Organization, Software Estimation, Risk Management. Project Scheduling, Project Monitoring and Control- Measurement during Software Projects.

DevOps: Motivation-Cloud as a platform-Operations- Deployment Pipeline: Overall Architecture-Building and Testing-Deployment- Case study: Migrating to Microservices

**Total Periods: 55Hrs****COURSE OUTCOMES**

**CO1:** Make use of the principals involved in gathering requirements and perform requirements modeling -L1

**CO2:** Build software architectural models - L3

**CO3:** Analyze suitable models and arrive at an appropriate software design- L2

**CO4:** Appreciate the quality assurance procedures by using software metrics -L3


**CO5:** Analyze Software Project management techniques and find the advantages of DevOps practices - L3

**TEXT BOOKS**

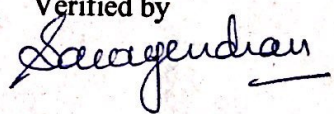
1. S.Thangasamy, -Essentials of Software Engineering, Wiley India, First Edition, 2012
2. S. M. Blaha and J. Rumbaugh, -Object Oriented Modeling and Design with UML, Second Edition, Prentice-Hall India, 2007
3. R.S. Pressman, ISoftware Engineering – A Practitioner's ApproachI, Seventh edition, McGraw Hill International Edition, 2010.
4. Watts S. Humphrey, -Managing the Software ProcessII, First Edition, Addison Wesley, 1989.
5. Stephen Schach, -Software EngineeringII, Seventh edition, TMH, New Delhi, 2007

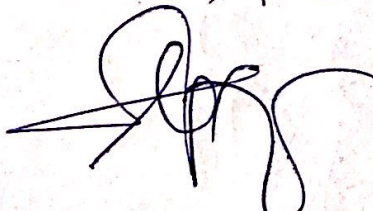
**REFERENCE BOOKS**

- 1 Pankaj Jalote, -An Integrated Approach To Software EngineeringII, Third Edition, Narosa Publishing House, Reprint 2014
- 2 I Sommerville, -Software EngineeringII, Ninth Edition, Pearson Education, 2010
- 3 Len Bass, Ingo Weber And Liming Zhu, -Devops: A Software Architect'S Perspectivel, Pearson Education, 2016

  
Prepared by

Approved by  


Verified by  






# 19MITC06 – BIG DATA FRAMEWORK AND HADOOP LAB

## Course Objectives:

- Understand the Big Data Platform and its Usecases
- Provide an overview of ApacheHadoop
- Understand Map ReduceJobs
- Provide hands on Hadoop EcoSystem
- To gain knowledge Large scale preprocessing for big dataanalytics

|            |                 |
|------------|-----------------|
| Semester   | II              |
| Credit     | 5               |
| Paper Type | Core            |
| Max. Marks | CIA:30 + CE :70 |

## UNIT I INTRODUCTION TO BIG DATA:

**T7 + P3 hrs**

Introduction – Big Data- Characteristics of Big Data – Big data management architecture- Examining Big Data Types – Big Data Technology Components – Big data analytics –Big data analytics examples - Web Data Overview – Web Data in Action

1. Introduction to Online repository and its process

## UNIT II HADOOP

**T 6 + P 9 hrs**

Hadoop : Introduction – History of Hadoop - Hadoop Ecosystem- Analyzing data with Hadoop - Hadoop Distributed File System- Design - HDFS concepts - Hadoopfilesystem –Data flow – Hadoop I / O - Data integrity – Serialization - Setting up a Hadoop cluster - Cluster specification - cluster setup and installation – YARN

1. Hadoop file management tasks like adding files and directories, retrieving files, deleting files
2. Implement Stock count Map reduce program

## UNIT III MAP REDUCE

**T 6 + P 9 hrs**

MapReduce: Introduction – Understanding Map, Reduce functions - Scaling out - Anatomy of a MapReduce Job Run - Failures – Shuffle and sort - Mapreduce types and formats - features – counters - sorting - Mapreduce Applications – Configuring and setting the environment - Unit test with MR unit- local test

1. programming architecture using Map Reduce API
2. Store the basic information about students such as roll no, name, date of birth , and address of student using various collection types such as List, Set and Map

## UNIT IV APACHE SPARK

**T 6 + P 9 hrs**

Spark: – Installing spark – Spark applications, Jobs, Stages and Tasks –Resilient Distributed databases- Anatomy of a Spark Job Run – Spark on YARN- SCALA: Introduction- Classes and objects- Basic types and operators- built-in control structures- functions and closures- inheritance

1. Implementation of RDD Transformation
2. DATasharing using SPARK RDD

## UNIT V : LARGE-SCALE DATA PROCESSING

**T 6 + P 9 hrs**

Introduction to Apache Spark and Use Cases Apache Spark APIs for large-scale data processing: verview, Linking with Spark, Initializing Spark, Resilient Distributed Datasets (RDDs), External Datasets, RDD Operations, Passing Functions to Spark, Working with Key-Value Pairs, Shuffle operations, RDD Persistence, Removing Data, Shared Variables, Deploying to a Cluster

1.Health care Data set with SPARK

Lab Programmes (5 hrs)

Setting up a hadoop environment

- Implement Stock count Map reduce program
- Deploy Map reduce program that mines weather data
- Analyze Map reduce program using log files
- Analyze two different map reduce programs using joins
- Implement file management tasks using Hadoop
- Apply sorting technique using Map reduce Exercises to implement
- Extract features from datasets

**Total Hours: T 30 + P 45 =75**





## COURSE OUTCOMES

Upon successful completion of course the students will be able to


- Understand the characteristics of big data and concepts of Hadoop ecosystem. L1
- Understand the concepts of Scala programming L1
- Apply Mapreduce programming model to process big data L2
- Analyze Spark and its uses for big data processing L3
- Design programs for big data applications using Hadoop components. L3

## TEXT BOOK

1. Bill Franks (2012). Taming the Big Data Tidal wave, John Wiley & Sons
2. Tom White (2015). Hadoop : The Definitive Guide, Third Edition, O'Reilly Media
3. Garry Turkington, Hadoop Beginner's Guide, Packt Publishing, 2015

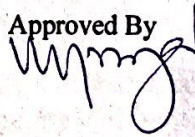
## REFERENCE BOOKS

1. Boris lublinsky, Kevin t. Smith, Alexey ,Yakubovich(2015). Professional Hadoop Solutions, Wiley
2. Min Chen (2014). Big Data : Related Technologies, Challenges and Future Prospects, Springer
3. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, Professional Hadoop Solutions, Wiley, 2015.
4. Jonathan R. Owens, Jon Lentz and Brian Femiano, Hadoop Real-World Solutions Cookbook, Packt Publishing, 2013.
5. VigneshPrajapati, "Big Data Analytics with R and Haoop", Packet Publishing 2013
6. JayLiebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press(2013)

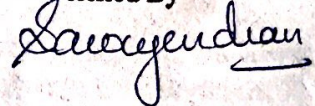
  
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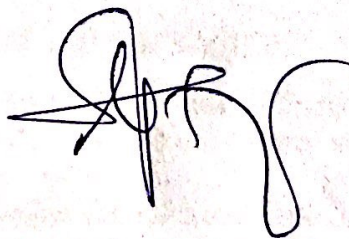
(Dr. M. Venkata)

Approved By



Verified By







## 19MCSC05 – ROBOTIC PROCESS AUTOMATION DESIGN AND DEVELOPMENT WITH LAB

|            |                 |
|------------|-----------------|
| Semester   | II              |
| Credit     | 5               |
| Paper Type | Core            |
| Max. Marks | CIA:30 + CE :70 |

### COURSE OBJECTIVES

To provide a good understanding of the Robotic Process Automation

- Understand the basics of Robotic Process Automation
- Use and understand the various functionalities and features of UiPath Studio and Orchestrator
- Identify processes which can be automated
- Develop and deploy attended and unattended robots independently
- Know and apply business best practices in RPA projects

### UNIT – I PROGRAMMING REVIEW

T 06+ P4 hrs

**Basic Programming concept review:** knowledge of data and data structures- Software development guidelines- Learn about scripting languages, macros and their applications introduction of Variables and files.**Programming fundamentals from an RPA perspective**-RPA and its development

-List the programming constructs used in RPA projects Differentiate between the types of- robots used in RPA- Identify the business processes that can be automated.

**Installing UiPath software-** Install and update the UiPath components and extensions,. - Use the user interface of the UiPath Studio to interact with the application and design automation workflows.- Search, install, save, use and reuse activities in UiPath Studio

1. Download/install UiPath and its browser extensions.
2. "Swap two variables" by the following methods:
  - (i) Three bucket method
  - (ii) Using only two variables

### UNIT – II FOUNDATIONAL RPA CONCEPTS

T 06

**Applying RPA-** Explain the concept of Center of Excellence and its role in the success of an RPA project. - Apply the RPA project methodology, by differentiating it from Software Development Lifecycle.

**RPA deployments: business and management considerations-** Identify the stages of implementing RPA and plan the RPA journey. - Position RPA as a technology in the future enterprise ecosystem.

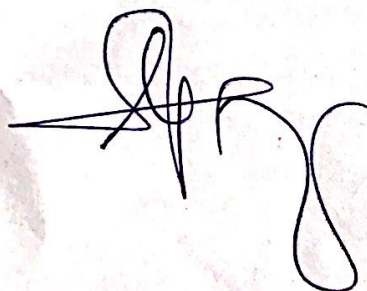
### UNIT – III UIPATH - INTRODUCTION & BASICS

T06 + P6hrs

**UIPATH- Introduction- Variables within Studio:-**Understand Variables in UiPath- **Control flow:** Understand the concept of control flow- - Use the control statements specific to UiPath in automation projects.

**Data Manipulation techniques:** Define variables and data structures according to the business needs formulated - Apply the main commands and operations of data manipulation.- Apply data manipulation methods suitable to RPA to different types of data structures and variables.

3. Generate the following:
  - (i) Natural Numbers series
  - (ii) Odd Numbers Series
  - (iii) Even Numbers Series
  - (iv) Prime Numbers Series
  - (v) Sorted Numbers Series





4. Display "Hello" by using Sequence and Flowchart activities through:
  - (i) Message Box activity
  - (ii) Write Line activity

#### **UNIT – IV RECORDING AND ADVANCED UI INTERACTION**

**T 06+P6hrs**

**Recording and Advanced Ui interaction-** Differentiate between actions - Basic, Desktop and Web Recording.- Screen Scraping wizard - configure input and output methods as appropriate to the context.- Use the Data Scraping functionality of UiPath in the appropriate contexts. **Selectors:-** . Define selectors- Identify the types of selectors- Explain the functional components of selectors- . Learn how to debug selectors- Selectors and how they are applied in UiPath Studio

**RPA Applications:-** Image, Text and Data Tables Automation in Studio-Image Text Advanced Citrix Automation- Excel Data Tables & PDF - Understand the concept of Anchors.

5. Use the 'Recorder' feature for automating disk clean-up process.
6. Scrape data from a website and store it in .CSV File.
7. Display the sum of two variables by taking two variables as input and produce the output. The code will keep executing until one of the variable entered by the user is 0.

#### **UNIT – V ADVANCED CONCEPTS AND APPLICATION**

**T6 + P9hrs**

**Email Automation-** Exception handling: Debugging and Exception handling- Identify the workflow designs to implement in RPA projects- Project Organization - steps to publish the library in UiPath studio- Identify the need of robotic enterprise framework and team foundation server.


**Orchestrator-** . Define Orchestrator and its functions- Understand how to work with Orchestrator- processes and publishing package- Identify types of robots in Orchestrator.

**Future Trends-** Define artificial intelligence and identify its components- Describe the concept of machine learning. - Explain natural language processing. - Understand computer vision.

8. Display the sum of two variables by taking two variables as input and produce the output. The code will keep executing until one of the variable entered by the user is 0.
9. Create a 'Guessing Game' with the following conditions:
  - (i) Generate a Random Number and prompt the user to input a number.
  - (ii) In case of a wrong input a message is displayed to the user stating 'Please enter a lesser/greater number'.
  - (iii) The loop keeps on running until the input number equals the generated number.
10. Compare two columns in an excel sheet. The output should display 'Match/Not Match' against the corresponding cell in the sheet.

#### **GENERAL LIST OF EXERCISES (Total Hours :20 Hrs)**

1. Fill a web form from the data stored in an excel sheet.
2. Read a scanned image of an invoice and store the extracted data in a .CSV file.
3. Read a true PDF file and fill the webform.
4. Read a word file and then create a list of unique words in an excel sheet.
5. Create a Queue in orchestrator and store the subject of the email in .CSV.
6. Save the attachment from the unread emails having 'Resume' mentioned in the subject line.





7. Build a data table and fill the data from the .CSV file. Once filled check for the mismatching columns using the try catch mechanism.
8. Generate monthly expenditure report by extracting data from a user email account using Re-framework.

**Total Periods: T30 +P45=75Hrs**

### **COURSE OUTCOMES**


- Analyze Programming fundamentals from an RPA perspective. L2
- Apply RPA concepts in business and management considerations. L3
- Able to know the UIPATH-Tool Basics, Data Manipulations Techniques L1
- Analyze the UIPath-Recording and Data Scraping in the appropriate contexts L2.
- Apply RPA automation in real-time application. L3

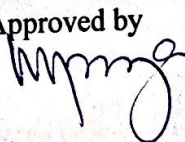
### **TEXT BOOKS**

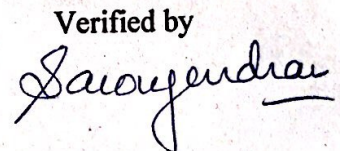
1. Alok Mani Tripathi, "Learning Robotic Process Automation", kindle Edition, Packt Publishing, 2018.
2. Vaibhav Jain, "Crisper Learning: for UiPath", Independently published, 2018

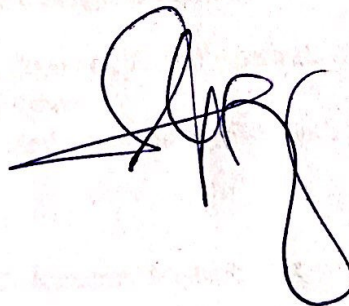
### **REFERENCES**

1. NICE RPA team, Steve Kaelble, "Robotic Process Automation", NICE Special Edition, Nice Publication, John Wiley & Sons, Ltd.,
2. <https://www.tutorialspoint.com/uiopath/index.htm>

  
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**19MCSC06 - Literature Survey****Course Objectives:**

- To understand the competitive advantages of research study
- To learn the several key technologies used in manipulating and analyzing research data
- To learn research analysis methods
- To gain knowledge on literature study

|            |                |
|------------|----------------|
| Semester   | II             |
| Credit     | 2 <sup>5</sup> |
| Paper Type | Extra Credit   |
| Max. Marks | CE :50         |

**UNIT I RESEARCH DESIGN:**

Review of Research Literature: Purpose and use of literature review, locating relevant information, use of library & electronic databases, preparation & presentation of literature review, research article reviews, theoretical models and frame work. Identification of gaps in research, formulation of research problem, definition of research objectives.

**UNIT II DOCUMENTATION:**

"How" of documentation b. Techniques of documentation c. Importance of documentation d. Use of computer packages in documentation

**UNIT III INTRODUCTION TO PRESENTATION**

Presentation (especially for oral presentation): Importance and types of different skills, contained, format of model, introduction, Poster, Gestures, eye contact, facial, expressions, stage fright, volume of pitch, speed, pause & language, Visual aids & seating, Questionnaire etc.

**UNIT IV RESEARCH PUBLICATION**

Research Publication: Thesis, Research paper, Review Article & Technical Reports: Organization of thesis and reports, formatting issues, citation methods, references, effective oral presentation of research. Quality indices of research publication: impact factor, immediacy factor, H- index and other citation indices

**UNIT V APPLICATION OF RESULTS AND ETHICS**

Environmental impacts - Ethical issues - ethical committees - Commercialisation - Copy right - royalty - Intellectual property rights and patent law - Trade Related aspects of Intellectual Property Rights - Reproduction of published material - Plagiarism - Citation and acknowledgement - Reproducibility and accountability.

**COURSE OUTCOMES**

- Understand the concepts of research L1
- Understand the different stages of research process L1
- Apply methods to collect best data L3
- Assess the suitable research design & work L2

**Text Books:**

1. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
2. Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International. 418p.

**Reference Books:**

1. Trochim, W.M.K., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing. 270p.
2. Wadehra, B.L. 2000. Law relating to patents, trademarks, copyright designs and geographical indications. Universal Law Publishing.
3. Coley, S.M. and Scheinberg, C. A., 1990, "Proposal Writing", Sage Publications. n Day, R.A., 1992. How to Write and Publish a Scientific Paper, Cambridge University Press.
4. Fink, A., 2009. Conducting Research Literature Reviews: From the Internet to Paper. Sage Publications

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**19MCSE01 - THEORY OF COMPUTATION AND COMPILERS****COURSE OBJECTIVES**

- To Familiarize the theory of computation
- To know the concept of context free language
- To identify the Runtime Storage organization
- To make use the Code Optimization

|                    |   |
|--------------------|---|
| <b>Semester</b>    | <b>II</b>                               |
| <b>Credit</b>      | <b>4</b>                                |
| <b>Paper Types</b> | <b>Elective</b>                         |
| <b>Max. Marks</b>  | <b>CIA -30 +<br/>CE -70<br/>TOT=100</b> |

**UNIT I : THEORY OF COMPUTATION****10**

**Theory of Computation:** Formal Language, Non-Computational Problems, Diagonal Argument, Russels's Paradox.

**Regular Language Models:** Deterministic Finite Automaton (DFA), Non-Deterministic Finite Automaton (NFA), Equivalence of DFA and NFA, Regular Languages, Regular Grammars, Regular Expressions, Properties of Regular Language, Pumping Lemma, Non-Regular Languages, Lexical Analysis.

**UNIT II: CONTEXT FREE LANGUAGE****12**

**Context Free Language:** Pushdown Automaton (PDA), Non-Deterministic Pushdown Automaton (NPDA), Context Free Grammar, Chomsky Normal Form, Greibach Normal Form, Ambiguity, Parse Tree Representation of Derivation Trees, Equivalence of PDA's and Context Free Grammars; Properties of Context Free Language.

**Turing Machines (TM):** Standard Turing Machine and its Variations; Universal Turing Machines, Models of Computation and Church-Turing Thesis; Recursive and Recursively-Enumerable Languages; Context-Sensitive Languages, Unrestricted Grammars, Chomsky Hierarchy of Languages, Construction of TM for Simple Problems

**UNIT-III- COMPUTATIONAL COMPLEXITY****11**

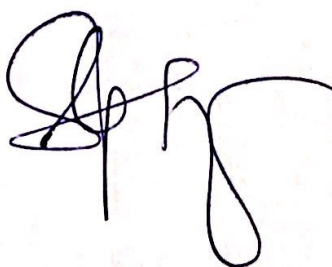
Unsolvability Problem, Halting Problem, Post Correspondence Problem, Unsolvability Problems for Context-Free Languages, Measuring and Classifying Complexity, Tractable and Intractable Problems.

**Syntax Analysis:** Associativity, Precedence, Grammar Transformations, Top Down Parsing, Recursive Descent Predictive Parsing, LL(1) Parsing, Bottom up Parsing, LR Parser, LALR(1) Parser

**UNIT IV: RUNTIME STORAGE ORGANIZATION****11**

**Semantic Analysis:** Attribute Grammar, Syntax Directed Definitions, Inherited and Synthesized Attributes; Dependency Graph, Evaluation Order, S-attributed and L-attributed Definitions; Type-Checking.

**Run Time System:** Storage Organization, Activation Tree, Activation Record, Stack Allocation of Activation Records, Parameter Passing Mechanisms, Symbol Table...





**UNIT V: INTERMEDIATE CODE GENERATION**

11

**Intermediate Code Generation:** Intermediate Representations, Translation of Declarations, Assignments, Control Flow, Boolean Expressions and Procedure Calls.

**Code Generation and Code Optimization:** Control-flow, Data-flow Analysis, Local Optimization, Global Optimization, Loop Optimization, Peep-Hole Optimization, Instruction Scheduling..

**TOTAL PERIODS – 55Hrs****COURSE OUTCOMES**


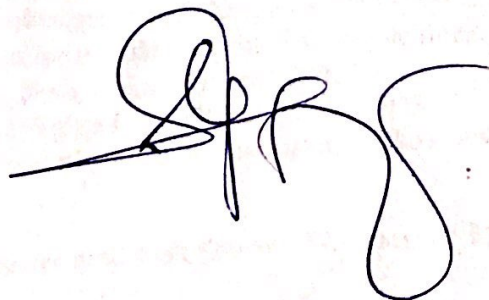
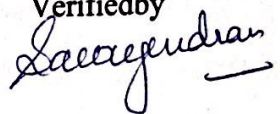
- Able to know Theory of Computation and Language Models. L1
- Analyse the context free and Turing machines. L2
- Classifying complexity of the problems L2
- Analyze the run time storage organization L2
- Apply the code optimization approaches. L3

**TEXT BOOK**

1. Michael Sipser, "Introduction to the Theory of Computation", Third Edition, New Delhi, 2012.

**REFERENCE BOOK**

1. Anil Maheshwari & Michiel Smid, "Introduction to Theory of Computation", Carleton University, Ottawa, Canada, 2019.

  
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**19MSCE02 MOBILE APPLICATIONS****COURSE OBJECTIVES**

- Understand system requirements for mobile applications.
- Generate suitable design using specific mobile development frameworks.
- Generate mobile application design.
- Implement the design using specific mobile development frameworks.
- Deploy the mobile applications in marketplace for distribution.

|            |                               |
|------------|-------------------------------|
| Semester   | II                            |
| Credit     | 4                             |
| Paper Type | Elective                      |
| Max. Marks | CIA:30 +<br>CE :70<br>TOT=100 |

**UNIT I INTRODUCTION****10**

Introduction to mobile applications – Embedded systems - Market and business drivers for mobile applications – Publishing and delivery of mobile applications – Requirements gathering and validation for mobile applications.

**UNIT II BASIC DESIGN****10**

Introduction – Basics of embedded systems design – Embedded OS - Design constraints for mobile applications, both hardware and software related – Architecting mobile applications – User interfaces for mobile applications – touch events and gestures – Achieving quality constraints – performance, usability, security, availability and modifiability.

**UNIT III ADVANCED DESIGN****11**

Designing applications with multimedia and web access capabilities – Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing environment – Design patterns for mobile applications.

**UNIT IV ANDROID****12**

Introduction – Establishing the development environment – Android architecture – Activities and views – Interacting with UI – Persisting data using SQLite – Packaging and deployment – Interaction with server side applications – Using Google Maps, GPS and Wifi – Integration with social media applications.

**UNIT V IOS****12**

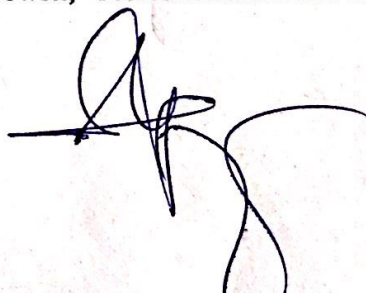
Introduction to Objective C – iOS features – UI implementation – Touch frameworks – Data persistence using Core Data and SQLite – Location aware applications using Core Location and Map Kit – Integrating calendar and address book with social media application – Using Wifi - iPhone marketplace.

**TOTAL :55 PERIODS****Course OUTCOMES:**

- Describe the requirements for mobile applications L1
- Explain the challenges in mobile application design and development L2
- Develop design for mobile applications for specific requirements L3
- Implement the design using Android SDK L3
- Implement the design using Objective C and iOS L3
- Deploy mobile applications in Android and iPhone marketplace for distribution L2

**TEXT BOOK**

1. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012.



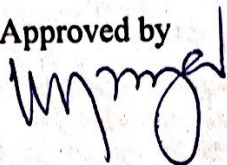


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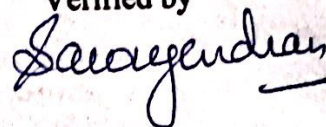
1. Charlie Collins, Michael Galpin and Matthias Kappler, -Android in Practicel, DreamTech, 2012.
2. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, -Beginning IOS6 Development: Exploring the iOS SDKI, Apress, 2013.
3. <http://developer.android.com/develop/index.html>.
4. James Dovey and Ash Furrow, -Beginning Objective CI, Apress, 2012.
5. Reto Meier, -Professional android DevelopmentI, Wiley-India Edition, 2012.

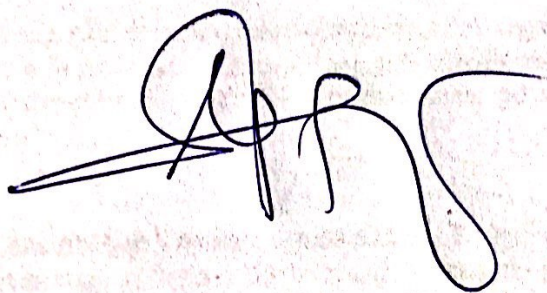
  
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**19MCSE03- DISTRIBUTED COMPUTING****Course Objectives**

- Introduce foundations of Distributed Computing.
- Introduce about the networking and Operating system concept.
- Introduce the idea of peer to peer services and file system.
- To be aware of transaction models and deadlocks.
- Understand the issues involved in studying process and resource management.

|            |          |
|------------|----------|
| Semester   | II       |
| Credit     | 4        |
| Paper Type | Elective |
| Max. Marks | CIA -30  |
| Semester   | CE -70   |
|            | TOT =100 |

**UNIT – I**

Characterization of Distributed Systems: Introduction - Examples of distributed systems - Resource sharing and the Web - Challenges. System Models: Introduction - Architectural models - Fundamental models. 11

**UNIT – II**

Networking and Internetworking: Introduction - Types of network - Network principles. Interprocess Communication: Introduction - The API for the Internet Protocols - External data representation and marshalling. Operating System Support: The Operating system layer - Protection - Processes and threads - Operating system architecture. 11

**UNIT – III**

Security: Overview of security techniques - Cryptographic algorithms - Digital signatures. Peer - to - peer Systems: Napster and its legacy - peer - to - peer middleware - Routing overlays. Time and Global States: Clocks, events and process states - Synchronizing physical clocks - Logical time and logical clocks - Global States. 11

**UNIT – IV**

Transactions and Concurrency Control: Transactions - Nested transactions - Locks - Optimistic concurrency control - Timestamp ordering. Distributed Transactions: Atomic commit protocols - Concurrency control in distributed transactions - Distributed deadlocks. 11

**UNIT – V**

Replication: System model and group communication - Fault-tolerant services - Transactions with replicated data. Web Services: Web services - Service descriptions and IDL for web services - A directory service for use with web services - XML security. CORBA case study: Introduction - CORBA RMI - CORBA services. 11

**Total Periods : 55Hrs****Course Outcome**

- Understand the concept of Distributed Computing. L1
- Remember network protocols and operating systems. L1
- An ability to apply cryptographic algorithms, clocks and events for problem solving. L2
- Identify and explain about the transaction models and deadlocks. L3
- Able to identify the replications in data communications L3

**TEXT BOOK**

1. George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", Fifth Edition, Pearson Education, 2012.

**REFERENCE BOOKS**

1. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, 2007.
2. Tanenbaum A.S., Van Steen M., "Distributed Systems: Principles and Paradigms", Pearson Education, 2007.
3. Liu M.L., "Distributed Computing, Principles and Applications", Pearson Education, 2004.
4. Nancy A Lynch, "Distributed Algorithms", Morgan Kaufman Publishers, USA, 2003.

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**19MCSC07 – CLOUD COMPUTING****COURSE OBJECTIVES**

- To provide an understanding of Cloud Computing Concepts
- To introduce various cloud services
- To identify, analyze, cloud management
- To study virtualization and its types
- To analyze cloud security and its challenges

|            |                    |
|------------|--------------------|
| Semester   | III                |
| Credit     | 4                  |
| Paper Type | Core               |
| Max. Marks | CIA:30 +<br>CE :70 |

**UNIT – I :****11**

Cloud Computing Fundamentals: Cloud Computing definition, Types of cloud, Cloud services: Benefits and challenges of cloud computing, Evolution of Cloud Computing , usage scenarios and Applications , Business models around Cloud – Major Players in Cloud Computing - Issues in Cloud - Eucalyptus - Nimbus - Open Nebula, CloudSim

**UNIT – II:****11**

Types of Cloud services: Software as a Service - Platform as a Service - Infrastructure as a Service - Database as a Service - Monitoring as a Service - Communication as services - Service providers- Google App Engine, Amazon EC2 - Service providers- Google App Engine, Amazon EC2 - Introduction to MapReduce – GFS

**UNIT – III:****11**

Collaborating on Calendars, Schedules and Task Management – Collaborating on Event Management, Contact Management, Project Management – Collaborating on Word Processing , Databases – Storing and Sharing Files- Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Collaborating via Social Networks – Collaborating via Blogs and Wikis.

**UNIT – IV :****11**

Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization – System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

**UNIT – V :****11**

Security in Clouds: Cloud security challenges – Software as a Service Security, Common Standards:The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security, End user access to cloud computing, Mobile Internet devices and the cloud

**Total Periods: 55 Hours**



## Course Outcome

- Know the concepts of cloud computing- L1
- Able to gain knowledge in various cloud services -L1
- Apply cloud services on cloud management-L3
- Analyze the virtualization and its types-L2
- Evaluate the cloud security-L3

## Text Book


1. John W. Rittinghouse; James F. Ransome," *Cloud Computing :Implementation, Management, and Security*", CRC press, First edition, 2017.

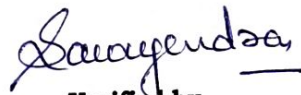
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1. Bloor R., Kanfman M., Halper F. Judith Hurwitz "Cloud Computing for Dummies" (Wiley India Edition), 2010 (UNIT-I)
2. John Rittinghouse & James Ransome, "Cloud Computing Implementation Management and Strategy", CRC Press, 2010.(UNIT-II)
3. Antohy T Velte ,Cloud Computing : "A Practical Approach", McGraw Hill, 2009(UNIT-II- 3 , 11)
4. Michael Miller, Cloud Computing: "Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing, August 2008.(UNIT -III)
5. James E Smith, Ravi Nair, "Virtual Machines", Morgan Kaufmann Publishers, 2006.(UNIT-IV)
6. [http://cloud-standards.org/wiki/index.php?title=Main\\_Page](http://cloud-standards.org/wiki/index.php?title=Main_Page)(UNIT - V)

## Web References

1. Haley Beard, "Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing", Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008
2. [webpages.iust.ac.ir/hsalimi/.../89.../Cloud%20Common%20standards.ppt](http://webpages.iust.ac.ir/hsalimi/.../89.../Cloud%20Common%20standards.ppt)  
[op.ennebula.org](http://op.ennebula.org),
3. [www.cloudbus.org/cloudsim/](http://www.cloudbus.org/cloudsim/) , <http://www.eucalyptus.com/>

  
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Course Co-ordinator

  
Verified by  
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Dean-School of Computing

  
Approved by  
Dr. Krishna Priya.V  
BOS-Chairman





**19MITC07 – Research Ethics****COURSE OBJECTIVES**

- To gain familiarity with a phenomenon or to achieve new insights into it
- To introduce various Methods to Avoid Plagiarism
- To identify challenges to avoid plagiarism
- To study Anti-Plagiarism Software
- To analyze Different Online Tools to detect plagiarism

|            |                           |
|------------|---------------------------|
| Semester   | III                       |
| Credit     | 4                         |
| Paper Type | Core-Online Course SWAYAM |
| Max. Marks | CIA:30 + CE :70           |

**UNIT – I :****11**

Introduction to Research, Ethics and Academic Honesty- Ethics in Writing- Academic Integrity: Research Misconduct/Fabrication/Unethical Practices

**UNIT – II:****11**

Academic/Research:Falsification, Manipulation or Tempering of Data- Literature Review and Proper Use of E-Resources - Using Design thinking Methods to Avoid Plagiarism

**UNIT – III:****11**

Writing Quality Academic Publications: Challenges to avoid plagiarism - Scientific Reading, Cite and Write - Report writing using popular word processing packages such as MS word, Open Office etc.

**UNIT – IV :****11**

Style Manuals and Bibliographies. Ex. APA, MLA, Chicago, IEEE- Introduction to Reference Management Tools (RMT)- Features and Functionalities of Anti-Plagiarism Software

**UNIT – V :****11**

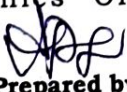
Detection of Plagiarism by using Different Online Tools- Agencies and Organization dealing with plagiarism issues (eg. Retract/Deluze) - Plagiarism Policies, Penalties and Consequences

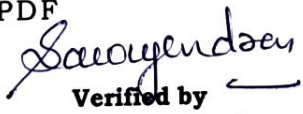
**Total Periods: 55 Hours****Course Outcome**

- Gain basic knowledge in research Ethics and Academic Honesty .- L1
- Have basic knowledge on qualitative research techniques -L1
- Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis -L1
- Implement data analysis-and hypothesis testing procedures -L2
- Gain knowledge in IPR,Copyrights and citations -L2

**References**

1. Shri Manoj Kumar K Central University Of Himachal Pradesh, "Research Ethics" Online Video, PDF

  
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Course Co-ordinator

  
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Dr.Anna Saro Vijendran  
Dean-School of Computing

  
Approved by  
Dr.Krishna Priya.V  
BOS-Chairman





**19MITC08- MACHINE LEARNING WITH PYTHON LAB****Course Objectives:**

- Understand the concepts of machine learning.
- Understand the supervised learning algorithms for Classification, prediction and clustering.
- Analyze the logic behind the execution of various models and classifiers.
- Again knowledge in neural network concepts
- Know the types and use of unsupervised algorithm

|            |                   |
|------------|-------------------|
| Semester   | III               |
| Credit     | 5                 |
| PaperType  | Core              |
| Max. Marks | CIA:30<br>+CE :70 |

**UNIT I : Introduction to Machine Learning****09L+6P**

Introduction: Why Machine learning – problems machine learning can solve – knowing your task and knowing your data-why python – scikit – learn – Essential libraries and tools – measuring success training and testing data – evaluating a model

1. Implementation of numpy and scipy in python
2. Build a model to predict the new iris from the given iris.csv

**UNIT II : Supervised learning****09L+6P**

Supervised learning – classification and regression – Generalization, Overfitting and Underfitting – Supervised Machine Learning Algorithms– k-Nearest Neighbors – k-Neighbors classification – Linear Models – Linear models for regression – Naive Bayes Classifiers–Decision Trees – Analyzing decision trees – Ensembles of Decision Trees–Random forests–Building random forest

3. Write a python program to visualize all data points in Scatter plot (Forge dataset)
4. Apply K means algorithm to cluster a set of data stored in a .CSV file.
5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as .CSV file. Compute the accuracy of the classifier, considering few test data sets.

**UNITIII : Support Vector Machines****09L+6P**

Kernelized Support Vector Machines – Linear models and nonlinear features – The kernel trick- Understanding SVMs – Tuning SVM parameters – Preprocessing data for SVMs

6. Implementation of linear dataset using aka Ordinary Least Square (OLS)
7. Build a model using SVM for any cancer datasets

**UNIT IV : Neural Networks****09L+6P**

Neural Networks (Deep Learning) – The neural network model – Tuning neural networks –Estimating complexity in neural networks – The Decision Function – Predicting Probabilities –Uncertainty in Multiclass Classification

8. Build an Neural Network by implementing the **MLP** and test the same using appropriate data sets.
9. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.

**UNIT V: Unsupervised Learning****09L+6P**

Unsupervised Learning and Preprocessing –Types of Unsupervised Learning– Challenges in Unsupervised Learning – Preprocessing and Scaling – Different Kinds of Preprocessing –Applying Data Transformations – Scaling Training and Test Data – Dimensionality Reduction, Feature Extraction and Manifold Learning– Principal Component Analysis (PCA) – Applying PCA to the cancer dataset for visualization

10. Apply Principal Component Analysis to any health care dataset, predict and visualize it

**Total hours: 75Hrs**



## **COURSE OUTCOMES**

Upon successful completion of course the students will be able to

- Implement the concepts in machine learning.
- Demonstrate supervised learning algorithms for classification, prediction and clustering in python
- Create and execute linear and nonlinear models
- Build neural networks in various uncertainty and decision models
- Apply the concept of PCA in real world problems in research

## **TEXT BOOKS**

1. Introduction to machine learning with python – A Guide for Data Scientists – O'Reilly Media, Andreas C. Müller & Sarah Guido 2016, First Edition

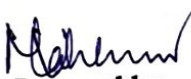
## **REFERENCES**

1. Hastie.T, Tibshirani.R, and Friedman.J (2009). The Elements of Statistical Learning: Data Mining Inference and Prediction, Second edition, Springer
2. Christopher M. Bishop (2007) Pattern Recognition and Machine Learning – Information Science and Statistics, Springer

## **Examination Evaluation:**

**CIA-30 [Regular Theory Evaluation:** CIA-1:5 Marks, Seminar:5 Marks, Assignment:5 Marks, Activity:5 Marks, Model Exam:10 Marks, Total :30Marks]

**CE-70 [External Practical Evaluation:** Record: 10Marks, Viva Voce: 10Marks, Program1:25Marks, Program2:25Marks, Total 70 Marks]

  
Prepared by  
**Dr. Mahalakshmi.S.B**  
Course Co-ordinator

  
Verified by  
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Dean-School of Computing

  
Approved by  
**Dr. Krishna Priya.V**  
BOS-Chairman





**19MCSC08- DATA ANALYTICS AND OPEN SOURCE TOOLS LAB****Course Objectives:**

- To understand the competitive advantages of big data analytics
- To learn the several key technologies used in manipulating, storing, and analyzing bigdata
- To learn data analysis methods
- To gain knowledge on R programming for bigdata analytics

|            |                   |
|------------|-------------------|
| Semester   | III               |
| Credit     | 5                 |
| Paper Type | Core              |
| Max.Marks  | CIA:30<br>+CE :70 |

**UNIT I DATA EVOLUTION****09L+6P**

Data Development Time Line - ICT Advancement - a Perspective -Data Growth - a Perspective - IT Components - Business Process - Landscape - Data to Data Science - Understanding data: Introduction - Types of Data: Numeric - Categorical - Graphical - High Dimensional Data - Data Classification - Sources of Data: Time Series - Transactional Data - Biological Data - Spatial Data - Social Network Data- Data Evolution - Data Sources

Case Study 1: Prepare a Report of different data repositories and their genuiness

Case Study 2: Analyze on line free tools for big data analytics and submit a report with evidence

**UNIT II STATISTICAL MODEL****09L+6P**

Review of Basic Data Analytic Methods Using R: Introduction to R, Exploratory Data Analysis, Statistical Methods for Evaluation.- Vectors assignment and vector arithmetic - Index vectors - Objects, their modes and attributes - Ordered and unordered factors - Arrays - Matrices - Lists - Data Frames - Reading data from files - Grouping, loops and conditional execution - Functions,

- 1.Perform statistical analysis and visualization using R
- 2.Implementation of visualize data using Bar chart, Line chart, Pie chart, Scatterplot and Histogram.
- 3.Implementation of extract features from datasets

**UNIT III :Regression****09L+6P**

Linear models - standard models - Graphical procedures: High-level plotting commands - The plot() function Displaying multivariate data - Display graphs - Univariate Graphs - Graphical elements-Packages - Standard packages - Contributed packages and CRAN -Namespaces Linear Regression, Logistic Regression, Reasons to Choose and Cautions, Additional Regression Models. - Classification: Decision Trees , Naïve Bayes , Diagnostics

4. Implementation of Statistical analysis on Grocery Datasets
5. Implementation of Functions and matrices
5. Implement correlation and regression in the dataset using R
6. Implement regularized Linear regression

**UNIT IV : Advanced Analytical Theory and Methods****09L+6P**

**Clustering-** Overview of Clustering, K-means, Additional Algorithms. -Association Rules: Overview, Apriori Algorithm, Evaluation of Candidate Rules , Applications of Association Rules, An Example: Transactions in a Grocery Store , Validation and Testing , Diagnostics. Overview of Time Series Analysis, ARIMA Model, Additional Methods.

7. Implementation of Classification
8. Implementation of Time series Analysis using R
9. Implementation of Clustering
- 10.Implementation of Association Rule mining



**UNIT V: EMERGING ANALYTICS:****09L+6P**

Social. mobile, video: Measuring social web - the data challenge- analyzing mobile customer experiences-measuring the success of blogs- quantifying the impact of Twitter - Analyzing the performance of videos. Case studies: Walmart, Netflix, Facebook, Uber, Amazon, Kaggle

Case Study 3: analyse the Churn prediction of Telecom industry (Free data set available in repositories)

Case Study 4: Apply the data analytics techniques on Healthcare data and Predict the Results

**Total Hours :75 Hrs****COURSE OUTCOMES**

Upon successful completion of course the students will be able to

CO1: Acquire knowledge about the tools and techniques for solving big data analytics.

CO2: Analyze regression and classification models for data Analysis

CO3: Apply various functions and methods of R programming to large datasets

CO4: Apply various of Python programming for Data Analytics

CO5: Analyse and applying the big data flow for the actual projects

**TEXT BOOKS**

1. EMC2 Education Services, "Data Science Big Data Analytics- Discovering, Analyzing, Visualizing and Presenting Data" Wiley Publishing, Inc.,2015.
2. W.N Venables, D.M Smith and the R Core Team, An Introduction to R, Notes on R: A programming environment for Data Analysis and Graphics Version3.4.4 (2018-03-15).

**REFERENCES**


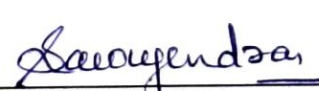
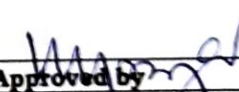
1. Richard Cotton, "Learning R - A Step-by-step Function Guide to Data Analysis, , O'Reilly Media,2013.
2. V. Bhuvaneshwari, T. Devi, (2016). Big Data Analytics: A Practitioner's Approach, Bharathiar University
3. Chris Eaton, Dirk deRoos et al.(2012). Understanding Big data, McGraw Hill 3. Min Chen (2014). Big Data : Related Technologies, Challenges and Future Prospects, Springer 4. Judith Hurwitz (2013). Big Data for Dummies, John Wiley & Sons
4. Alain F. Zuur, Elena N. Ieno, Erik H.W.G. Meesters, "A Beginner's Guide to R" Springer, 2009
5. Roger D. Peng, "R Programming for Data Science" Lean Publishing, 2014 3. R Data camp - Online Course Contents - <https://campus.datacamp.com/courses/>

**Examination Evaluation:**

**CIA-30 [Regular Theory Evaluation:** CIA-1:5 Marks,Seminar:5

Marks,Assignment:5 Marks,Activity:5 Marks,Model Exam:10 Marks, Total :30Marks]

**CE-70 [External Practical Evaluation:** Record: 10Marks, Viva Voce: 10Marks, Program1:25Marks, Program2:25Marks, Total 70 Marks]

|  |  |  |
|--|--|--|
| <br>Prepared by | <br>Verified by | <br>Approved by |
| Dr.Hemalatha.M   | Dr.Anna Saro Vijendran   | Dr.Krishna Priya.V   |
| Course Co-ordinator  | Dean-School of Computing   | BOS-Chairman   |





**19MCSC09: Business Intelligence****Course Objectives:**

1. To know how to design and build a Business Intelligence solution.
2. To learn how to design and build a Data Warehouse
3. To gain knowledge on various design the data warehouse in order to develop an effective BI plan.

|            |                    |
|------------|--------------------|
| Semester   | III                |
| Credit     | 2\$                |
| Paper Type | Self-study paper   |
| Max. Marks | CE:50<br>Total :50 |

**UNIT I INTRODUCTION TO BUSSINESS INTELLIGENCE**

An Overview of Business Intelligence, Analytics, and Decision Support-Changing Business Environments and Computerized Decision Support, A Framework for Business Intelligence (BI), Intelligence Creation, Use, and BI Governance, Transaction Processing Versus Analytic Processing, Successful BI Implementation, Analytics Overview, Brief Introduction to Big Data Analytics.

**UNIT II BUSINESS REPORTING**

Business Reporting, Visual Analytics, and Business Performance Management- Business Reporting Definitions and Concepts, Data and Information Visualization, Different Types of Charts and Graphs, The Emergence of Data Visualization and Visual Analytics, Performance Dashboards, Business Performance Management, Performance Measurement.

**UNIT III -DATAMINING**

Data Mining- Data Mining Concepts and Applications, Data Mining Applications, Data Mining Process, Data Mining Methods, Data Mining Software Tools, Data Mining Privacy Issues, Myths, and Blunders, Text and Web Analytics, Text Analytics and Text Mining Overview- Natural Language Processing, Text Mining Applications, Text Mining Proces, Sentiment Analysis, Web Mining Overview, Search Engines, Web Usage Mining (Web Analytics), Social Analytics.

**UNIT IV DATA ANALYTICS**

Big Data and Analytics, Definition of Big Data- Fundamentals of Big Data Analytics, Big Data Technologies, Data Scientist, Big Data and Data Warehousing, Big Data Vendors, Big Data And Stream Analytics, Applications of Stream Analytics.

**UNIT V BUSINESS ANALYTICS**

Business Analytics: Emerging Trends and Future Impact- Location-Based Analytics for Organizations, Analytics Applications for Consumers, The Web 2.0 Revolution and Online Social Networking, Cloud Computing and BI, Impacts of Analytics In Organizations, Issues of Legality, Privacy, and Ethics, An Overview of the Analytics Ecosystem.

**COURSE OUTCOMES**

Upon successful completion of course the students will be able to

1. Acquire knowledge about the tools and techniques for solving big data analytics.
2. Analyze regression and classification models for data Analysis
3. Apply various functions and methods of R programming to large datasets
4. Apply various of Python programming for Data Analytics
5. Analyze and applying the big data flow for the actual projects


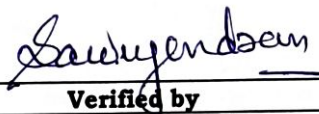
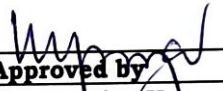


**TEXT BOOKS**

1. EMC2 Education Services, "Data Science Big Data Analytics- Discovering, Analyzing, Visualizing and Presenting Data" Wiley Publishing, Inc.,2015.
2. W.N Venables, D.M Smith and the R Core Team, An Introduction to R, Notes on R: Aprogramming environment for Data Analysis and Graphics Version3.4.4(2018-03-15).

**REFERENCES**

1. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley,2013.
2. Richard Cotton, "Learning R – A Step-by-step Function Guide to Data Analysis, , O,,Reilly Media,2013.
3. V. Bhuvanewari, T. Devi, (2016). Big Data Analytics: A Practitioner's Approach, Bharathiar University
4. V. Bhuvanewari (2016). Data Analytics with R, Bharathiar University
5. Chris Eaton, Dirk deroos et al.(2012). Understanding Big data, McGraw Hill 3. Min Chen (2014). Big Data : Related Technologies, Challenges and Future Prospects, Springer 4. Judith Hurwitz (2013). Big Data for Dummies, John Wiley & Sons
6. Alain F. Zuur, Elena N. Ieno, Erik H.W.G. Meesters, "A Beginner's Guide to R" Springer, 2009
7. Roger D. Peng, "R Programming for Data Science" Lean Publishing, 2014 3. R Data camp – Online Course Contents - <https://campus.datacamp.com/courses/>
8. Michael Berthold, David J. Hand, —Intelligent Data Analysisl, Springer, Second Edition,2007.

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| <b>Dr.Hemalatha.M</b>   | <b>Dr.Anna Saro Vijendran</b>   | <b>Dr.Krishna Priya.V</b>   |
| <b>Course Co-ordinator</b>  | <b>Dean-School of Computing</b>   | <b>BOS-Chairman</b>   |





**19MCSI01: Digital Marketing****COURSE OBJECTIVES**

- Understand the fundamentals of Digital Marketing
- To inculcate the skills of digital Marketing among students.
- Designed to build conceptual foundation of Digital Marketing
- To develop the students' skills to plan, implement and monitor digital marketing campaigns in Globalized Environment

|                    |                      |
|--------------------|----------------------|
| <b>Semester</b>    | <b>III</b>           |
| <b>Credit</b>      | <b>3\$</b>           |
| <b>Paper Types</b> | <b>IDC-SelfStudy</b> |
| <b>Max. Marks</b>  | <b>CE -100\$</b>     |

**UNIT I:**

Introduction to Digital Marketing and its Significance - Traditional Marketing Vs Digital Marketing - Digital Marketing Process-Website Planning and Development: Types of websites - Website Planning and Development - Keywords-Understanding Domain and Webhosting - Building Website/Blog using CMS Word Press - Using Word Press Plug-ins

**UNIT II:**

Introduction to Search Engine Optimization -Keyword P lanner Tools - On Page SEO Techniques-Indexing and Key Word Placement - On Page SEO Techniques - Content Optimization - On Page SEO : Yoast SEO Plug-in - Off -Page SEO Techniques

**UNIT III:**

Email Marketing- Introduction and Significance - Designing e-mail marketing campaigns using Mail Chimp- Building E-mail List and Signup Forms - Email Marketing Strategy and Monitoring - Email -Automization - Pay Per Click Advertising: Introduction- Pay Per Click Advertising: Google Ad word - Types of Bidding strategies

**UNIT IV:**

Designing and Monitoring search campaigns - Designing and Monitoring Display campaigns -

Designing and Monitoring Video campaigns - Designing and Monitoring Universal App Campaigns - Google Analytics : Introduction and Significance - Google Analytics Interface and Setup - Understanding Goals and Conversions - Monitoring Traffic Behavior and preparing Reports - Social Media Marketing : Introduction and Significance

**UNIT V:**

Facebook Marketing: Introduction Types of Various Ad Formats - Setting up Facebook Advertising Account - Understanding Facebook Audience and its Types - Designing Facebook Advertising Campaigns - Working with Facebook Pixel - Twitter Marketing: Basics - Designing Twitter Advertising Campaigns - Introduction to LinkedIn Marketing - Developing digital marketing strategy in Integration form



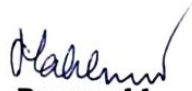
## **COURSE OUTCOMES**

**Upon the successful completion of the course the student should be able to:**

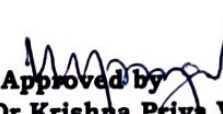
- Gain Knowledge in Digital Marketing technologies-L1
- Explore about search engine optimization and its techniques- L3
- Have adequate knowledge in various marketing campaigns .-L2
- Analyze campaigns and preparing reports.-L3
- Apply marketing strategies through online -L3

## **REFERENCES**

1. Swayam online – Digital Marketing by Dr. Tejinderpal Singh

  
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**19MCSE04****Programming Languages and Computer Graphics**

|            |                    |
|------------|--------------------|
| Semester   | III                |
| Credit     | 4                  |
| Paper Type | Elective           |
| Max. Marks | CIA:30 +<br>CE :70 |

**COURSE OBJECTIVES**

- To provide an understanding Programming Languages and Computer Graphics
- To analyze the web page design scripting languages
- To identify, and evaluate 2D Transformation and viewing
- To study the 3D Object representation

**UNIT - I:****12**

**Programming Language:** Basic Concepts-Object Oriented Programming: Class, Object, Instantiation, Inheritance, Encapsulation, Abstract Class, Polymorphism-Programming In C++: Tokens, Identifiers, Variables And Constants- Data Types, Operators- Control Statements- Functions Parameter Passing, Virtual Functions- Class And Objects- Constructors And Destructors- Overloading- Inheritance- Templates-Java-Basic Concepts-Interface-Packages- Multithread Programming

**11****UNIT - II:**

**HTML-** Introduction, Structure of HTML Document: Text Basics, Images and Multimedia, Links and webs, Document Layout, Cascading Style Sheet- HTML 4 style sheet features, Creating Forms, Frames and Tables.

**DHTML:** Combining HTML, CSS and Javascript, events and buttons, controlling your browser,

**XML:** Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Well formed, using XML with application.XML, XSL and XSLT. Introduction to XSL, XML transformed simple example, XSL elements, transforming with XSLT

**Javascript :** Client side scripting, What is Javascript, How to develop Javascript, simple Javascript, variables, functions, conditions, loops and repetition charts

**The Applet Class:** Basics – Building applet code – Applet life cycle– Creating an executable applet – Designing a web page – Running the applet – Getting input from the user – Graphics programming: The graphic class – Lines and rectangles – Circles and ellipses – Using control loops in applets – Drawing bar

**10****UNIT - III:**

**Computer Graphics:** Video-Display Devices, Raster-Scan and Random-Scan Systems; Graphics Monitors, Input Devices, Points and Lines; Line Drawing Algorithms, Mid-Point Circle and Ellipse Algorithms; Scan Line Polygon Fill Algorithm, Boundary-Fill and Flood Fill.

**UNIT - IV:****11**

**2-D Geometrical Transforms and Viewing:** Translation, Scaling, Rotation, Reflection and Shear Transformations; Matrix Representations and Homogeneous Coordinates; Composite Transforms, Transformations Between Coordinate Systems, Viewing Pipeline, Viewing Coordinate Reference Frame, Window to View-Port Coordinate Transformation, Viewing Functions, Line and Polygon Clipping Algorithms

**UNIT - V :****11**

**3-D Object Representation:**Geometric Transformations and Viewing: Polygon Surfaces, Quadric Surfaces, Spline Representation, Bezier and B-Spline Curves; Bezier and B-Spline Surfaces; Illumination Models, Polygon Rendering Methods, Viewing Pipeline and Coordinates; General Projection Transforms and Clipping.

**Total Periods: 55 Hours**



### Course Outcome

- To analyze the strengths and weaknesses of programming languages for effective and efficient program development.
- To inculcate the principles underlying the programming languages enabling to learn new programming and scripting languages.
- To grasp different programming paradigms
- Develop scientific and strategic approach to solve complex problems Computer in the domain of Computer Graphics
- To use the programming paradigms effectively in computer graphics.

### Text Book

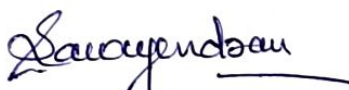
1. Herbert Schildt, "Java™ : The Complete Reference", Seventh Edition.
2. Steve Marschner, Peter Shirley, " Fundamentals of Computer Graphics, A K Peters/CRC Press 2015 4th Edition, ISBN: 9781482229417

### Reference Books

1. Randy Connolly, " Fundamentals of Web Development 1/e, Pearson publishers, 2016
2. Kogent Learning Solutions Inc., " Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, XML and AJAX, Black Book" Kindle Edition



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**19MCSE05- CYBER SECURITY****Course Objectives:**

- To understand the competitive advantages of Cyber Security
- key terms and concepts in cyber law, intellectual property and Cybercrimes, trademarks and domain theft
- To gain knowledge various security standards and security testing Techniques

|            |                   |
|------------|-------------------|
| Semester   | III               |
| Credit     | 4                 |
| Paper Type | Elective          |
| Max. Marks | CIA:30<br>+CE :70 |

**UNIT 1: INTRODUCTION OF CYBERCRIME:**

11

Types, The Internet spawns crime, Worms versus viruses, Computers' roles in crimes, Introduction to digital forensics, Introduction to Incident - Incident Response Methodology - Steps - Activities in Initial Response, Phase after detection of an incident.

**UNIT II :INITIAL RESPONSE AND FORENSIC DUPLICATION:**

11

Initial Response & Volatile Data Collection from Windows system - Initial Response & Volatile Data Collection from Unix system - Forensic Duplication: Forensic duplication: Forensic Duplicates as Admissible Evidence, Forensic Duplication Tool Requirements, Creating a Forensic. Duplicate/Qualified Forensic Duplicate of a Hard Drive.

**UNIT III PRESERVING AND RECOVERING DIGITAL EVIDENCE:**

11

File Systems: FAT, NTFS - Forensic Analysis of File Systems - Storage Fundamentals: Storage Layer, Hard Drives Evidence Handling: Types of Evidence, Challenges in evidence handling, Overview of evidence handling procedure.

**UNIT IV Network Forensics and System investigation:**

11

Intrusion detection; Different Attacks in network, analysis Collecting Network Based Evidence - Investigating Routers - Network Protocols - Email Tracing- Internet Fraud. Data Analysis Techniques - Investigating Live Systems (Windows & Unix) Investigating. Hacker Tools - Ethical Issues - Cybercrime.

**UNIT V BODIES OF LAW:**

11

Constitutional law, Criminal law, Civil law, Administrative regulations, Levels of law: Local laws, State laws, Federal laws, International laws, Levels of culpability: Intent, Knowledge, Recklessness, Negligence Level and burden of proof : Criminal versus civil cases, Vicarious liability, Laws related to computers: CFAA, DMCA, CAN Spam, etc. Right to Information Act.

**Total Hours: 55Hrs****COURSE OUTCOME**

1. Identify and present indicators that a cyber-security incident has occurred.
2. Apply criminal justice methods to cyber security and computer forensic investigations.
3. Plan, implement, and evaluate penetration testing and ethical hacking of computer systems.
4. Analyze, and mitigate threats to internal computer systems. Collect, process, analyze, and present computer forensic evidence.
5. Apply critical thinking skills to risk analysis of computer systems.




---

**TEXT BOOKS:**

1. Kevin Mandia, Chris Prosise, "Incident Response and computer forensics", Tata McGrawHill, 2006.
2. Peter Stephenson, "Investigating Computer Crime: A Handbook for Corporate Investigations", Sept 1999.
3. Eoghan Casey, "Handbook Computer Crime Investigation's Forensic Tools and Technology", Academic Press, 1st Edition, 2001.

**REFERENCES:**

1. Skoudis. E., Perlman. R. Counter Hack: A Step-by-Step Guide to Computer Attacks and Effective Defenses. Prentice Hall Professional Technical Reference. 2001.
2. Norbert .Zaenglein, "Disk Detective: Secret You Must Know to Recover Information From
3. Computer", Paladin Press, 2000. Bill Nelson, Amelia Philips and Christopher Steuart, "Guide to computer forensics investigation "Course technology, 4th edition..

  
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**19MCSE06– Augmented Reality and Virtual Reality**

|            |                   |
|------------|-------------------|
| Semester   | III               |
| Credit     | 4                 |
| Paper Type | Elective          |
| Max. Marks | CIA:30<br>+CE :70 |

**Course Objectives:**

- To make students know the basic concept and framework of virtual reality.
- To teach students the principles and multidisciplinary features of virtual reality.
- To teach students the technology for multimodal user interaction and perception in VR, in particular the visual, audial and haptic interface and behavior.
- To teach students the technology for managing large scale VR environment in real time.
- To provide students with an introduction to the VR system framework and development tools

**UNIT I:****11**

Introduction of Virtual Reality: Fundamental Concept and Components of Virtual Reality. Primary Features and Present Development on Virtual Reality. Multiple Modals of Input and Output Interface in Virtual Reality: Input -- Tracker, Sensor, Digital Glove, Movement Capture, Video-based Input, 3D Menus & 3DScanner etc. Output -- Visual /Auditory / Haptic Devices..

**UNIT II :****11**

Visual Computation in Virtual Reality: Fundamentals of Computer Graphics. Software and Hardware Technology on Stereoscopic Display. Advanced Techniques in CG: Management of Large Scale Environments & Real Time Rendering. Environment.

**UNIT III:****11**

Environment Modelling in Virtual Reality: Geometric Modelling, Behaviour Simulation, Physically Based Simulation. Interactive Techniques in Virtual Reality: Body Track, Hand Gesture, 3D Manus, Object Grasp..

**UNIT IV:****11**

Introduction of Augmented Reality (AR): System Structure of Augmented Reality. Key Technology in AR. Development Tools and Frameworks in Augmented Reality: Frameworks of Software Development Tools in AR. X3D Standard; Vega, MultiGen, Virtools..

**UNIT V****11**

Application of AR in Digital Entertainment: AR Technology in Film & TV Production. AR Technology in Physical Exercises and Games. Demonstration of Digital Entertainment by AR.

**COURSE OUTCOME**

- An ability to apply knowledge of computing and mathematics to solve complex computing problems in computer science discipline. (L1).
- An ability to use current techniques, skills, and tools necessary for computing practice with an understanding of the limitations.. (L3)
- An ability to develop 3D virtual environments and to develop 3D interaction techniques (L1)
- An ability to develop immersive augmented reality applications. (L2)
- Demonstrate VR in TV, Film and Games (L2)



**TEXT BOOKS:**


1. Alan B. Craig, Understanding Augmented Reality, Concepts and Applications, Morgan Kaufmann, 2013.  
2006.
2. Alan Craig, William Sherman and Jeffrey Will, Developing Virtual Reality Applications, Foundations of Effective Design, Morgan Kaufmann, 2009.

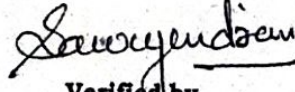
**REFERENCES:**

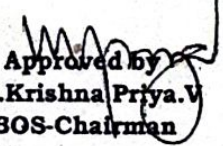
1. Donald Hearn and Pauline Baker, "Computer Graphics C Version", Pearson Education, 2002.

**WEB REFERENCES**

1. <https://www.coursera.org/learn/augmented-reality>

  
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BOS-Chairman





**19MCS301 MINI PROJECT****GUIDELINES TO M.Sc. (Computer Science) MINI PROJECT  
REPORT PREPARATION**

The students should strictly adhere to the following points while preparing their final project report.

|            |                    |
|------------|--------------------|
| Semester   | III                |
| Credit     | 4                  |
| Paper Type | Core               |
| Max. Marks | CIA:80 +<br>CE :20 |

- Students are expected to undergo project work individually and submit individual project report.
- Project reports should be typed / printed in double space using A4 size bond sheets with a left margin at column 10 and a right margin at column 75.
- A page should not contain more than 25 lines.
- The source code should be loaded and made readily available in the system during Viva – Voce examination for verification by the examiners.
- Table of contents should be in the specified format. [ as in Annexure IV]
- The students are asked to report to the concerned guides regularly during their project period to present their progress of work.
- The students should submit the project report in the Last week of March, 2019.

**Tentative Dates regarding Project**

**I Review** : Meet concern faculty guide to show their project objective, motivation, working principles and design of their work on or before 11-07-2020.

**II Review** : Meet concern faculty guide and report about your progress on coding on or before 08-08-2020.

**III Review:** To run your project on or before 12-09-2020. Rough

Documentation of the Project, Submitted to the respective Guides, get corrected and modifications any should be done. Final Submission of the bounded project as per specifications - Last Week of November, 2020.

**\*\* Exact dates will be intimated later**

**Note:** For each Meeting internal marks will be awarded based on their Punctuality, performance and quality of work.

- The format of the report is as follows :

1. Wrapper ( Annexure I )
2. Copy of the Wrapper
3. Certificate from the department (Annexure II)
4. Declaration by the student (Annexure III)
5. Acknowledgement
6. Table of contents (Annexure IV)
7. Chapters.

**NOTE:** (In all the meetings, students should meet the class in charge to sign in the Attendance, Marks will be awarded for attendance)





{ANNEXURE I}

< PROJECT TITLE >

PROJECT WORK

DONE BY

NAME : < STUDENT NAME>

REG.NO : < REGISTER NUMBER >

Under the guidance of

<Name of the guide>

<Designation>

<COLLEGE EMBLEM>

DEPARTMENT OF COMPUTER SCIENCE  
SRI RAMAKRISHNA COLLEGE OF ARTS AND SCIENCE  
(Formerly S.N.R SONS COLLEGE-AUTONOMOUS)  
(REACCREDITED WITH "A" BY NAAC )  
(AFFILIATED TO BHARATHIAR UNIVERSITY)  
COIMBATORE – 641 006.

November 2020.

{NOTE: This is just a sample copy. You should take care of alignment, font, font size and spacing. }



{ANNEXURE II}  
(Specimen Copy of Certificate)

**CERTIFICATE**

This is to certify that the project work entitled

<Name of the project >

done at

<Company Name>

is a bonafide record of work done by

<Student name >

<Register No. >

in partial fulfillment for the award of the degree of

MASTER OF COMPUTER SCIENCE

of Bharathiar University during

July 2020 to Nov' 2020

Head of the Department,

<Name of HOD>

Prof. & Head,

Dept. of PG (CS&IT)

Sri Ramakrishna College of Arts and Science, Sri Ramakrishna College of Arts and Science

Faculty Guide

<Name of Guide>

<Designation>

Dept. of PG(CS&IT)

Submitted for the viva – voce examination held on \_\_\_\_\_ - -

**EXTERNAL EXAMINER**

**INTERNAL EXAMINER**

{ANNEXURE III}

**DECLARATION**

I hereby declare that this project work entitled \_\_\_\_\_ for submitted to Sri Ramakrishna College of Arts and Science (Formerly S.N.R. Sons College), An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore, is a record of original work done by me under the guidance of <guide name> and that this project work has not formed the basis for the award of any degree / diploma / associate ship / fellowship or similar to any candidate in any university.

Place :

Date :

Signature of the Student

Countersigned by

<Guide Name >



## {ANNEXURE – IV}

## TABLE OF CONTENTS

(Specimen Copy of contents page)

Page No

ACKNOWLEDGEMENT

ABSTRACT

|         |     |                                 |
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| Chapter | I   | Introduction                    |
|         | 1.1 | An Overview                     |
|         | 1.2 | Objectives of the project       |
|         | 1.3 | Organization project            |
|         | 1.4 | Scope of the system             |
| Chapter | II  | System Analysis                 |
|         | 2.1 | Existing System                 |
|         | 2.2 | Proposed System                 |
|         | 2.3 | Hardware Specification          |
|         | 2.4 | Software Specification          |
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|         | 3.1 | Design process                  |
|         | 3.2 | Data                            |
|         | 3.3 | Output Design                   |
| Chapter | IV  | Testing and Implementation      |
|         | 4.1 | System Testing                  |
|         | 4.2 | Quality Assurance               |
|         | 4.3 | System Maintenance              |
| Chapter | V   | Conclusion                      |
|         |     | Scope of the Future Development |

Bibliography (Should be in Specific format (Author name (alphabetic order), Title of the book, Publication, Edition & Year)).


Annexure


Source Code


Screens

Tables

Reports

  
**Prepared by**  
**Dr.Jeyalakshmi.A**  
**Course Co-ordinator**

  
**Verified by**  
**Dr.Anna Saro Vijendran**  
**Dean-School of Computing**

  
**Approved by**  
**Dr.Krishna Priya.V**  
**BOS-Chairman**



## 19MITC09 - DATA COMMUNICATION AND NETWORKS

(Common to Computer Science and Information Technology)

### COURSE OBJECTIVES

- To master the fundamentals of data communications networks
- Learn how computer network hardware and software operate
- To understand the network security in WWW
- To learn the cloud computing in networks

|            |                     |
|------------|---------------------|
| Semester   | IV                  |
| Credit     | 4                   |
| Paper Type | Core                |
| Max. Marks | CIA -30<br>+ CE -70 |

### UNIT I: DATA COMMUNICATION

**10Hours**

**Data Communication:** Components of a Data Communication System, Simplex, Half-Duplex and Duplex Modes of Communication; Analog and Digital Signals; Noiseless and Noisy Channels; Bandwidth, Throughput and Latency; Digital and Analog Transmission; Data Encoding and Modulation Techniques; Broadband and Baseband Transmission; Multiplexing, Transmission Media, Transmission Errors, Error Handling Mechanisms

### UNIT II: NETWORK MODELS

**10Hours**

**Computer Networks:** Network Topologies, Local Area Networks, Metropolitan Area Networks, Wide Area Network, Wireless Networks, Internet. **Network Models:** Layered Architecture, OSI Reference Model and its Protocols; TCP/IP Protocol Suite, Physical, Logical, Port and Specific Addresses; Switching Techniques

### UNIT III: FUNCTIONS OF OSI AND TCP/IP LAYERS

**12Hours**

**Functions of OSI and TCP/IP Layers:** Framing, Error Detection and Correction; Flow and Error Control; Sliding Window Protocol, HDLC, Multiple Access – CSMA/CD, CSMA/CA, Reservation, Polling, Token Passing, FDMA, CDMA, TDMA, Network Devices, Backbone Networks, Virtual LANs; IPv6 Packet Format, Mapping Logical to Physical Address (ARP), Direct and Indirect Network Layer Delivery; Routing Algorithms, TCP, UDP and SCTP Protocols; Flow Control, Error Control and Congestion Control in TCP and SCTP.

### UNIT IV: NETWORK SECURITY AND WORLD WIDE WEB

**11Hours**

**World Wide Web (WWW):** Uniform Resource Locator (URL), Domain Name Service (DNS), Resolution - Mapping Names to Addresses and Addresses to Names; Electronic Mail Architecture, SMTP, POP and IMAP; TELNET and FTP.

**Network Security:** Malwares, Cryptography and Steganography; Secret-Key Algorithms, Public-Key Algorithms, Digital Signature, Virtual Private Networks, Firewalls.

### UNIT V: INTERMEDIATE CODE GENERATION

**12Hours**

**Mobile Technology:** GSM and CDMA; Services and Architecture of GSM and Mobile Computing; Middleware and Gateway for Mobile Computing; Mobile IP and Mobile Communication Protocol;

**Cloud Computing and IoT:** SaaS, PaaS, IaaS, Public and Private Cloud; Virtualization, Virtual Server, Cloud Storage, Database Storage, Resource Management, Service Level Agreement, Basics of IoT.



**Total Hours: 55Hours**

**COURSE OUTCOMES**

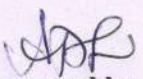
- Independently know basic computer network technology. L1
- Identify the different types of network topologies and protocols. L2
- Enumerate the layers of the OSI model and TCP/IP function of each layer. L3
- Identify the network security in World wide web L1
- Able to know the cloud computing techniques mobile and IOT L3

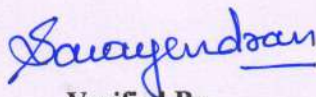
**TEXT BOOK**

1. Andrews S. Tanenbaum, David J Wetherall; Computer Networks; Edition 5, Pearson Education, 2012.

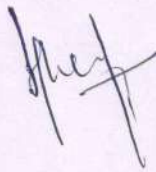
**REFERENCE BOOKS**

1. The TCP/IP Guide, by Charles M. Kozierok, Free online Resource, <http://www.tcpipguide.com/free/index.htm>.
2. William Stallings, Data & Computer Communications, PHI, Edition 6, 2012

  
**Prepared by**  
Dr.Jeyalakshmi.A  
Course Co-ordinator

  
**Verified By**  
Dr.Anna Saro Vijendran  
Dean-School of Computing

  
**Approved by**  
Dr.Sumathi.N  
BOS-Chairman





## 19MCSC10: Advanced Robotic Process Automation Design and Development with Lab

(Common to Computer Science and Information Technology)

### COURSE OBJECTIVES

To provide a good understanding of the Robotic Process Automation

- Use and know the various functionalities and features of UiPath Studio and Orchestrator
- Identify processes which can be automated
- Develop and deploy attended and unattended robots independently
- Know and apply business best practices in RPA projects

|            |                    |
|------------|--------------------|
| Semester   | IV                 |
| Credit     | 5                  |
| Paper Type | Core               |
| Max. Marks | CIA:30 +<br>CE :70 |

### UNIT-I RPA Introduction with UIPATH Studio

7L+8PHours

**Programming fundamentals from an RPA perspective**-RPA and its development -List the programming constructs used in RPA projects- Differentiate between the types of robots used in RPA- Identify the business processes that can be automated.

**UIPATH Studio**-Workflows-Sequences-Flowchart-State Machine-Variables-Types of Variables-Control Flows-Types of Control Flow.

1. Implement the prime numbers.
2. Implement the flow chart concept and state machine concept.

### UNIT-II Recording and Screen Scraping

7L+8PHours

**UIPATH Recording**:Basics-Types of Recording-Automatic Recording-Basic Recording-Example of Basic Recording-Desktop Recording-Examples of Desktop Recording-Web Recording-Examples of Web Recording. **Screen Scraping**: UI Elements-Input methods-Output or screen scraping methods-Data scraping methods-Examples of using data scraping methods.

3. Implement Basic Recording for simple arithmetic operations.
4. Implement the screen scraping method.

### UNIT-III UIPATH – Selectors and Citrix Automation

7L+8PHours

**Uipath Selectors**: Introduction-Selectors with wildcards-Types of selectors-Full Versus Partial Selectors- Explain the functional components of selectors

**Citrix Automation**: Image, Text automation in Studio-Image Text Advanced Citrix Automation-Examples of Citrix Automation.

5. Scrape data from a website and store it in .CSV File.
6. Implement Image / Text Automation

### UNIT-IV RPA Applications and Error Handling in UIPATH

7L+8PHours

**RPA Applications**:- Excel Data Tables Automation & PDF Automation Understand the concept of Anchors. Debugging in UIPATH-Exception Handling –Rethrow-Terminate-Throw-Try Catch

7. Implement PDF file automation.
8. Implement Exception handling Concept in Uipath studio

### UNIT-V Orchestrator and Future Trends

7L+8PHours

**Orchestrator**- . Define Orchestrator and its functions- Understand how to work with Orchestrator-processes and publishing package- Identify types of robots in Orchestrator.

**Future Trends**- Define artificial intelligence and identify its components- Describe the concept of



machine learning. – Discuss UIPATH Task Mining-Process Mining.

9. Scrape data from a website and store it in .CSV File.

10. Create a Queue in orchestrator and store the subject of the email in .CSV.

### COURSE OUTCOMES

- Analyze Programming fundamentals from an RPA perspective. L3
- Apply the UIPath-Recording and Data Scraping in the appropriate contexts L2.
- Able to know the selector and citrix automation. L1
- Apply the exception handling for debugging the error L2
- Apply RPA automation in real-time application. L2

**Total Periods: 35L +40P=75Hrs**

### TEXTBOOKS

1. Alok Mani Tripathi, "Learning Robotic Process Automation", kindle Edition, Packt Publishing, 2018.
2. Vaibhav Jain, "Crisper Learning: for UiPath", Independently published, 2018

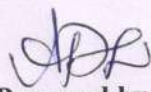
### REFERENCEBOOKS

1. NICE RPA team, Steve Kaelble, "Robotic Process Automation", NICE Special Edition, Nice Publication, John Wiley & Sons, Ltd., 2018.
2. <https://www.tutorialspoint.com/uipath/index.htm>

### Internal /External Assessment Pattern:

**Continuous Internal Assessment Calculation:** Total Marks: 30 [As per Theory Evaluation]:  
[CIA-1:5marks+ Seminar: 5marks+ Assignment: 5marks+ Activity: 5marks+ Model: 10marks =30marks]

**Comprehensive Examination Calculation:** Total Marks:70 (As per Practical Evaluation)  
[Record: 10marks +Viva: 10marks+Prog-1:25 marks +Prog-2:25 marks =70marks]

  
**Prepared by**  
Dr.Jeyalakshmi.A  
Course Co-ordinator

  
**Verified By**  
Dr. Anna Saro Vijendran  
Dean-School of Computing

  
**Approved by**  
Dr. Maria Priscilla.G  
BOS-Chairman



**19MCS401 PROJECT WORK & VIVA VOCE****GUIDELINES TO M.Sc. (Computer Science) MAIN PROJECT  
REPORT PREPARATION**

|            |                     |
|------------|---------------------|
| Semester   | IV                  |
| Credit     | 8                   |
| Paper Type | Core                |
| Max. Marks | CIA:240 +<br>CE :60 |

The students should strictly adhere to the following points while preparing their final project report.

- Students are expected to undergo project work individually and submit individual project report.
- Project reports should be typed / printed in double space using A4 size bond sheets with a left margin at column 10 and a right margin at column 75.
- A page should not contain more than 25 lines.
- The source code should be loaded and made readily available in the system during Viva – Voce examination for verification by the examiners.
- Table of contents should be in the specified format. [ as in Annexure IV]
- The students are asked to report to the concerned guides regularly during their project period to present their progress of work.
- The students should submit the project report in the Last week of March, 2021.

**Tentative Dates regarding Project**

**I Review** : Meet concern faculty guide to show their project objective, motivation, working principles and design of their work on or before 22-01-2021.

**II Review** : Meet concern faculty guide and report about your progression coding on or before 26-02-2021.

**III Review**: To run your project on or before 26-03-2021. Rough

Documentation of the Project, Submitted to the respective Guides, get corrected and modifications any should be done. Final Submission of the bounded project as per specifications - Last Week of MARCH, 2021.

**\*\* Exact dates will be intimated later**

Note: For each Meeting internal marks will be awarded based on their Punctuality, performance and quality of work.

- The format of the report is as follows:

1. Wrapper ( Annexure I)
2. Copy of the Wrapper
3. Certificate from the department (Annexure II)
4. Declaration by the student (Annexure III)
5. Acknowledgement
6. Table of contents (Annexure IV)
7. Chapters.

NOTE: (In all the meetings, students should meet the class in charge to sign in the Attendance, Marks will be awarded for attendance)



{ANNEXURE I}

< PROJECT TITLE >

PROJECT WORK

DONE BY

NAME : < STUDENT NAME >

REG.NO : <REGISTER NUMBER >

Under the guidance of

<Name of the guide>

<Designation>

<COLLEGE EMBLEM>

DEPARTMENT OF COMPUTER SCIENCE  
SRI RAMAKRISHNA COLLEGE OF ARTS AND SCIENCE  
(FORMERLY S.N.R SONS COLLEGE-AUTONOMOUS)  
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( AFFILIATED TO BHARATHIAR UNIVERSITY)  
COIMBATORE – 641 006.

APRIL 2021.

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{ANNEXURE II}  
(Specimen Copy of Certificate)

**CERTIFICATE**

This is to certify that the project work entitled

<Name of the project >

done at

<Company Name>

is a bonafide record of work done by

<Student name >

<Register No. >

in partial fulfillment for the award of the degree of

MASTER OF COMPUTER SCIENCE

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DECEMBER 2020 to APRIL 2021

Head of the Department,

<Name of HOD>

Prof. & Head,

Dept. of Computer Science

Sri Ramakrishna College of Arts and Science, Sri Ramakrishna College of Arts and Science

Faculty Guide

<Name of Guide>

<Designation>

Department of Computer Science

Submitted for the viva – voce examination held on \_\_\_\_\_

**EXTERNAL EXAMINER**

**INTERNAL EXAMINER**



{ANNEXURE III}

**DECLARATION**

I hereby declare that this project work entitled \_\_\_\_\_ for submitted to Sri Ramakrishna College of Arts and Science (Formerly S.N.R. Sons College), An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore, is a record of original work done by me under the guidance of <guide name> and that this project work has not formed the basis for the award of any degree / diploma / associate ship / fellowship or similar to any candidate in any university.

Place :

Date:

Signature of the Student

Countersigned by

<Guide Name >

## {ANNEXURE – IV}

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|                 | 2.4 Software Specification       |         |
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|                 | 3.1 Design process               |         |
|                 | 3.2 Database Design              |         |
|                 | 3.3 Output Design                |         |
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|                 | 4.2 Quality Assurance            |         |
|                 | 4.3 System Maintenance           |         |
| Chapter         | V Conclusion                     |         |
|                 | Scope of the Future Development  |         |

Bibliography (Should be in Specific format(Author name(alphabetic order), Title of the book, Publication, Edition & Year)).

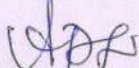
Annexure

Source Code

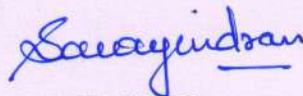
Screens

Tables

Reports

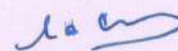
  
Prepared by

Dr. Jeyalakshmi.A  
Course Co-ordinator



Verified By

Dr. Anna Saro Vijendran  
Dean-School of Computing



Approved by

Dr. Maria Priscilla.G  
BOS-Chairman

