#### Dr. Ambedkar Institute of Technology, Bengaluru-56 (An Autonomous Institute, Affiliated to VTU, Belagavi)

Master of Computer Applications Program (Accredited by National Board of Accreditation)



# MCA I – IV semester Syllabus Two Years Duration (2022 – 2024) (Revised )

## Dr. Ambedkar Institute of Technology, Bengaluru – 560056 Master of Computer Applications

#### Institute - Vision and Mission

#### Vision

To create Dynamic, Resourceful, Adept and Innovative Technical professionals to meet global challenges.

#### Mission

- To offer state-of-the-art under graduate, post graduate and doctoral programs in the fields of Engineering, Technology and Management
- To generate new knowledge by engaging faculty and students in research, development and innovation.
- To provide strong theoretical foundation to the students, supported by extensive practical training to meet the industrial requirements.
- To instil moral and ethical values with social and professional commitment.

#### **DEPARTMENT - VISION AND MISSION**

#### VISION

To create a quality human resource with good technical competence to face the global challenges.

#### MISSION

- To create a Centre of Excellence through industry institute interaction.
- To prepare students for utilizing more creativity, innovativeness and leadership Qualities.
- To inculcate a sense of commitment to the students towards socio-economic development of the nation

#### **Program Educational Objectives**

**PEO 1:** Apply the principles of software engineering and application development in verticals related to Information Technology and Information Technology Enabled services (ITES).

**PEO 2:** Inculcate creative and innovative ideas with latest developments in the industry to be displayed as an entrepreneur, or a researcher or academician.

**PEO 3:** To incorporate the lifelong learning process with leadership skills and corporate social responsibilities.

#### **Program Outcomes:**

**PO 1**: Ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modelling and design of computer based systems.

**PO 2**: Graduates will be able to demonstrate with excellent programming, analytical, logical and problem solving skills.

**PO 3**: Graduates will be able to design a computing system to meet desired needs within realistic constraints such as safety, security and applicability.

**PO 4**: An ability to devise and conduct experiments, interpret data and provide well informed conclusions.

PO 5: An ability to select modern computing tools and techniques and use them with dexterity.

**PO 6**: An ability to function professionally with ethical responsibility as an individual as well as in multidisciplinary teams with positive attitude.

**PO 7**: An ability to appreciate the importance of goal setting and to recognize the need for lifelong learning.

**PO 8**: Develop and maintain medium to large scale application software using theoretical and applied knowledge of software engineering and project management.

PO 9: An ability to communicate effectively.

**PO 10**: An ability to understand the impact of system solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.

**PO 11:** An ability to execute the project either individually or in a group.

**PO 12**: An ability to become an Entrepreneur in the field of information technology to create a value and wealth for the betterment of the individual and society at large.

## **Dr. Ambedkar Institute of Technology** (An Autonomous Institute affiliated to VTU, Accredited by NAAC with 'A' grade)

(An Autonomous Institute affiliated to VTU, Accredited by NAAC with 'A' grade) Department of Master of Computer Applications SCHEME OF TEACHING AND EXAMINATION OF MCA FIRST SEMESTER (AUTONOMOUS) 2022-2024

		Course Title	Tea	iching hou week	rs per	Exa	minati	ion		Credi ts
Sl. No	Course Code		Lecture	Tutorial/ Seminar/ Assignment	Practical / Project	Duration in hours	SEE Marks	CIE Marks	Total Marks	
1	22MCA11	Object Oriented Programming using Java	4	-	-	3	50	50	100	4
2	22MCA12	Data Structures and Algorithms	3	-	2	3	50	50	100	4
3	22MCA13	Web Technologies	4	-	-	3	50	50	100	4
4	22MCA14	Mathematical Foundations for Computer	4	-	-	3	50	50	100	4
5	22MCA15	RDBMS	3		2	3	50	50	100	4
6	22MCA16	Research Methodology and IPR	2	-	-	3	50	50	100	2
7	22MCAL17	Object Oriented Programming using Java Lab	-	-	2	3	50	50	100	1
8	22MCAL18	Web Technology Lab	-	-	2	3	50	50	100	1
9	22MCAB19	PrinciplesofProgramming(Bridge Course -Non-credit)	3	-	-	3	50	50	100	0
Total				-	08	27	450	450	900	24

## Dr. Ambedkar Institute of Technology (An Autonomous Institute affiliated to VTU, Accredited by NAAC with 'A' grade)

(An Autonomous Institute affiliated to VTU, Accredited by NAAC with 'A' grade) Department of Master of Computer Applications SCHEME OF TEACHING AND EXAMINATION OF MCA SECOND SEMESTER (AUTONOMOUS) 2022-2024

			Teac	hing hours week	per	]	Exam	ination		Credits
Sl. No	Course Code	Course Title	Lecture	Tutorial/ Seminar/ Assignment	Practical / Project	Duration in hours	SEE Marks	CIE Marks	Total Marks	
1	22MCA21	Python Programming	4	-	-	3	50	50	100	4
2	22MCA22	Software Engineering and Project	4	-	-	3	50	50	100	4
3	22MCA23	Data Science	3	-	2	3	50	50	100	4
4	22MCA24	Professional Practices	3	-	-	3	50	50	100	3
5	22MCA25	Elective – 1	2		2	3	50	50	100	3
6	22MCA26	Elective - 2	3	-	-	3	50	50	100	3
7	22MCAL27	Python Programming	-	-	2	3	50	50	100	1
8	22MCAL28	Cloud Computing	-	2	2	3	50	50	100	2
09	22MCAM29	Mini Project -1	-	2	2	3	50	50	100	2
Total			20	04	10	27	45 0	450	900	26

#### Dr. Ambedkar Institute of Technology (An Autonomous Institute affiliated to VTU, Accredited by NAAC with 'A' grade) Department of Master of Computer Applications MCA SECOND SEMESTER ELECTIVE COURSES

S.No	<b>Course Code</b>	Course Title
1.	22MCA251	Ethical Hacking
2.	22MCA252	Software Testing and Automation
3.	22MCA253	R Programming

#### Elective – 1

#### Elective – 2

S.No	<b>Course Code</b>	Course Title
1.	22MCA261	UI & UX
2.	22MCA262	Artificial Intelligence
3.	22MCA263	Digital Marketing

## **Dr. Ambedkar Institute of Technology** (An Autonomous Institute affiliated to VTU, Accredited by NAAC with 'A' grade)

(An Autonomous Institute affiliated to VTU, Accredited by NAAC with 'A' grade) Department of Master of Computer Applications SCHEME OF TEACHING AND EXAMINATION OF MCA THIRD SEMESTER (AUTONOMOUS) 2022-2024

		, , , , , , , , , , , , , , , , , , ,	Teac	ching hours week	s per		Exami	nation	-	
Sl. No.	Course Code	Course Title	Lecture	Tutorial/ Seminar/ Assignme	Practical / Project	Duration in hours	SEE Marks	CIE Marks	Total Marks	Credits
1	22MCA31	Machine Learning & Deep Learning	4	-	-	3	50	50	100	4
2	22MCA32	Full Stack Web Development	4	-	-	3	50	50	100	4
3.	22MCA33	Network Architecture and Programming	3	-	2	3	50	50	100	4
4	22MCA34	Elective – 3	3		2	3	50	50	100	4
5	22MCA35	Elective - 4	3		-	3	50	50	100	3
6	22MCAL36	Machine Learning & Deep Learning Lab	-	-	2	3	50	50	100	1
7	22MCAL37	Full Stack Web Development Lab	-	-	2	3	50	50	100	1
8	22MCAM38	Mini Project -2	-	-	4	3	50	50	100	2
9.	22MCAI39	Industry Internship	-	-	2	-	-	50	50	2
		Total	17	00	12	27	400	450	850	25

#### Dr. Ambedkar Institute of Technology (An Autonomous Institute affiliated to VTU, Accredited by NAAC with 'A' grade) Department of Master of Computer Applications MCA THIRD SEMESTER ELECTIVE COURSES

S.No	<b>Course Code</b>	Course Title
1.	22MCA341	Internet of Things & Applications
2.	22MCA342	Big Data Analytics
3.	22MCA343	Programming using C#

#### Elective – 3

#### **Elective-4**

S.No	<b>Course Code</b>	Course Title
1.	22MCA351	Block Chain Technology
2.	22MCA352	Enterprise Resource Planning
3.	22MCA353	Cyber Security

## **Dr. Ambedkar Institute of Technology** (An Autonomous Institute affiliated to VTU, Accredited by NAAC with 'A' grade)

#### (An Autonomous Institute affiliated to VTU, Accredited by NAAC with 'A' grade) Department of Master of Computer Applications SCHEME OF TEACHING AND EXAMINATION OF MCA FOURTH SEMESTER (AUTONOMOUS) 2022-2024

			T hou	'eachi rs per	ing : week		Exami	nation		
SI. No.	Course Code	Course Title	Lecture	Tutorial	Practical /	Duration in hours	SEE Marks	CIE Marks	Total Marks	Credit s
1.	22MCAS41	Technical Seminar	-	-	2	2	-	50	50	2
2.	22MCAP42	Project Work	-	-	4	3	150	50	200	23
Total			-	-	4	8	200	150	350	25
					Ma	rks		Credit	S	
					30	00		100		

#### **Dr. Ambedkar Institute of Technology** (An Autonomous Institute affiliated to VTU, Accredited by NAAC with 'A' grade)

#### (An Autonomous Institute affiliated to VTU, Accredited by NAAC with 'A' grade) Department of Master of Computer Applications SCHEME OF TEACHING AND EXAMINATION OF MCA INTERDEPARTMENT ELECTIVE (AUTONOMOUS) 2022-2024

SI				Teaching hours per week			Exami	nation	l		
No ·	Course Code	Course Title	Lecture	Tutorial	Practica I	Duratio n in	SEE Marks	CIE Marks	Total Marks	Credit s	Eligibilit y
1	22MCAE01	Data Science using Python	3	-	-	3	50	50	100	3	All Branche
3.	22MCAE02	R programming for data Science	3			3	50	50	100	3	All Branche
4.	22MCAE03	Full stack web development	3			3	50	50	100	3	All Branche
5.	22MCAE04	Ethical Hacking	3			3	50	50	100	3	All Branche

# Dr. Ambedkar Institute of Technology (An Autonomous Institute affiliated to VTU, Accredited by NAAC with 'A' grade) Department of Master of Computer Applications Credits for the TWO Year MCA Program- Scheme 2022 (AUTONOMOUS) 2022-2024

	C	redits for the	<b>TWO Year</b>	MCA Progr	am- Schem	e 2022	
Semester	Core	Practical	Elective	Project /	Seminar	Total	Total
				Industry		Credits	Marks
				Credits			
				Internship			
Ι	22	2	0	0	0	24	900
II	15	3	6	2	0	26	900
III	12	2	7	4	0	25	850
IV	00	0	3	20	2	25	350
		Т	otal			100	3000

#### Dr Ambedkar Institute of Technology, Bengaluru-56 Department of Master of Computer Applications <u>Scheme and Syllabus - CBCS - 2022 -2024</u>

Semester	Ι											
Course Title	<b>OBJECT</b> (	OBJECT ORIENTED PROGRAMMING USING JAVA										
Course Code	22MCA11	2MCA11										
Category	Computer A	Computer Applications										
Scheme and		1	No. of Hour	s/Week		Total teaching	Credits					
Credits	L	Т	Р	SS	Total	hours						
	04	04 00 00 00 04 52 04										
CIE Marks: 50	SEE Mark	EE Marks: 50 Total Max. marks=100 Duration of SEE: 03 Hours										

#### **COURSE OBJECTIVE:**

- Understand the different object-oriented concepts and implement basic programs
- Develop applications using inheritance and interface concepts
- Apply multithreading programming concepts and handling errors efficiently
- Able to Design client server application in java

#### **UNIT I: Java Programming Fundamentals**

The Java Language, The Key Attributes of Object-Oriented Programming, A First Simple Program, Handling Syntax Errors

**Introducing Data Types and Operators:** Java's Primitive Types, Literals, A Closer Look at Variables, The Scope and Lifetime of Variables, operators, Shorthand Assignments, Type conversion in Assignments, Using Cast, Operator Precedence, Expressions.

**More Data Types and Operators: Arrays**, Multidimensional Arrays, Alternative Array Declaration Syntax, Assigning Array References, Using the Length Member, The For-Each Style for Loop, Strings, The Bitwise operators.

#### **UNIT II: Introducing Classes, Objects and Methods**

Class Fundamentals, How Objects are Created, Reference Variables and Assignment, Methods, Returning from a Method, Returning Value, Using Parameters, Constructors, Parameterized Constructors, The new operator Revisited, Garbage Collection and Finalizes, The this Keyword.

A Closer Look at Methods and Classes: Controlling Access to Class Members, Pass Objects to Methods, How Arguments are passed, Returning Objects, Method Overloading, Overloading Constructors, Recursion, Understanding Static, Introducing Nested and Inner Classes, Varargs: Variable-Length Arguments.

**Inheritance:** Inheritance Basics, Member Access and Inheritance, Constructors and Inheritance, Using super to Call Superclass constructors, Using super to Access Superclass Members, Creating a Multilevel Hierarchy, When are Constructors Executed, Superclass References and Subclass Objects, Method Overriding, Overridden Methods support polymorphism, Why Overridden Methods, Using Abstract Classes, Using final, The Object Class.

**UNIT III: Interfaces** 

11 hours

#### 11 hours

11 hours

Interface Fundamentals, Creating an Interface, Implementing an Interface, Using Interface References, Implementing Multiple Interfaces, Constants in Interfaces, Interfaces can be extended, Nested Interfaces, Final Thoughts on Interfaces.

**Packages: Package** Fundamentals, Packages and Member Access, Importing Packages, Static Import **Exception Handling: The** Exception Hierarchy, Exception Handling fundamentals, The Consequences of an Uncaught Exception, Exceptions Enable you to handle errors gracefully, using Multiple catch clauses, Catching subclass Exceptions, try blocks can be nested, Throwing an Exception, A Closer look at Throwable, using finally, using throws, Java's Built-in Exceptions, New Exception features added by JDK 7, Creating Exception Subclasses.

#### **UNIT IV: Multithreaded Programming**

#### 11 hours

08 hours

Multithreading fundamentals, The Thread Class and Runnable Interface, Creating Thread, Creating Multiple Threads, Determining When a Thread Ends, Thread Priorities, Synchronization, using Synchronization Methods, The Synchronized Statement, Thread Communication using notify(), wait() and notify All(), suspending, Resuming and stopping Threads.

**Enumerations, Auto boxing and Annotations:** Enumerations, Java Enumeration are class types, The Values () and Valueof() Methods, Constructors, methods, instance variables and enumerations, Auto boxing, Annotations (metadata)

**Applets:** Applet basics, A complete Applet Skeleton, Applet Initialization and Termination, A key Aspect of an Applet Architecture, Requesting Repainting, using the status window, Passing parameters to Applets

#### UNIT V: Networking with Java.net

Networking fundamentals, The Networking classes and Interfaces, The InetAddress class, The Socket Class, The URL class, The URL Connection Class, The HttpURL Connection Class.

**Exploring Collection Framework:** Collections Overview, The Collection Interfaces, The collection Classes. The Arrays Class

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

#### **COURSE OUTCOMES:**

- CO1: Demonstrate the basic object-oriented concepts & apply them to create java applications
- **CO2:** Apply inheritance and interface concepts to design java applications
- CO3: Design java applications with multithreading concepts and demonstrate the error handling concepts
- CO4: Design client server applications.

#### TEXT BOOKS

- **1.** Java Fundamentals, A comprehensive Introduction by Herbert Schildt, Dale Skrien. Tata McGraw Hill Edition 2013.
- **2.** Herbert Schildt: JAVA the Complete Reference, 7th/9th Edition, Tata McGraw Hill, 2007. (Chapter 17)

#### **REFERENCE BOOKS**

- 1. Java 6 Programming, Black Book, KoGenT ,Dreamtech Press, 2012
- 2. Java 2 Essentials, Cay Hortsmann, second edition, Wiley

#### **EBOOKS/ONLINE RESOURCES**

1. http://www.nptel.ac.in

2. https://en.wikipedia.org

#### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	PO8	PO9	PO10	PO11	PO1	
CO	Μ	Н	Н	Н	Н								
CO	Μ	Η	Μ	Η	Η								
CO		Η	Μ	Н	Н								
CO		Η	Μ	Μ	Н			Μ		L	L		
Stren	Strength of correlation: Low-1, Medium-2, High-3												

#### Dr Ambedkar Institute of Technology, Bengaluru-56 Department of Master of Computer Applications Scheme and Syllabus - CBCS – 2022-2024

Semester	Ι											
Course Title	DATA S	DATA STRUCTURES AND ALGORITHMS										
Course Code	22MCA	12										
Category	Computer	Computer Applications										
Scheme and			No. of Hou	rs/Week		Total teaching	Credits					
Credits	L	Т	Р	SS	Total	hours						
	03	00	02	00	04	52	04					
CIE Marks: 50	SEE Marks: 50 Total Max. marks=100 Duration of SEE: 03 Hours											

#### **COURSE OBJECTIVE:**

- Formulate and apply object-oriented programming using C to solve the engineering problems.
- Analyze data structures and algorithms to solve the problems and evaluate their solutions.
- Demonstrate different Applications of data structures.
- Study the algorithms or program code segments that contains iterative constructs
- Analyze the asymptotic time complexity of the algorithm or code segments.

# UNIT I: Introduction to Data Structures and Algorithms12 hoursIntroduction to stacks, Applications of Stack. Queues and linked lists: Basic Operations,Implementations, Singly Linked List, Linked list implementations of stacks, Example of list operations,Circular Linked List: Inserting, deleting and searching elements in a list, Double Linked List.

#### **UNIT II: Trees**

Basic concepts, Binary trees and its properties, operations on binary trees, Binary tree traversals, Binary Search Tree: insertions and deletions.

10

10

10

hours

hours

hours

UNIT III: Algorithm Analysis and Algorithmic Paradigms	10	hours
Notion of Algorithm, Asymptotic Notations and Basic efficiency classes, Mathematica	l anal	ysis of
Recursive and Non-recursive algorithms Divide-and-Conquer: Merge sort, Quicksort, Bi	nary	Search

#### **UNIT IV: Algorithm Design Techniques**

The General method, Prim's Algorithm, Kruskal's Algorithm, Dijkstra's Algorithm, Warshall's and Floyd's Algorithms.

#### **UNIT V:** Graph Algorithms

The Knapsack Problem, **Decrease-and-Conquer: Depth** First and Breadth First Search, **Backtracking:** n-Queens problem

Hands-on Sessions: All the above discussed concepts are demonstrated in the lab.

**TEACHING LEARNING PROCESS:** Chalk and Talk, power point presentation.

#### **COURSE OUTCOMES:**

- **CO1:** Demonstrate the implementation of Stack, Queue and List for real world applications.
- CO2: Analyze algorithms and solve real time problems using various algorithm design techniques.

**CO3:** Apply the asymptotic notations to show the performance of the algorithm or code segments.

**CO4:** Solve the optimization problems by recommending an efficient algorithm.

#### TEXT BOOKS

- **1.** Richard F Gilberg and BehrouzAForouzan: Data Structures A Pseudocode Approach with C,Cengage Learning, 6 the Indian Reprint 2009.
- **2.** Anany Levitin: Introduction to the Design and Analysis of Algorithms, Pearson Education, 2nd Edition

#### **REFERENCE BOOKS**

- 1. Yedidyah Langsam and Moshe J. Augenstein and Aaron M Tenenbaum: Data Structures using C and C++, 2ndEdition, Pearson Education Asia, 2002.
- 2. NanjeshBennur, Dr.Manjaiaha DH, Dr. C.K. Subbaraya: C programming skills and Data Structures primer, First Edition, IPH Publication, 2017.
- 3. Coremen T.H., Leiserson C.E., and Rivest R.L.: Introduction to Algorithms, PHI 1998.
- 4. Horowitz E., Sahani S., Rajasekharan S.: Computer Algorithms, Galgotia Publication 2001.

#### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	PO11	PO12
CO1	Н	Н			М							
CO2	Н	М										
CO3	H			M	L							
CO4	Н	М	М		M							
Stren	Strength of correlation: Low-1, Medium- 2, High-3											

#### Dr Ambedkar Institute of Technology, Bengaluru-56 **Department of Master of Computer Applications** Scheme and Syllabus - 2022 - 2024

Semester	Ι											
Course Title	WEB TI	WEB TECHNOLOGIES										
Course Code	22MCA	13										
Category	Compute	er Applica	ations									
Scheme and		N	No. of Hours/W	Veek		Total	Credits					
Credits	L	Т	Р	SS	Total	teaching hours						
	04	00	00	00	04	52	04					
CIE Marks: 50	SEE Marks: 50Total Max. marks=100Duration of SEE: 03 Hours											

#### **COURSE OBJECTIVE:**

- To create web pages using HTML5 and Cascading Style Sheets. •
- To build dynamic web pages using Bootstrap & JavaScript.
- To demonstrate structured and unstructured data and handling them.
- To develop different approaches of Server-side scripts using PHP.

#### UNIT I : Introduction to Web & XHTML5

Internet, WWW, Web Browsers, Web Servers, URLs, MIME, HTTP, Security, Client-Side Scripting versus Server-Side Scripting.

Introduction to XHTML5 tags, Basic syntax and structure, Images, Hyper-links, Lists, Tables, forms. HTML5 elements- Layouts, canvas, media, audio and video,

Cascading Style Sheets-Syntax, selectors, Styles-colors, background, text, fonts, icons, links, box model, span and div tags

#### **UNIT II: Bootstrap components**

Introduction to Bootstrap-Bootstrap file structure, Basic HTML Template, Global Styles, Default Grid System – Basic Grid HTML, Offsetting Columns, Nesting Columns, Fluid Grid Systems, Container Layouts. Responsive Design.

Bootstrap Layout Components: Dropdown Menus, Forms, Button Groups, Navigation Elements, Navbar, Breadcrumbs, Alerts, Progress Bars, Media Objects

#### **UNIT III: Java Script**

Introduction to Javascript, Screen output and keyboard input, controls statements, Arrays and functions, pattern matching

The Document Object Model, DOM-methods, Elements Access in Java Script, Element Access, Events and Event Handling-onclick(), onload(), Java Script validations

#### **UNIT IV: Handling structured and Unstructured data**

XML- Introduction, syntax, Document structure, Document Type Definitions, Namespaces, XML schema, displaying raw XML documents

Handling structured and unstructured data store: Introduction to JSON, Array literals, Object literals, mixing literals, JSON Syntax, JSON data types, JSON Encoding and Decoding, JSON versus XML. Database Access through the Web: introduction to SQL, the MySQL database.

## 10 hours

11 hours

10 hours

10 hours

#### UNIT V: Server-side scripting

Introduction to PHP, Overview of PHP, Primitives, operations and expressions, Output, Control statements, Arrays, Functions, Pattern matching, Form handling, Files handlers. Building Web applications with PHP- Using databases, tracking users- cookies, sessions.

# **TEACHING LEARNING PROCESS:** Chalk and Talk, power point presentation, animations, videos

#### **COURSE OUTCOMES:**

- **CO1:** Describe the basic constructs of the web concepts.
- **CO2:** Apply the knowledge of designing web application that use asynchronous communication.
- CO3: Design Single page web applications using JavaScript frameworks.
- **CO4:** Design an interactive web page with server side scripting language for real world problems.

#### TEXT BOOKS

- 1. Bootstrap Essentials, Snig Bhaumik, PACKT publishing
- 2. Robert W. Sebesta: Programming the World Wide Web, 7th Edition, Pearson Education, 2012.
- 3. Steven Holzner: Ajax: A Beginner's Guide, Tata McGraw Hill, 2011

#### **REFERENCE BOOKS**

- 1. Amos Q. Haviv," MEAN Web Development", Packt Publishing, 2014.
- 2. Nicholas C Zakas et al: Professional AJAX, Wiley India, publications

#### **EBOOKS/ONLINE RESOURCES**

- 1. https://www.w3schools.com
- 2. https://www.tutorialspoint.com

#### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	PO9	<b>PO10</b>	PO11	PO12
CO1					Н						Μ	
CO2		Μ		Н	Н						L	
CO3		L		Μ	Н		Н				Н	
CO4					Μ						H	
Stren	Strength of correlation: Low-1, Medium-2, High-3											

#### Dr Ambedkar Institute of Technology, Bengaluru-56 **Department of Master of Computer Applications** Scheme and Syllabus - CBCS - 2022 - 2024

Semester	Ι											
Course Title	MATHEN	<b>ATIC</b>	AL FOUN	<b>DATIONS F</b>	OR COM	PUTER APPLI	CATIONS					
Course Code	22MCA14	ļ										
Category	Computer A	Computer Applications										
Scheme and		١	No. of Hour	s/Week		Total teaching	Credits					
Credits	L	Т	Р	SS	Total	hours						
	04	00	00	00	04	52	04					
CIE Marks: 50	SEE Marks: 50         Total Max. marks=100         Duration of SEE: 03 Hours											

**COURSE OBJECTIVE:** 

- To understand fundamental concepts of sets, relations, functions, logic, statistics and probability theory
- To acquire mathematical concepts like matrix algebra, logic and proofs.
- To apply statistical concepts and probability distributions for different real-world problems.

#### **UNIT I: Matrix Algebra**

Rank of a matrix-Row Echelon Form and Normal form, Solving system of equations -Gauss Elimination, Eigen values and Eigen vectors, Cayley - Hamilton theorem - Inverse of a matrix

#### **UNIT II: Sets, Relations & Functions**

Basic definitions, Venn diagrams and set operations, Laws of set theory, Principle of inclusion and exclusion

Relations- Properties of relations, Matrices of relations, Equivalence relations and partitions Functions – Injective, subjective and bijective, Function compositions and Inverse functions.

#### **UNIT III: Mathematical Logic**

Propositions and logical operators, Truth table, Propositions generated by a set Logical equivalenceconverse, inverse and contrapositive, logical implications, Quantifiers, Rules of Inference, Methods of Proof and disproof

#### **UNIT IV: Statistics**

Descriptive Statistics, Measure of Central Tendency -Mean, Median and Mode, Quartiles, Measure of Dispersion -Range, Median, Absolute deviation about median, Variance and Standard deviation, Skewness and Kurtosis, Correlation-Pearson correlation, Spearman Rank correlation

#### **UNIT V: Probability Distributions and Hypothesis Testing**

Theory of probability-Binomial distribution, Poisson distribution

Testing of hypothesis– Null and alternative hypothesis, Tests - type I and type II error

#### **TEACHING LEARNING PROCESS:** Chalk and Talk, power point presentation, animations, videos

10 hours

10 hours

#### 11 hours

11 hours

10 hours

#### **COURSE OUTCOMES:**

- **CO1:** Understand basic concepts of matrix algebra, set theory, functions, relations, statistics and probability theory used for solving problems.
- **CO2:** Examine the mathematical concepts like Linear algebra, probability distributions and statistics for different domains of data science.
- **CO3:** Apply fundamentals of mathematical and Statistical concepts to computer applications
- **CO4:** Analyse various mathematical and statistical knowledge gained to demonstrate the problems arising in practical situations.

#### **TEXT BOOKS**

- 1 Grimaldi, R.P and Ramana, B.V. "Discrete and Combinatorial Mathematics", 5th Edition, Pearson Education, 2006.
- 2 Theory and Problems of Probability, Seymour Lipschutz and Marc lars Lipson, 2 nd Edition Schaum's Outline Series, ISBN: 0-07-118356-6.
- 3 Larsen, Richard J., and Morris L. Marx: An Introduction to Mathematical Statistics and its Applications, Pearson Education, 2017.

#### **REFERENCE BOOKS**

- 1. Discrete Mathematics & its Applications, Kenneth H Rosen, 7 th Edition, 2010, McGraw-Hill, ISBN10: 0073383090, ISBN-13: 978-0-073383095.
- 2 Trembley, J.P. and Manohar, R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill, New Delhi, 2007.

#### **EBOOKS/ONLINE RESOURCES**

- 1. http://www.nptel.ac.in
- 2. https://en.wikipedia.org
- 3. https://physicsworld.com/

#### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	PO10	PO11	PO12
CO1	Н	Μ										
CO2	Н	Μ	L									
<b>CO3</b>	L	Η	Μ	Μ								
CO4	L	Μ	Μ	Н								
Stren	Strength of correlation: Low-1, Medium-2, High-3											

#### Dr Ambedkar Institute of Technology, Bengaluru-56 **Department of Master of Computer Applications** Scheme and Syllabus - CBCS - 2022 - 2024

Semester	Ι										
Course Title	RDBMS										
Course Code	22MCA15	5									
Category	Computer A	Computer Applications									
Scheme and		1	No. of Hour	s/Week		Total teaching	Credits				
Credits	L	Т	Р	SS	Total	hours					
	03	00	01	00	04	52	04				
CIE Marks: 50	SEE Marks: 50 Total Max. marks=100 Duration of SEE: 03 Hours										

#### **COURSE OBJECTIVE:**

- Understand and implement the processes of database management system.
- Apply the SQL Query, Database Design
- Interpret RDBMS concept and managing multiple transactions, recovery techniques in case of Transaction failures

#### **UNIT 1: Introduction**

Characteristics of Database approach, Actors on the Scene, Workers behind the scene, Advantages of using DBMS approach, Data models, schemas and instances, Three -schema architecture and data independence, Database languages and interfaces, the database system environment, Centralized and client -server architectures, Classification of Database Management systems

#### **UNIT-2: Entity-Relationship Model:**

Conceptual Database 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. Construction of ER diagram: Sample case studies

**UNIT 3: Introduction to SOL** 

**10 Hours** Overview of the SQL Query Language, SQL Data Definition, Basic structure of SQL Queries, Additional Basic Operations, Null values, Aggregate Functions, Queries using where, group by, order by

#### **UNIT 4: Working on SOL Oueries and normalization**

Working with subqueries, SQL joins, Complex queries, Handling views - Data control language commands

#### **UNIT 5: Normalization and Transaction Management**

**10 Hours** Informal Design Guidelines for Relation Schemas, Functional dependencies, Normal Forms based on Primary Keys, General Definitions of 2nd and 3<sup>rd</sup> Normal Forms, Boyce Codd Normal Forms Transaction Concept, ACID Properties - A Simple Transaction Model, Transaction model states, Serializability

**TEACHING LEARNING PROCESS:** Chalk and Talk, power point presentation, animations, videos

#### **10 Hours**

**10 Hours** 

**12 Hours** 

#### **COURSE OUTCOMES:**

CO1: Demonstrate on the fundamentals of data models.

CO2: Build ER diagrams and and table structures for various real-time systems and apply querying techniques.

CO3: Apply normalization techniques in designing databases.

CO4: Implement and analyze the process of transactions to handle multiple transactions.

#### **TEXT BOOKS**

- 1. Elmasri and Navathe: Fundamentals of Database Systems, 5th Edition, Addison -Wesley, 2011
- 2. Silberschatz, Korth and Sudharshan Data base System Concepts,6th Edition, Tata McGraw Hill, 2011

#### **REFERENCE BOOKS**

- 1. C.J. Date, A. Kannan, S. Swamynatham: An Introduction to Database Systems, 8th Edition, Pearson education,2009
- 2. Raghu Ramakrishnan and Johannes Gehrke: Database management Systems, 3rdEdition, McGraw-Hill, 2003

#### **EBOOKS/ONLINE RESOURCES**

- 1. http://www.nptel.ac.in
- 3. https://en.wikipedia.org

#### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Μ											
CO2	Μ	L		Н								
CO3	Μ	L		Н	Μ		Н			L		
<b>CO4</b>	Μ	L		Μ	Н		Н	Η		L		

#### Dr Ambedkar Institute of Technology, Bengaluru-56 Department of Master of Computer Applications Scheme and Syllabus - CBCS – 2022 -2024

Semester	Ι											
Course Title	RESEA	RESEARCH METHODOLOGY										
Course Code	22MCA	16										
Category	Computer	Computer Applications										
Scheme and			No. of Hou	rs/Week		Total teaching	Credits					
Credits	L	Т	Р	SS	Total	hours						
	02	00	00	00	02	26	02					
CIE Marks: 50	SEE Marks: 50         Total Max. marks=100         Duration of SEE: 03 Hours											

#### **COURSE OBJECTIVE:**

- Understand basic concepts of research and its methodologies.
- To gain overview of a range of quantitative and qualitative approaches to data analysis.
- To Accurately collect, analyze and report data
- Be aware of the ethical principles of research, report writing and ethical challenges

#### **UNIT I: Overview of Research**

Definitions of Research and its types, Research approaches, Significance of Research, Research Methods versus Methodology. Research Process. Criteria of Good Research. Identifying and defining research problem, Technique Involved in Defining a Problem.

#### **UNIT II: Introduction to research designs**

Meaning of Research Design, Need and Features of Research Design, Important concepts relating to Research Design, Basic principles of experimental design, Different Research Designs, Primary data and Secondary Data, methods of primary data collection, designing questionnaires and schedules, Collection of secondary data

#### **UNIT III: Sampling Methods**

Census and Sample Survey, Steps in Sample design, Probability sampling: simple random sampling, systematic sampling, stratified sampling, cluster sampling and Multistage sampling. Non probability sampling.

#### **UNIT IV: Hypothesis Testing**

Introduction to Hypothesis, basic Concepts concerning testing of Hypothesis, Procedure and Flow diagram for Hypothesis, Measuring the power of a Hypothesis test, Testing of Hypotheses: Parametric test: z-test, t-test :one sample mean and two sample mean , Non parametric test-Chi Square.

#### **UNIT V: Essential of Report writing and Ethical issues**

Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Ethical issues related to Research, Plagiarism and self-Plagiarism, Publishing. IPR: Patents, Conditions of Patentability, Drafting and Filing a Patent application, Copyright and Related rights, copyright protection, Trademark: signs which may serve as Trademarks.

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

#### 8 hours

8 hours

8 hours

#### 8 hours

#### 8 hours

#### **COURSE OUTCOMES:**

**CO1:** Explain various research objectives and concepts of qualitative and quantitative research problems and report writing.

**CO2:** Apply appropriate method for data collection, process the complex data and prepare a report.

**CO3:** Analyze the real word data with quantitative techniques and interpret the results.

**CO4:** Formulate research methodology for real world problems.

#### TEXT BOOKS

- **1.** Kothari C.R., Research Methodology Methods and techniques by, New Age International Publishers, 3rd Edition, 2013.
- 2. Levin RI and Rubin, "Statistics for Management ", 7th Edition, Pearson Education, New Delhi, ISBN: 9788177585841
- **3.** Intellectual Property Handbook WPO Publications, 2<sup>nd</sup> Edition 2008.

#### **REFERENCE BOOKS**

1. Krishnaswami KN, Sivakuma AI and Mathiarajan, "Management Research Methodology", Pearson Education, 2009, ISBN: 9788177585636

#### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	PO9	PO10	PO11	PO12
CO1	L	Μ	Μ							Н		
CO2	L	L		Μ					Μ			Н
<b>CO3</b>	L	L		Μ					Μ			Н
<b>CO4</b>	L	L		М					Н			Н
Stren	Strength of correlation: Low-1, Medium- 2, High-3											

#### Dr Ambedkar Institute of Technology, Bengaluru-56 Department of Master of Computer Applications <u>Scheme and Syllabus - CBCS - 2022 -2024</u>

Semester	Ι											
Course Title	PRINCI	PRINCIPLES OF PROGRAMMING										
Course Code	22MCA	B19										
Category	Computer	Computer Applications										
Scheme and			No. of Hou	rs/Week		Total teaching	Credits					
Credits	L	Т	Р	SS	Total	hours						
	03	03 00 00 00 03 40 00										
CIE Marks: 50	SEE Marks: 50Total Max. marks=100Duration of SEE: 03 Hours											

#### **COURSE OBJECTIVE:**

- Provide students with the formal notations for solving a problem and make them learn the syntax of C language, thereby writing code with good programming style.
- Understand and appreciate the use of arrays, strings, functions, structures and Union in C.
- Exploring the pointers and data file processing

#### **UNIT I: Algorithms and Flowcharts**

Introduction to Algorithms, Definition of flowcharts, symbol of flowcharts, Algorithms & flow charts using input statements, output statements, compute statements, and conditional statements and iterative statements.

#### **UNIT II: Arrays and Strings**

Introduction to array, one dimensional and two-dimensional arrays, declaration and initialization of arrays, reading, writing and manipulation of above types of arrays, multidimensional arrays, dynamic arrays, programming examples. Declaring and initializing string variables, reading string from terminal, writing string to screen, arithmetic operations on characters, putting strings together, comparison of two strings, string handling functions, table of strings, other features of strings, programming examples.

#### **UNIT III: User Defined Functions**

Need for user defined functions, a multi-function program, elements of user defined functions, defining functions, return values and their types, function calls, function declaration, category of functions, no arguments and no return values, arguments but no return values, arguments with return values, no arguments with return value, function that return multiple values, nesting of functions, recursion, passing array to functions passing string to functions, programming examples.

#### **UNIT IV: Structures and Unions**

Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, operations on individual members, array of structures, structures within structures, structures and functions, Unions, size of structures, bit fields, programming examples.

#### **UNIT V: Pointers and File Management**

Understanding pointers, accessing the address space of a variable, declaring and initialization pointer variables, accessing a variable through its pointer, chain of pointers, pointer expressions, pointers and

#### 8 hours

8 hours

#### 8 hours

8 hours

## 8 hours

arrays, pointer and character strings, array of pointers, pointer as function arguments, functions returning pointers, pointers and structures, programming examples.

Defining and opening a file, closing a file, input/output operation on files, error handling during I/O operations, random access files, command line arguments, programming examples.

#### TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

#### **COURSE OUTCOMES:**

CO1: Design, write and execute C programs for simple applications

- CO2: Formulate and appreciate the use of arrays, strings, functions, structures and unions in C
- CO3: Design the structure and union
- CO4: Design the pointers and data file processing

#### TEXT BOOKS

- 1. VikasGupta: "Computer Concepts & C Programming", Dreamtech Press 2013. ISBN-13:9788177229981/ISBN-10:8177229982
- 2. Jacqueline Jones & Keith Harrow: Problem Solving with C, 1st Edition, Pearson 2011.
- 3. R S Bichkar, Programming with C, University Press, 2012.
- 4. V Rajaraman: Computer Programming in C, PHI, 2013.

#### **REFERENCE BOOKS**

- 1. Behrouz A Forouzan, Richard F Gilberg: Computer Science-A Structured Approach Using C, 3<sup>rd</sup> Edition, Cengage Learning,2013
- 2. M G Venkateshmurthy: Programming Techniques through C, Pearson Education, 2017
- 3. Ivor Horton: Beginning C from Novice to professional, 7th Edition, Springer, 2014

#### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	<b>PO8</b>	PO9	PO10	PO11	PO12	
CO1	L	Μ	Μ							Η			
CO2	L	L		Μ					Μ			Н	
CO3	L	L		Μ					Μ			Н	
CO4	L	L		Μ					Н			Н	
Stren	Strength of correlation: Low-1, Medium- 2, High-3												

#### Dr Ambedkar Institute of Technology, Bengaluru-56 Department of Master of Computer Applications Scheme and Syllabus - 2022 -2024

Semester	Ι										
Course Title	OBJECT	<b>OBJECT ORIENTED PROGRAMMING USING JAVA LAB</b>									
Course Code	22MCAI	L <b>17</b>									
Category	Compute	Computer Applications									
Scheme and		Ν	No. of Hours/We	eek		Total teaching	Credits				
Credits	L	Т	Р	SS	Total	hours					
	00	00	02	00	02	26	01				
CIE Marks: 50	SEE Marks: 50Total Max. Marks=100Duration of SEE: 03 Hours						Hours				

#### **COURSE OBJECTIVE:**

- Design & Develop the fundamentals of Object-oriented programming in Java, including defining classes, invoking methods, using class libraries.
- Design & Develop exception handling and multithreading concepts.
- Develop efficient Java applets and applications using OOP concepts

	List of Programs
1.	a) Write a JAVA Program to demonstrate Constructor Overloading and Method
	Overloading.
	b) Write a JAVA Program to implement Inner class and demonstrate its Access
	protection.
2.	Write a program in Java for String handling which performs the following:
	i) Checks the capacity of String Buffer objects.
	ii) Reverses the contents of a string given on console and converts the resultant
	string in upper case.
	iii) Reads a string from console and appends it to the resultant string of (ii).
3.	a) Write a JAVA Program to demonstrate multi-level Inheritance.
	b) Simple Program on Java for the implementation of Multiple inheritance using
	interfaces to calculate the area of a rectangle and triangle.
4.	Write a JAVA program which has
	i) A Class called Account that creates account with 500Rs minimum balance, a
	deposit()method to deposit amount, a withdraw() method to withdraw amount and
	also throws Less Balance Exception if an account holder tries to withdraw money
	which makes the balance become less than 500Rs.
	ii) A Class called LessBalanceException which returns the statement that says
	withdraw amount (Rs) is not valid.

	iii) A Class which creates 2 accounts, both account deposit money and one											
	account tries to withdraw more money which generates a LessBalanceException take											
	appropriate action for the same.											
5.	Write a java program to handle the following system exceptions											
	ArrayIndexOutOfBoundException											
	FileNotFoundException											
	NumberFormatException											
6.	a) Write a JAVA program using Synchronized Threads, which demonstrates Producer											
	Consumer concept.											
	b) Design a program to create two threads, one thread will print odd numbers and											
	second thread will print even numbers between 1 to 10 numbers											
7.	Write a JAVA program to implement a Queue using user defined Exception Handling											
	(also make use of throw, throws).											
8.	Complete the following:											
	i. Create a package named shape.											
	ii. Create some classes in the package representing some common shapes like Square,											
	Triangle, and Circle.											
	iii. Import and compile these classes in other program.											
9.	Write a JAVA program which has											
	i). A Interface class for Stack Operations											
	ii). A Class that implements the Stack Interface and creates a fixed length Stack.											
	iii).A Class that implements the Stack Interface and creates a Dynamic length Stack.											
	iv). A Class that uses both the above Stacks through Interface reference and does the											
	Stack operations that demonstrates the runtime binding.											
10.	Write a JAVA program which uses Datagram Socket for Client Server Communication											
	for multiple systems											

#### **TEACHING LEARNING PROCESS:** power point presentation, animations, videos

#### **COURSE OUTCOMES:**

CO1: Design and Develop Java programming language and runtime environment and implement the multithreading and client-side programming.

#### SCHEME FOR EXAMINATIONS

Student has to pick one question from a lot of 12 questions **MAPPING of COs with POs** 

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
CO:1	М	Н	Н	Н	Η					Μ	Μ		
Streng	Strength of correlation: Low-1, Medium- 2, High-3												

Dr Ambedkar Institute of Technology, Bengaluru-56 Department of Master of Computer Applications

#### Scheme and Syllabus - 2022 - 2024

Semester	Ι										
Course Title	WEB TH	WEB TECHNOLOGIES LAB									
Course Code	22MCAI	L18									
Category	Compute	Computer Applications									
Scheme and		Ν	No. of Hours	/Week		Total teaching	Credits				
Credits	L	Т	Р	SS	Total	hours					
	00	00	02	00	02	26	01				
CIE Marks: 50	SEE Marks: 50Total Max. marks=100Duration of SEE: 03 Hours										

#### **COURSE OBJECTIVE:**

- To design web pages using Bootstrap framework and add effects with jQuery.
- To create web pages using XHTML and Cascading Style Sheets.
- To build dynamic web pages using JavaScript.
- To develop different approaches of Server-side scripts using PHP.
- To design asynchronous web applications using Ajax.

	List of Programs
1.	Design a static web portal using HTML5 semantic elements and Bootstrap of online book stores. The website should consist the pages like Home page, Registration and user Login, Books catalogue, Shopping cart, order confirmation.
	Design a web page using Bootstrap layout components such as Carousel, Cards, Collapse.
2.	Design a webpage with Home tab and Sign In links using Tabs/navs. Apply modal for Sign In page and an image for Home tab.
3.	Develop a dynamic web page (such as Registration page) using HTML and on submit, the form entries should be displayed in next page using Javascript.
4.	<ul> <li>Write JavaScript to validate the following fields of the Registration page.</li> <li>First Name (Name should contains alphabets and the length should not be less than 6 characters).</li> <li>Password (Password should not be less than 6 characters length).</li> <li>E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)</li> <li>Mobile Number (Phone number should contain 10 digits only). 5</li> <li>Last Name and Address (should not be Empty).</li> </ul>
5.	Demonstrate the working of JSON Structures with HTML.

6.	<ul><li>a) Write a PHP program to store current date-time in a COOKIE and display the 'Last visited on' date-time on the web page upon reopening of the same page.</li><li>b) Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.</li></ul>
7.	Create HTML form with Name of License Holder, Fuel type, Vehicle Type, Registration Number, Make & Model, Year of Registration. On submitting, store the values in MySQL table. Retrieve and display the data based on name.
8.	Create a HTML form using Bootstrap with Name, Address Line 1, Address Line 2, and E-mail text fields. On submitting, store the values in MySQL table. Provide buttons to update and delete data for the same.

#### **TEACHING LEARNING PROCESS:** power point presentation, animations, videos

#### **COURSE OUTCOMES:**

**CO1:** Design and Develop interactive asynchronous web application with server-side script.

#### SCHEME FOR EXAMINATIONS

Student has to pick one question from a lot of 8 questions

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	PO10	PO11	PO12
CO:1		L		Μ	Μ		Η				Н	
Streng	th of co	orrelatio	on: Lov	ligh-3								

#### Dr Ambedkar Institute of Technology, Bengaluru-56 **Department of MCA** Scheme and Syllabus - 2022 - 2024

Semester	II											
Course Title	РҮТНО	PYTHON PROGRAMMING										
Course Code	22MCA	22MCA21										
Category	COMPU	COMPUTER APPLICATIONS										
Scheme and		l	Total	Credits								
Credits	L	Т	Р	SS	Total	teaching						
						hours						
	04	00	00	00	04	52	4					
CIE Marks: 50	SEE Marks:50Total Max. marks=100Duration of SEE: 03 Hours											

#### **COURSE OBJECTIVES:**

- 1. Understand and Learn the basics of Python Programming
- 2. Demonstrate the python data structure
- 3. Demonstrate database connectivity and object oriented programming concepts
- 4. Demonstrate data analytics concept using Numpy, pandas and data visualization

#### **UNIT I: Python Basic Concepts and Programming**

Introduction to Python programming, Features of Python, Execution of a Python Program, Python Virtual Machine (PVM, Memory Management in Python), Garbage Collection in Python, Comparisons between C and Python, Data types in Python, Control Statements, Functions

#### **UNIT II: Python Data Collections**

Strings: Creating and storing strings, string operations, formatting Strings.

Lists: Basic List operations, Built in functions used on lists, List Comprehensions.

Tuples and Sets: Basic Operations on Tuples, Functions to Process Tuples. Set Methods, set operations.

Dictionaries: Operations on Dictionaries, Dictionary Methods.

**UNIT III: Files and Database Connectivity, Regular Expressions** 10 hours Files and Database Connectivity: File Processing in python, Types of Databases Used with Python, Working with MySQL Database, Using MySQL from Python, Retrieving All Rows from a Table, Inserting Rows into a Table, Deleting Rows from a Table, Updating Rows in a Table, Creating Database Tables through Python

Regular Expressions: Sequence Characters in Regular Expressions, Quantifiers in Regular Expressions, Special Characters in Regular Expressions, Using Regular Expressions on Files.

#### **UNIT IV: Object oriented Programming**

Object oriented Programming: Basics of OOPS, Encapsulation, Inheritance, polymorphism. Magic Methods.

Decorators: Understanding Decorators, Decorator Syntax, Decorators Functions, Decorator classes. Context Managers: Context manager syntax, when you should write context managers. Generators: Understanding Generators, Generator syntax, Generator Examples.

#### 10 hours

10 hours

10 hours

#### **UNIT V: Numpy, Pandas and Data Visualization**

12 hours

Numpy: The Numpy Array, N-dimensional array operations and manipulations. Data processing using arrays.

Pandas: Essential Functionality, Data frames, computing descriptive statistics, Time series analysis with pandas.

Data Visualization: Matplotlibs package-plotting graphs-controlling Graph-Adding Text- More Graph types. Data Visualization with Seaborne.

#### TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

#### **COURSE OUTCOMES:**

#### **CO1:** Understand the Fundamentals of Python programming

- CO2: Demonstrate various features of python programming for building applications.
- **CO3:** Apply python programming for designing the applications efficiently.

CO4: Design and Develop applications to be deployed in real world scenarios.

#### **TEXT BOOKS**

- 1. Core Python Programming: 2017 Edition, R. Nageswara Rao, DreamTech Publication.
- 2. Python for Data Analysis 2nd Edition, O'Reilly Publications
- 3. Practical Programming: An introduction to Computer Science Using Python, second edition, Paul Gries, Jennifer Campbell, Jason Montojo, The Pragmatic Bookshelf.
- 4. Core Python Programming, Wesley J Chun, 3rd Edition, Pearson Education.

#### **REFERENCE BOOKS**

- 1. Professional Python, Sneeringer, Luke, 2016, John Wiley & Sons, ISBN -978-1-119-07085-6.
- 2. Mastering Python Fundamentals with ease, Asha Gowda KareGowda, Bhargavi K, Lambart Academic Publishing
- 3. Introduction to Python Programming ,Gowrihankar S, Veena A, CRC Press/Tyler and Francies.

#### SCHEME FOR EXAMINATIONS

**Question Paper Pattern:** 

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Μ	Н	Н	М								
CO2	Н	Μ	H	Н	L							
CO3	Μ	Μ	H	Н	L					Μ	Μ	
CO4	Μ	Μ	Н	Н	L					Н	Н	
Strength of correlation: Low-1, Medium-2, High-3												

#### Dr Ambedkar Institute of Technology, Bengaluru-56 Department of MCA Scheme and Syllabus - 2022 -2024

Semester	II											
Course Title	SOFTWA	SOFTWARE ENGINEERING AND PROJECT MANAGEMENT										
Course Code	22MCA22	22MCA22										
Category	Computer A	Computer Applications										
Scheme and		Ν	No. of Hour	s/Week		Total teaching	Credits					
Credits	L	Т	Р	SS	Total	hours						
	04	00	00	00	04	52	04					
CIE Marks: 50	SEE Mark	s: 50	Total Max. marks=100         Duration of SEE: 03 Hours									

#### **COURSE OBJECTIVES:**

- Classify various software requirement process and tools
- Build software Design and Architecture using software notations and tools
- Understand, how to implement the software project using software tools and Methodologies
- Test the software and Measure the quality of Software

#### **UNIT I: Requirements Engineering**

Software requirements Fundamentals, Requirements process, Requirements elicitation, Requirements Analysis, Requirements specification, Requirements validation, Practical consideration, Requirement tools

#### UNIT II: Software Architecture and Design

Software Design Fundamentals, Key Issues in Software Design, Software structure and Architecture, User Interface design, Software design quality analysis and evaluation, Software design notations, Software design strategies and Methods, Software design tools

#### **UNIT III: Software Implementation Methods and Tools**

Software implementation Fundamentals, Managing software Implementation, Practical considerations, software Implementation Tools, software implementation Technologies, Product Documentation, Formal software Implementation methods

## UNIT IV: Software Testing and Software Quality

Software Testing:

Software Testing Fundamentals, Test levels, Test Techniques, Test related measures, Test process, testing tools

Software Quality:

Software Quality fundamentals, Software quality management processes, practical considerations, Software Quality tools

#### **UNIT V: Software Project Management**

Initiation and Scope definition, Software project planning, software project implementation plans, Review and evaluation, software closure activities, software engineering measurement, Software management tools

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

10 hours

10 hours

10 hours

#### 10 hours

#### rations

12 hours

#### **COURSE OUTCOMES:**

**CO1: Understand the importance of Software Engineering and Management, Tools and methodologies** 

CO2: Design software by using software design notations and design tools

CO3: Implement the software using methods and tools

CO4: Develop the quality Software using efficient project management

#### **TEXT BOOKS**

- 1. Software Engineering, 10<sup>th</sup> Edition Ian Sommerville, University of St. Andrews, Pearson, 2016
- Software Engineering: A Practitioner's Approach, 8/e by Bruce R. Maxim and Roger S. Pressman, 2019
- 3. Fundamentals of Software Engineering, Rajib Mall, 4<sup>th</sup> Edition, PHI, 2014

#### **REFERENCE BOOKS**

- 1. Object oriented software engineering, Stephan R . Schach, Tata McGraw Hill, 2008
- 2. Applying UML and Patterns, Craig Larman, , 3rd edition, Pearson Education, 2005.

#### **EBOOKS/ONLINE RESOURCES**

1. http://www.nptel.ac.in

2. https://en.wikipedia.org

#### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	PO11	PO12
CO1					Н	Μ						
CO2					Н			Μ				
CO3					Н							М
CO4						Μ	L		L		Н	
Strength of correlation: Low-1, Medium-2, High-3												

#### Dr Ambedkar Institute of Technology, Bengaluru-56 Department of MCA Scheme and Syllabus - 2022 -2024

Semester	II										
Course Title	DATA SCIENCE										
Course Code	22MCA23										
Category	Computer Applications										
Scheme and	No. of Hours/Week					Total teaching	Credits				
Credits	L	Т	Р	SS	Total	hours					
	03	00	01	00	05	39+26	04				
CIE Marks: 50	SEE Marks: 50		Total Ma	x. marks=100	Duration of SEE: 03 Hours						

#### **COURSE OBJECTIVE:**

- To understand the concepts of Data science.
- To analyse the sampling techniques for data classification.
- To implement modelling methods for machine learning problems.
- Analyzing data from files and visualizing graphical presentations using tableau.

UNIT I: Introduction to Data Science 9 hours							
Introduction, Evolution of data science, Data science process - roles, stages in data science project -							
components of the Data Science lifecycle, data analytics, exploring data - managing data - cleaning							
and sampling for modeling and validation							
UNIT II: Data Pre-processing and Data Wrangling11 hours							
Loading from different files, Accessing datasets.							
Data Pre-processing: Data Cleaning, stripping out extraneous information, Find and treat missing							
values, Identify and treat outliers							
Data Wrangling: Grouping, merging, combining, concatenating, Reshaping(pivoting), Data							
Transformation – Mapping. Implementations with python.							
UNIT III: Statistics and Hypothesis Testing 10 Hours							
Inferential Statistics-Point estimates, Confidence Interval, Central limit theorem,							
Normalizing data using z-score, Normal Distributions							
Hypothesis testing- t-test -One Sampled and two sampled tests, Correlation -Person correlation							
coefficient. Implementations with python							
UNIT IV: Data Science Algorithms 11 hours							
Understanding Linear regression, making prediction-hypothesis on regression coefficients, Adding best							
fit. Multiple Linear Regression, Polynomial Regression, Logistic Regression, Implementation in python							
Model Evaluation-Confusion matrix, Implementation in python							
UNIT V: Data Visualization-Tableau 11 hours							
Introduction, Techniques used for visual data representation, Types of data visualization, Applications							
of data visualization, visualizing big data, Tools used in data visualization,							
Introduction to tableau software-connecting to data, tableau desktop workspace, Data analytics in							
tableau public, Using visual controls in tableau public							

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

#### **COURSE OUTCOMES:**

- CO1: Outline the role of data science and the significance of exploratory data analysis (EDA) in data science.
- CO2: Illustrate data preprocessing techniques and perform computational analysis using python.
- CO3: Apply basic data science algorithms for predictive modelling and analyse using visualization tool.
- CO4: Formulate and use appropriate models of data analysis and visualize them.

#### **TEXT BOOKS**

- 1 Joel Grus, Data Science from Scratch, O'Reilly Media, 2015.
- 2 David Dietrich, Barry Heller," Data Science & Big Data Analytics: Discovering, Analysing, Visualizing and Presenting Data", Wiley,2015
- 3 Joshua N. Milligan, Blair Hutchinson, Mark Tossell and Roberto Andreoli, Learning Tableau 2022 - Fifth Edition, O'Reilly Media

#### **REFERENCE BOOKS**

- 1. W. N. Venables, D. M. Smith and the R Core Team, "An Introduction to R", 2013.
- 2. Ryan Sleeper, Practical Tableau, O'Reilly Media, Inc., Copyright © 2018
- 3. Communicating Data with Tableau, Ben Jones, O'Reilly Media, Inc.,

#### **EBOOKS/ONLINE RESOURCES**

1. http://www.nptel.ac.in

2. https://en.wikipedia.org

#### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	Μ	S										
CO2	L	Μ		S	Μ							
CO3		Μ		S	S		S			Μ		
CO4				Μ	S		S			Μ	Μ	
Strength of correlation: Low-1, Medium-2, High-3												
Semester	II											
---------------	---------	---------	------------	--------------	--------	------------------	---------					
Course Title	PROFE	SSION	AL PRAC	TICES								
Course Code	22MCA	24										
Category	Comput	er App	lications									
Scheme and			No. of Hou	rs/Week		Total teaching	Credits					
Credits	L	Т	Р	SS	Total	hours						
	03	00	00	00	03	39	03					
CIE Marks: 50	SEE Mar	:ks: 50	Total Ma	x. marks=100	Durati	on of SEE: 03 Ho	ours					

### **COURSE OBJECTIVE:**

- To understand the ethics of communication.
- To demonstrate the etiquettes of communication in professional life.
- Apply to communication skills to enhance professional practices.

### **UNIT I : Communication**

Objectives – Introduction - Basics of Communication - Channels of Communication - Importance of Communication – Non-Verbal Communication: Attributes and methods - Seven Cs of Communication

### **UNIT II : Written Communication**

Letter Writing: Business Letter Formats, Principles of Letter Writing - Letter Components Sample letters: Job Application Letter, Resumes, Resignation letter, Goodwill letters, Termination letter

Writing E-mail, Writing Exercises

### **UNIT III: Technical Writing**

Writing Reports: Different types of reports, Stages in report writing, Structuring your report, Style of writing - User Instruction Manuals: Elements, Guidelines

Technical Writing Exercises

### **UNIT IV: Oral Communication**

Oral Communication skills – Importance and advantages– Face to face communication – Telephone communication – Listening – Techniques of effective listening

Formal Presentations and Informal Presentations - Preparation of Presentations and Guidelines -Body Language – Visual aids: factors

Oral communication exercises

### **UNIT V : Reading Communication**

Types of Reading - Reading to Study – Active Reading - Proof Reading: Guidelines Reading Exercises

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

### 8 hours

8 hours

7 hours

8 hours

### **COURSE OUTCOMES:**

- CO1: To understand the basic requisites of communication skills.
- CO2: To enhance the professionalism in business communication
- **CO3:** To demonstrate the communication etiquettes in professional life.
- **CO4:** To apply the communication etiquettes in professional practices.

#### **TEXT BOOKS**

- 1. Koneru Aruna, Professional Communication McGraw Hill Pub. 1998, New Delhi Computer
- 2. Petit Lesikkar, Business Communication, 1994, McGraw Hill

### **REFERENCE BOOKS**

- 1. Murphy Herta, Herbert W Hidderbrandt, Jane P Thomas Effective Business Communication, 1997, McGraw Hill Willey
- 2. Communication Skills Handbook, Summers Willey Pub. India

### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	PO10	PO11	PO12
CO1						Μ			Н	L		L
CO2						Μ			Η	L		L
<b>CO3</b>						Μ			Н	L		L
<b>CO4</b>						Μ			Н	L		L
Stren	gth of c	orrelat	ion: Lo	ow-1, ]	Medium	n-2, Hi	gh-3					

Semester	II						
Course Title	ETHICA	AL HA	CKING				
Course Code	22MCA	251					
Category	Comput	er App	lications				
Scheme and			No. of Hou	rs/Week		Total teaching	Credits
Credits	L	Т	Р	SS	Total	hours	
	02	00	02	00	03	40	03
CIE Marks: 50	SEE Mar	:ks: 50	Total Ma	x. marks=100	Durati	on of SEE: 03 Ho	ours

### **COURSE OBJECTIVES:**

- To remember and understand the fundamental aspects and importance of ethical hacking.
- To gain knowledge on the basic working principles of Kali Linux environment.
- To apply the hacking tools to identify the security issues and exploitable insecurities.
- To analyze and assess the effectiveness of the security policies.

### **UNIT I: Introduction to IoT**

Hacking, Hackers, Types of Hackers - Phases of hacking - Ethical Hacking - Working of an ethical hacker, responsibilities – Vulnerabilities - Exploits: Gaining access and denying access, Web Exploits Techniques – Malicious activities - Defensive Security

### **UNIT II : Getting started with Kali Linux**

Kali Linux – Overview, Features, Methods of installation - Command line arguments: ls, cd, mkdir, rmdir, cp, rm, mv, grep, echo - Networking Commands: ifconfig, arp, netstat, route

Editing Commands: echo, cat, replacing, appending, touch, nano, gedit - Installing updates and tools: sudo apt install, sudo apt remove, sudo apt upgrade, apt-get, sudo apt update, sudo su - Users and Privileges: chmod, useradd, userdel, passwd

### **UNIT III: Information Gathering and Scanning**

Anonymity: Working with Proxychains Address Spoofing: MAC address spoofing – Spoofing with Macchanger. Reconnaissance: Types – HTTrack: Features - Working with HTTrack and WebHTTrack Information gathering: Types – Maltego: Features - Working with Maltego - Dmitry: Features and usages – Working with Dmitry

#### **UNIT IV : Scanning and Exploitation**

Scanning: Phases of scanning: Determining live systems, Working with ping and ping sweeps Port scanning: Nmap scanning commands, Working with Nmap Exploits: What is Exploits? Types: Active and Passive, Gaining access to remote services: Working with Medusa Network sniffing: What is network sniffing – Types – network sniffing with wireshark - Password cracking: Definition – Working with John the ripper tool

### **UNIT V : Web-based Exploitation and Maintaining Access**

Web application analysis: Spidering a website - burpsuite: Features, Tools, Working with burpsuite Wireless attacks: Areas of aircrack-ng – working with aircrack-ng - Maintaining Access: Introduction to Metasploit: Benefits - Components - Sample Case Scenarios of White hat hacking

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, Hands-on sessions

### 08 hours

08 hours

08 hours

### 07 hours

### **COURSE OUTCOMES:**

- CO1: Remember the fundamental aspects of hacking and understand the role of ethical hacking
- CO2: Develop a practical understanding on the basic principles and techniques of Kali Linux
- CO3: Apply various hacking tools to build an gather offensive security strategy.

CO4: Analyzing the significance of white hat hacking by studying hacking scenarios.

### **TEXT BOOKS**

- 1 Basics of hacking and penetration testing, Patrick Engebretson, Elsevier, 2011 edition
- 2 Computer Hacking Beginner's Guide. Alan T. Norman

### **REFERENCE BOOKS**

- 1 Hacking: The Art of Exploitation, John Ericson, 2nd Edition
- 2 Penetration Testing: A Hands-On Introduction to Hacking by Georgia Weidman.
- 3 Hacking for Beginners: Manthan Desai -2010.

### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	PO11	<b>PO12</b>
CO1			Μ			L				Μ		
CO2				L	Η							
CO3			Μ	H	Η	L				Μ		
<b>CO4</b>				Η	Η					Μ		
Stren	gth of c	orrelat	ion: Lo	ow-1,	Medium	-2, Hi	gh-3					

Semester	II											
Course Title	SOFTWAI	OFTWARE TESTING AND PRACTICES										
Course Code	22MCA25	52										
Category	Computer A	Applicati	ons									
Scheme and		1	No. of Hour	s/Week		Total teaching	Credits					
Credits	L	Т	Р	SS	Total	hours						
	03	00	02	00	05	39	03					
CIE Marks: 50	SEE Mark	s: 50	Total Ma	x. marks=100	Durati	on of SEE: 03 Ho	ours					

### **COURSE OBJECTIVES:**

- The process of Software Testing Life Cycle and Types of Testing
- Differentiate between Manual Testing and Automation in Testing
- Design Test Cases using the testing tool Selenium IDE and Web Driver.
- Identify different web Elements and apply them to design test cases.

#### **UNIT I: Introduction to Testing**

Introduction and Fundamentals of Testing, Myths and Facts of Software Testing, Quality Assurance and Quality Control, Testing Objectives, Software Testing Life Cycle (STLC), Test Planning, Test-case Design Technique. Types of Testing- White Box testing, Black Box Testing, Integration Testing, Regression Testing, Validation Testing, Alpha Testing, Beta Testing, Acceptance Testing. Defect Management: Defect Management Process, JIRA Defect Tracking Tools.

### **UNIT II: User Interface Testing**

Software Test Automation: Fundamentals of Test Automation, Manual Testing Vs Test Automation, Terms used in Automation, Skills needed for Automation, Scope of Automation, Challenges in Automation. Selenium – WebDriver: Introduction to WebDriver, Installation of Selenium WebDriver, Creating the Scripts in WebDriver, Web Element Locators, Xpath, id, LinkText, CSS Selector, Class Name. TagName WebDriver Commands: Browser Commands, getUrl(), getTitle(), getPageSource(),close(),Quit(), Navigation Commands, backward(0,forward(),to(),refresh() WebElements Commands, Isselected(), IsEnabled(), getAttribute(), getText(),notify(), sendKeys(), submit(), wait().

### **UNIT III: Handling Web Elements**

CheckBox and Radio Button Operation, DropDown and Multiple select Operations, Handle Alert in WebDriver : dismiss(), accept(), getText(), sendKey(), Popup window handling in Web Drivers, getWindowHandle(), Wait commands in Web Drivers, Mouse Event using Action commands, Handling Multiple Windows, and IFrames, Running Test in Invisible Mode, Handling Dynamic Web Pages. Running selenium WebDriver in different popular Browser

### **UNIT IV: Application Programming Interface Testing**

Introduction, API testing types, Command, tests on APIs, Advantages, Tasks involved, Tools used for API Testing, Challenges, Best Practices, Case study, Database Testing, Security Testing.

#### 10 hours

10 hours

### 12 hours

### **UNIT V: Advanced Topics on Testing**

Cross Platform Testing, Coding Standards Overview, Code Coverage Metrics, Code freeze, Code Inspection, Code Review, Code Walkthrough, Code based testing, Code driven Testing. CUCUMBER framework, Test Driven Development (TDD), Behavioral Driven Development (BDD)

**TEACHING LEARNING PROCESS:** Chalk and Talk, power point presentation, animations, videos Hands-on Sessions: All the above discussed concepts are demonstrated in the lab.

### **COURSE OUTCOMES:**

CO1: Analyze the process of Software Testing Life Cycle and types of Testing.

**CO2:** Demonstrate Manual Testing and Automation in Testing

**CO3: Design Test Cases for User Interface Testing.** 

CO4: Design Test Cases for Application Programming Interface (API) Testing and Data base Testing.

### TEXT BOOKS

- 1. Rex Black: Advanced Software Testing—Vol. 1, Shroff Publishers, 2011.
- 2. Srinivasan Desikan Gopalaswamy: Software Testing Principles and Practices,5th Edition, Pearson Education, 2007.
- 3. David Burns: Selenium 2 Testing Tools: Beginner's Guide, PACKT PUBLISHING, 2012.

### **REFERENCE BOOKS**

- 1. Rex Black: Advanced Software Testing-Vol. 2, Shroff Publishers, 2011
- 2. Gundecha Unmesh: Selenium Testing Tools Cook Book, PACKT PUBLISHING, 2012

### **EBOOKS/ONLINE RESOURCES**

<u>1. http://www.nptel.ac.in</u> <u>2. https://en.wikipedia.org</u>

### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	Р	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	<b>PO8</b>	PO9	PO10	PO11	PO12
CO1	Μ				Η					Н		
CO2	Μ	Н	Μ									
CO3	Μ	Н		Н	Н			М				
CO4	Μ	Н	Μ	Μ							Μ	М
Strength of correlation: Low-1, Medium-2, High-3												

Semester	II						
Course Title	R PROGE	RAMM	ING				
Course Code	22MCA25	3					
Category	Computer A	Applicati	ons				
Scheme and		Ν	No. of Hour	s/Week		Total teaching	Credits
Credits	L	Т	Р	SS	Total	hours	
	02	00	01	00	3	40	03
CIE Marks: 50	SEE Mark	s: 50	Total Ma	x. marks=100	Durati	on of SEE: 03 Ho	ours

### **COURSE OBJECTIVES:**

- Understand the basics in R programming in terms of constructs, control statements, string functions
- Able to appreciate and apply the R programming from a statistical perspective
- To import, review, manipulate and summarize data-sets including MySQL databases in R
- To perform appropriate statistical tests, create and edit visualizations with R

### **UNIT I: Introduction**

Introduction: Overview of R, R data types and objects, reading and writing data, sub setting R Objects, Essentials of the R Language, Installing R, Running R, Packages in R

Control structures, functions, scoping rules, dates and times, preview of Some Important R Data Structures- Vectors, Character Strings, Matrices, Lists

#### **UNIT II: Data Transformation**

Functions in R, Data frames, Filtering and ordering data, Summaries and aggregates, joins, Input-Output: Reading Data & writing data, importing data from different file formats, Data Cleaning -Missing Values, Duplicates, Outliers

UNIT III: R Data bases & Data Visualization

R Data base-create connection, R- MySQL commands-create a table, select, select with where clause, insert, update, delete command Visualizing Data –Histograms, box plot, bar chart, scatter plot-Managing Colours, Adding Text, title, axes and captions.

### **UNIT IV: Descriptive Statistics**

Descriptive Statistics and Exploratory Data Analysis, Measures of Central Tendency- Mean, Median, Mode, Measures of Dispersion-Range, Standard Deviation, Variance, Summary Statistics-Quartiles, Correlation-Introduction, types.

### **UNIT V: Regression & Distributions**

Regression- Introduction, Linear regression, Implementation with R Distribution-Binomial Distribution, Poisson distribution, Normal Distribution, working with tables, Implementations with R Hypothesis testing: t-tests

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

#### 11 hours

10 hours

11 hours

10 hours

#### **COURSE OUTCOMES:**

- CO1: Demonstrate R fundamentals such as data structures, data interfaces, visualization & statistics.
- CO2: Apply programming concepts with data manipulations features to perform data analysis.
- CO3: Prepare a model and visualise the data read from files formats and from SQL databases.
- CO4: Apply statistics and probability distributions to analyse real time problems.

### **TEXT BOOKS**

1 Dr. Joshua F. Wiley, Beginning R, Apress, second edition, 2015

2 Mark Gardener, Beginning R- The Statistical Programming Language, John Wiley & Sons, Inc, 2012. 3 Joseph Schmuller, "Statistical Analysis with R", John Wiley, 2017.

#### **REFERENCE BOOKS**

1.Pierre Lafaye de Micheaux, The R Software Fundamentals of Programming and Statistical Analysis, Springer

#### **EBOOKS/ONLINE RESOURCES**

- 1. http://www.nptel.ac.in
- 3. https://en.wikipedia.org

### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	PO11	PO12
CO1	Н	Μ			L							
CO2	Μ	Η		Η	М							
CO3		Μ		Η	H						Μ	
CO4		L		Μ	М		Н				Μ	
Stren	Strength of correlation: Low-1, Medium-2, High-3											

Semester	II						
Course Title	UI & U2	X					
Course Code	22MCA2	261					
Category	Compute	r Applica	ations				
Scheme and			No. of Hou	ırs/Week		Total teaching	Credits
Credits	L	Т	Р	SS	Total	hours	
	03	00	00	00	03	39	03
CIE Marks: 50	SEE Ma	rks: 50	Total Ma	x. marks=100	Durati	on of SEE: 03 Ho	ours

### **COURSE OBJECTIVE:**

- Understand the theoretical foundations and awareness of user interface and user experience design
- Apply various design skills in UI and UX for real world applications.
- Demonstrate Quality of Service in design strategies, approaches and technical documentation Process.
- Evaluate UI/UX design process, artefacts for building products

#### **UNIT I: Introduction**

The User Interface-Introduction, Overview, The importance of user interface – Defining the user interface, The importance of Good design, Characteristics of graphical and web user interfaces, Principles of user interface design

#### **UNIT II: The User Interface Design process**

The User Interface Design process- Obstacles, Usability, Human characteristics in Design, Human Interaction speeds, Business functions-Business definition and requirement analysis, Basic business functions, Design standards.

### UNIT III: System menus and navigation schemes

System menus and navigation schemes- Structures of menus, Functions of menus, Contents of menus, Formatting of menus, Phrasing the menu, Selecting menu choices, Navigating menus, Kinds of graphical menus.

### **UNIT IV: Windows and Screen based controls**

Windows - Characteristics, Components of window, Window presentation styles, Types of window, Window management, Organizing window functions, Window operations, Web systems, Characteristics of device based controls. Screen based controls- Operable control, Text control, Selection control, Custom control, Presentation control, Windows Tests-prototypes, kinds of tests.

### **UNIT V: Structure Plane and Surface Plane**

Structure Plane: Defining the Structure Interaction Design, Conceptual Models, Error Handling, Information Architecture, Structuring Content, Architectural Approaches, Organizing Principles; Surface Plane: Sensory Design, Defining the Surface, Making Sense of the Senses, Contrast and Uniformity, Internal and External Consistency, Colour Palettes and Typography, Design Comps and Style Guides.

### 8 hours

7 hours

hours

8

### 8 hours

### **COURSE OUTCOMES:**

CO1: Understand the theoretical foundations and awareness of user interface and user experience design

CO2: Apply various design skills in UI and UX for real world applications

CO3: Demonstrate Quality of Service in design strategies, approaches and technical documentationProcess

CO4: Evaluate UI/UX design process, artefacts for building products

### TEXT BOOKS

- 1. "Designing the User Interface", Ben Shneiderman, Plaisant, Cohen, Jacobs, 5th Edition, 2014, PearsonEducation, ISBN-10: 9332518734 ISBN-13: 978-9332518735
- 2. "The Elements of User Experience: User-Centred Design for the Web", Jesse James, ,2nd Edition, 2011 NewRiders Publishers, ISBN-10: 0321683684 ISBN-13: 978-0321683687.

### **REFERENCE BOOKS**

- 1. "Sketching User Experiences: Getting the Design Right and the Right Design", Morgan Kaufmann, 2007, ISBN-10: 0123740371 ISBN-13: 978-0123740373.
- "Handbook of Usability Testing: How to Plan, Design, and Conduct Effective Tests", Jeffrey Rubin, Dana Chisnell, 2nd Edition,2008 Wiley India Private Limited, ISBN-10: 8126516909 ISBN-13: 978- 8126516902

### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each moduleMAPPING of

	<b>PO1</b>	PO2	PO3	<b>PO4</b>	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	PO9	PO1	PO11	PO1	
										U		4	
CO1	L	Μ	$\mathbf{M}$							H			
CO2	L	L		Μ					Μ			Η	
CO3	L	L		Μ					Μ			Η	
<b>CO4</b>	L	L		Μ					H			Η	
Stren	Strength of correlation: Low-1, Medium- 2, High-3												

### Mapping of COs with POs

Semester	II						
Course Title	ARTIFI	CIAL I	NTELLI	GENCE			
Course Code	22MCA	262					
Category	Compute	r Applica	ations				
Scheme and			No. of Hou	rs/Week		Total teaching	Credits
Credits	L	Т	Р	SS	Total	hours	
	03	00	00	00	03	39	03
CIE Marks: 50	SEE Mar	rks: 50	Total Ma	x. marks=100	Durati	on of SEE: 03 Ho	ours

### **COURSE OBJECTIVE:**

- Identify the problems where AI is required and the different methods Available.
- Compare and contrast different AI techniques available.
- Define and explain learning algorithms.

### **UNIT I: Introduction**

Introduction to artificial intelligence, AI Agents and environment, typs of agents, structure of intelligent agent, History of AI AI applications, PEAS, Problems, Problem solving, Problem solving agents.

8 hours

8 hours

8 hours

7 hours

8 hours

### UNIT II: Knowledge Representation

Issues of knowledge representations, Types of knowledge, Mappings Approaches to knowledge representations, knowledge using Rules, search Knowledge, rationality, heuristic search strategies, Search, Adversarial search, Planning and scheduling.

### **UNIT III: Symbolic Reasoning**

Under Uncertainty, Statistical reasoning, Logical agents, The wumpus

worldproblem, Weak Slot and Filter Structures, strong slot-and-fillerstructures, Game Playing.

### **UNIT IV: Fuzzy Logic and inference**

Ontologies Bayesian reasoning Temporal reasoning, Bays theorem, types of learning, decision trees, Case study: Medical diagnosis.

### **UNIT V: Natural Language Processing**

Learning, Expert Systems, Case studies: Playing chess, Manufacturing scheduling.

### **TEACHING LEARNING PROCESS:** Chalk and Talk, power point presentation, animations,

### **COURSE OUTCOMES:**

CO1: Identify the AI based problems

CO2: Apply techniques to solve the AI problems

CO3: Define learning and explain various learning techniques.

### **CO4: Implement AI concepts in real time projects**

### TEXT BOOKS

- 1 E. Rich , K. Knight & S. B. Nair Artificial Intelligence, 3/e, McGraw Hill.
- 2 Artificial Intelligence: A Modern Approach, Stuart Rusell, Peter Norving, Pearson Education 2nd Edition.
- 3 Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems Prentice Hal of India

### **REFERENCE BOOKS**

- 1. Artificial Intelligence and Expert Systems Development by D W Rolston-Mc Graw hill.
- 2. N.P. Padhy "Artificial Intelligence and Intelligent Systems" Oxford University Press-2015

### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each moduleMAPPING of

### Mapping of COs with POs

	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	<b>PO8</b>	PO9	PO10	PO11	PO12
CO1	L	M	Н									
CO2	Μ		Н		L							
CO3			Н					M		L		
<b>CO4</b>	L		Μ						Н			
Stren	gth of	correla	ation:	Low-1,	Mediu	m- 2, H	igh-3					

Semester	II											
Course Title	DIGITA	DIGITAL MARKETING										
Course Code	22MCA2	22MCA263										
Category	Compute	r Applic	ations									
Scheme and		-	No. of Hour	s/Week		Total	Credits					
Credits	L	Т	Р	SS	Total	teaching						
						hours						
	03	00	00	00	04	39	03					
CIE Marks: 50	SEE Ma	rks: 50	Total Max	. marks=100	Durat	ion of SEE: (	3 Hours					

### **COURSE OBJECTIVE:**

- Identify the importance of the digital marketing for marketing success, to manage customer relationships across all digital channels
- Able to do Web site and SEO optimization and to develop a digital marketing plan.
- Create Google AdWords campaigns, social media planning and basic knowledge of Google Analytics for measuring effects of digital marketing.

### **UNIT I : Introduction to Digital Marketing**

Introduction: Introduction to digital marketing, Digital marketing platforms and Strategies, Latest Digital marketing trends, Emergence of digital marketing as a tool, Drivers of the new marketing environment; P.O.E.M. framework, Digital landscape, Digital marketing plan, Digital marketing models.

Web design: Optimization of Web sites, MS Expression Web.

### **UNIT II: Search Engine Optimization**

Search Engines: Components of Search Engines, Keyword Research, Google Keyword Planner, Market Research and Analysis.

Onpage Optimization : Onpage Analysis Methodology , Web site Speed , Domain name in SEO ,Optimization-Title,URL, Meta Tags, Sitemaps Generation, Redirecting Techniques .

Offp Offpage Optimization: Link Building and Types, Linking Building Methodology, Links Analysis Tools, Directory Submissions, Local Business Directories, Social Bookmarking, UsingClassifieds for Inbound traffic, Question and Answers, Blogging & Commenting.

Webmaster Tools: Verification Process in GWMT , Selecting Target Location, Google Webmaster Tools .

Local SEO: Introduction, Submission to Google My Business, Completing the Profile, Local SEO Ranking Signals, Citations and Local Submissions, SEO Reporting.

### 7 hours

### **UNIT III: Google AdWords**

PPC Advertising: Paid Marketing, Google Account setup Google AdWords, Display Advertising. Remarketing Strategy, Building Remarketing List & Custom Targets, Creating Remarketing Campaign.CRM:CRM platform, CRM models.

### UNIT IV: Web Analytics

Web analytics: Web analytics – levels, Importance of Analytics for Business, Popular Analytics Software's, Key performance Metrics [KPI] in Analytics Visits and Users, Time on Page ,Bounce Rate , Exit Rate , Conversion Rate Engagement.

Google Analytics: Installing Analytics code in site, Analytics account structure, Real Time Reports, Settings in Analytics, Traffic Reports.

Conversion Tracking: What is conversion, Conversion Process and Funnel, Types of Conversions, Conversion Reports, Funnel Visualization, Multi-Channel Funnels, Attribution Reporting, Digital Marketing Budgeting.

### UNIT V: Social Media Marketing

Introduction, Impact of Social Media on SEO, Facebook Marketing strategy, Email Marketing, VisualMarketing, Business opportunities and Instagram options, LinkedIn Marketing, YouTube marketing

,Analytics and Targeting Twitter Marketing, Mobile Marketing, social media metrics. Social media risks and challenges.

### TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

### **COURSE OUTCOMES:**

CO1: Understand the key concepts related to digital-marketing.

CO2: Demonstrate the use of different electronic media for designing marketing activities.CO3: Analyze role of social media marketing for the given problem and technical Solutions to overcome social media threats.

CO4: Estimate the key concepts related to digital-marketing for the given case.

### TEXT BOOKS

- 1. Seema Gupta "Digital Marketing" Mc-Graw Hill 1st Edition 2017.
- 2. Puneet Singh Bhatia "Fundamentals of Digital Marketing" Pearson 1st Edition 2017.

### **REFERENCE BOOKS**

- 1. Ian Dodson "The Art of Digital Marketing" Wiley Latest Edition
- 2. Prof. Nitin C. Kamat, Mr.Chinmay Nitin Kamat Digital Social Media Marketing.

### EBOOKS/ONLINE RESOURCES

- 1. https://www.tutorialspoint.com/digital\_marketing
- 2. https://www.guru99.com/free-digital-marketing-tutorial.html

### 8 hours

### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	PO10	PO11	<b>PO1</b>
CO1							Μ			Η		
CO2				Μ	Η							
CO3										Η		Μ
CO4							L			Η		Μ
Strength of correlation: Low-1, Medium-2, High-3												

Semester	II						
Course Title	РҮТНО	N PROGR	AMMING	LAB			
Course Code	22MCA	L27					
Category	COMPU	TER APPL	ICATIONS	5			
Scheme and		No. c	of Hours/W	/eek		Total	Credits
Credits	L	Т	Р	SS	Total	teaching	
						hours	
	-	-	02	00	02	26	1
CIE Marks: 50	SEE Ma	arks:	Total Ma	ax.	Durat	ion of SEE: 0	3 Hours
	50		marks=1	.00			

### **COURSE OBJECTIVES:**

- Learn basics concepts of python programming.
- Implement advanced programs in python based on the knowledge gained.

	List of Programs
1.	Demonstrate a python program on
	i) Control statements
	ii) Functions
2.	Demonstrate string operations
3.	Demonstrate list operations
4.	Demonstrate Set operations
5.	Demonstrate operations on Tuple
6.	Demonstrate operations on dictionary
7.	Demonstrate File handling
8.	Demonstrate Object oriented Concepts
9.	Develop a program to manipulate data using database connectivity.
10.	Data frame manipulation
11.	Develop a program using Numpy
12.	Write a Python program to demonstrate Time series analysis with Pandas.
13.	Implement a python program to demonstrate
	Data visualization with various Types of Graphs

### TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations,

### **COURSE OUTCOMES:**

CO: Design and develop an application using Python Programming for real world scenario.

### SCHEME FOR EXAMINATIONS

In the practical Examination each student has to pick one question from a lot of all the 13 questions.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	<b>PO9</b>	PO10	PO11	PO12
СО	Η	Η	Μ	Η	Μ			Н	Η			

Semester	II										
Course Title	CLOUD COMPUTING LAB										
Course Code	22MCAL	28									
Category	Computer A	Applicati	ions								
Scheme and		1	No. of Hour	s/Week		Total teaching	Credits				
Credits	L	Т	Р	SS	Total	hours					
	00	02	02	00	04	26+26	2				
CIE Marks: 50	SEE Mark	s: 50	Total Ma	x. marks=100	Durati	on of SEE: 03 Ho	ours				

### **COURSE OBJECTIVES:**

- Understand the different cloud computing concepts.
- To work with virtualized environment.
- Explore different Cloud services such as Amazon, Salesforce and VMware.

### Part 1: Working with Amazon Web Services (AWS):

- a. Familiarize the services by AWS
- b. Creating user login
- c. Creating Linux, Windows virtual machines instance using EC2
- d. Run simple applications on EC2 Instance
- e. Creating Storage using S3
- f. Create a Backup using Image and launch new instance using Backup image
- g. Creating an RDS Instance with MySQL Workbench and Dynamo DB
- h. Demonstrate Database application on AWS
- i. Upgrading and downgrading the infrastructure based on the requirement
- j. Demonstrate Load balancing using different instance of EC2
- k. Launch a web application.
- 1. Demonstration of Identity and Access management.
- m. Demonstrate Elastic bean stack
- n. Demonstrate AWS dynamic web application

### Part 1I: Working with Salesforce Trailhead Platform:

- a. Create a web application to enter the students' details like name, USN, semester, section and CGPA to a database on Salesforce cloud platform.
- b. Create a web application to implement an online cart for adding items to a shopping cart and deleting it.
- c. Create a web application to enter the faculty details like faculty ID, faculty name, and salary to a database and calculate the income tax to be paid by the faculty at the end of financial year.
- d. Create a web application to book a flight from a source to destination and store the status of flight, and departure timings on database.
- e. Develop Department events' registration app with an object containing event name, date/time, venue as parent relationship, another object containing student name, branch, event name, date/time, and venue as child relationship.

- f. Develop Blood donation registration app with an object which records donors' name, age and blood group as parent relationship and another object containing hemoglobin level, donated or not details (if age>18) child relationship.
- g. Develop Attendance maintenance app with an object to record student details, attendance and provide a link to college websites' results webpage.
- h. Create a web application with objects to maintain database of an art gallery which contains objects like artists, arts, and inventory and provide a link to any of the art gallery website.

### Part III: Working with Google Cloud :

i. Create a Collaborative learning environment for a particular learning topic using Google

Apps. Google Drive, Google Docs and Google Slides must be used for hosting ebooks, important articles and presentations respectively.

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

### **COURSE OUTCOMES:**

**CO1:** Demonstrate Infrastructure as a Service (IaaS), Platform as a Service (PaaS) andSoftware as a Service (SaaS).

### **SCHEME FOR EXAMINATIONS:**

In the practical examination each student has to demonstrate one exercise from each part.

LEVE	LEVEL OF CO-PO MAPPING TABLE													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	<b>PO</b> 9	PO1 0	PO1 1	PO12		
CO1	M	Μ	Μ	М	Н	Μ	М			М	Н	Н		

Course Title	MINI P	ROJEC	CT - 1								
Course Code	22MCA	M29									
Category	COMPU	COMPUTER APPLICATIONS									
Scheme and		No. of Hours/Week Total Credits									
Credits	L	Т	Р	SS	Total	teaching					
						hours					
	-	02	02	00	04	13+13	2				
CIE Marks: 50	SEE Ma	SEE Marks: Total Max. Duration of SEE: 03 Hours									
	50	50 marks=100									

### Mini project using the following technologies

### Mobile application development/Java frame work/ Django frame work

### **COURSE OBJECTIVES:**

- Learn the basics of the Framework
- Build applications using database
- Learn to develop web application/mobile app development

	PART - A
	Demonstrate the following concept using Android
1.	Exploring layouts, widgets
2.	Android activity life cycle
3.	Intents in Android and Shared preferences
4.	Sending SMS and EMAIL
5.	Fragments & Animations
6.	Databases and content providers
7.	Sensors and location-based services
8.	Audio playback and image capture
	OR
	Demonstrate the following concept using Java Framework
1.	Develop JDBC application using database
2.	Demonstrate servlet
	i) program to handle form data
	ii) Session and cookies
3.	Develop a java servlet program for the validation of login and password using database. If
	the user name and password matches display messages in the different webpage.
4.	Develop a JSP program for
	i) Implementing page directives
	ii) Implementing action tags
	application using JAVA bean and JSP

5.	Develop a registration page in JSP with proper validation and store all records							
	detabase							
	uatabase.							
6.	Develop Hibernate application for data management							
7.	Develop a sample application using Spring framework for data base connectivity							
8.	Develop MVC application using Spring framework							
	OR							
	Demonstrate the following concept using Django Framework							
1.	Django installation and setup environment							
2.	Integrating HTML or Bootstrap in Django							
3.	Form handling with validation in Django							
4.	Develop calculator using Django framework							
5.	Django Database connectivity with SQLite or MySQL							
6.	Implement Django Admin operations							
7.	Django REST API(CRUD operation)							
8.	Develop registration page in Django							
Note 1: S	Note 1: Student has to pick one question from the above list							
	MINI-PROJECT							

Students should be able to build a complete project using multiple features learnt in Part – A with userinterfaces and database connectivity and the Project should be deployed .The project work should be carried out with team strength of maximum two.

### NOTE:

- 1. In the examination, one exercise from part A is asked for 20 marks.
- 2. The mini project under part B has to be evaluated for 30 marks.
- 3. A team of two students must develop the mini project. However during the examination, each student must demonstrate the project individually.
- 4. The team must submit a brief project report (25-30 pages) that must include the following
  - Introduction
  - Requirement Analysis
  - Software Requirement Specification
  - Analysis and Design
  - Implementation
  - Testing
- 5. The report must be evaluated for 5 Marks. Demonstration and Viva for 15 Marks.
- 6. Project report duly signed by the Guide and HOD need to be submitted during examination.

## **TEACHING LEARNING PROCESS:** Chalk and Talk, power point presentation, animations, videos

### **COURSE OUTCOMES:**

**CO:** Design and develop applications for real world scenarios.

### SCHEME FOR EXAMINATIONS

- 1. In the examination, one exercise from part A is to asked for 20 marks
- 2. Mini project student group size is limited to two students only.
- 3. The mini project under part B has to be evaluated for 30 marks.
- 4. Project report duly signed by the Guide and HOD, need to be submitted duringexamination.

LEVEL OF CO-PO MAPPING TABLE													
CO/	PO1	PO2	PO	PO	PO5	PO6	<b>PO7</b>	<b>PO8</b>	PO9	PO10	PO11	PO12	
CO	Μ	Μ	Η	Н	Μ	Η	Η		L	Μ			

### Dr Ambedkar Institute of Technology, Bengaluru-56 Department of Master of Computer Applications <u>Scheme and Syllabus - CBCS - 2022 - 2024</u>

Semester	III											
Course Title	MACHIN	MACHINE LEARNING & DEEP LEARNING										
Course Code	22MCA31											
Category	Computer A	Applicati	ons									
Scheme and		١	No. of Hour	s/Week		Total teaching	Credits					
Credits	L	Т	Р	SS	Total	hours						
	04	00	00	00	04	52	04					
CIE Marks: 50	SEE Mark	SEE Marks: 50 Total Max. marks=100 Duration of SEE: 03 Hours										

### **COURSE OBJECTIVE:**

hyper parameters.

- To distinguish between, supervised & unsupervised and gain knowledge about basic concepts of Machine Learning.
- To understand concept learning and apply machine learning techniques and analyse text using NLP.
- To apply the appropriate machine learning strategy for any given problem.
- To develop skills of using recent machine learning software for solving practical problems.

#### **UNIT I: Concept Learning and Supervised Learning** 10 hours Concept Learning-Find S algorithm, Candidate Elimination Algorithm. Classification-Introduction to Bayes Theorem and Concept learning, Naive Bayes Classifier, Decision Tree- ID3 classifier, Overfitting and Under fitting Ensemble Methods-Bagging & Boosting, Random Forest Model **UNIT II: Unsupervised Learning & Reinforcement Learning** 10 hours Introduction to Unsupervised Learning, Clustering- Clustering as a machine learning task, different types of clustering techniques-Partitioning methods, Hierarchical clustering, Density based Methods. Reinforcement Learning-Introduction, Markov's Decision Process, Q-Learning **UNIT III: Introduction to Natural Language Processing** 11 Hours Introduction to NLP, History of NLP, Text Analytics and NLP, various steps of NLP, Types of data Preprocessing in NLP-Removing punctuation, removing stop words, Tokenization, Stemming, Lemmatization, creating a worldcloud, Implementation with Python Feature extraction from texts- Feature extraction methods -Bag of Words (BOG) **UNIT IV: Foundations of Neural Network** 10 hours Foundations of Neural Networks and Deep Learning: Neural Networks- Biological neuron, Perceptron, Multilayer feed forward networks, Training neural networks, Activation functions, Loss functions, and

Building blocks of Deep Networks-RBMs, and Auto encoders.

### **UNIT V: Deep Neural Network**

Architectures of Deep Network: Unsupervised pre-trained networks, Convolution neural networks-CNN architecture, layers, pooling layers, fully connected layers, applications of CNN, Recurrent neural networks

### TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

### **COURSE OUTCOMES:**

- CO1: Explain basic concepts related to Machine Learning and deep learning techniques.
- CO2: Identify and apply the appropriate techniques to process the data and analyse the applications using machine learning techniques
- CO3: Apply suitable techniques of Machine learning and perform Model evaluation.
- CO4: Implement machine learning algorithms and solve real-world problems.

#### TEXT BOOKS

- 1. Machine Learning, Tom M Mitchel, McGraw Hill publications, ISBN-0070428077
- 2. Principles of Soft Computing, Dr. S. N. Sivanandam, Dr. S. N Deepa, Weilly India, 2<sup>nd</sup> Edition, 2011.
- 3. Josh Patterson and Adam Gibson, Deep Learning, A practitioner's approach, First edition, Shroff Publishers and Distributors Pvt. Ltd., 2017

### **REFERENCE BOOKS**

- **1.** Jake Vander plas, "Python Data Science Handbook: Essential tools for working with data", O'Reilly Publishers, I Edition.
- 2. Ethem Alpaydin "Introduction to Machine Learning" 2nd Edition PHI Learning Pvt. Ltd-New Delhi.

### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	PO11	PO12
CO1	Μ	Н										М
CO2	L	М		Н				Μ				
CO3	L	L		Н	Н			Μ		Н	М	L
CO4	L	L		Н	Н			Μ		Н	М	L
Stren	Strength of correlation: Low-1, Medium-2, High-3											

Semester	III	III										
Course Title	FULL ST	FULL STACK WEB DEVELOPMENT										
Course Code	22MCA32	2MCA32										
Category	Computer A	Computer Applications										
Scheme and		1	No. of Hour	s/Week		Total teaching	Credits					
Credits	L	Т	Р	SS	Total	hours						
	04	04 00 00 00 04 52 04										
CIE Marks: 50	SEE Mark	s: 50	Total Max. marks=100 Durat			on of SEE: 03 Ho	ours					

### Dr Ambedkar Institute of Technology, Bengaluru-56

Department of Master of Computer Applications

Scheme and Syllabus - CBCS - 2022 - 2024

### **COURSE OBJECTIVE:**

- To design as web page using front end technologies
- To develop application with server-side scripting tools
- To develop web application with REST APIs and use of framework to communicate client-server applications.
- To build as responsive web application with managing NOSQL databases.

### TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

### **COURSE OUTCOMES:**

- CO1: Demonstrate basic concepts of react, node, express and mongo dB technologies.
- CO2: Design an application and apply the knowledge of React.js, Node.js, Express.js and MongoDB for a given scenario.
- CO3: Develop interactive web applications on server side with NodeJS and MongoDB.
- CO4: Build responsive web application communicating with REST API and managing data with NOSQL databases.

### TEXT BOOKS

- 1. ERN Quick Start Guide, Eddy Wilson Iriarte Koroloiva, 2018, PACKT Publication, ISBN 978-1-78728-108-0
- **2.** Learning React Functional Web Development with React and Redux, Alex Banks and Eve Porcello, O'Reilly Media, Inc., May 2017
- 3. Pro MERN Stack, Vasan Subramanian, 2019, ISBN-13(pbk):978-1-4842-2653-7

### **REFERENCE BOOKS**

3. MERN Quick Start Guide, Eddy Wilson Iriarte Koroloiva, 2018, PACKT Publication, ISBN 978-1-78728-108-0.

### SCHEME FOR EXAMINATIONS

Course Title	NETWO	NETWORK ARCHITECTURE AND PROGRAMMING									
Course Code	<b>22MCA</b>	22MCA33									
Category	Comput	omputer Applications									
Scheme and		No. of Hours/Week Total teaching Credits									
Credits	L	Т	Р	SS	Total	hours					
	03	03 00 02 00 04 52 04									
CIE Marks: 50	SEE Mar	rks: 50	Total Max. marks=100 D			<b>Duration of SEE: 03 Hours</b>					

• Each full question consists of 20 marks.

• Questions are set covering all the topics under each module

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1					Н						Μ	
CO2		М		Н	Н						L	
CO3		L		М	Н		Н				Н	
CO4					М						Н	
Strength of correlation: Low-1, Medium-2, High-3												

### Dr Ambedkar Institute of Technology, Bengaluru-56 Department of Master of Computer Applications Scheme and Syllabus - CBCS – 2022 -2024

Course Title	NETWO	NETWORK ARCHITECTURE AND PROGRAMMING									
Course Code	22MCA	22MCA33									
Category	Comput	omputer Applications									
Scheme and		No. of Hours/Week Total teaching Credit									
Credits	L	Т	Р	SS	Total	hours					
	03	03 00 02 00 04 52 04									
CIE Marks: 50	SEE Mar	rks: 50	Total Ma	x. marks=100	<b>Duration of SEE: 03 Hours</b>						

### **COURSE OBJECTIVE:**

- Learn the architecture of networks and the layering.
- Understand the functions of various protocols.
- Simulate a network architecture.
- Analyze the characteristics of a network.

UNIT I : Architecture and Physical Layer10 hours
Introduction, Types of Computer Networks, Network Architectures: OSI, Internet, Addressing,
Physical Layer: Encoding, Framing, Multiplexing
UNIT II : Data Link Layer 11 hours
Elementary Protocols: Unrestricted Simplex, Simplex Stop and wait, Simplex for noisy channel -
Sliding Window Protocols: 1-bit Sliding Window Protocol, Go-Back-N (GBN) and Selective
Repeative (SR) Medium Access Control Protocols: ALOHA, CSMA
UNIT III: Network Layer 11 hours
Design: Datagram Networks, Virtual Circuit Network, Routing algorithms: Shortest Path Algorithm,
Distance Vector Routing, Multicast routing protocol, Internet Protocols: IPv4, IPv6, ICMP, ARP
UNIT IV: Transport Layer and Quality of Service 9 hours
Transport Layer Protocols: TCP, UDP Congestion Control Algorithms, Quality of Service:
Techniques for achieving QoS, Integrated services, Differentiated services
UNIT V: Programming with Network Simulator 11 hours
Introduction to Simulator, NAM, Trace file structure
Programming with NS to simulate a TCP network, UDP network, LAN network, Transfer of a file,
Wireless Network, Routing Techniques

### TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, Hands-on sessions

### **COURSE OUTCOMES:**

- CO1: Understand the fundamental architecture of networks.
- CO2: Demonstrate the functions of various protocols of different layers.
- CO3: Analyze and evaluate the techniques for building a quality network.

CO4: Apply the networking principles to build a simulated network. **TEXT BOOKS** 

- 1. Tanenbaum, A., Computer Networks, 3rd ed., Prentice-Hall, 1996
- 2. Jan L Harrington, Network Security: A Practical Approach, Morgan Kauffman, 2005

### **REFERENCE BOOKS**

- 1. "Douglas E Comer, "Internetworking with TCP/IP, Principles, Protocols and Architecture" 6th Edition, PHI 2014, ISBN-10: 0130183806
- 2. Uyless Black "Computer Networks, Protocols, Standards and Interfaces" 2nd Edition PHI, ISBN-10: 8120310411.

### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	PO11	<b>PO12</b>
CO1	2		2									
CO2			2							1		
CO3			3		2					1		
<b>CO4</b>	1		3		3			1				
Stren	Strength of correlation: Low-1, Medium- 2, High-3											

### Dr Ambedkar Institute of Technology, Bengaluru-56 Department of Master of Computer Applications Scheme and Syllabus - CBCS – 2022 -2024

### **COURSE OBJECTIVE:**

### • Learn the evolution of IOT from M2M to global Context.

Course Title	INTERN	JET OF	THINGS	S AND APPLI	CATION	S					
Course Code	22MCA3	22MCA341									
Category	Compute	omputer Applications									
Scheme and		1	No. of Hou	rs/Week		Total teaching	Credits				
Credits	L	Т	Р	SS	Total	hours	1				
	03	03 00 02 00 04 52 04									
CIE Marks: 50	SEE Mar	ks: 50	Total Ma <sup>-</sup>	x. marks=100	Durati	ation of SEE: 03 Hours					

• Understand IoT in managing data and knowledge.

• Realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks.

• Analyze the application areas of IOT .

• Design IoT projects to make the Real World work easy.

UNIT I : Introduction to IoT 10 hours
Definition and characteristics of IoT, Genesis of IoT, IoT and Digitization, IoT Impact, Modern day
IoT applications, Physical and Logical design of IoT, IoT communicational model, IoT Challenges, The
Core IoT Functional Stack
UNIT II : Smart Things 10 hours
IoT Sensors, Actuators, IoT Networking, Connecting Smart Objects, Communications Criteria, IoT
Access Technologies, Sensor Networks, IoT Access Technologies. IoT Enablers.
UNIT III: Embedded System Platform for IoT12 hours
Embedded Devices: Introduction, Processor for things, Things design, Gateway design.
Arduino: Introduction, Getting started with Arduino Feature of Arduino, Types of Arduino Board, Arduino IDE,
Anatomy of Interactive devices, Blinking an LED.
Raspberry Pi: Introduction, Essential of setting Raspberry Pi, Programming Raspberry with Python.
Mobile Application Development for IoT using Android: Sending and Receiving Data via Bluetooth
with an Android Device, Android application for Home Automation.
UNIT IV : Communication Technologies10 hours
Introduction, OSI and TCP/IP communication model for communication network. Data Protocol:
MQTT, CoAP, AMQP.
Communication Protocols: Introduction toIEEE802.15.4,Zigbee,6LowPan, Bluetooth, NFC, RFID
LoRa.
Applications of IoT: Smart Cities and Smart Homes, Connected Vehicles, Industrial Internet of Things,
program practices. Problem statements for project work.
UNIT V : Big Data and Cloud Computing for IoT8 hours
Big Data for IoT: Introduction, IoT platforms, The Eight main components of an IoT platform. IoT
platform in Action: Use case for an appliance retailer.

**Cloud Computing for IoT:** Sensor cloud, Fog Computing, Sending & Receiving Data to & from cloud, hands on example programs.

**IoT platforms:** AWS IoT, Microsoft Azure IoT, IBM Watson, Cisco's IoT, SalesForce's IoT, carriots, Oracle Integrated Cloud, How to select the right IoT platform.

### TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

### **COURSE OUTCOMES:**

- CO1: Understand the concepts and application areas of IOT
- CO2: Apply the concepts of IoT to different applications
- CO3: Analyze the IoT architecture and design along with functional/compute stack and data management.
- CO4: Design and Implement IoT applications in different domains and embedded platform.

### TEXT BOOKS

- 3. "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press)
- 4. "Internet of Things: A Hands-on Approach", by Arshdeep Bahga and Vijay Madisetti (Hands-on-Approach)", 1stEdition, VPT, 2014. (ISBN: 978-8173719547).

#### **REFERENCE BOOKS**

- 3. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things:Introduction to a New Age of Intelligence",1st Edition,AcademicPress, 2014.
- 4. Raj Kamal, "Internet of Things: Architecture and Design Principles", 1st Edition, McGraw Hill Education, 2017. (ISBN: 978-9352605224).

### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	PO11	PO12
<b>CO1</b>	Н				Μ					Н		
CO2		Н	Μ	Μ	Η			L				
CO3		Н	Μ	Н						L		
<b>CO4</b>		Н	Η	Н	Η			Μ			Н	Н
Stren	Strength of correlation: Low-1, Medium-2, High-3											

### Dr Ambedkar Institute of Technology, Bengaluru-56 Department of Master of Computer Applications <u>Scheme and Syllabus - CBCS - 2022 -2024</u>

Semester	III	Ш										
Course Title	<b>BIG DAT</b>	BIG DATA ANALYTICS										
Course Code	22MCA34	2MCA342										
Category	Computer A	Computer Applications										
Scheme and		١	No. of Hour	s/Week		Total teaching	Credits					
Credits	L	Т	Р	SS	Total	hours						
	03	03 00 02 00 04 52 04										
CIE Marks: 50	SEE Mark	s: 50	Total Ma	x. marks=100	Duration of SEE: 03 Hours							

### **COURSE OBJECTIVE:**

- To remember fundamental concepts about data and its identification.
- To analyze the design of Hadoop Distributed Files system.
- To understand and analyze Map Reduce technique for solving Big Data problems.
- To analyze different Hadoop related tools like Pig, Hive and HBase.

### **UNIT I: Introduction to Big Data**

# Introduction, Applications, Basic Nomenclature, Analysis Process Model, Analytical Model Requirements, cloud and Big Data – Predictive Analytics, Crowd Sourcing Analytics, Inter- and Trans-Firewall Analytics.

### **Hadoop Fundamentals**

Data, Data Storage and Analysis, Grid Computing, Volunteer Computing, A Brief History of Hadoop, Apache Hadoop and the Hadoop Ecosystem.

### **UNIT II: The Hadoop Distributed File system**

The Design of HDFS, HDFS Concepts, Blocks, Name nodes and Data nodes, HDFS Federation, HDFS High-Availability, The Command Line Interface, Basic File system Operations, Hadoop File systems Interfaces, The Java Interface, Reading Data from a Hadoop URL, Reading Data Using the File System API, Writing Data, Directories, Querying the File system, Deleting Data, Data Flow Anatomy of a File Read, Anatomy of a File Write.

### **UNIT III: Map Reduce**

A Weather Dataset ,Data Format, Analyzing the Data with Unix Tools, Analyzing the Data with Hadoop, Map and Reduce, Working of Map Reduce - Anatomy of a Map Reduce Job Run, Failures, Shuffle and Sort, Task Execution, Map Reduce Formats - Input Formats, Output Formats

### **UNIT IV: NOSQL and Hadoop Tool**

11 hours

### 10 hours

11 hours

### NOSQL Data Management

Introduction to NoSQL, Key-value pair databases, Document databases, Column family databases, Graph databases.

### Hadoop Tool-Pig

Pig – Grunt – pig data model – Pig Latin – developing and testing Pig Latin scripts, **Pig Latin** – Structure, Statements, Expressions, Types, Schemas, Functions, Macros, User-Defined Functions – A Filter UDF, An Eval UDF, A Load UDF.

### **UNIT V: Hadoop Tool-Hive**

### 10 hours

Installing Hive – The Hive shell, Hive – Architecture, data types and file formats – HiveQL data definition – HiveQL data manipulation – HiveQL queries. Tables – Managed Tables and External Tables, Partitions and Buckets, Importing Data, Querying Data – Sorting and Aggregating, Storage Formats, Joins, Sub queries, Views. Implementation of case studies.

### TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

### **COURSE OUTCOMES:**

- CO1: Explain the fundamentals of big data analytical techniques and usage of hadoop tools.
- CO2: Analyse Hadoop ecosystem and Map Reduce concept to solve big data problems.
- CO3: Design a Map-Reduce model to process the data using tools for a use case.
- **CO4:** Evaluate the performance of data analytics and visualize the results.

### TEXT BOOKS

- 4. Machine Learning, Tom M Mitchel, McGraw Hill publications, ISBN-0070428077
- Principles of Soft Computing, Dr. S. N. Sivanandam, Dr. S. N Deepa, Weilly India, 2<sup>nd</sup> Edition, 2011.
- 6. Josh Patterson and Adam Gibson, Deep Learning, A practitioner's approach, First edition, Shroff Publishers and Distributors Pvt. Ltd., 2017

### **REFERENCE BOOKS**

- **4.** Jake Vander plas, "Python Data Science Handbook: Essential tools for working with data", O'Reilly Publishers, I Edition.
- 5. Ethem Alpaydin "Introduction to Machine Learning" 2nd Edition PHI Learning Pvt. Ltd-New Delhi.

### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	<b>PO8</b>	PO9	PO10	PO11	PO12
--	-----	-----	-----	-----	-----	-----	-----	------------	-----	------	------	------

CO1	М	Н										М
CO2	L	М		Н				М				
CO3	L	L		Н	Н			Μ		Н	Μ	L
CO4	L	L		Н	Н			Μ		Н	Μ	L
Strength of correlation: Low-1, Medium- 2, High-3												

### Dr Ambedkar Institute of Technology, Bengaluru-56 Department of Master of Computer Applications Scheme and Syllabus - CBCS – 2021 -2022

Semester	III										
Course Title	PROGRAMMING USING C#										
Course Code	22MCA343										
Category	Computer Applications										
Scheme and		]		Total	Credits						
Credits	L	Т	Р	SS	Total	teaching					
						hours					
	03	00	02	00	04	52	04				
CIE Marks: 50	SEE Marks: 50		Total Max	. marks=100	Duration of SEE: 03 Hours						

### **COURSE OBJECTIVE:**

- To describe the Fundamentals of .Net framework
- To demonstrate Object Oriented Programming concepts using C#
- To implement delegates, event handling and exception handling
- To develop Web applications using ASP.NET, ADO.NET

### UNIT I : Getting started with .NET Framework 4.0 and C#

### 7 hours

Understanding Previous Technologies, Benefits of .NET Framework, Architecture of .NET Framework 4.0, .NET Execution Engine, Components of .NET Framework 4.0: CLR, CTS, Metadata and Assemblies, .NET Framework Class Library, Windows Forms, ASP .NET and ASP .NET AJAX, ADO .NET, Windows workflow Foundation, Windows Presentation Foundation, Windows Communication Foundation, Widows Card Space and LINQ.

Introducing C#: Need of C#, C# Pre-processor Directives, Creating a Simple C# Console Application, Identifiers and Keywords. Data Types, Variables and Constants: Value Types, Reference Types, Type Conversions, Boxing and Unboxing, Variables and Constants. Expression and Operators: Operator Precedence, Using the?? (Null Coalescing) Operator, Using the: (Scope Resolution) Operator and Using the is and as Operators. Control Flow statements: Selection Statements, Iteration Statements and Jump Statements

### UNIT II: Namespaces, Classes and Object-Oriented Programming

### 8 hours

Namespaces, The System namespace, Classes and Objects: Creating a Class, Creating an Object, Using this Keyword, Creating an Array of Objects, Using the Nested Classes, Defining Partial Classes and Method, Returning a Value from a Method and Describing Access Modifiers. Static Classes and Static

Class Members. Properties: Read-only Property, Static Property. Accessibility of assessors and Anonymous types. Indexers, Structs: Syntax of a struct and Access Modifiers for structs. System.Object Class

Encapsulation: Encapsulation using assessors and mutators, Encapsulation using Properties. Inheritance: Inheritance and Constructors, Sealed Classes and Sealed Methods, Extension methods.

Polymorphism: Compile time Polymorphism/ Overloading, Runtime Polymorphism/ Overriding. Abstraction: Abstract classes, Abstract methods. Interfaces: Syntax of Interfaces, Implementation of Interfaces and Inheritance

### UNIT III: Delegates, Events, Exception Handling

Delegates: Creating and using Delegates, Multicasting with Delegates.

Events: Event Sources, Event Handlers, Events and Delegates, Multiple Event Handlers.

Exception Handling: The try/catch/throw/finally statement, Custom Exception. System. Exception, Handling Multiple Exception

### **UNIT IV: Graphical User Interface with Windows Forms**

Introduction, Windows Forms, Event Handling: A Simple Event- Driven GUI, Control Properties and Layout, Labels, TextBoxes and Buttons, GroupBoxes and Panels, CheckBoxes and RadioButtons, ToolTips, Mouse-Event Handling, Keyboard-Event Handling. Menus, Month Calendar Control, LinkLabel Control, ListBox Control, ComboBox Control, TreeView Control, ListView Control, TabControl and Multiple Document Interface (MDI) Windows.

### UNIT V: Web App Development and Data Access using ADO.NET

Introduction to Web Basics, Multitier Application Architecture, First Web Application: Building Web-Time Application, Examining Web-Time.aspx's Code-Behind File, Understanding Master pages, Standard Web Controls: Designing a Form, Validation Controls, GridView Control, DropDownList, Session Tracking.Set up the sample database,Create the forms and add controls,Store the connection string,Retrieve the connection string,Write the code for the forms,Test your application ASP.NET AJAX: Exploring AJAX,Need for AJAX, AJAX and other technologies, AJAX Server Controls, ScriptManager control, Update Panel, UpdateProgress Control, Creating Simple Application using AJAX Server Controls.

### TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

### **COURSE OUTCOMES:**

• **CO1:** Distinguish the features of C# and client-server concepts using .Net Framework Components.

### 8 hours

8 hours

- **CO2:** Demonstrate delegates, events and exception handling with ASP, Win Form, ADO.NET.
- **CO3:** Develop Graphical User Interface for various applications.
- **CO4:** Develop Web based and Console based applications with database connectivity.

### TEXT BOOKS

- 1. .NET 4.0 Programming (6-in-1), Black Book, Kogent Learning Solutions Inc., Wiley- Dream Tech Press.Robert W. Sebesta: Programming the World Wide Web, 7th Edition, Pearson Education, 2012.
- 2. Paul Deitel and Harvey Deitel: C# 2010 for Programmers, 4th Edition, Pearson Education.

### **REFERENCE BOOKS**

- 1. Andrew Trolsen: Pro C# 5.0 and the .NET 4.5 Framework, 6th Edition, WileyAppress.
- 2. Bart De Smet: C# 4.0 Unleashed, Pearson Education- SAMS Series.
- 3. Herbert Schildt: Complete Reference C# 4.0, Tata McGraw Hill, 2010.

### **EBOOKS/ONLINE RESOURCES**

- 1. https://dotnet.microsoft.com/en-us/learn/csharp
- 2. https://www.w3schools.com
- 3. https://www.programiz.com/csharp-programming

### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	<b>PO1</b>	PO2	<b>PO3</b>	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	PO10	PO11	<b>PO1</b>
CO	Η	L	L	Μ	L			L				
CO	Η	Η	L	Μ								
СО	Μ	Η	Μ	Η	L							
СО	Μ	Η	Η	Η	Η							
Strength of correlation: Low-1, Medium-2, High-3												
Semester	III											
---------------	------------------------------------	------------------------	------------	---------	------------------	----------------	---------	--	--			
Course Title	BLOCK	BLOCK CHAIN TECHNOLOGY										
Course Code	22MCA	2MCA351										
Category	Computer	omputer Applications										
Scheme and			No. of Hou	rs/Week		Total teaching	Credits					
Credits	L	Т	Р	SS	Total	hours						
	03	00	00	00	03	40	00					
CIE Marks: 50	SEE Marks: 50 Total Max. marks=100			Durati	on of SEE: 03 Ho	ours						

## **COURSE OBJECTIVE:**

- Designed to provide the conceptual understanding of the blockchain
- Learn the working technology of blockchain
- Understand the application scenarios of blockchain
- Implement blockchain in Ethereum technology
  UNIT I: Basis of Blockchain Technology

UNIT I: Basis o	of Blockchain Technology	8 hours
Introduction to B	Blockchain, growth – Definition – Elements of Blockchain, Tiers,	Types, Consensus,
Decentralization:	: Methods of Decentralization, Routes to decentralization, Bl	ockchain and full
ecosystem decent	tralization	

UNIT II: Blockchain Mining	8 hours
Blockchain: The structure of block, The structure of block header, genesis block - Minin	ng: Tasks,
Rewards, Proof of Work, Mining Algorithm, Mining Systems: CPU, GPU, FGPA, ASIC- Min	ing Pools.
UNIT III: Use case - Financial Markets and Smart Contracts	8 hours
Trading, Exchanges, Trade Lifecycle, order anticipators, Market, Manipulation, Smart G	Contracts:
Templates, Smart Oracles, Deploying smart contracts in Blockchain	
UNIT IV: Generic Use Cases	8 hours
Block Chain as Evidences – Digital Art -Block Chain Health–Blockchain Government	
UNIT V: Technology on Ethereum	8 hours
Ethereum blockchain, Ethereum network: main net, test net, private net, components of	Ethereum

ecosystem, Ethereum Virtual Machine

## TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

### **COURSE OUTCOMES:**

CO1: Understand the structure and underlying technology of blockchain

**CO2:** Analyze the application scenarios of blockchain

**CO3:** Apply the blockchain technology to build a blockchain system

### **TEXT BOOKS**

- 1. Mastering Blockchain, by Imran Bashir, II edition Packt Publications
- 2. BlockChain: Blueprint for a new economy, by Melanie Swan O'Reilly Publications

### **REFERENCE BOOKS**

- 1. "BlockChain: A Beginners Guide", Authors: Shermin Voshmgir, Valentin Kalinov Publisher: <u>https://blockchainhub.net/</u>
- 2. "Cryptocurrency and Bitcoin Technologies", Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder published by Princeton University press 2016

### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	PO11	<b>PO12</b>
CO1	Μ	Н					L					
CO2			Н				L			М		
<b>CO3</b>			Н	L	Μ		L			М		
Stren	gth of c	orrelat	ion: Lo	ow-1, M	edium-	2, High-	3					

Semester	III								
Course Title	ENTER	ENTERPRISE RESOURCE PLANNING							
Course Code	22MCA	2MCA352							
Category	Computer	omputer Applications							
Scheme and			No. of Hou	rs/Week		Total teaching	Credits		
Credits	L	Т	Р	SS	Total	hours			
	03	00	00	00	03	40	03		
CIE Marks: 50	SEE Mar	rks: 50	Total Ma	x. marks=100	Duration of SEE: 03 Hours				

### **COURSE OBJECTIVE:**

- Identify the different ERP related Technologies and their benefits
- Understand the Various Business Modules
- ERP implementation using different Techniques
- Learn different ERP vendors and practice them

## UNIT I: ERP and Related Technologies

**Business Process Re-engineering:** Management Information systems, Decision Support Systems, Executive Information Systems- Advantages of EIS; Disadvantages of EIS,

**Data Warehousing**: Data Mining, On-Line Analytical Processing, Product Life Cycle Management, Supply Chain Management, ERP Security

# **UNIT II: Benefits of ERP**

Reduction of Lead-time, On-time shipment, Reduction in cycle time, ImprovedResource Utilization, Better Customer Satisfaction, Improved Supplierperformance, Increased flexibility, Reduced quality costs, improved information Accuracy and Decision-making capability.

### **UNIT III: Business Modules**

**Business Modules**: Business Modules in an ERP Package, Finance, Manufacturing, Human Resource, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution.

## **UNIT IV: ERP Implementation Life Cycle**

**ERP Tools and Software:** ERP Selection Methods and Criteria, ERP Selection Process, ERP Vendor Selection.

**ERP** Implementation Lifecycle: Pros and cons of ERP implementation, Factors for the Success of an ERP Implementation, Latest ERP Implementation Methodologies.

# **UNIT V: Different ERP Vendors**

**ERP Vendors:** SAP-AG: Products and technology R/3 overview; SAP advantage, Baan Company. **Oracle Corporation**: Products and technology; Oracle Application; Vertical solutions, Microsoft Corporation, QAD

Case Study - hands on exercises using various ERP tools.

### 8 hours

8 hours

8 hours

8 hours

8 hours

## TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

### **COURSE OUTCOMES:**

**CO1:** Acquire knowledge of ERP related technologies and their benefits.

CO2: Analyze various Business Modules.

**CO3:** Apply ERP implementation in different business organizations

CO4: Evaluate various ERP tools and apply on different models.

### TEXT BOOKS

- 1. Alexis Leon, Enterprise Resource planning, McGraw-Hill Education (India), 2014
- **2.** Garg, vinod kumar, venkitakrishnan n. k., Enterprise Resource planning concepts and practice, 2016
- 3. Ellen F. Monk, Bret J. Wagner, Concepts of Enterprise Planning, Cengage, 2013

### **REFERENCE BOOKS**

- 1. Enterprise Resource Planning, Mary Sumner, Pearson Education, Fourth Impression2009.
- 2. The SAP R /3 Hand book, Jose Antonio Fernandz, , Tata McGraw Hill
- 3. Enterprise Resource Planning, Mahadeo Jaiswal & Ganesh Vanapalli, Macmillan, 1/e 2005

### SCHEME FOR EXAMINATIONS

- Each full question consists of 20 marks.
- Questions are set covering all the topics under each module

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	PO11	<b>PO12</b>
CO1					3	2						
CO2									3		2	1
CO3									3		2	1
<b>CO4</b>					3		1					
Stren	gth of c	orrelat	ion: Lo	ow-1, M	edium-	2, High-	3					

Semester	III								
Course Title	CYBER	CYBER SECURITY							
Course Code	22MCA	22MCA353							
Category	Compute	omputer Applications							
Scheme and		1	No. of Hours/V	Week		Total	Credits		
Credits	L	Т	Р	SS	Total	teaching			
						hours			
	03	00	00	00	03	40	03		
CIE Marks: 50	SEE Marks:		Total Max.	marks=100	<b>Duration of SEE: 03 Hours</b>				
	50								

## **COURSE OBJECTIVE:**

- To prepare students with the technical knowledge and skills needed to protect and defend computer systems and networks.
- To develop graduates that can identify, Analyse, remediate computer security breaches.

## **UNIT I : Introduction, Cybercrime**

Definition and Origins of the word, Cybercrime and information Security, Who are Cybercriminals? Classifications of Cybercrimes. How Criminals Plan Them – Introduction, How Criminals Plan the Attacks, Cyber cafe and Cybercrimes, Botnets, Attack Vector, The Indian IT ACT 2000.

## UNIT II: Tools and Methods used in Cybercrime

Introduction, Proxy Server and Anonymizers, Password Cracking, Key loggers and Spyware, Virus and Warms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow

## **UNIT III: Phishing and Identity Theft**

Introduction, Phishing – Methods of Phishing, Phishing Techniques, Phishing. Toolkits and Spy Phishing. Identity Theft – PII, Types of Identity Theft, Techniques of ID Theft. Digital Forensics Science, Need for Computer Cyber, Forensics and Digital Evidence, Digital Forensics Life Cycle.

**UNIT IV: Phishing and Identity Theft** 

### 8 hours

8 hours

8 hours

#### 8 hours

UNIX Command Lines, Backtrack Linux, Mac Ports, Cygwin, Windows Power Shell. NetCatCommands, Net Cat Uses, SSH, Data Pipe, Fpipe

8 hours

**UNIT V: : Network Defense tools** 

Firewalls and Packet Filters: Firewall Basics, Packet Filter Vs Firewall, How a Firewall Protects a Network, Packet Characteristic to Filter, Stateless VsStateful Firewalls, Network Address Translation (NAT) and Port Forwarding, the basic of Virtual Private Networks, Linux Firewall, Windows Firewall, Snort: Introduction Detection System.

## TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

## **COURSE OUTCOMES:**

- **CO1:** To Create Solutions in Incident Handling and Implement Cyber security Best Practices and Risk Management.
- **CO2:** Communicate in a Written and Professional Manner to Strategize Identify and Implement Legal Ramifications.
- **CO3:** Integrate Network Monitoring and Present Real-Time Solutions Understand Software Design and Secure Practices.
- **CO4:** Implement Cyber security concepts in real time projects.

## TEXT BOOKS

- 1. Sunit Belapure and Nina Godbole, "Cyber Security: Understanding cyber crimes, computer forensics and legal perspectives", Wiley India Pvt. Ltd, 2013
- 2. James Graham, Ryan Olson, Rick Howard, "Cyber SecurityEssentials", CRC Press 2010

## **REFERENCE BOOKS**

- 1. Bill Nelson, Amelia Philips and Christopher Steuart, "Guide to Computer Forensics and Investigations", 4<sup>th</sup> Edition, 2015
- 2. Network Security Essentials: Applications and Standards, by William Stallings. Prentice Hall
- 3. Cryptography: Theory and Practice by Douglas R. Stinson, CRC press.

## **EBOOKS/ONLINE RESOURCES**

- 4. https://www.w3schools.com
- 5. https://www.tutorialspoint.com
- 6. https://www.javatpoint.com

## SCHEME FOR EXAMINATIONS

• Each full question consists of 20 marks.

## • Questions are set covering all the topics under each module

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	L		Η		Μ							
CO2	Μ		Н							L		

<b>CO3</b>	H				Μ	L	
CO4	Μ	Н			$\mathbf{L}$		
Strength of c	correlation: Lo	ow-1, Medi	um- 2, I	High-3			

Semester	III							
Course Title	MACHIN	MACHINE LEARNING & DEEP LEARNING LAB						
Course Code	22MCAL3	36						
Category	Computer A	Computer Applications						
Scheme and		Ν	No. of Hour	s/Week		Total teaching	Credits	
Credits	L	Т	Р	SS	Total	hours	1	
	00	00	02	00	02	26	01	
CIE Marks: 50	SEE Mark	s: 50	Total Ma	x. marks=100	Duration of SEE: 03 Hours			

# Dr Ambedkar Institute of Technology, Bengaluru-56

Department of Master of Computer Applications Scheme and Syllabus - CBCS – 2022 -2024

## **COURSE OBJECTIVE:**

- To understand Pre-processing techniques and perform exploratory data analysis.
- Identify and apply Machine Learning algorithms and deep learning algorithm to solve real world problems
- To develop skills of using recent machine learning & deep learning tools for solving practical problems

	Lab Programs
	Complete the Installation of Node, Installation of React & Installation of Mongo as a prerequisite to perform the lab exercises.
1.	Implement FIND S Algorithm using python to get Maximally Specific Hypothesis.
2.	Implement Linear Regression using Python Script and identify explanatory variables.
3.	Implementation of Multiple Linear Regression for House Price Prediction using sklearn.
4.	Write a program to demonstrate the working of the decision tree.
5.	Implement clustering technique for a given data set in python.
6.	Analyse Bayes Theorem for any real-world scenario.
7.	Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
8.	Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.

9.	Implement Convolutional Neural Network for predicting hand written digits.

### **COURSE OUTCOMES:**

**CO1:** Implement exploratory data analysis, data visualization and different machine Learning and deep learning Techniques to solve real world problems in Python.

### SCHEME FOR EXAMINATIONS

## • Student has to pick one question from a lot of 9 programs

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	<b>PO9</b>	PO10	PO11	PO12
CO1	L	L		Н	Н		Н	М		Н	М	L
Strength of correlation: Low-1, Medium-2, High-3												

Semester	III										
Course Title	FULL ST	FULL STACK WEB DEVELOPMENT LAB									
Course Code	22MCAL	2MCAL37									
Category	Computer A	Computer Applications									
Scheme and		1	No. of Hour	s/Week		Total teaching	Credits				
Credits	L	Т	Р	SS	Total	hours					
	00	00	02	00	02	26	01				
CIE Marks: 50	SEE Marks: 50Total Max. marks=100Duration of SEE: 03 Hours										

## **COURSE OBJECTIVE:**

- To develop single page application using React
- Demonstrate interactive applications with react components, state and props.
- To build an HTTP server using the different modules in Node.js.
- To develop an interactive web application with React, Node and NOSQL database.

	Lab Programs
	Complete the Installation of Node, Installation of React & Installation of Mongo as a prerequisite to perform the lab exercises.
1.	Design a React program to perform a toggle operation on a click of a button using props.
2.	Develop a program to print the textbox value on an alert box using States.
3.	Build Student Registration Portal using entities like component, State and Props.
4.	Design a calculator application using React components and implement using NodeJS local Modules.
5.	Build a basic registration form in React where users can enter first name, last name, and email. Post-registration, an error message is displayed for each field if validation fails else a success message is shown.
6.	Implement file operations using NodeJS file system Module.
7.	Create a Node.js file that reads the requested file and returns the content to the client using routers. If anything goes wrong, throw a 404 error:
8.	Build a REST application for Library Management using NodeJS & Express JS.
9.	Connect to NOSQL-MongoDB and create database and collections using mongo DB Shell.
10.	Perform CRUD operations with NodeJS with MongoDB.

### **COURSE OUTCOMES:**

CO1: Build an interactive web application with React, Node, Express and MongoDB database.

## SCHEME FOR EXAMINATIONS

• Student has to pick one question from a lot of 10 programs

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	<b>PO9</b>	PO10	PO11	PO12
CO1		М		М	М		Η			Н	Н	
Stren	Strength of correlation: Low-1, Medium-2, High-3											

Course Title	MINI PI	ROJEC	<b>T-2</b>				
Course Code	22MCA	M38					
Category	Compute	r Appli	cations				
Scheme and			No. of Hou	rs/Week		Total teaching	Credits
Credits	L	Т	Р	SS	Total	hours	
	00	00	4	00	04	52	02
CIE Marks: 50	SEE Marks: 50Total Max. marks=100Duration of SEE: 03 Hours						

### **COURSE OBJECTIVE:**

• Students will develop an application using any latest technology

Sync	psis
~	1

52 hours

- A team of two students must develop the mini project.
- Synopsis of the project must be submitted in the beginning of the 3<sup>rd</sup> semester
- The synopsis of the project must include: Problem formulation and literature survey. Details of the required tools and technologies for the development of project.
- Internal assessment shall be evaluated by the internal panel/guide for 50 marks. The team must submit a brief project report (25-30 pages) that must include the following
- ➢ Introduction
- Requirement Analysis
- Software Requirement Specification
- Analysis and Design
- ➢ Implementation
- ➤ Testing

The report must be evaluated for 10 Marks. Demonstration and Viva for 40 Marks.

The project presentation and Viva-voce shall be evaluated jointly by both the internal and external examiners for 50 marks.

## TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

### **COURSE OUTCOMES:**

**CO1:** Design and develop an applications for real world scenario.

### SCHEME FOR EXAMINATIONS

The report must be evaluated for 10 Marks. Demonstration and Viva for 40 Marks.

The project presentation and Viva-voce shall be evaluated jointly by both the internal and external examiners for 50 marks.

<b>CO</b> /	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	L	Μ		S	Μ	Μ		S			S	

# Dr Ambedkar Institute of Technology, Bengaluru-56 Department of Physics Scheme and Syllabus - CBCS – 2022 -2024

Course Title	INDUST	INDUSTRY INTERNSHIP									
Course Code	22MCA	[39									
Category	Compute	r Appli	cations								
Scheme and			No. of Hou	rs/Week		Total teaching	Credits				
Credits	L	Т	Р	SS	Total	hours					
	00	00	2	00	02	26	02				
CIE Marks: 50	SEE Mar	·ks: 50	Total Ma	x. marks=100	Duration of SEE: 03 Hours						

### **COURSE OBJECTIVE:**

• Students will develop an application using any latest technology

### **Internship - Guidelines**

- $\circ$  The students should undergo an internship for 4 weeks during the vacation soon after the 2<sup>rd</sup> semester SEE.
- The internship shall be carried out in an Industry/R&D labs or Institution
- The student should submit the internship report and make the presentation to the internal panel.
- The internal panel will evaluate the internship work for 50 Marks.
- SEE will be conducted for Internship and will be evaluated for 50 Marks

TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

### **COURSE OUTCOMES:**

**CO1:** Learn new technology and implement in the real world problems in association with the industry.

### SCHEME FOR EXAMINATIONS

- The internal panel will evaluate the internship work for 50 Marks.
- SEE will be conducted for Internship and will be evaluated for 50 Marks

CO/	PO	PO	PO	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO1</b>	<b>PO11</b>	<b>PO12</b>
CO	L	Μ		S	Μ	Μ		S			S	

Semester	IV	IV									
Course Title	MOOCs	MOOCs									
Course Code	22MCA	AUD41									
Category	Computer	Computer Applications									
Scheme and			No. of Hou	rs/Week		Total teaching	Credits				
Credits	L	Т	Р	SS	Total	hours					
	00	00 00 00 00 00 - 00									
CIE Marks: 00	SEE Marks: -0 Total Max. marks=0 Duration of SEE: -0										

### Guidelines

- A student has to register and complete MOOC course individually
- Students shall take up any online courses which is chosen from any platform like NPTL, Swayam, Course Era, edx etc. in the areas Technical writing, Aptitude skills, Personality Development etc..
- $\circ$   $\,$   $\,$  The course duration must span 4-6 weeks.
- This course does not have any CIE or SEE however, student must produce completion certificate for the course taken up during their MCA Course. The result is decided either pass or fail based on the course in the stipulated time.

### **COURSE OUTCOMES:**

CO1- Acquiring a sound technical knowledge of their selected course topic

### SCHEME FOR EXAMINATIONS

Students have to present a technical seminar topic for CIE

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	PO10	PO11	PO12
<b>CO1</b>						Н	Μ		Н			

Semester	IV	IV									
Course Title	TECHN	TECHNICAL SEMINAR									
Course Code	22MCA	S42									
Category	Computer	Applica	ations								
Scheme and			No. of Hou	rs/Week		Total teaching	Credits				
Credits	L	Т	Р	SS	Total	hours					
	00	00 00 02 00 02 - 02									
CIE Marks: 50	SEE Marks: - Total Max. marks=50 Duration of SEE: -										

## **COURSE OBJECTIVE:**

• Students will Present technical seminar by learning new technologies

### **Seminar Guidelines**

- Selection of topic/area : The seminar should be related to the mini project undertaken.
- Obtain the approval from the guide for the selected topic.
- Study of topic: Students are informed to acquire a thorough knowledge on the subject by referring back papers and reference books (These may be included as references at the end of the paper) on the corresponding area.
- Preparation of slides for presentation: Slides may be presented in MS power point.
- Time allowed for presentation is 20 minutes for presentation and 5 minutes for discussions.So, number of slides may be around 20 25 to adhere the time limit.Organization of slides:
- The first slide will be a title page showing the title, name of student (presenter), USN.and Semester. 2nd page will contain overview of the seminar
- Successive pages will contain bjectives of the paper Introduction Body of the paper includes system dynamics, methodology, graphs, block diagrams etc. arranged in a logical sequence depending on the problem. Results and discussions

### TEACHING LEARNING PROCESS: Chalk and Talk, power point presentation, animations, videos

### **COURSE OUTCOMES:**

CO1- Demonstrate a sound technical knowledge of their selected seminar topic

### SCHEME FOR EXAMINATIONS

Students have to present a technical seminar topic for CIE

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	PO10	PO11	PO12
CO1		Н				М	Μ		Н			

Semester	IV										
Course Title	PROJECT WORK										
Course Code	22MCAP43										
Category	Computer Applications										
Scheme and			No. of Hou		Total teaching	Credits					
Credits	L	Т	Р	SS	Total	hours					
	00	00	04	00	04	16	23				
<b>CIE Marks:</b>	SEE Ma	rks:	Total Max. marks=200 D			Duration of SEE: 03 Hours					
50	150										

## **COURSE OBJECTIVE:**

Apply the student's knowledge and implementation skills. Learn any specific technical skills required and apply them to the project work

## Synopsis

- □ Synopsis of the project must be submitted before the end of the first month of 4<sup>th</sup>semester
- □ The synopsis of the project must include:
  - Problem formulation and literature survey.
  - Details of the required tools and technologies for the development of project.
  - Write up shall not exceed 15 pages.

Internal assessment for synopsis presentation and evaluation of the synopsis by the internal panel/guide is for 100 marks.

## **Dissertation:**

- The project shall be carried out in the same institution or in industry/R&D labs based on software tools and technologies learnt in MCA course/internship forminimum period of 16 weeks.
- Internal assessment shall be evaluated by the internal panel/guide for **50** marks. For continuous evaluation of project work by the internal examiner/guide with progress reports is for 10 marks each. (3 progress reports x 10 marks= 30)
- Final presentation for the entire project is evaluated for 20 marks by the project Guide.
- The internal examiners (Project Guide with at least 3 years of experience) and the external examiners shall be appointed by the authorities of the college for the final evaluation of the project.
- Internal and external examiners shall carry out the evaluation of Dissertation report for 75 marks individually. The average of the marks allotted by the internal and external examiners

shall be the final marks for the project Dissertation report evaluation. The project presentation and Viva-voce shall be evaluated jointly by both the internal and external examiners for 75 marks. The student shall publish the project outcome in the reputed journals.

### **COURSE OUTCOMES:**

Ddemonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study.

### SCHEME FOR EXAMINATIONS

Internal assessment shall be evaluated by the internal panel/guide for 50 marks. Decertation report will be evaluated for 75 marks by both external and internal examiner. Viva-voce shall be evaluated jointly by both the internal and external examiners for 75 marks.

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	PO10	PO11	PO12
CO1	Н	Н	Н	М	Н	М	Μ	М	Н	L	L	L
Strength of correlation: Low-1, Medium- 2, High-3												