

MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE

(An Autonomous College)

Affiliated to Periyar University, Salem | Accredited by NAAC with 'A' Grade

Recognized by UGC under Section 2(f) & 12 (B)



ESTD-1994

**MUTHAYAMMAL
COLLEGE OF ARTS
AND SCIENCE**

(Autonomous)

A UNIT OF VANETRA GROUP

| Learn.
Lead

www.muthayammal.in

DEGREE OF MASTER OF SCIENCE

Learning Outcomes - Based Curriculum Framework

- Choice Based Credit System



Syllabus for M.Sc., Computer Science (Semester Pattern)

(For Candidates admitted from the academic year
2021 -2022 and onwards)





Muthayammal College of Arts and Science

Rasipuram-637 408

VISION

- To redefine the scope of higher education by infusing into each of our pursuits, initiatives that will encourage intellectual, emotional, social and spiritual growth, thereby nurturing a generation of committed, knowledgeable and socially responsible citizens.

MISSION

- To Ensure State of the world learning experience
- To espouse value based Education
- To empower rural education
- To instill the spirit of entrepreneurship and enterprise
- To create a resource pool of socially responsible world citizens

Department of PG Computer Science

VISION

- To redefine the scope of higher education by infusing into each of our pursuits, initiatives that will encourage intellectual, emotional, social and spiritual growth, thereby nurturing a generation of committed, Knowledgeable and socially responsible citizens.

MISSION

- To Ensure State of the world learning experience
- To espouse value based Education
- To empower rural education
- To instil the sprite of entrepreneurship and enterprise
- To create a resource pool of socially responsible world citizens

PROGRAMME EDUCATIONAL OBJECTIVES (PEOS)

PEO1: Post Graduates will be able to promote learning environment to meet the industry expectation.

PEO2: Post Graduates will be incorporated the critical thinking with good Communication and Leadership skills to become a self-employed

PEO3: Post Graduates will be upholding the human values and environmental sustenance for the betterment of the society.

GRADUATE ATTRIBUTES

The Graduate Attributes of **M.Sc. COMPUTER SCIENCE** are:

GA 1 Research Skills

GA 2 Multicultural Competitive Skills

GA 3 Critical Thinking

GA 4 Problem Solving

GA 5 Disciplinary Knowledge

GA 6 Moral and Ethical Awareness

GA 7 Self Directed Learning

PROGRAMME OUTCOMES (POs)

- PO1:** Post graduates will attain profound proficiency and expertise
- PO2:** Post graduates will be ensured with corporative self – directed learning
- PO3:** Post graduates will acquires acumen to handle diverse contexts and function in domains of multiplicity;
- PO4:** Post graduates will exercise intelligence in research Investigations and Introducing innovations.
- PO5:** Post graduates will learn ethical values and commit to Professional ethics

PROGRAMME SPECIFIC OUTCOMES (PSOs)

- PSO1:** Provides technology-oriented students with the knowledge.
- PSO2:** Students understand the computer subjects with demonstration of all programming and theoretical concepts with the use of ICT
- PSO3:** Get industrial exposure through the one month Industrial Internship in IT industry
- PSO4:** Interact with IT experts & knowledge by IT visits
- PSO5:** To develop creative solutions, critical thinking, analyses and research skills

SEM	COURSE_CODE	TITLE OF THE COURSE	Hrs./W		CREDIT POINTS	MAX.MARKS		
			Lect.	Lab.		CIA	ESE	TOTAL
I	21M1PCSC01	Design And Analysis Of Algorithms	4		4	25	75	100
I	21M1PCSC02	Distributed Operating System	4		4	25	75	100
I	21M1PCSC03	Advanced Java Programming	4		4	25	75	100
I	21M1PCSC04	Internet Of Things	4		4	25	75	100
I	21M1PCSE01	Advanced Computer Architecture	4		4	25	75	100
I	21M1PCSP01	Practical : Advanced Java Programming		5	2	40	60	100
I	21M1PCSP02	Practical : Algorithms Using C++		5	2	40	60	100
I		TOTAL	20	10	24	205	495	700
II	21M2PCSC05	Advanced Web Technology	4		4	25	75	100
II	21M2PCSC06	Compiler Design	4		4	25	75	100
II	21M2PCSC07	Data Mining	4		4	25	75	100
II	21M2PCSE02	Advanced Database Management System	4		4	25	75	100
II	21M2PMAED1	Numerical And Statistical Methods	4		4	25	75	100
II	21M2PCSP03	Practical : Web Technology		4	2	40	60	100
II	21M2PCSP04	Practical : Datamining		4	2	40	60	100
II	21M2PHUR01	Human Rights	2		2	100		
II		TOTAL	22	8	26	305	495	700

[Signature]
HOD-CS

DEPARTMENT OF COMPUTER SCIENCE
MUTHAYAMMAL COLLEGE OF ARTS & SCIENCE
RASIPURAM-637 408.
NAMAKKAL (DT)



[Signature]
PRINCIPAL
MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE
(AUTONOMOUS)
RASIPURAM - 637 408,
NAMAKKAL DISTRICT.

III	21M3PCSC08	Cryptography and Network Security	4		4	25	75	100
III	21M3PCSC09	Mobile Application Development	4		4	25	75	100
III	21M3PCSC10	Object Oriented Analysis And Design	4		4	25	75	100
III	21M3PCSC11	Open Source Computing	4		4	25	75	100
III	21M3PCSE07	BIG DATA ANALYSIS	4		4	25	75	100
III	21M3PCSP05	Practical : Mobile Application Development		4	2	40	60	100
III	21M3PCSP06	Practical : Python Programming		4	2	40	60	100
III	21M3PCSI1	Industrial Training		2	2	100		
III		TOTAL	20	10	26	305	495	700
IV		ELECTIVE - IV	5		4	25	75	100
IV		ELECTIVE - V	5		4	25	75	100
IV	21M4PCSPR1	Project Work		8	4	50	150	200
IV	21M4PCSOE1	COMPUTER SCIENCE FOR COMPETITIVE EXAMINATIONS			2	100		
IV		TOTAL	10	8	14	200	300	400
		OVERALL TOTAL	72	36	90	1015	1785	2500
IV	21M4PCSEC1	MOOC COURSE/ SWAYAM			2			

[Signature]
HOD - S

DEPARTMENT OF COMPUTER SCIENCE
MUTHAYAMMAL COLLEGE OF ARTS & SCIENCE
RASIPURAM-637 408.
NAMAKKAL (Dt)

[Signature]
PRINCIPAL

PRINCIPAL
MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE
(AUTONOMOUS)
RASIPURAM - 637 408,
NAMAKKAL DISTRICT.



PG - REGULATIONS

1. Internal Examination Marks - Theory

Components	Marks
CIA I & II	10
Attendance	5
Assignment	5
Seminar	5
Total	25

Attendance Percentage	Marks
96% to 100%	5
91% to 95%	4
86% to 90%	3
81% to 85%	2
75% to 80%	1
Below 75%	0

2. Question Paper Pattern for CIA I, II AND ESE (for 75Marks) (3hours)

Section-A (10 Marks) (Objective Type)

10x 1=10 Marks

Answer ALL Questions

ALL questions carry EQUAL Marks

Section-B (15 Marks) (Analytical Type)

Answer any THREE Questions out of FIVE questions

3 x 5=15 Marks

ALL questions carry EQUAL Marks

SECTION-C (50 Marks)

Answer ALL the Questions

5 x 10=50 Marks

Either or Type.

ALL Questions Carry EQUAL Marks

Total 75 Marks

(Syllabus for CIA-I 2.5 Unit, Syllabus for CIA-II All 5 Unit)

2.a) Components for Practical CIA.

Components	Marks
CIA -I	15
CIA - II	15
Observation Note	5
Attendance	5
Total	40

2.b) Components for Practical ESE.

Components	Marks
Completion of Experiments	50
Record	5
Viva	5
Total	60

3. Internship/Industrial Training, Mini and Major Project Work

Internship/Field Work Industrial Training		Project Work	
Components	Marks	Components	Marks
<i>CIA</i> *1		<i>CIA</i>	
Work Diary	25	a)Attendance Marks	20
Report	50	b)Review Marks	30
Viva-voce Examination	25		50
Total	100		
		<i>ESE</i> *1	
		a)Final Report Marks	120
		b)Viva-voce Marks	30
		Total	150
			200

*1Evaluation of report and conduct of viva- voce will be done jointly by Internal and External Examiners

4. Components for Human Rights Course (CIA Only)

- The Course Human Rights is to be treated as 100% CIA course which is offered in II Semester for I year PG students.
- Total Marks for the Course =100

Components	Marks
TwoTests	75
Assignments	25
Total	100

- In case the candidate fails to secure 50 marks, which is the passing minimum, he/she may have to reappear for the same in the subsequent semesters.

5. Guidelines for Competitive Exams- Online Mode- Online Exam 3 hours

Components	Marks
100 Objective Type Questions 100*1=100 Marks	100

Objective type Questions from Question Bank.

- The passing minimum for this paper is 50%
- In case, the candidate fails to secure 50% passing minimum, he/she may have to reappear for the same in the subsequent semesters.

-----X-----

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1PCSC01	DESIGN AND ANALYSIS OF ALGORITHMS	DSC THEORY - I	I	4				4
Objective	1.To understand Data Structures used for Programming and Manipulation of Data. 2.To understand the basics of Design and Analysis of Algorithms.							
Unit	Course Content						Knowledge Levels	Sessions
I	Introduction – Basic Design and Analysis techniques of Algorithms, Correctness of Algorithm. Performance Analysis. Divide and conquer Method: Binary Search, Finding Maximum and Minimum, Merge Sort and Quick Sort.						K1,K2	8
II	Sorting and Searching Techniques: Elementary sorting techniques– Bubble Sort-Insertion Sort. Greedy Methods: Knapsack Problem- Minimum Cost Spanning Trees- Single Source Shortest Path Problem.						K2	8
III	Dynamic Programming: Multistage Graphs, 0/1 knapsack and Traveling Salesman Problem. Basic Traversal and Search Techniques: Techniques for Binary Tree, zx: Depth First Search and Breadth First Search - Connected Components and Spanning Tree - Biconnected Components and DFS- Balanced Trees: Red-Black Trees.						K2,K3,K4	9
IV	Backtracking: 8 Queens Problems, Sum of Subsets, Graph Coloring, Hamiltonian Cycle and Knapsack Problem.						K3,K4	10
V	Branch and Bound: Least Cost Search. Bounding: FIFO Branch and Bound and LC Branch and Bound. 0/1 Knapsack Problem, Travelling Salesman Problem.						K4,K5	10
Course Outcome	CO1: Remember and understand the Concept of Algorithms						K1	
	CO2: Understand and Apply concept of Sorting and Searching						K2	
	CO3: Apply dynamic approach in algorithms						K3	
	CO4: Analyze the concept of Backtracking						K4	
	CO5: Evaluate the concept of Branch and Bound						K5	
Learning Resources								
Text Books	1. E.Horowitz, S. Sahni and Sanguthevar Rajasekaran , Fundamentals of Computer Algorithms , Second edition, Universities Press. 2. Cormen, T.H., Charles, E. Leiserson., Ronald, L. Rivest. (2009). Clifford Stein Introduction to Algorithms (3rd ed.). New Delhi: PHI.							
Reference Books	1. S. K. Basu, Design Methods and Analysis of Algorithms , PHI, 2005. 2. Goodman and S. T. Hedetniem, Introduction to the Design and Analysis of Algorithms, MGH, 1977.							
Website Link	1. https://www.javatpoint.com/daa-tutorial 2. https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

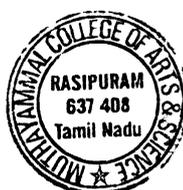
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1PCSC01	DESIGN AND ANALYSIS OF ALGORITHMS	DSC THEORY-I	I	4	4			4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	M	S	S	S	S
CO2	S	M	S	L	S	M	M	S	S	S
CO3	M	S	M	M	S	S	M	S	S	S
CO4	S	M	S	S	M	S	S	M	S	S
CO5	M	S	S	L	M	S	M	S	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	-
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assesment Methods	Attendance, Assignment, Seminar, Internal – I & II

Designed By	Verified By	Approved By
P. SUBRAMANIAM <i>[Signature]</i>	P. Subramaniam <i>[Signature]</i>	A. L. Sany <i>[Signature]</i>



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1PCSC02	DISTRIBUTED OPERATING SYSTEM	DSC THEORY - II	I	4	4			4
Objective	1. To understand hardware and software issues in modern distributed systems. 2. To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed.							
Unit	Course Content						Knowledge Levels	Sessions
I	Introduction – Operating System Definition – Functions of Operating System – Types of Advanced Operating System – Design Approaches – Synchronization Mechanisms – concepts of a Process – Critical Section Problem – Process Deadlock – Models of Deadlock – Conditions for Deadlock – System with single-unit requests, Consumable Resources , Reusable Resources						K1 **	9
II	Distributed Operating Systems: Introduction- Issues – Communication Primitives – Inherent Limitations –Lampport’s Logical Clock, Vector Clock, Global State, Cuts – Termination Detection – Distributed Mutual Exclusion – NonToken Based Algorithms – Lamport’s Algorithm - Token Based Algorithms –Distributed Deadlock Detection – Distributed Deadlock Detection Algorithms – Agreement Protocols						K1,K2	9
III	Distributed Resource Management – Distributed File Systems – Architecture – Mechanisms – Design Issues – Distributed shared Memory – Architecture – Algorithm – Protocols – Design Issues – Distributed Scheduling–Issues–Components–Algorithms.						K2	8
IV	Failure Recovery and Fault Tolerance– Concepts – Failure Classifications – Approaches to Recovery – Recovery in Concurrent Systems– Synchronous and Asynchronous Check pointing and Recovery –Check pointing in Distributed Database Systems – Fault Tolerancelssues – Two-Phase and Non blocking Commit Protocols – Voting Protocols – Dynamic Voting Protocols.						K3,K4	10
V	Multiprocessor and Database Operating Systems –Structures – Design Issues – Threads –Process Synchronization – Processor Scheduling – Memory management– Reliability/Fault Tolerance – Database Operating Systems – concepts– Features of Android OS, Ubuntu, Google Chrome OS and Linux operating systems.						K4,K5	9
Course Outcome	CO1: Remember hardware and software issues in modern distributed systems.						K1	
	CO2: Understand in distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems.						K2	
	CO3: Apply the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed.						K3	
	CO4: Analyze about Shared Memory Techniques						K4	
	CO5: Analyze knowledge about file access.						K4	
Learning Resources								
Text Books	1. Mukesh Singhal N.G.Shivaratri, “Advanced Concepts in Operating Systems”, McGraw Hill2000. 2. Distributed Operating System–Andrew S. Tanenbaum, PHI.							
Reference Books	1.Abraham Silberschatz, Peter B.Galvin, G.Gagne, “Operating Concepts”, 6th Edition Addison Wesley publications 2003. 2.Andrew S. Tanenbaum, “Modern Operating Systems”, 2nd Edition Addison Wesley 2001							
Website Link	https://www.tutorialspoint.com/Distributed-Systems https://www.javatpoint.com/distributed-operating-system							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1PCSC02	DISTRIBUTED OPERATING SYSTEM	DSC THEORY - II	I	4	4			4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	S	M	M	S	L
CO2	S	M	S	M	M	M	S	S	S	M
CO3	S	S	M	S	L	M	M	S	S	S
CO4	M	S	S	S	M	S	S	M	S	S
CO5	S	M	S	L	M	S	S	S	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assessment Methods	Attendance, Assignment, Seminar, Internal – I & II

Designed By	Verified By	Approved By
SELVAKUMAR G. <i>[Signature]</i>	P. Subramaniam <i>[Signature]</i>	A. h. Sanyal <i>[Signature]</i>



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1PCSC03	ADVANCED JAVA PROGRAMMING	DSC THEORY - III	I	4	4			4
Objective	1. To understand the concepts of AWT 2. To acquire knowledge on JAVA Beans, RMI, JDBC and Servlet							
Unit	Course Content						Knowledge Levels	Sessions
I	I/O, AWT AND EVENT HANDLING: Input/output: Exploring java.io - AWT classes and Graphics-AWT Controls Event Handling-Event Classes-Event Listener Interfaces-Layout Managers-Menus						K1	8
II	INTRODUCING SWING & JAVA BEANS : Exploring Swing -JLabel and ImageIcon, JTextField -The Swing Buttons – JTabbedPane - JScrollPane, JList&JComboBox -Trees &JTables -What Is a Java Bean? - Advantages of Java Beans -Introspection, Bound and Constrained Properties -Persistence & Customizers						K1,K2	10
III	RMI & NETWORKING: Remote Method Invocation -Settingup Remote Method Invocation -RMI with Applets - Networking Basics - The Networking Classes and Interfaces -InetAddress - Inet4Address and Inet6Address -TCP/IP Client sockets -URL - URL Connection – Http URL Connection .						K2,K3	8
IV	JDBC : Presentation to JDBC CONNECTION settings -The Concept of JDBC -JDBC Driver Types -JDBC Packages -A Brief Overview of the JDBC Process -Database Connection -Associating the JDBC/ODBC Bridge with the Database -Statement Objects – Result Set.						K2,K3,K4	9
V	SERVLETS : Background, The Life Cycle of a Servlet & The JSDK-A Simple Servlet -The Servlet API –RolePlay - Servlet Concept-The javax.servlet Package -Reading Servlet Parameters, The javax.servlet.http Package -Handling HTTP Request and Responses – Using Cookies -Session Tracking.						K4,K5	10
Course Outcome	CO1: Remember and Understand the concept of I/O and AWT						K1	
	CO2: Understand and Apply Swing and Beans						K2	
	CO3: Apply and Apply RMI						K3	
	CO4: Analyze the concept JDBC connection						K4	
	CO5: Evaluate the concept Servlet						K5	
Learning Resources								
Text Books	1. Naughton and H.Schildt, (2007), "Java 2-The complete reference", Fifth Edition McGraw Hill							
Reference Books	1. Jim Keogh, (2002), "The Complete Reference J2EE", Tata McGraw Hill Edition, New Delhi. 2. Marty Hall, Larry Brown, (2004), "Core Servlets and Java Server Pages"							
Website Link	1. https://www.edureka.co/blog/advanced-java-tutorial 2. https://www.w3schools.in/java							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1PCSC03	ADVANCED JAVA PROGRAMMING	DSC THEORY - III	I	4	4			4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	S	M	S	S	S
CO2	S	S	S	S	M	S	M	M	S	S
CO3	M	M	L	M	S	M	S	S	S	S
CO4	S	M	S	L	S	S	M	S	S	S
CO5	M	S	M	M	S	M	M	S	S	S

Level of Correlation between CO and PO
 L-LOW M-MEDIUM S-STRONG

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assesment Methods	Attendance, Assignment, Seminar, Internal – I & II

Designed By	Verified By	Approved By
R. MEENA R. Chand	P. Srinivasan P.	A. L. Ganesan



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1PCSC04	INTERNET OF THINGS	DSC THEORY - IV	I	4	▲			4
Objective	1. To Describe the IoT and Cloud architectures 2. To Classify cloud computing elements such virtual machines, web apps, mobile services, etc.							
Unit	Course Content						Knowledge Levels	Sessions
I	INTRODUCTION To IoT: Internet of Things - Physical Design- Logical Design- IoT Enabling Technologies – IoT Levels and Deployment Templates - Domain Specific IoTs - IoT and M2M - IoT System Management with NETCONF-YANG- IoT Platforms Design Methodology						K1	8
II	IoT ARCHITECTURE: M2M high-level ETSI architecture - IETF architecture for IoT - OGC architecture - IoT reference model - Domain model - information model - functional model - communication model- IoT reference architecture						K2	8
III	IoT PROTOCOLS: Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols –Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus– Zigbee Architecture – Network layer – 6LowPAN - CoAP - Security						K2,K3	9
IV	WEB OF THINGS: Web of Things versus Internet of Things –Two Pillars of the Web –Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence. Cloud of Things: Grid/SOA and CloudComputing – Cloud Middleware – Cloud Standards –Cloud Providers and Systems –MobileCloud Computing – The Cloud of Things Architecture.						K2,K3	10
V	APPLICATIONS: The Role of the Internet of Things for Increased Autonomy and Agility in Collaborative Production Environments - Resource Management in the Internet of Things: Clustering, Synchronization and Software Agents. Applications- Smart Grid– ElectricalVehicle Charging.						K3,K4,K5	10
Course Outcome	CO1: Remember the application areas of IOT						K1	
	CO2: Understand the revolution of Internet in Mobile Devices, Cloud & Sensor Networks						K2	
	CO3: Apply the factors that contributed to the emergence of IoT						K3	
	CO4: Apply the concepts of IoT Architecture Reference model and IoT reference architecture						K3	
	CO5: Analyze and understand the various IoT Transport and Session layer Protocols.						K4	
Learning Resources								
Text Books	1. Arshdeep Bahga, Vijay Madiseti, "Internet of Things – A hands-on approach", Universities Press, 2015. 2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), "Architecting the Internet of Things",Springer,2011.							
Reference Books								
Website Link	https://www.tutorialspoint.com/internet_of_things/index.htm							
	L-Lecture	T	P		C			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1PCSC04	INTERNET OF THINGS	DSC THEORY - IV	I	4	⚡			4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	L	S	M	S	S	S	M	S	L
CO2	S	S	M	S	L	S	S	M	M	M
CO3	S	M	S	M	S	S	M	S	S	S
CO4	M	S	M	S	L	S	M	L	S	M
CO5	S	M	S	M	S	M	S	M	L	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assesment Methods	Attendance, Assignment, Seminar, Internal – I & II

Designed By	Verified By	Approved By
A.M. NIRMALA Nirmala	P. Subramaniam PS	A. h. Sanyal



M.Sc.-Computer Science Syllabus LOCF- CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1PCSP01	ADVANCED JAVA PROGRAMMING LAB	DSC PRACTICAL - I	I	5			5	2
Objective	1. To learn Graphical User Interface (GUI) networking and database manipulation. 2. To learn and use advanced technology in Java such as Remote method Invocation, Servlet and Java Beans							
S.No.	List of Experiments / Programs						Knowledge Levels	Sessions
1	Creating Input output and Random files.						K1-K3	6
2	Developing chat application with datagram sockets and datagram packets.						K1,K2,K3	6
3	Developing Simple client/server application.						K1-K3	6
4	Developing mouse and keyboard events.						K1-K3	6
5	Creating java program using swing components.						K4	6
6	Implementing RMI.						K4	7
7	Establishing JDBC Connectivity.						K5	7
8	Creating simple web applications using Servlets using GET POST methods.						K5	8
9	Creating simple web applications using JSP.						K5	8
Course Outcome	CO1: Remember the file and packets						K1	
	CO2: Understand the key board events						K2	
	CO3: Apply the swing and RMI						K3	
	CO4: Analyze the GET and POST						K4	
	CO5: Evaluate the Jsp						K5	
Learning Resources								
Text Books	1. Naughton and H.Schildt, (2007), "Java 2-The complete reference", Fifth Edition McGraw Hill							
Reference Books	1. Jim Keogh, (2002), "The Complete Reference J2EE", Tata McGraw Hill Edition, New Delhi. 2. Marty Hall, Larry Brown, (2004), "Core Servlets and Java Server Pages"							
Website Link	1. https://www.edureka.co/blog/advanced-java-tutorial 2. https://www.w3schools.in/java							



M.Sc.-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P
21M1PCSP01	ADVANCED JAVA PROGRAMMING LAB	DSC PRACTICAL - I	I	5			S

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	L	S	M	M	S	M
CO2	M	S	L	S	S	M	S	S	S	M
CO3	S	S	S	S	M	M	M	S	S	S
CO4	M	M	M	S	M	S	S	M	S	S
CO5	S	S	M	M	L	S	S	S	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	To give more sample programs to related topic
Teaching and Learning Methods	Presentation, Decode the Code
Assessment Methods	Attendance Observation Model Practical - I Model Practical - II

Designed By	Verified By	Approved
<i>R. Kumar</i>	<i>[Signature]</i>	<i>[Signature]</i>



M.Sc.-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1PCSP 02	ALGORITHMS USIN C++LAB	DSC PRACTICAL - II	I	5			5	2
Objective	1. To write and execute programs in C++ to solve problems using data structures 2. To learn to write C++ programs to implement various sorting and searching algorithms							
S.No.	List of Experiments / Programs	Knowledge Levels	Sessions					
1	Apply the Divide and Conquer technique to arrange a set of numbers using Merge Sort method.	K1	6					
2	Perform Strassen's matrix multiplication using Divide and Conquer method.	K1	6					
3	Solve the Knapsack problem using Dynamic Programming.	K2,K3	6					
4	Construct a Minimum Spanning Tree using Greedy method.	K2	6					
5	Perform Warshall's Algorithm using Dynamic Programming.	K4	6					
6	Solve Dijkstra's Algorithm using Greedy Technique.	K4	6					
7	Solve Subset Sum problem using Backtracking	K4	6					
8	Implement the 8-Queens Problem using Backtracking.	K5	6					
9	Implement Knapsack Problem using Backtracking.	K5	6					
10	Find the solution of Traveling Salesperson Problem using Branch and Bound technique.	K5	6					
Course Outcome	CO1: Remember the appropriate data structures and algorithms for solving real world problems.	K1						
	CO2: Understand the various kinds of searching and sorting techniques	K2						
	CO3: Apply the data structures such as stacks, queues, Search trees, and hash tables to solve various computing problems	K3						
	CO4: Analyze appropriate data structures to solve specific problems	K4						
	CO5: Evaluate different data structures such as stack, queues, linked list, trees and graphs	K5						
Learning Resources								
Text Books	1. E.Horowitz, S. Sahni and Sanguthevar Rajasekaran , Fundamentals of Computer Algorithms , Second edition, Universities Press. 2. Cormen, T.H., Charles, E. Leiserson., Ronald, L. Rivest. (2009). Clifford Stein Introduction to Algorithms (3rd ed.). New Delhi: PHI.							
Reference Books	1. S. K. Basu, Design Methods and Analysis of Algorithms , PHI, 2005. 2. Goodman and S. T. Hedetniem, Introduction to the Design and Analysis of Algorithms, MGH, 1977.							
Website Link	https://www.w3resource.com/cpp-exercises/basic-algorithm/index.php							

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards							
Course Code	Course Title	Course Type	Sem	Hours	L	T	P
21M1PCSP02	ALGORITHMS USING C++ LAB	DSC PRACTICAL - II	I	5			5

CO-PO Mapping										
CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	S	M	M	S	L
CO2	M	M	M	M	M	M	S	S	S	M
CO3	M	S	L	S	S	M	M	S	S	S
CO4	S	M	S	L	M	S	S	M	S	S
CO5	M	S	M	S	S	S	S	S	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	To give more sample programs to related topic
Teaching and Learning Methods	Presentation, Decode the Code
Assessment Methods	Attendance Observation Model Practical - I Model Practical - II

Designed By	Verified By	Approved By
<i>U. Mahesh</i>	<i>[Signature]</i>	<i>[Signature]</i>



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSC05	ADVANCED WEB TECHNOLOGY	DSC THEORY - V	II	4	4			4
Objective	1.A student will be recognise with client server architecture and able to develop a web application 2.Students will identify the skills and project-based experience needed for entry into web application							
Unit	Course Content						Knowledge Levels	Sessions
I	OVERVIEW OF ASP.NET - The .NET framework – Learning the.NETlanguages Data types – Declaring variables- Scope and Accessibility-Variable operations- Object Based manipulation- Conditional Structures-Loop Structures- Functions and Subroutines. Types, Objects andNamespaces: The Basics about Classes- Value types and ReferencetypesAdvanced class programming- Understanding name spaces andassemblies. Setting up ASP.NET and IIS.						K1,K2	9
II	DevelopingASP.NETApplications-ASP.NETApplications:ASP.NET Code behind- TheGlobal.asax application file- Understanding ASP.NET Classes- ASP.NET Configuration.Web Form fundamentals: A simple page applet-Improving the currency converter- HTMLcontrol classes-The page class- Accessing HTML server controls. Web controls: WebControl Classes –Auto Post Back and Web Control events- Accessing web controls. UsingVisual Studio.NET: Starting a Visual Studio.NET Project- Web form Designer-Writingcode- Visual studio.NET debugging. Validation and Rich Controls:Validation- A simpleValidation example- Understanding regularexpressions- A validated customer form. Statemanagement - Tracing, Logging, and Error Handling.						K2	10
III	Working with Data - Overview of ADO.NET - ADO.NET and datamanagementCharacteristics of ADO.NET-ADO.NET object model.ADO.NET data access : SQL basics– Select , Update, Insert, Deletestatements- Accessing data- Creating a connection- Using a commandwith a Data Reader - Accessing Disconnected data - Selecting multiptables – Updating Disconnected data. Data binding: Single value DataBinding- Repeated value data binding- Data binding with data bases. Datalist – Data grid – Repeater – Files, Streams and Email – Using XML						K2,K3	10
IV	Web Services - Web services Architecture: Internet programming then and now- WSDL–SOAP- Communicating with a web service-Web servicediscovery and UDDI. Creating Webservices: Web service basics-The Stock Quote web service – Documenting the web serviceTesting the webservice- Web service Data types- ASP.NET intrinsic objects. Using webservices: Consuming aweb service- Using the proxy class- An example withTerra Service.						K3	8
V	Advanced ASP.NET - Component Based Programming: Creating a simple component –Properties and state- Database components-Using COM components. Custom controls: UserControl- Deriving Custom controls. Caching and Performance Tuning: Designing andscalability– Profiling- Caching- Output caching- Data caching – Object Caching.Implementing security: Determining security requirements- The ASP.NET securitymodelForms authentication- Windows authentication.						K4,K5	8
Course Outcome	CO1: Remember the fundamental ideas and standards underlying Web Service Technology						K1	
	CO2: Understand the fundamental principles for cloud applications						K2	

	CO3: Apply concepts at the frontier of industrial practice and emerging standard	K4	
	CO4: Analyze business processes using the Workflow foundation.	K4	
	CO5: Evaluate and deploy web services and cloud applications using appropriate Microsoft technologies.	K5	
Learning Resources			
Text Books	1. Mathew Mac Donald, "ASP.NET Complete Reference", TMH 2005.		
Reference Books	1. Crouch Matt J, "ASP.NET and VB.NET Web Programming", Addison Wesley 2002. 2. J.Liberty, D.Hurwitz, "Programming ASP.NET", Third Edition, O'REILLY, 2006.		
Website Link	1. https://www.tutorialspoint.com/web_development_tutorials.htm		
	L-Lecture	T-Tutorial	P-Practical
			C-Credit

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSC05	ADVANCED WEB TECHNOLOGY	DSC THEORY - V	II	4				4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	S	M	S	S	M	S	M
CO2	M	S	S	S	S	S	S	M	M	L
CO3	S	S	M	S	S	S	S	S	M	S
CO4	S	S	S	L	M	S	M	S	S	S
CO5	M	S	L	M	M	M	S	M	L	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assessment Methods	Attendance, Internal Examinations, Class Test, Assignment

Designed By	Verified By	Approved By
<i>Uemalsh</i>	<i>[Signature]</i>	<i>A-h-sans</i>



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards									
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C	
21M2PCSC06	COMPILER DESIGN	DSC THEORY - VI	II	4	4			4	
Objective	1. To learn principles, algorithms and techniques used to construct various phases of compiler. 2. To acquire knowledge about finite automata, regular expressions, context free grammars, compiler parsing techniques, Syntax Directed definitions and translation scheme								
Unit	Course Content						Knowledge Levels	Sessions	
I	Lexical analysis - Language Processors, The Structure of a Compiler, Parameter passing mechanism – Symbol table - The role of the lexical analyzer - Input buffering – Specification of tokens - Recognition of tokens – Finite automata - Regular expression to automata.						K1,K2	8	
II	Syntax Analysis - The role of the parser - Context-free grammars - Writing a grammar – Topdown Parsing - Bottom-up Parsing - LR parsers- LALR parsers.						K2	9	
III	Semantic Analysis – Inherited and Synthesized attributes – Dependency graphs – Ordering the evaluation of attributes – S-attributed definitions – L-attributed definitions – Applications of Syntax Directed translation – Syntax Directed translations schemes - Storage organization –Stack allocation of space.						K3	10	
IV	Intermediate Code Generation - Variants of Syntax trees – Three Address code – Types and Declarations – Translation of Expressions – Type checking - Control flow - Back patching -Switch Statements – Procedure calls.						K3, K4	9	
V	Code Generation and Code Optimization - Issues in the design of a code generator - The target language – Address in the Target Code – Basic Block and Flow graphs – Optimization of Basic Blocks - A simple code generator – Peep hole Optimization.						K5	9	
Course Outcome	CO1: Remember and Understand the concept of compiler and automata						K1		
	CO2: Understand the types of Parser						K2		
	CO3: Apply and Apply Semantic Analysis						K3		
	CO4: Analyze the Code Generation procedures						K4		
	CO5: Evaluate the Code Optimization						K5		
Learning Resources									
Text Books	1. Alfred V. Aho, Monica S.Lam, Ravi Sethi and Jeffrey D. Ullman, "CompilersPrinciples, Techniques and Tools", Second Edition, Pearson Education Asia, 2009.								
Reference Books	1. A.V. Aho, Ravi Sethi, J.D. Ullman, Compilers - Principles, Techniques and Tools, Addison-Wesley,2003. 2. Fischer Leblanc, Crafting Compiler, Benjamin Cummings, Menlo Park,1988.								
Website Link	1. https://www.i2tutorials.com/compiler-design-tutorial/ 2. https://www.javatpoint.com/compiler-tutorial								
	L-Lecture	T-Tutorial	P-Practical		C-Credit				

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSC06	COMPILER DESIGN	DSC THEORY - VI	II	4				4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	S	S	M	M	S
CO2	S	M	S	L	S	S	S	S	S	S
CO3	M	S	M	M	S	S	S	S	S	L
CO4	S	M	S	S	M	M	S	S	S	L
CO5	M	S	S	L	M	M	S	S	M	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assesment Methods	Attendance, Internal Examinations, Class Test, Assignment

Designed By	Verified By	Approved By
<i>Arumath</i>	<i>[Signature]</i>	<i>A-h. bany</i>



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSC07	DATA MINING	DSC THEORY - VII	II	4	4			4
Objective	1. To learn basic concepts of Data Mining Techniques 2. To gain knowledge in different Algorithms used for Information Retrieval from Datasets							
Unit	Course Content						Knowledge Levels	Sessions
I	Data Mining And Data Pre-processing: Data Mining – Motivation – Definition – Data Mining on Kind of Data – Functionalities – Classification – Data Mining Task Primitives – Major Issues in Data Mining – Data Pre-processing – Definition – Data Clearing – Integration and Transformation – Data Reduction.						K1,K2	9
II	Data Warehousing: Multidimensional Data Model –Data Warehouse Architecture – Data Warehouse Implementation –From data Warehousing to Data Mining – Online Analytical Processing – Online Analytical Mining.						K2,K3	8
III	Frequent Patterns, Associations And Classification: The Apriori Algorithm – Definition of Classification and Prediction – Classification by Decision Tree Induction – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Lazy Learners –K-Nearest Neighbor–Other Classification Methods.						K3,K4	9
IV	Cluster Analysis: Definition – Types of data in Cluster Analysis – Categorization of major Clustering Techniques – Partitioning Methods Hierarchical Clustering – BIRCH - ROCK – Grid Based Methods – Model Based Clustering Methods–Outlier Analysis.						K2,K3,K4	9
V	Spatial, Multimedia, Text And Web Data: Spatial Data Mining – Multimedia Data Mining –Text Mining – Mining the World Wide Web – Data Mining Applications – Trends in Data Mining.						K4,K5	10
Course Outcome	CO1: Remember and Understand the concept Data mining						K1	
	CO2: Understanding the Data warehouse concept						K2	
	CO3: Apply and Association and Classification						K3	
	CO4: Analyze the concept Cluster						K4	
	CO5: Evaluate the different types of data						K5	
Learning Resources								
Text Books	1. Jiawei Han and MichelineKamber, "Data Mining: Concepts and Techniques (The Morgan Kaufmann Series in Data Management Systems) 3rd Edition, July 6,2011. 2. Ian H. Witten, Eibe Frank, Mark A. Hall, "Data Mining: Practical Machine Learning Tools and Techniques", Elsevier; Third edition,2014.							
Reference Books	1. Margret H. Dunham, "Data Mining: Introductory and Advanced Topics",Pearson Education,2003. 2. M. Awad, Latifur Khan, BhavaniThuraisingham, Lei Wang, "Design and Implementation of Data Mining Tools", CRC Press- Taylor & Francis Group,2015.							
Website Link	1. https://nptel.ac.in/courses/106105174 2. https://www.javatpoint.com/data-mining							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSC07	DATA MINING	DSC THEORY - VII	II	4				4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	S	S	S	S	L
CO2	M	S	M	L	S	M	S	M	S	M
CO3	S	M	S	S	S	S	M	S	M	L
CO4	M	S	M	M	M	S	S	M	S	S
CO5	S	M	S	L	L	S	M	S	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assessment Methods	Attendance, Internal Examinations, Class Test, Assignment

Designed By	Verified By	Approved By
		A. h. bany



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSP03	PRACTICAL - III WEB TECHNOLOGY	DSC PRACTICAL - III	II	4	4		4	2
Objective	1. Design and develop static and dynamic webpages. 2. Familiarize with Client-Side Programming, Server-Side Programming, and Active server Pages.							
S.No.	List of Experiments / Programmes						Knowledge Levels	Sessions
1	Create a website for a bank and include types of navigation.						K1	6
2	Write a program to perform Asp.Net State.						K1,K2	6
3	Design Image Mapping using Asp.Net						K3	6
4	Create the following using web controls a) Money conversion b) Temperature conversion						K3	6
5	Write a program to create an advertisement using Ad rotator.						K3-K4	6
6	Create a user control that contains a list of colors. Add a button to the Web Form which when clicked changes the color of the Form to the color selected from the list.						K3-K4	6
7	Create a user control that displays the current date and time. Include it in a Web Form and refresh it each time a button is clicked.						K3-K4	6
8	Create a user control that receives the user name and password from the user and validates them. If the user name is "Radiant" and the password is "asp.net" then the user is authorized, otherwise not.						K4	6
9	Create a web application to insert 3 records inside the SQL database table having following fields (DeptId, DeptName, EmpName, Salary). Update the salary for any one employee and increment it to 15% of the present salary. Perform delete operation on 1 row of the database table. (Using ADO.NET and ASP.NET)						K4-k5	6
10	Create a Web App to display all the Empname and Deptid of the employee from the database using SQL source control and bind it to GridView. Database fields are(DeptId, DeptName, EmpName, Salary) (Using ADO.NET and ASP.NET)						K4-k5	6
Course Outcome	CO1: Remember the concepts of HTML5, CSS, JavaScript, XML, PHP and develop Javascript programs.						K1	
	CO2: Understand XML program to display student information using CSS.						K2	
	CO3:Apply the PHP programs to sort the student records stored indatabase using selection sort, string manipulations						K3	
	CO4: Analyze PHP program to keep track of the number of visitors visiting the web page, Digital Clock, simple calculator						K4	
	CO5: Evaluate and deploy web services and cloud applications using appropriate Microsoft technologies.						K5	
Learning Resources								
Text Books	1. S. Tanenbaum, 2011, Computer Networks, Fifth Edition, Pearson Education, Inc.							
Reference Books	1. B. Forouzan, 1998, Introduction to Data Communications in Networking, Tata McGraw Hill, NewDelhi. 2. F.Halsall,1995, Data Communications, Computer Networks and Open Systems, Addison Wessley.							
Website Link	https://www.javatpoint.com/computer-network-tutorial							

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSP03	PRACTICAL - III WEB TECHNOLOGY	DSC PRACTICAL - III	II	4				2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO 1	PSO 2	PSO3	PSO 4	PSO 5
CO1	S	M	S	M	S	S	S	S	L	S
CO2	M	S	M	M	L	S	S	M	M	S
CO3	S	M	S	S	S	S	S	S	S	M
CO4	M	S	M	S	S	S	M	S	S	S
CO5	S	M	M	S	S	M	S	S	L	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	To give more sample programs to related topic,
Teaching and Learning Methods	Presentation, Decode the Code
Assessment Methods	Observation Model Practical-I Model Practical - II <i>CIA 40%.</i> <i>ESE 60%.</i>

Designed By	Verified By	Approved By
<i>Ugmaah</i>	<i>[Signature]</i>	<i>Ah-sany</i>



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSP04	PRACTICAL - IV DATA MINING	DSC PRACTICAL - IV	II	4	4		4	2
Objective	1. Compare the exposure on implementation of well-known data mining tasks 2. Calculate to real life data sets for analysis and prediction							
S.No.	List of Experiments / Programmes						Knowledge Levels	Sessions
1	To get the input from user and perform numerical operations (MAX,MIN, AVG, SUM,SQRT, ROUND).						K1	6
2	To perform data import/export (.CSV, .XLS, .TXT) operations using dataframes.						K2	6
3	To get the input matrix from user and perform Matrix addition, subtraction, multiplication,inverse transpose and division operations using vector concept						K3	6
4	To perform statistical operations (Mean, Median, Mode and Standard deviation).						K1	6
5	To perform data pre-processing operations i) Handling Missing data ii) Min-Max normalization						K4	6
6	To perform dimensionality reduction operation using PCA.						K3	6
7	To perform Simple Linear Regression and Multi Linear Regression.						K2	6
8	To perform K-Means clustering operation and visualize it.						K4,K5	6
9	Write R script to diagnose any disease using KNN classification.						K5	6
10	To perform market basket analysis using Apriori algorithm.						K3	6
Course Outcome	CO1: Remember The data mining process and important issues around data cleaning, pre-processing and integration.						K1	
	CO2: Understand the principle of algorithms and techniques used in data mining, such as clustering, association mining, classification and prediction.						K2	
	CO3:Apply the data mining concepts for analysis of data						K3	
	CO4: Analyze industry level data mining skills using software tools						K4	
	CO5: Evaluate the use of relevant theories, concepts and techniques to solve real-world business problems						K5	
Learning Resources								
Text Books	1. Jiawei Han and MichelineKamber, "Data Mining: Concepts and Techniques (The Morgan Kaufmann Series in Data Management Systems) 3rd Edition, July 6,2011. 2. Ian H. Witten, Eibe Frank, Mark A. Hall, "Data Mining: Practical Machine Learning Tools and Techniques", Elsevier; Third edition,2014.							
Reference Books	1. Margret H. Dunham, "Data Mining: Introductory and Advanced Topics",Pearson Education,2003. 2. M. Awad, Latifur Khan, BhavaniThuraisingham, Lei Wang, "Design and Implementation of Data Mining Tools", CRC Press- Taylor & Francis Group,2015.							
Website Link	1. https://www.javatpoint.com/data-mining 2. https://nptel.ac.in/courses/106105174							

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hou rs	L	T	P	C
21M2PCSP04	PRACTICAL - IV DATA MINING	DSC PRACTICAL - IV	II	4				2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	M	S	M	S	L	S
CO2	S	S	M	S	M	S	S	M	M	M
CO3	M	S	S	M	S	S	S	S	M	S
CO4	S	M	S	S	S	M	M	M	S	M
CO5	M	S	S	S	S	S	M	SS	L	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	To give more sample programs to related topic,
Teaching and Learning Methods	Presentation, Decode the Code
Assesment Methods	Observation Model Practical Model Practical - II <i>CIA 40% RSE - 60%</i>

Designed By	Verified By	ApprovedBy
<i>[Signature]</i>	<i>[Signature]</i>	<i>A-h-ban</i>



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3PCSC08	CRYPTOGRAPHY AND NETWORK SECURITY	DSC THEORY - VIII	III	4				4
Objective	1. To understand basics of Cryptography and Network Security. 2. To understand secure a message over insecure channel by various means.							
Unit	Course Content						Knowledge Levels	Sessions
I	Types of Physical Medium – Topologies – Wireless Networking: Wireless Protocols, Data Link Layer: Layered Data Link Protocols – SLIP and PPP – MAC and ARP, Network Layer: Routing Risks – Addressing – Fragmentation						K1	9
II	Internet Protocol: IP Addressing – ICMP – Security options. Transport Layer: Common Protocols – Transport Layer Functions – Gateways. TCP: Connection Oriented Protocols – TCP Connections – UDP. SSL: SSL Functionality – Certificates. SSH: SSH and Security – SSH Protocols. STMP: E-Mail Goals – Common Servers.						K1,K2	9
III	Security: Threat Models – Concepts – Common Mitigation Methods. Network Theory: Standards Bodies – Network Stacks – Multiple Stacks – Layers and Protocols – Common Tools. Cryptography: Securing Information – Authentication and Keys – Cryptography and Randomness - Hashes – Ciphers – Encryption – Steganography.						K1,K2,K3	9
IV	Data Encryption Techniques – Data Encryption Standards – Symmetric Ciphers. Public Key Cryptosystems – Key Management.						K3,K4	9
V	Authentication – Digital Signatures – E-Mail Security – Web Security – Firewall.						K4,K5	9
Course Outcome	CO1: Remember security of the data over the network						K1	
	CO2: Remember and understand in the emerging areas of cryptography and network security						K2	
	CO3: Apply and Analyze various networking protocols						K3	
	CO4: Analyze any network from the threats in the world.						K4	
	CO5: Evaluate and design classical encryption techniques and block ciphers.						K5	
Learning Resources								
Text Books	1. Neal Krawetz, "Introduction Network Security", Indi a Edition, Thomson Delmar Learning,2007. 2. V.K. Pachghare, "Cryptography and Information Security", PHI Learning Private Limited 2009.							
Reference Books	1. William Stallings," Cryptography and Network Security", Prentice – Hall of India, 2008. 2. Lincoln D.Stein, "Web Security", Addison Wesley 1999. 3. Behrouz A. Forouzan, Cryptography and Network Security, Tata McGraw-Hill, 2007							
Website Link	https://www.javatpoint.com/computer-network-security							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Code	Course Code	Course Code	Course Code	Course Code	T	P	C
21M3PCSC08	CRYPTOGRAPHY AND NETWORK SECURITY	DSC THEORY - VIII	III	4				4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
C01	S	L	S	M	S	S	S	M	S	L
C02	S	S	M	S	L	S	S	M	M	M
C03	S	M	S	M	S	S	M	S	S	S
C04	M	S	M	S	L	S	M	L	S	M
C05	S	M	S	M	S	M	S	M	L	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assesment Methods	Attendance, Assignment, Seminar, Internal – I & II

Designed By	Verified By	Approved By
Dr. A. ANUSHA PRIYA <i>[Signature]</i>	P. Suresh Kumar <i>[Signature]</i>	A. K. B. Kumar <i>[Signature]</i>



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3PCSC09	MOBILE APPLICATION DEVELOPMENT	DSC THEORY - IX	III	4				4
Objective	<p>1. To describe robust mobile applications and learn how to integrate them with other services</p> <p>2. To describe intuitive, reliable mobile apps using the android services and components</p>							
Unit	Course Content						Knowledge Levels	Sessions
I	Introduction: Applications - A Simplified Reference Model. Multiplexing: Space Division Multiplexing – Frequency Division Multiplexing – Time Division Multiplexing – Code Division Multiplexing. Cellular Systems – Comparison of S/T/F/CDMA. GSM: Mobile Services – System Architecture – Localization and Calling – Handover.						K1	8
II	Developing Spectacular Android Applications: Why Develop for Android? - Android Programming Basics – Hardware Tools – Software Tools. Prepping Your Development Headquarters: Assembling Your Toolkit – Installing and Configuring Your Support Tools – Getting Acquainted with the Android Development Tools.						K1,K2	9
III	Your First Android Project: Starting a New Project in Eclipse – Deconstructing Your Project – Setting up an Emulator – Creating Launch Configurations – Running the Hello Android App – Understanding the Project Structure. Designing the User Interface: Creating the Silent Mode Toggle Application – Laying Out the Application – Developing the User Interface – Adding an Image to Your Application – Creating a Launcher Icon for the Application – Adding a Toggle Button Widget – Previewing the Application in the Visual Designer.						K2,K3	10
IV	Coding Your Application: Understanding Activities – Creating Your First Activity – Working with the Android Framework Classes – Installing Your Application – Reinstalling Your Application – Responding to Errors. Understanding Android Resources: Understanding Resources – Working with Resources.						K3,K4	9
V	Handling User Input: Creating the User Input Interface – Getting Choosy with Dates and Times – Creating Your First Alert Dialog Box – Validating Input. Getting Persistent with Data Storage: Finding Places to Put Data – Asking the User for Permission – Creating Your Application's SQLite Database. Creating and Editing Tasks with SQLite: Inserting, Deleting and Updating a task.						K3,K4,K5	9
Course Outcome	CO1: Remember enterprise level mobile applications with Kotlin on Android						K1	
	CO2: Understand both the basic and advanced concepts of Kotlin						K2	
	CO3: Understand why use Kotlin over Java						K2	
	CO4: Apply the Install and configure Android Studio						K3	
	CO5: Analyze the key Android programming concepts						K4	
Learning Resources								
Text Books	<p>1. Jochen H. Schiller, "Mobile Communications", Addison-Wesley and imprint of Pearson Education Ltd., 2003. (Units I)</p> <p>2. Donn Felker and Joshua Dobbs, "Android Application Development – for Dummies", Wiley Publishing Inc., 2011. (Units II,III,IV,V)</p>							
Reference Books	1. Jerome (J.F.) DiMarzio, "Android – A Programmer's Guide", Tata McGraw-Hill Publication, 2008.							
Website Link	1. https://www.javatpoint.com/android-tutorial							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3PCSC09	MOBILE APPLICATION DEVELOPMENT	DSC THEORY - IX	III	4				4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	S	S	M	L	S	M
CO2	S	S	S	S	L	M	S	M	S	S
CO3	M	S	S	S	S	S	S	S	M	S
CO4	S	M	S	S	S	S	S	L	S	M
CO5	M	S	L	S	S	S	M	L	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assessment Methods	Attendance, Assignment, Seminar, Internal – I & II

Designed By	Verified By	Approved By
S. JOTHIVE L P <i>SJM</i>	Subramaniam <i>SP</i>	A. h. Ganesan <i>A. h. Ganesan</i>



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3PCSC10	OBJECT ORIENTED ANALYSIS AND DESIGN	DSC THEORY - X	III	4				4
Objective	1. To understand the Object-based view of Systems 2. To inculcate necessary skills to handle complexity in software design							
Unit	Course Content						Knowledge Levels	Sessions
I	Introduction: Role of Analysis and Design in Software Development – Meaning of Object Orientation - Overview of Various OOAD Methodologies - Goals of UML. Use case Modeling: Actors and Use Cases - Use Case Relationships - Finding Actors - Finding Use Cases - Use of Use Cases for Validation and Verification.						K1,K2	9
II	Concept: The Object Model - The Evolution of the Object Model - Foundations of the Object Model - Applying the Object Model. Classes and Object: The Nature of an Object - Relationships among Objects - The Nature of a Class - Relationships among Classes.						K1,K2,K3	10
III	Notations-Classification- The importance of proper classification - Identifying classes and objects - Key abstractions and Mechanisms.						K3,K4	8
IV	Class Diagrams: Sequence Diagrams - Interaction Overview Diagrams - Composite Structure Diagrams - State Machine Diagrams - Timing Diagrams - Object Diagrams - Communication Diagrams.						K2,K3,K4	9
V	Applications: Control System: Traffic Management - Web Application: Vacation Tracking System - Data Acquisition: Weather Monitoring Station.						K4,K5	9
Course Outcome	CO1: Remember and Understand the concept of OOAD						K1	
	CO2: Understand the use classes and objects						K2	
	CO3: Apply the Classification						K3	
	CO4: Analyze the different types of diagrams						K4	
	CO5: Evaluate the applications of OOAD						K5	
Learning Resources								
Text Books	1. Mahesh P. Matha, "Object – Oriented Analysis and Design Using UML" , PHI Learning Private Limited, New Delhi, 2008. 2. Grady Booch Robert A. Maksimchuk Michael W. Engle Bobbi J. Young, Ph.D. Jim Conallen Kelli A. Houston "Object-Oriented Analysis and Design with Applications" Third Edition, Pearson Education, Inc., April 2007.							
Reference Books	1. Martin Fowler, Kendall Scott, "UML Distilled, A Brief Guide to the Standard Object Modeling Languages", Second Edition, Pearson Education, 2000. 2. James Rumbaugh et al, " Object - Oriented Modeling and Design With UML" second Edition, Pearson Education, 2007.							
Website Link	1. https://nptel.ac.in/courses/106105153 2. https://www.javatpoint.com/software-engineering-object-oriented-design							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3PCSC10	OBJECT ORIENTED ANALYSIS AND DESIGN	DSC THEORY - X	III	4				4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	L	S	M	S	M	S
CO2	S	M	M	S	S	S	S	S	M	L
CO3	M	S	S	M	S	S	S	S	M	S
CO4	S	S	S	S	M	S	S	S	S	M
CO5	S	S	M	M	L	M	M	M	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assessment Methods	Attendance, Internal Examinations, Class Test, Assignment

Designed By	Verified By	Approved By
P. Muthamgi Selvi P. Muthamgi	P. Subramanian	A. h. Suresh



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3PCSC11	OPEN SOURCE COMPUTING	DSC THEORY - XI	III	4				4
Objective	1.To understand why Python is a useful scripting language for developers. 2.To define the structure and components of a Python program.							
Unit	Course Content						Knowledge Levels	Sessions
I	Python: Introduction – Numbers – Strings – Variables – Lists – Tuples – Dictionaries – Sets – Comparison						K1	8
II	Code Structures: if, elif, and else – Repeat with while – Iterate with for – Comprehensions – Functions – Generators – Decorators – Namespaces and Scope – Handle Errors with try and except – User Exceptions. Modules, Packages, and Programs: Standalone Programs – Command-Line Arguments – Modules and the import Statement – The Python Standard Library. Objects and Classes: Define a Class with class – Inheritance – Override a Method – Add a Method – Get Help from Parent with super – In self Defense – Get and Set Attribute Values with Properties – Name Mangling for Privacy – Method Types – Duck Typing – Special Methods – Composition						K1,K2	10
III	Data Types: Text Strings – Binary Data. Storing and Retrieving Data: File Input/Output – Structured Text Files – Structured Binary Files - Relational Databases – NoSQL Data Stores.						K3	9
IV	Web: Web Clients – Web Servers – Web Services and Automation – Systems: Files – Directories – Programs and Processes – Calendars and Clocks						K3,K4	9
V	Concurrency: Queues – Processes – Threads – Green Threads and gevent – twisted – Redis. Networks: Patterns – The Publish-Subscribe Model – TCP/IP – Sockets – ZeroMQ –Internet Services – Web Services and APIs – Remote Processing – Big Fat Data and MapReduce – Working in the Clouds.						K4,K5	9
Course Outcome	CO1: Remember computer architecture and data representations (variables, representation of numbers and character strings).						K1	
	CO2: Understand basic algorithmic problem-solving techniques (decision structures, loops, functions).						K2	
	CO3: Apply Design, document, implement and test solutions to programming problems.						K3	
	CO4: Analyze the objects used in programming.						K4	
	CO5: Evaluate and repair coding errors in a program.						K5	
Learning Resources								
Text Books	1. Bill Lubanovic, "Introducing Python", O'Reilly, First Edition-Second Release, 2014.							
Reference Books	1. Mark Lutz, "Learning Python", O'Reilly, Fifth Edition, 2013. 2. David M. Beazley, "Python Essential Reference", Developer's Library, Fourth Edition, 2009.							
Website Link	https://www.javatpoint.com/python-tutorial							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards									
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C	
21M3PCSC11	OPEN SOURCE COMPUTING	DSC THEORY - XI	III	4				4	

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	L	S	M	S	S	M	S	S	S
CO2	S	S	M	S	L	M	S	M	S	S
CO3	S	M	S	M	S	S	M	S	M	S
CO4	M	S	M	S	L	S	M	M	S	M
CO5	S	M	S	M	S	M	S	S	M	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assessment Methods	Attendance, Assignment, Seminar, Internal – I & II

Designed By	Verified By	Approved By
A.M.NIRMALA Nemagi	P. Subramaniam SP	A. h. sany



M.Sc.-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hou rs	L	T	P	C
21M2PCS P05	MOBILE APPLICATION DEVELOPMENT	DSC PRACTICAL - V	III	4			4	2
Objective	1. Mobile Application Development course is designed to quickly get you up to write applications for Android devices. 2. Learn the basics of Android platform, get to understand the application frontiers and able to design his own applications.							
S.No.	List of Experiments / Programs						Knowled ge Levels	Session s
1	Write an Android Program to Demonstrate Alert Dialog Box						K1	4
2	Build an Android Program to Build a Simple Android Application						K2	5
3	Simulate an Android Program to Perform all Operations using Calculators						K2	4
4	Implement an Android Program to Change the Image Displayed on the Screen						K3	5
5	Prepare an Android Program to Demonstrate Action Button by Implementing on Click Listener						K3	4
6	Develop an Android Program to Demonstrate the Sound Button Application						K4	5
7	Write an Android Program to Demonstrate the use of Scroll View						K4	4
8	Build an Android Program to Demonstrate Radio Group Application						K4	5
9	Create an Android Program to Demonstrate the Menu Application						K5	4
10	Simulate an Android Program to Demonstrate List View Activity						K5	5
Course Outcome	CO1: Remember OOPC to develop Mobile Applications.						K1	
	CO2: Understand Layout Management and Multi layout definition techniques to create adaptable User Interface						K2	
	CO3: Apply the user interface for mobile Application using widgets with event handling						K3	
	CO4: Analyze the push notifications for incoming messages						K4	
	CO5: Evaluate applications to the Android marketplace for distribution.						K5	
Learning Resources								
Text Books	1. Jochen H. Schiller, "Mobile Communications", Addison-Wesley and imprint of Pearson Education Ltd., 2003. (Units I) 2. Donn Felker and Joshua Dobbs, "Android Application Development – for Dummies", Wiley Publishing Inc., 2011. (Units II, III, IV, V)							
Reference Books	1. Jerome (J.F.) DiMarzio, "Android – A Programmer's Guide", Tata McGraw-Hill Publication, 2008.							
Website Link	https://www.javatpoint.com/android-tutorial							

M.Sc.-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3PCSP05	MOBILE APPLICATION DEVELOPMENT	DSC PRACTICAL - V	III	4			4	2

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	M	S	S	M	S	M
CO2	M	M	S	S	S	S	S	M	M	L
CO3	M	S	M	M	M	S	S	S	M	S
CO4	S	S	S	S	L	S	M	S	S	S
CO5	S	S	S	M	S	M	S	M	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	To give more sample programs to related topic,
Teaching and Learning Methods	Presentation, Decode the Code
Assessment Methods	Attendance Observation Model Practical - I Model Practical - II

Designed By	Verified By	Approved By
<i>U. N. Mahalingam</i>	<i>[Signature]</i>	<i>[Signature]</i>



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3PCSP06	PYTHON PROGRAMMING	DSC PRACTICAL-VI	III	4			4	2
Objective	1. Learn core Python scripting elements such as variables and flow control structures. 2. Master the fundamentals of writing Python scripts							
S.No.	List of Experiments / Programs	Knowledge Levels	Sessions					
1	Programs using elementary data items, lists, dictionaries and tuples	K2	6					
2	Programs using conditional branches, loops.	K1	5					
3	Programs using functions	K2	4					
4	Programs using exception handling	K3	4					
5	Programs using classes and objects	K4	6					
6	Programs using inheritance & Polymorphism	K2	5					
7	Programs to implement file operations.	K3	5					
8	Programs using modules.	K4	5					
9	Programs for creating dynamic and interactive web pages using forms.	K5	5					
10	Program using database connection.	K4,K5	5					
Course Outcome	CO1: Remember the mathematical results in physical and other forms.	K1						
	CO2: Understand the Linear Differential Equations.	K2						
	CO3: Apply the contour integration of complex functions	K3						
	CO4: Analyze solving and programming capability.	K4						
	CO5: Evaluate how to write loops and decision statements in Python.	K5						
Learning Resources								
Text Books	1. Bill Lubanovic, "Introducing Python", O'Reilly, First Edition-Second Release, 2014							
Reference Books	1. Mark Lutz, "Learning Python", O'Reilly, Fifth Edition, 2013. 2. David M. Beazley, "Python Essential Reference", Developer's Library, Fourth Edition, 2009.							
Website Link	https://www.javatpoint.com/python-tutorial							



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P
21M3PCSP 06	PYTHON PROGRAMMING	DSC PRACTICAL-VI	III	4			4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	L	S	S	S	S	M	S
CO2	S	S	M	M	M	S	S	L	M	S
CO3	S	S	S	M	S	S	S	S	S	S
CO4	M	M	M	S	L	S	M	L	S	M
CO5	S	M	S	S	S	M	M	M	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	To give more sample programs to related topic,
Teaching and Learning Methods	Presentation, Decode the Code
Assessment Methods	Attendance Observation Model Practical - I Model Practical - II

Designed By	Verified By	Approved By
<i>U. Mahalingam</i>	<i>[Signature]</i>	<i>[Signature]</i>



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1PCSE01	ADVANCED COMPUTER ARCHITECTURE	DSE - I	I	4	4			4
Objective	1. To describe the advanced processor architectures to the students. 2. To explain students know about the Parallelism concepts in Programming							
Unit	Course Content						Knowledge Levels	Sessions
I	Evolution of Computer systems – Parallelism in Uniprocessor Systems: Architecture, Mechanisms – Parallel Computer Structures: Pipeline , Array, Multiprocessor						K1	8
II	Linear Pipeline processors: Asynchronous and Synchronous Models – Non-linear PipelineProcessors: Reservation and Latency Analysis –Collision-free scheduling – Instruction Pipeline Design: Instruction Execution Phases – Mechanisms f or Instruction Pipelining – Arithmetic Pipeline Design: Computer Arithmetic Principles – Static Arithmetic Pipelines.						K1,K2	10
III	SIMD Array Processor – SIMD Interconnection Network: Static vs Dynamic Network –Mesh connection Iliac Network- Tube interconnection Network. Associative Array Processing: Associative memory organization.						K1,K2,K3	9
IV	Multiprocessor System Interconnects: Hierarchical Bus System - Crossbar Switch and Multiport Memory - Multistage and Combining Networks – Cache Coherence and Synchronization Mechanisms: The Cache Coherence Problem – Snoopy Bus Protocols –Directory-Based Protocols – Message-PassingMechanisms: Message-Routing Schemes.						K3,K4	9
V	Multiprocessor Operating Systems- Interprocessor Communication Mechanisms - Multiprocessor Scheduling Strategies.						K4,K5	9
Course Outcome	CO1: Remember concepts of parallelism in hardware/software.						K1	
	CO2: Understand pipeline processors						K2	
	CO3: Understand and Apply array processor and associative memory						K3	
	CO4: Apply interconnection networks						K3	
	CO5: Analyze and Evaluate operating systems						K4	
Learning Resources								
Text Books	1. Kai Hwang, Faye A.Briggs, "Computer Architecture and Parallel Processing," McGrawHill, 1985. 2. Kai Hwang, "Advanced Computer Architecture," McGraw -Hill International Editions, 2001.							
Reference Books	1. Grama, "An Introduction to Parallel Computing: Design and Analysis ofAlgorithms," 2 nd Edition, Pearson, 2004. 2. Gita Alaghband, Harry Frederick Jordan, "Fundamentals of Parallel Processing,"Prentice Hall, 2003. 3. Seyed H Roosta, "Parallel Processing and Parallel Algorithms: Theory and Computation," Springer Science & Business Madia, 1999							
Website Link	1. https://www.youtube.com/watch?v=v7iefsovo9M 2. https://www.javatpoint.com/computer-organization-and-architecture-tutorial							
	L-Lecture	T-Tutorial	P-Practical	C-Credit				

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards									
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C	
21M1PCSE01	ADVANCED COMPUTER ARCHITECTURE	DSE - I	I	4	4				4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
C01	S	L	S	M	S	S	M	S	M	L
C02	S	S	M	S	L	M	S	M	S	M
C03	S	M	S	M	S	S	M	S	M	S
C04	M	S	M	S	L	M	S	M	S	L
C05	S	M	S	M	S	M	M	S	M	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assessment Methods	Attendance, Internal Examinations, Class Test, Assignment

Designed By	Verified By	Approved By
M. KRISHNA MOORTHY K. S. J.	P. Subramaniam R	A. h. S. S.



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSE02	ADVANCED DATABASE MANAGEMENT SYSTEMS	DSE - II	II	4	4			4
Objective	1. To classify strong foundation in advanced database concepts from an industry perspective. 2. Describe query processing and transaction management concepts for object-relational database and distributed database.							
Unit	Course Content						Knowledge Levels	Sessions
I	Relational and parallel Database Design: Basics, Entity Types, Relationship Types, ERModel, ER-to-Relational Mapping algorithm. Normalization: Functional Dependency, 1NF, 2NF, 3NF, BCNF, 4NF and 5NF. Architecture, I/O Parallelism, Interquery Parallelism, Intraquery Parallelism, Interoperation Parallelism, Interoperation Parallelism						K1	8
II	Distributed and Object based Databases: Architecture, Distributed data storage, Distributed transactions, Commit protocols, Concurrency control, Query Processing. Complex Data Types, Structured Types and Inheritance, Table Inheritance, array and Multi-set, Object Identity and Reference Types, Object Oriented versus Object Relational.						K2, K3	9
III	Spatial Database: Spatial Database Characteristics, Spatial Data Model, Spatial Database Queries, Techniques of Spatial Database Query, Logic based Databases: Introduction, Overview, Propositional Calculus, Predicate Calculus, Deductive Database Systems, Recursive Query Processing.						K2, K3, K4	10
IV	XML Databases: XML Hierarchical data model, XML Documents, DTD, XML Schema, XML Querying, XHTML, and Illustrative Experiments.						K3, K4	8
V	Temporal Databases: Introduction, Intervals, Packing and Unpacking Relations, Generalizing the relational Operators, Database Design, Integrity Constraints, Multimedia Databases: Multimedia Sources, Multimedia Database Queries, Multimedia Database Applications.						K4, K5	10
Course Outcome	CO1: Remember advance database concepts and database models.						K1	
	CO2: Understand and analyze various terms related to transaction Management in centralized and distributed database.						K2	
	CO3: Apply data modeling and database development process for object-oriented DBMS.						K3	
	CO4: Analyze Analyze and Implement the concept of object-relational Database in development of various real time software.						K4	
	CO5: Evaluate Apart of Examine the issues related to multimedia and mobile database performance.						K5	
Learning Resources								
Text Books	1. Abraham Silberschatz, Henry F Korth, S Sudarshan, "Database System Concepts", 6th edition, Mc Graw-Hill International Edition, 2011 2. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", 8th Edition, Pearson Education Reprint 2016.							
Reference Books	1. Ramez Elmasri, Shamkant B Navathe, "Fundamental of Database Systems", Pearson, 7th edition 2016. 2. Thomas Connolly, Carolyn Begg., "Database Systems a practical approach to Design, Implementation and Management", Pearson Education, 2014.							
Website Link	https://www.javatpoint.com/dbms-tutorial							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSE 02	ADVANCED DATABASE MANAGEMENT SYSTEMS	DSE - II	II	4				4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO 1	PSO 2	PSO3	PSO 4	PSO 5
CO1	S	M	L	M	S	S	M	M	S	M
CO2	M	S	M	S	L	M	S	L	M	M
CO3	S	M	S	M	S	S	S	S	L	S
CO4	M	S		L	M	M	M	M	S	M
CO5	S	M	S	M	S	S	S	M	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assesment Methods	Attendance, Internal Examinations, Class Test, Assignment

Designed By	Verified By	Approved By
<i>R. Dhruv</i>	<i>H</i>	<i>A. V. Sanyal</i>



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSE05	CLOUD COMPUTING	DSE - II	II	4	4			4
Objective	Define the fundamental ideas behind Cloud Computing, the evolution of the paradigm, its applicability benefits, as well as current and future challenges, Explain the basic ideas and principles in data center design cloud management techniques and cloud software deployment considerations.							
Unit	Course Content						Knowledge Levels	Sessions
I	COMPUTING BASICS: Cloud computing definition- Characteristics- Benefit-Challenges- Distributed Systems- Virtualization-Service-oriented computing- Utility-oriented computing- Building Cloud Computing environments- computing platforms & technologies - Cloud Models – Cloud Service Examples - Cloud Based Services & Applications - Cloud concepts and Technologies						K1,K2	9
II	VIRTUALIZATION, CLOUD SERVICES AND PLATFORMS : Virtualization:Virtualization- Characteristics-taxonomy-types- Pros and Cons- Examples Architecture: Reference model- types of clouds- Compute Service - Storage Services - Cloud Database Services - Application Services - Content Delivery Services - Analytics Services - Deployment And Management Service - Identity And Access Management Services - Open Source Private Cloud Software.						K2	7
III	CLOUD APPLICATION DESIGN AND DEVELOPMENT : Design consideration- Reference Architecture for Cloud Application - Cloud Application Design Methodologies - Data Storage Approaches- Development in Python: Design Approaches – Application: Image Processing - Document Storage – Map Reduce - Social Media Analytics.						K3	10
IV	PYTHON FOR CLOUD : Introduction- Installing Python-Data types & Data Structures- Control Flow- Functions- Modules- Packages- FileHandling- Date/Time Operations – Classes- Python for Cloud: Amazon Web Services –Google Cloud Platform - Windows Azure – Map Reduced – Packages of Interest–Designing a RESTful Web API.						K3,K4	9
V	BIG DATA ANALYTICS, MULTIMEDIA CLOUD & CLOUD SECURITY: Big Data Analytics: Clustering big data - Classification of Big Data – Recommendation systems. Multimedia Cloud: Case Study: Live Video Stream App - Streaming Protocols – Case Study: Video Transcoding App-Cloud Security: CSA Cloud Security Architecture – Authentication - Authorization - Identity and Access management - Data Security - Key Management- Auditing- Cloud for Industry, Healthcare & Education.						K5	10
Course Outcome	CO1: Remember the core concepts of the cloud computing paradigm						K1	
	CO2: Understand fundamental concepts in cloud infrastructures						K2	
	CO3: Apply system, network and storage virtualization and outline their role in enabling the cloud computing system model.						K3	
	CO4: Analyze the fundamental concepts of cloud storage and demonstrate their use in storage systems such as Amazon S3 and HDFS.						K4	
	CO5: Evaluate various cloud programming models and apply them to solve problems on the cloud.						K5	
Learning Resources								
Text	1. Buyya, Vecciola and Selvi, Mastering Cloud Computing: Foundations and Applications							

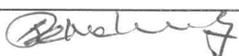
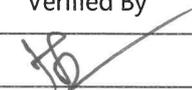
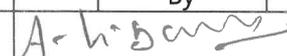
Books	Programming, Tata McGraw Hill, 2013. 2. ArshdeepBahga, Vijay Madiseti, "Cloud Computing: A Hands – On Approach" Universities press (India) Pvt. limited2016.							
Reference Books	1. Rittinghouse and Ransome, Cloud Computing: Implementation, Management, and Security, CRC Press,2016. 2. Michael Miller "Cloud Computing Web based application that change the way you work and collaborate online". Pearson edition,2008							
Website Link	https://www.javatpoint.com/cloud-computing-tutorial							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSE 05	CLOUD COMPUTING	DSE - II	II	4	4			4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	S	M	S	S	S	L	S
CO2	M	S	L	M	M	S	S	M	M	S
CO3	S	S	S	L	S	S	S	S	L	M
CO4	M	M	M	S	M	S	M	L	S	S
CO5	S	S	M	S	S	M	S	S	L	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	Seminar, Group Discussion, Class Test, Discussion about new Apps
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assessment Methods	Attendance, Internal Examinations, Class Test, Assignment

Designed By	Verified By	Approved By
		



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PC SE06	DIGITAL IMAGE PROCESSING	DSE - II	II	4	4			4
Objective	To study the image fundamentals and mathematical transforms necessary for image processing, To study the image segmentation, representation and compression procedures.							
Unit	Course Content						Knowledge Levels	Sessions
I	Introduction: Digital image processing – Origins of digital image processing- Examples of fields that use digital image processing-Fundamental steps in digital image processing Components of an image processing system-Representing digital image.						K1,K2	8
II	Some Basic relationships between Pixels-Basic gray level transformations- Histogram processing - Basic spatial filtering- Smoothing special filtering- Image Degradation/ Restoration process- Noise Models.						K2	10
III	Image Segmentation: Thresholding - Edge Based Segmentation – Region Based Segmentation – Matching. Image Compression: Error Criterion - Lossy Compression - Lossless Compression.						K2,K3	10
IV	Shape Representation and Description: Region Identification - Contour Based Representation And Description – Region Based Shape Representation And Description						K3,K4	9
V	Image Recognition: Introduction – Statistical Pattern Recognition - Neural Net Syntactic Pattern Recognition - Graph Matching – Clustering.						K3,K4,K5	8
Course Outcome	CO1: Remember the concept of image processing						K1	
	CO2: Understand the filtering concepts						K2	
	CO3: Apply the image segmentation						K3	
	CO4: Analyze the shape representation and description						K4	
	CO5: Evaluate the image recognition						K5	
Learning Resources								
Text Books	1. Rafael, C. Gonzalez ., & Richard, E. Woods. (2008). Digital Image Processing (3 rd ed.). New Delhi Pearson Education.							
Reference Books	1. Chanda, B., & Dutta Majumder, D. (2000). Digital Image Processing and Analysis (1st ed.). New Delhi: Prentice Hall of India. 2. Milan Sonka., Vaclav Hlavac.,& Roger Boyle. (2004). Image Processing Analysis and Machine Vision (2 nd ed.). New Delhi: Vikas Publishing House.							
Website Link	1. https://www.youtube.com/watch?v=1I6kfkY4GyQ 2. https://nptel.ac.in/courses/117105135							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSE 06	DIGITAL IMAGE PROCESSING	DSE - II	II	4	4			4

CO-PO Mapping

CO Number	P01	P02	P03	P04	PO 5	PSO 1	PSO 2	PSO3	PSO 4	PSO 5
CO1	S	S	S	L	S	S	L	M	S	L
CO2	S	S	M	M	S	S	S	S	S	L
CO3	S	S	S	L	M	S	S	S	M	S
CO4	S	M	L	S	S	S	S	M	S	M
CO5	M	S	S	L	S	S	S	M	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	Seminar, Group Discussion, Class Test, Discussion about new Apps
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assessment Methods	Attendance, Internal Examinations, Class Test, Assignment

Designed By	Verified By	Approved By
V. Suthar		A. H. Sanyal



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3PCSE07	BIG DATA ANALYTICS	DSE - III	II	4	4			4
Objective	1.To Understand the Big Data Platform and its Use cases 2.To Provide an overview of Apache Hadoop							
Unit	Course Content						Knowledge Levels	Sessions
I	Fundamentals of Big Data Understanding Big Data: Concepts and Terminology – Big Data Characteristics – Types of Data – Case Study Background – Drivers for Big Data Adoption: Information and Communication Technology – Big Data Analytics Lifecycle.						K1,K2	8
II	Fundamentals of Hadoop Core components of Hadoop- Apache Hadoop – HDFS Daemons – MapReduce Daemons – HDFS High Availability Daemons – Benefits and Challenges of HDFS – File Sizes, Block Sizes and Block Abstraction in HDFS – Data Replication – How does HDFS Store, Read, and Write Files? – Data Serialization Options – File System Shell Commands for HDFS.						K1,K2	9
III	HDFS and MapReduce Choosing Key and Value Types for MapReduce Jobs – The Relationship of Input Keys to Output Keys – Sorting Keys and Values – Sort and Shuffle Process – MapReduce Job Configuration and Submission Hadoop Distributed File System – MapReduce Framework – Setting the Environment – Hadoop Cluster Modes – Running a MapReduce Job with the MR1Framework - Running a MapReduce Job with the Yarn Framework – Running Hadoop Streaming						K2,K3	10
IV	Hive and HBase Apache Hive: Setting the Environment – Configuring Hadoop, Hive – Starting HDFS, Hive Server, CLI – Creating and Using a Database– Creating a Managed Table – Loading data into a Table – Creating a Table using LIKE – Adding Data into a Table from Queries – Adding Data using INSERT INTO TABLE - Adding Data using INSERT OVERWRITE – Creating a table using CREATE TABLE AS SELECT – Altering, Truncating and Dropping a Table– Creating an External Table – Apache HBase: Setting the Environment - Configuring Hadoop, Hive and HBase – Starting the HBase and HBase Shell – Creating HBase Table – Adding Data to a Table – Listing all Tables – Getting a Row of Data – Scanning a Table – Counting the Number of Rows in a Table – Altering a Table – Deleting a Table Row, Column – Disabling and Enabling a Table – Truncating and Dropping a Table – Determining If Table Exists – Creating a Hive External Table stored by HBase						K3,K4	10
V	Pig Introduction – Installing and Running Pig – Grunt – Pig’s Data Model – Introduction to Pig Latin – Advanced Pig Latin – Developing and Testing Pig Latin Scripts – Making Pig Fly – Writing Evaluation and Filter Functions – Writing and Loading Store Function						K1,K5	8
Course Outcome	CO1: Remember Big Data and its analytics in the real world						K1	
	CO2: Understand the concept Hadoop						K2	
	CO3: Apply the HDFS and MapReduce						K3	
	CO4: Analyze the Hive and HBase Apache Hive						K4	
	CO5: Evaluate the pig big data						K5	
Learning Resources								
Text Books	1. Alan Gates, “Programming Pig”, Orelly Publication, 2011. 2. Deepak Vohra, “Practical Hadoop Ecosystem: A Definitive Guide to Hadoop-Related Frameworks and Tools”, Apress, 2016. 3. Thomas Erl, Wajid Khattak, Paul Buhler, —Big Data Fundamentals Concepts, Drivers & Techniques, Service Tech Press, 2015.							
Reference Books	1. Noreen Burlingame, “The little book on BigData”, New Street publishers, 2012. 2. Anil Maheshwari, “Data Analytics”, Mc Graw Hill Education,2017.							
Website Link	1.https://nptel.ac.in/courses/106104189 2. https://www.tutorialspoint.com/big_data_analytics/index.htm							
	L-Lecture	T-Tutorial	P-Practical	C-Credit				

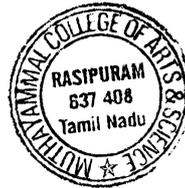
M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3PCSE07	BIG DATA ANALYTICS	DSE - III	II	4	4			4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	S	M	S	S	S	M	S
CO2	M	S	L	M	M	S	S	L	M	S
CO3	S	S	S	L	S	S	S	S	S	L
CO4	M	M	M	S	M	S	M	L	S	M
CO5	S	S	M	S	S	M	M	M	L	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	-
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assessment Methods	Attendance, Internal Examinations, Class Test, Assignment

Designed By	Verified By	Approved By
SELVAKUMAR G. <i>[Signature]</i>	P. Subram <i>[Signature]</i>	A. h. Sams <i>[Signature]</i>



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4PCSE10	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	DSE - IV	IV	5	3	2		4
Objective	1. To understand the basic theory underlying machine learning. 2. To Explain a range of machine learning algorithms along with their strengths and weaknesses.							
Unit							Knowledge Levels	Sessions
I	Introduction to Artificial intelligence and Problem-Solving Agent Problems of AI, AI technique, Tic – Tac – Toe problem. Intelligent Agents, Agents & environment, nature of environment, structure of agents, goal-based agents, utility-based agents, learning agents. Defining the problem as state space search, production system, problem characteristics, issues in the design of search programs.						K1	9
II	Search techniques : Problem solving agents, searching for solutions; uniform search strategies: breadth first search, depth first search, depth limited search, bidirectional search, comparing uniform search strategies. Heuristic search strategies Greedy best-first search, A* search, AO* search, memory bounded heuristic search: local search algorithms & optimization problems: Hill climbing search, simulated annealing search, local beam search.						K2	8
III	Constraint satisfaction problems and Game Theory Local search for constraint satisfaction problems. Adversarial search, Games, optimal decisions & strategies in games, the minimax search procedure, alpha-beta pruning, additional refinements, iterative deepening.						K2,K3	9
IV	Knowledge & reasoning Statistical Reasoning: Probability and Bays" Theorem, Certainty Factors and Rule-Base Systems, Bayesian Networks, Dempster-Shafer Theory, Fuzzy Logic. AI for knowledge representation, rule-based knowledge representation, procedural and declarative knowledge, Logic programming, Forward and backward reasoning.						K3,K4	10
V	Introduction to Machine Learning 9 Exploring sub-discipline of AI: Machine Learning, Supervised learning, Unsupervised learning, Reinforcement learning, Classification problems, Regression problems, Clustering problems, Introduction to neural networks and deep learning.						K4,K5	9
Course Outcome	CO1: Remember importance of visualization in the data analytics solution						K1	
	CO2: Understand structured of thinking to unstructured problems						K2	
	CO3: Apply a very broad collection of machine learning algorithms and problems						K3	
	CO4: Analyze algorithmic topics of machine learning and mathematically deep enough to introduce the required theory						K4	
	CO5: : Evaluate an appreciation for what is involved in learning from data.						K5	
Learning Resources								
Text Books	1 S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, Prentice Hall, Third Edition, 2015. 2 Nils J. Nilsson, Artificial Intelligence: A New Synthesis (1 ed.), Morgan-Kaufmann, 1998.							
Reference	1. Elaine Rich, Kevin Knight, & Shivashankar B Nair, Artificial Intelligence, McGraw Hill, 3rd							

Books	ed.,2017. 2. Introduction to Artificial Intelligence & Expert Systems, Patterson, Pearson, 1st ed. 2015						
Website Link	https://www.javatpoint.com/artificial-intelligence-tutorial						
	L-Lecture	T-Tutorial	P-Practical		C-Credit		

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4PCSE 10	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	DSE -IV	IV	5	3	2		4

CO-PO Mapping

CO Number	P01	P02	P03	P04	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	L	S	M	S	S	M	S	M	S
CO2	S	S	M	S	L	S	S	S	M	L
CO3	S	M	S	M	S	M	S	S	S	M
CO4	M	S	M	S	L	M	S	M	S	L
CO5	S	M	S	M	S	S	M	S	L	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assesment Methods	Attendance, Internal Examinations, Class Test, Assignment <i>2027</i>

ESE757

Designed By	Verified By	Approved By
<i>Ullmani</i>	<i>[Signature]</i>	<i>A-h-Dany</i>



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4PCSE11	GRID COMPUTING	DSE - IV	IV	5	3	2		4
Objective	1. Identify the technical foundations of cloud systems architectures. 2. Analyze the problems and solutions to cloud application problems.							
Unit	Course Content						Knowledge Levels	Sessions
I	Introduction-Parallel and Distributed computing- Evolution of Distributed computing-Cluster computing-Grid Computing-Introduction to Grid Architecture and standards – Elements of Grid computing-Overview of Grid Architecture						K1	9
II	Review of Web Services-OGSA-WSRF-Challenges and Applications-Open Grid Services Architecture (OGSA)- Grid Monitoring Architecture (GMA) - An Overview of Grid Monitoring Systems- Grid ICE— JAMM - MDS-Network Weather Service-R-GMA-Other Monitoring Systems						K2	9
III	Grid Security and Resource Management - Grid Security-A Brief Security Primer-PKI-X509 Certificates-Grid Security-Grid Scheduling and Resource Management-Scheduling Paradigms- Working principles of Scheduling - Grid Scheduling with QoS.						K2,K3	9
IV	Data Management and Grid Portals-Data Management-Categories and Origins of Structured Data-Data Management-Challenges-Architectural Approaches-Collective Data Management Services-Federation Services-Grid Portals-First-Generation Grid Portals-Second-Generation Grid Portals						K3,K4	9
V	Trust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure – Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.						K4,K5	9
Course Outcome	CO1: Remember the fundamental principles of distributed computing.						K1	
	CO2: Understand how the distributed computing environments known as Grids can be built from lower level services.						K2	
	CO3: Apply the importance of virtualization in distributed computing and how this has enabled the development of Cloud Computing						K3	
	CO4: Analyze the performance of Cloud Computing						K4	
	CO5: Evaluate the concept of Cloud Security.						K5	
Learning Resources								
Text Books	1. Kai Hwang, Geoffery C. Fox and Jack J. Dongarra, "Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet", First Edition, Morgan Kaufman Publisher, an Imprint of Elsevier, 2012. 2. Maozhen Li, Mark Baker, The Grid Core Technologies, John Wiley & Sons ,2005.							
Reference Books	1. The Grid 2 - Blueprint for a New Computing Infrastructure, Ian Foster and Carl Kesselman, Morgan Kaufman - 2004. 2. Grid Computing: Making the Global Infrastructure a reality, Fran Berman, Geoffrey Fox, Anthony J.G. Hey, John Wiley and sons							
Website Link	https://www.javatpoint.com/grid-computing							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

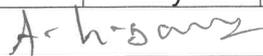
M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4PCSE 11	GRID COMPUTING	DSE - IV	IV	5	3	2		4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	S	S	S	S
CO2	M	S	M	M	S	M	S	M	M	S
CO3	S	S	S	L	L	S	M	S	L	L
CO4	M	S	M	S	M	M	S	M	S	M
CO5	S	M	M	L	S	S	M	S	L	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assesment Methods	Attendance, Internal Examinations, Class Test, Assignment

Designed By	Verified By	Approved By
		



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4PCSE12	WIRELESS NETWORKS	DSE - IV	IV	5	3	2		4
Objective	<p>1.To study the evolving wireless technologies and standards</p> <p>2.To understand the architectures of various access technologies such as 3G, 4G</p>							
Unit	Course Content						Knowledge Levels	Sessions
I	WIRELESS LAN - Introduction-WLAN Technologies: Infrared, UHF Narrowband, Spread Spectrum -IEEE802.11: System Architecture, Protocol Architecture, Physical Layer, MAC Layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, Radio Layer, Baseband Layer, Link Manager Protocol, Security – IEEE802.16-WIMAX: Physical Layer, MAC, Spectrum Allocation For WIMAX						K1,K2	14
II	MOBILE NETWORK LAYER - Introduction – Mobile IP: IP Packet Delivery, Agent Discovery, Tunneling and Encapsulation, IPV6-Network Layer In The Internet- Mobile IP Session Initiation Protocol – Mobile Ad-Hoc Network: Routing, Destination Sequence Distance Vector, Dynamic Source Routing.						K1,K3	11
III	MOBILE TRANSPORT LAYER - TCP Enhancements For Wireless Protocols – Traditional TCP: Congestion Control, Fast Retransmit/Fast Recovery, Implications Of Mobility – Classical TCP Improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time Out Freezing, Selective Retransmission, Transaction Oriented TCP – TCP Over 3G Wireless Networks.						K2,K3	12
IV	WIRELESS WIDE AREA NETWORK - Overview of UTMS Terrestrial Radio Access Network-UMTS Core Network Architecture: 3G-MSC, 3G-SGSN, 3G-GGSN, SMS- GMSC/SMS-IWMSC, Firewall, DNS/DHCP-High Speed Downlink Packet Access (HSDPA)- LTE Network Architecture and Protocol.						K3,K4	12
V	4G NETWORKS - Introduction – 4G Vision – 4G Features And Challenges – Applications Of 4G – 4G Technologies: Multicarrier Modulation, Smart Antenna Techniques, OFDM-MIMO Systems, Adaptive Modulation And Coding With Time Slot Scheduler, Cognitive Radio.						K5	11
Course Outcome	CO1: Remember the Wireless concepts						K1	
	CO2: Understand and organize Mobile network layer						K2	
	CO3: Apply and use of Mobile network layer						K3	
	CO4: Analyze the wireless wide area network						K4	
	CO5: Evaluate the 4G networks						K5	
Learning Resources								
Text Books	<p>1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education 2012.(Unit - I,II,III)</p> <p>2. Vijay Garg , "Wireless Communications And Networking", First Edition, Elsevier 2014.(Unit - IV,V)</p>							
Reference Books	<p>1. Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming,"3G Evolution HSPA and LTE for Mobile Broadband", Second Edition, Academic Press,2008.</p> <p>2. Anurag Kumar, D.Manjunath, Joy Kuri, "Wireless Networking", First Edition, Elsevier2011.</p>							
Website Link	<p>1. https://nptel.ac.in/courses/106105160</p> <p>2. https://www.javatpoint.com/wireless-lan-introduction</p>							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4PCSE12	WIRELESS NETWORKS	DSE - IV	IV	5	3	2		

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	S	L	S	S	S	S	S
CO2	M	S	S	S	M	M	S	M	M	S
CO3	M	M	S	S	S	S	M	S	L	L
CO4	S	S	M	S	S	M	S	M	S	M
CO5	S	S	S	S	S	S	M	S	L	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assessment Methods	Attendance, Internal Examinations, Class Test, Assignment

Designed By	Verified By	Approved By
R.M. [Signature]	[Signature]	A. h. [Signature]

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4PCSE13	ADVANCED SOFTWARE ENGINEERING	DSE - V	IV	5	3	2		4
Objective	1. To Understand Advanced knowledge in software engineering, Quality assurance techniques, Requirements management techniques 2. To Understand Software project planning, Quality engineering techniques							
Unit	Course Content						Knowledge Levels	Sessions
I	Introduction: The Problem Domain – Software Engineering Challenges – Software Engineering Approach – Software Processes: Software Process – Characteristics of a Software Process – Software Development Process Models – Other software processes.						K1	9
II	Software Requirements Analysis and Specification : Requirement engineering – Type of Requirements – Feasibility Studies – Requirements Elicitation – Requirement Analysis – Requirement Documentation – Requirement Validation – Requirement Management – SRS - Formal System Specification – Axiomatic Specification – Algebraic Specification -Software Quality Management – Software Quality, Software Quality Management System, ISO 9000, SEI CMM.						K2,K3	9
III	Software Project Management: Responsibilities of a software project manager – Project planning – Metrics for Project size estimation – Project Estimation Techniques – Empirical Estimation Techniques – COCOMO – Staffing level estimation – Scheduling – Organization and Team Structures – Staffing – Risk management – Software Configuration Management – Miscellaneous Plan.						K3	9
IV	Software Design: Outcome of a Design process – Characteristics of a good software design – Cohesion and coupling - Strategy of Design – Function Oriented Design – Object Oriented Design - Detailed Design.						K3,K4	9
V	Software Testing: A Strategic approach to software testing – Terminologies – Functional testing – Structural testing – Levels of testing – Validation testing - Regression testing – Art of Debugging – Testing tools - Metrics-Reliability Estimation. Software Maintenance - Maintenance Process - Reverse Engineering – Software Re-engineering - Configuration Management Activities.						K4,K5	9
Course Outcome	CO1: Remember and adhere to professional ethical standards in the system development and modification process						K1	
	CO2: Understand the ability to build and configure major operating system components						K2	
	CO3: Apply the ability to analyze and implement solutions to complex problems involving computers and networks						K3	
	CO4: Analyze the ability to work effectively in teams						K4	
	CO5: Classify a solid understanding to the methods of modern software engineering						K5	
Learning Resources								
Text Books	1. An Integrated Approach to Software Engineering – PankajJalote, Narosa Publishing House, Delhi ,3 rd Edition. 2. Fundamentals of Software Engineering – Rajib Mall, PHI Publication, 3rd Edition							
Reference Books	1. Software Engineering – K.K. Aggarwal and Yogesh Singh, New Age International Publishers, 3rd edition. 2. A Practitioners Approach- Software Engineering, - R. S. Pressman, McGraw Hill.							
Website Link	https://www.javatpoint.com/software-engineering-tutorial https://www.tutorialspoint.com/software_engineering/index.htm							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

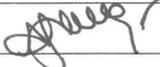
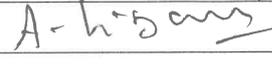
M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4PCSE 13	ADVANCED SOFTWARE ENGINEERING	DSE - V	IV	5	3	2		4

CO-PO Mapping

CO Number	P01	P02	P03	P04	PO 5	PSO 1	PSO 2	PSO3	PSO 4	PSO 5
CO1	S	L	S	M	S	S	M	M	S	L
CO2	S	S	M	S	L	M	S	S	S	M
CO3	S	M	S	M	S	M	M	S	S	S
CO4	M	S	M	S	L	S	S	M	S	S
CO5	S	M	S	M	S	S	S	S	S	S
Level of Correlation between CO and PO	L- LOW	M- MEDIUM	S- STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assesment Methods	Attendance, Internal Examinations, Class Test, Assignment

CIA 25%. ESE - 75%

Designed By	Verified By	Approved By
		



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4PCSE 14	WAP and XML	DSE - V	IV	5	3	2		4
Objective	1. To understand the concept of WAP. 2. To learn about the functionality of WAP gateways.							
Unit	Course Content						Knowledge Levels	Sessions
I	Overview of WAP: WAP and the wireless world – WAP application architecture – WAP internal structure – WAP versus the Web – WAP 1.2 – WTA and push features. Setting up WAP: Available software products – WAP resources – The Development Toolkits.						K1	8
II	WAP gateways: Definition – Functionality of a WAP gateway – The Web model versus the WAP model – Positioning of a WAP gateway in the network – Selecting a WAP gateway Basic WML: Extensible markup language – WML structure – A basic WML card – Text formatting – navigation – Advanced display features.						K2,K3	9
III	Interacting with the user: Making a selection –Events – Variables – Input and parameter passing. WML Script: Need for WML script – Lexical Structure – Variables and literals – Operators – Automatic datatype conversion – Control Constructs Functions – Using the standard libraries – programs – Dealing with Errors.						K4	9
IV	XML: Introduction XML: An Eagle’s Eye view of XML – XML Definition List of an XML Document – Related Technologies – An introduction to XML Applications – XML Applications – XML for XML – First XML Documents Structuring Data: Examining the Data XMLizing the data - The advantages of the XML format – Preparing a style sheet for Document Display.						K3,K4	10
V	Attributes, Empty Tags and XSL: Attributes – Attributes Versus Elements – Empty Tags – XSL – Well-formed XML documents – Foreign Languages and Non Roman Text – Non Roman Script on the Web Scripts, Character sets, Fonts and Glyphs – Legacy character sets– The Unicode Character set – Procedure to Write XML Unicode.						K4,K5	9
Course Outcome	CO1: Remember the basics of WAP architecture						K1	
	CO2: Understand the usage of WAP gate ways.						K2	
	CO3: Apply WML concepts to develop Web application.						K3	
	CO4: Analyze the interactive real time applications.						K4	
	CO5: Evaluate web sites using XSL Style Sheets.						K5	
Learning Resources								
Text Books	1) Charles Arehart and Others. "Professional WAP with WML, WML script, ASP, JSP, XML, XSLT, WTA Push and Voice XML" Shroff Publishers and Distributors Pvt. Ltd 2000. (For Unit - I, II,III) 2) Eliotte Rusty Harlod "XML TM Bible", Books India (P) Ltd, 2000 (For Unit - IV &V)							
Reference Books	1) Heather Williamson, "XML: The Complete Reference ", Tata McGraw-Hill Education India.							
Website Link	1. https://www.tutorialspoint.com/wml/wml_overview.htm#:~:text=The%20topmost%20layer%20in%20the.WML%20and%2							
	L-Lecture	T-Tutorial	P-Practical	C-Credit				

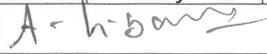
M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4PCSE 14	WAP and XML	DSE - V	IV	5	3	2		4

CO-PO Mapping

CO Number	P01	P02	P03	P04	PO 5	PSO 1	PSO 2	PSO3	PSO 4	PSO 5
CO1	S	S	M	S	S	S	M	M	M	M
CO2	S	S	S	S	M	S	S	S	M	M
CO3	S	M	S	S	L	M	M	S	M	M
CO4	S	S	M	S	S	S	S	S	S	S
CO5	S	S	S	M	L	M	L	M	L	S
Level of Correlation between CO and PO	L- LOW	M- MEDIUM	S- STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assesment Methods	Attendance, Internal Examinations, Class Test, Assignment

Designed By	Verified By	Approved By
		

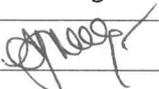
M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4PCSE15	ADVANCED COMPUTER NETWORKS	DSE - V	IV	5	3	2		4
Objective	1. To classify the concept of Computer network. 2. To contrast knowledge about data, network, transport layers							
Unit	Course Content						Knowledge Levels	Sessions
I	Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP models – Example networks: Internet, 3G Mobile phone networks, Wireless LANs –RFID and sensor networks - Physical layer – Theoretical basis for data communication - guided transmission media						K1,K2	13
II	Wireless transmission – Communication Satellites – Digital modulation and multiplexing - Telephones network structure – local loop, trunks and multiplexing, switching. Data link layer: Design issues – error detection and correction.						K2,K3	11
III	Elementary data link protocols – sliding window protocols – Example Data Link protocols – Packet over SONET, ADSL - Medium Access Layer–Channel Allocation Problem–Multiple Access Protocols.						K4	12
IV	Network layer - design issues - Routing algorithms - Congestion control algorithms – Quality of Service – Network layer of Internet-IP protocol – IP Address – Internet Control Protocol.						K3,K4	12
V	Transport layer – transport service- Elements of transport protocol - Addressing, Establishing & Releasing a connection– Error control, flow control, multiplexing and crash recovery - Internet Transport Protocol – TCP- Network Security: Cryptography.						K5	12
Course Outcome	CO1: Remembering computer networks						K1	
	CO2: Understand and use of multiplexing and error detection						K2	
	CO3: Apply the data link protocols						K3	
	CO4: Analyze Network layer						K4	
	CO5: Evaluate Transport layer and Security						K5	
Learning Resources								
Text Books	1. S. Tanenbaum, 2011, Computer Networks, Fifth Edition, Pearson Education, Inc.							
Reference Books	1. B. Forouzan, 1998, Introduction to Data Communications in Networking, Tata McGraw Hill, NewDelhi. 2. F.Halsall, 1995, Data Communications, Computer Networks and Open Systems, Addison Wessley.							
Website Link	1. https://www.javatpoint.com/computer-network-tutorial							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4PCSE 15	ADVANCED COMPUTER NETWORKS	DSE - V	IV	5	3	2		4

CO-PO Mapping

CO Number	P01	P02	P03	P04	PO 5	PSO 1	PSO 2	PSO3	PSO 4	PSO 5
CO1	S	M	M	S	L	S	M	S	L	S
CO2	M	S	S	S	M	S	S	M	M	M
CO3	M	M	S	S	S	S	S	S	M	S
CO4	S	S	M	S	S	M	M	M	S	M
CO5	S	S	S	S	S	S	M	S	L	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assesment Methods	Attendance, Internal Examinations, Class Test, Assignment

Designed By	Verified By	Approved By
		



M.Sc Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

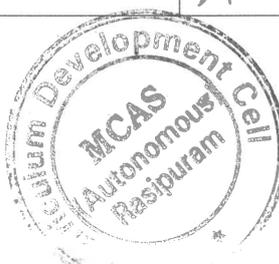
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3PC SIS1	INTERNSHIP	INTERNSHIP	III	-	-	-	-	2
Objective	To give optimum exposure on the practical aspects of IT Industries.							

S. No.	Guidelines for Internship Training Programme	Knowledge Levels	Sessions
1	The student should undergo 15 Days Internship training in any Software development firms/Hardware/ manufacturing firms/Any small scale industries, service providers like banks/Clinics/ NGOs/professional institutions like that of CA, Advocate etc/Civic Depts like Ward office/post office/police station/punchayat./ Research Centres/ University Depts/ College as research Assistant for research projects or similar capacities during the vacation which falls at the end of the 2 nd Semester.	K2-K4	
2	The training bridges the gap between the theoretical knowledge gained in the college and the practical application of the same in the industry / companies. The student will have a better exposure about the workplace and its nuances.		
3	Schedule of visit to be made by the staff is to be prepared by the HOD / Staff-in-charge.		
4	The trainees should strictly adhere to the rules and regulations and office timings of the institutions to which they are attached.		
5	A Staff member of a Department (Guide) will be monitoring the performance of the Candidate.		
6	The students should maintain a daily logbook where the student should record his details of the training.		
7	The trainees have to obtain a certificate on successful completion of the internship from the chief executive of an organization.		
8	The student should submit an attendance certificate to the institution for 15 days internship training from an organization.		
9	Internship Training Report (30 – 50 pages) should be prepared by the student and submitted in a month's time and at the end of the semester student should present the report with a power point presentation.		
10	Industrial training reports shall be prepared by the students under the supervision of the faculty of the department.		
11	Industrial training report must contain the following: Cover page Copy of training certificate, Profile of an industry report about the work undertaken by them during the tenure of training observation about the concern findings.		
12	Practical viva – voce examination will be conducted with internal & external examiners at the end of the 3rd semester and the credits will be awarded.		
13	Report Evaluation: External Viva-Voce examination will be conducted and the		

	maximum mark is 100.		
Course Outcome	CO1: Identify employment contacts leading directly to a full-time job following course completion	K3	
	CO2: Create communication, interpersonal and other soft skills essential for the job interview process	K4	
	CO3: Analyse the project requirements and engages in continuing professional development	K6	
	CO4: Analyze a problem and identify the computing requirements appropriate to its solution.	K6	
	CO5: Utilizing a new software tool.	K6	
Learning Resources			
Text Books	1. The Successful Internship by H. Frederick Sweitzer, Mary A. King, 2013. 2. Social Media Tools in Experiential Internship Learning by Samuel Kai Wah Chu, 2020.		
Reference Books	1. The Intern Files: How to Get, Keep and Make the Most of Your Internship by Jamie Fedorko, 2006.		
Website Link	1. http://gen.lib.rus.ec/		

M. Sc – Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C		
21M3PCSI1	INTERNSHIP	INTERNSHIP	III	-	-	-	-	2		
CO-PO Mapping										
CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	S	M	S	S	S	S
CO2	S	M	S	S	S	S	M	S	S	S
CO3	M	S	S	S	S	M	S	S	S	S
CO4	S	M	S	S	S	S	M	S	S	S
CO5	M	S	S	S	S	M	S	S	S	S
Level of Correlation between CO and PO		L-LOW			M-MEDIUM			S-STRONG		
Tutorial Schedule				-						
Teaching and Learning Methods				-						
Assessment Methods				CIA – 100 Marks 1. Work Log Book – 25 Marks 2. Training Report and Viva-Voce – 75 Marks						
Designed By			Verified By			Approved By				
Mr.P.SUBRAMANIAM			Mr.P.SUBRAMANIAM			A. h. Sams				



M.Sc., Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4PCSPR1	PROJECT WORK	PROJECT WORK	IV	8				4
Objective	To Identify Problem related to their area of interest in Computer Science industry and enhance problem solving skills and research knowledge.							
Details	Course Content			Knowledge Levels		Sessions		
PROJECT PREPARATION FORMAT								
Cover Page & Title Page	Cover Page & Title Page: The fonts and locations of various items on this page should be exactly as shown in a specimen copy.							
Inside cover page	Inside cover page Same as cover page.							
Bonafide Certificate	Bonafide Certificate: The Bonafide Certificate shall be in double line spacing using Font Style Times New Roman and Font Size 14.							
Acknowledgement	Acknowledgement: This should not exceed one page.							
Abstract	Abstract: Abstract should be one page synopsis of the project report typed double line spacing, Font Style Times New Roman and Font Size 14.							
Contents	Table of Contents: The table of contents should list all headings, sub headings after the table of contents page, as well as any titles preceding it. The title page and Bonafide Certificate will not find a place among the items listed in the Table of Contents. One and a half spacing should be adopted for typing the matter under this head.							
Tables	List of Tables: The list should use exactly the same captions as they appear above the tables in the text. 1.5 spacing should be adopted for typing the matter under this head.							
Figures	List of Figures: The list should use exactly the same captions as they appear below the figures in the body of the text. One and a half spacing should be adopted for typing the matter under this head. All charts, graphs, maps, photographs and diagrams should be designated as figures. X and Y axes titles are mandatory for all the graphs.							
Symbols	List of Symbols, Abbreviations and Nomenclature: 1.5 spacing should be adopted or typing the matter under this head. Standard symbols, abbreviations etc. should be used.							

Chapters	Chapter I - Introduction: Statement of the Problem, Significance, Need for the study, Objectives	K2	
	Chapter II- Review of literature	K4	
	Chapter III- Methodology: Tools used, Procedures, Hypothesis.	K4	
	Chapter IV- Results and Discussion: Tables and Figures, Statistical Presentations, Hypothesis Testing.	K5	
	Chapter V- Summary and conclusion	K6	
	Chapter VI- Scope of the Project	K6	
	References		

GUIDELINES FOR PROJECT PREPARATION

Numbering	<ul style="list-style-type: none"> • Every page in the project report, except the project report title page, must be accounted for and numbered. • The page numbering, starting from acknowledgements and till the beginning of the introductory chapter, should be printed in small Roman numbers, i.e, i, ii, iii, iv..... • The page number of the first page of each chapter should not be printed (but must be accounted for). All page numbers from the second page of each chapter should be printed using Arabic numerals, i.e. 2,3,4,5... • All printed page numbers should be located at the right corner at the bottom of the page. 		
Chapters	<ul style="list-style-type: none"> • Use only Arabic numerals. Chapter numbering should be centered on the top of the page using large bold print. <Size 14><Times New Roman> 		

TEXT

Regular Text	Regular Text: Times Roman 12 pts and normal print.		
Chapter Heading	Chapter Heading - Times Roman 14 pts. Bold and capital.		
Section Headings	Section Headings - Times roman 12 pts. Bold and capital.		
Subsection Headings	Subsection Headings - times roman 12 pts. bold print and Leading capitals i.e, only first letter in each word should be in capital.		
Special Text	Special Text- Italics/Superscript /Subscript/Special symbols, etc., as per necessity. Special text may include footnotes, endnotes, physical or chemical symbols, mathematical notations, etc.		
Sections	Sections: Use only Arabic numerals with decimals. Section numbering should be left justified using bold print. Example: 1.1, 1.2, 1.3, etc.		
Sub Sections	Sub Sections: Use only Arabic numerals with two decimals. Subsection numbering should be left Justified using bold print. Example: 1.1.1, 1.1.2, 1.1.3, etc.		
References	Use only Arabic numerals. Serial numbering should be carried out based on Alphabetical order of surname or last name of first author. The format is written like, author name followed by year followed by title of the work followed by details of the journal. Same font as regular text, serial number and all		

	<p>authors names to be in bold print. Title and Journal names should be in italic.</p>		
Typing Instructions	<p>Typing Instructions: The impression on the typed copies should be black in color. One and a half spacing should be used for typing the general text. The general text shall be typed in the Font style 'Times New Roman' and Font size 12. Use A4 (210 mm X 297 mm) bond un-ruled paper (80 gsm) for all copies submitted. Use one side of the paper for all printed/typed matter.</p>		
Justification	<p>Justification: The text should be fully justified</p>		
Margins	<p>Margins: The margins for the regular text are as follows LEFT - 1.5" RIGHT - 1" TOP - 1" BOTTOM - 1"</p>		
Paragraph Spacing	<p>Use 6 pts before & 6 pts after paragraphs. All paragraphs in the seminar/project report should be left justified completely, from the first line to the last line. Use 1.5 spacing between the regular text and quotations.</p> <p>Provide double spaces between: (a) From top of page to chapter title, (a) Chapter title and first sentence of a chapter,</p> <p>Use single spacing (a) In footnotes and endnotes for text. (b) in explanatory notes for tables and figures. (c) in text corresponding to bullets, listings, and quotations in the main body of seminar/project report .</p> <p>Use single space in references and double space between references.</p>		
Tables	<p>All tables should have sharp lines, drawn in black ink, to separate rows/columns as and when necessary.</p> <p>Tables should follow immediately after they are referred to for the first time in the text. Splitting of paragraphs, for including tables on a page, should be avoided. Provide double spaces on the top and the bottom of all tables to separate them from the regular text, wherever applicable. The title of the table etc. should be placed on the top of the table. The title should be centered with respect to the table. The titles must be in the same font as the regular text and should be single spaced.</p>		
Figures	<p>All figures, drawings, and graphs should be drawn in black ink with sharp lines and adequate contrast between different plots if more than one plot is present in the same graph. The title of the figure etc. should be placed on the bottom of the figure. Figures should follow immediately after they are referred to</p>		

	<p>for the first time in the text. Splitting of paragraphs, for including figures on a page, should be avoided. Provide double spaces on the top and the bottom of all figures to separate them from the regular text, wherever applicable. Figures should be centered with respect to the figure. The titles must be in the same font as the regular text and should be single spaced. The title format is given below:</p> <p>Fig. <blank><chapter number>.<serial number><left indent><figure</p>		
Page Dimension & Binding Specifications	The project report should be prepared in A4 size. The dissertation shall be properly bound; The bound front cover should indicate in Silver and embossed letter.		
Course Outcome	Understand of research idea	K2	
	Analyze of problem solving skills	K4	
	Analyze sources for conduct of Research	K4	
	Evaluate the research report	K5	
	Create the research report	K6	
Learning Resources			
Text Books	<p>1. Bert Bates, Karthy Sierra , Eric Freeman, Elisabeth Robson, “Head First Design Patterns”, O’REILLY Media Publishers.</p> <p>2. Mathew Mac Donald, “ASP.NET Complete Reference”, TMH 2005.</p>		
Reference Books	<p>1. Jan Graba, “An Introduction to Network Programming with Java- Java 7 Compatible”, 3rd Edition, Springer.</p> <p>2. Crouch Matt J, “ASP.NET and VB.NET Web Programming”, Addison Wesley</p>		
Website Link	<p>https://www.tutorialspoint.com/r/index.htm https://www.javatpoint.com/net-framework https://www.w3schools.com/java/java_intro.asp https://www.w3schools.com/r/</p>		

M. Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title				Course Type	Sem	Hours	L	T	P	C
21M4PCSPR1	PROJECT WORK				PROJECT WORK	IV	8				4
CO-PO Mapping											
CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	M	M	M	M	S	M	M	S	S	S	
CO2	S	S	S	S	S	M	S	S	S	S	
CO3	S	S	S	S	S	S	S	S	M	M	
CO4	S	S	S	M	S	S	S	S	M	M	
CO5	M	M	M	S	S	M	M	S	S	S	
Level of Correlation between CO and PO	L-LOW				M-MEDIUM			S-STRONG			
Tutorial Schedule											
Teaching and Learning Methods					Working with programming languages such as R, Python, Java and .Net.						
Assessment Methods					EA - 100% 1. Project Report - 150 Marks 2. Viva-Voce - 50 Marks 3. Total - 200 Marks						
Designed By				Verified By				Approved By			
M. K. Sanyal				[Signature]				A. K. Sanyal			



M.Sc., Computer Science -Computer Science for Competitive Examination Syllabus-LOCF-CBCS-
Pattern with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4PCSOE1	Computer Science for Competitive Examination.	Self study Online - Competitive Examination	IV	-	-	4	-	2
Objective	Creating the awareness on competitive examination among students. Imparting knowledge about the appearing for Competitive Examination and its impacts and developing an attitude of appearing for such exams.							
Unit	Course Content						Knowledge Levels	Sessions
I	<p>This course deals with the question related to Software Engineering, Internet of Things, Advanced Operating System, Computer Architecture, Database Management System, Computer Networks, Programming Languages, Advanced Java, Algorithms, Artificial Intelligence, and Mobile Application Development.</p> <p>Major emphasis has been put forth to include recent developments in the subjects. This course aims to give a holistic view of all the topics which comprised of some factual text points, multiple choice questions (MCQ), it is extremely suitable for students pursuing their higher degree in University/institute for their entrance exams, students preparing for various national and state level competitive entrance exams such as UGC-NET/JRF/SRF/Ph.D., GATE, IISc, etc. to get placement in MNC Companies. In addition, it is also useful for UPSC Rules for creating MCQ pattern.</p> <p>1. Objective type online examination will be conducted at the end of 4th semester.</p> <p>2. Questions must be taken from all previous question papers of NET, SET, NEET, UPSC, IBPS and Common Entrance Test for Ph.D.</p>						K1-K5	

	<p>3. Test critical thinking. Multiple choice questions to test the superficial knowledge. Learners to interpret facts, evaluate situations, explain cause and effect, make inferences, and predict results.</p> <p>4. Emphasize Higher-Level Thinking. Use memory-plus application oriented questions. These questions require students to recall principles, rules or facts in a real life context.</p> <p>Eg.1 One Tera byte (1 TB) is equal to? (a) 1028 gb (b) 1012 gb (c) 1000 gb (d) 1024 gb</p> <p>Eg.2 URL stands for: (A) Uniform Resource Locator (B) Uniform Resource Library (C) United Resource Locators (D) None of these</p> <p>5. HOD's instruct to the faculty to prepare minimum 500 questions booklet (cumulatively for each programme) with solutions and circulate among the students.</p>					
Course Outcome	CO1: Remember and Understand the basic language implementation techniques	K1				
	CO2: Apply the problem and develop problem solving skills in competitive exams	K3				
	CO3: Apply on Computational problems	K3				
	CO4: Analyze computer science theory and software development fundamentals to produce computing-based solutions	K4				
	CO5: Evaluate complex computing problem and to apply principles of computing	K5				
Learning Resources						
Reference Books	Objective Computer Science and Information Technology by Jushta Jaiswal, Jushta Jaiswal publications.					
Website Link	https://nptel.ac.in/courses/106106092 https://www.digimat.in/nptel/courses/video/106101061/L01.html https://www.digimat.in/nptel/courses/video/106104122/L01.html					
	L-Lecture	T-Tutorial	P-Practical	C-Credit		

CO-PO Mapping												
CO Number	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03	PS04	PS05		
CO1	M	S	S	S	S	S	S	S	S	S		
CO2	S	S	S	S	S	S	S	S	S	S		
CO3	S	S	S	S	S	S	S	S	S	S		
CO4	S	S	S	S	S	S	S	S	S	S		
CO5	S	S	S	S	S	S	S	S	S	S		
Level of Correlation between CO and PO					L-LOW		M-MEDIUM		S-STRONG			
Tutorial Schedule					NET/SET/GATE/CET/TRB /NEET/BANK Old question papers - solutions -online mock test							
Teaching and Learning Methods					Self study , Group discussion ,Chalk and Talk, Smart Class, Audio-Video Learning, learning through mock test							
Assessment Methods					100 multiple choice questions through computer based online examinations passing minimum is 50%							
Designed By <i>M. C. S. J.</i>						Verified By <i>HP</i> 21/11/2021			Approved By <i>A. h. S. J.</i>			



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSE D1	EDC- FUNDAMENTALS OF COMPUTERS AND COMMUNICATIONS	GEC – EDC – I	II	4	4			4
Objective	1. To understanding of basic concepts of computer science and engineering. 2. To understanding the fundamentals of hardware, software and programming.							
Unit	Course Content						Knowledge Levels	Sessions
I	Introduction: What is computer – Components of Computers – Advantages and Disadvantages of using computers – Computer Software – Categories of Computers-The Components of the Systems Unit: Processor – Data representation						K1	9
II	Input and Output Device: What is input – what are input devices – keyboard – pointing device – mouse – other pointing devices – Voice input –Digital Cameras – Video input – Scanners and Reading devices – Biometric input- Output: What is output – display devices – Monitors – Printers –Speakers.						K2	9
III	Operating Systems and Utility Programs: System software – Operating system – Operating system functions – types of operating systems – standalone operating systems–network operating systems – embedded operating system.						K2,K3	9
IV	Internet and World Wide Web: Internet – History of the Internet – How the Internet works –WWW–E-commerce–Communications and Networks: Communications – Uses of Computer Communications – Networks – Communication software – Communication devices – Communications Channel.						K4	9
V	Database Management: Databases, Data and Information, The Hierarchy of data–Maintaining data – File processing versus databases – database management systems–relational, object oriented and multi dimensional databases – web databases – database administration.						K4,K5	9
Course Outcome	CO1: Remember the use of mathematical software and solve simple mathematical problems.						K1	
	CO2: Understand the needs of hardware and software required for a computation task.						K2	
	CO3: Apply the typical provisions of cyber law that govern the proper usage of Internet and computing resources.						K3	
	CO4: Analyze the working of important application software and their use to perform any engineering activity.						K4	
	CO5: Evaluate the use of Operating system commands and shell script.						K5	
Learning Resources								
Text Books	1. Gary B. Shelly, Thomasj. Cashman, Misty E.Vermaat, "Introduction to Computers,"Cengage Learning, 2008							
Reference Books	1. B. Forouzan, 1998, Introduction to Data Communications in Networking, Tata McGraw Hill, NewDelhi. 2. F.Halsall,1995, Data Communications, Computer Networks and Open Systems, Addison Wessley.							
Website Link	https://www.tutorialspoint.com/computer_fundamentals/computer_fundamentals_tutorial.pdf							
	L-Lecture	T- Tutorial	P- Practical		C- Credit			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSE D1	EDC- FUNDAMENTALS OF COMPUTERS AND COMMUNICATIONS	GEC – EDC – I	II	4				4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	L	S	S	M	M	S	L
CO2	S	S	M	M	M	M	S	S	S	M
CO3	S	S	S	M	S	M	M	S	S	S
CO4	M	M	M	S	M	S	S	M	S	S
CO5	S	M	S	L	S	S	S	S	S	S
Level of Correlation between CO and PO	L- LOW	M- MEDIU M	S- STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assessment Methods	Attendance, Internal Examinations, Class Test, Assignment

Designed By	Verified By	Approved By
<i>K. J. J.</i>	<i>[Signature]</i>	<i>A. V. Sanyal</i>



M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSE D2	EDC - PRINCIPLES OF INFORMATION TECHNOLOGY	GEC – EDC – I	II	4	4			4
Objective	1. To know about basic concept of information technology 2. To gain knowledge for organizing data							
Unit	Course Content						Knowledge Levels	Sessions
I	Business Environment: Business and Information technology – business in the information age–about information technology–what is an information system– Information Technology in the Modern Organization.						K1,K2	8
II	Computer Hardware – Significance of Hardware – Central Processing Unit– Computer Memory – Computer Hierarchy – Input Technologies – Output Technologies. Computer Software: Software History and Significance–System Software–Application Software–Software issues– Programming languages–Enterprise Software.						K1, K2	9
III	Managing Organizational Data and Information: Basics of Data arrangement and Access –Traditional file environment – modern approach: database management systems – logical data models – data warehouses – Networks– Internet- Evolution of the Internet –Operation of the Internet– WWW-Intranets and Extranets.						K1,K2,K3	9
IV	Functional, Enterprises, and Inter organizational Systems: Information system to support business functions – transaction processing information systems – accounting and finance system – marketing and sales system – production and operations management system – Integrated information system and enterprises resource planning–inter organizational/Global information system. –Electronic Commerce						K3,K4	10
V	Information Systems Development: Information system planning– Traditional systems development life cycle – alternative methods for system development –system development outside the IS department – building Internet and Intranet applications –Implementing: Ethics, Impacts and Security.						K4,K5	9
Course Outcome	CO1: Remember and Understand the basic information technology						K1	
	CO2: Understand the hardware and software						K2	
	CO3: Apply the computer data and information						K3	
	CO4: Analyze the different business functions						K4	
	CO5: Evaluate the system development						K5	
Learning Resources								
Text Books	1. Turban, Rainer, Potter "Introduction to Information Technology," Second edition, Wiley India, 2007.							
Reference Books	1. V. Rajaraman, "Introduction to Information Technology, "Prentice Hall of India,2007							
Website Link	1. https://www.tutorialspoint.com/fundamentals_of_science_and_technology/information_technology.htm							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSE D2	EDC - PRINCIPLES OF INFORMATION TECHNOLOGY	GEC – EDC – I	II	4				4

CO-PO Mapping

CO Number	P01	P02	P03	P04	PO 5	PSO 1	PSO 2	PSO3	PSO 4	PSO 5
CO1	S	M	M	S	L	S	S	S	M	S
CO2	M	S	S	S	M	S	S	L	M	S
CO3	M	M	S	S	S	S	S	S	S	L
CO4	S	S	M	S	S	S	M	L	S	M
CO5	S	S	S	S	S	M	M	M	L	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assesment Methods	Attendance, Internal Examinations, Class Test, Assignment

Designed By	Verified By	ApprovedBy
		A. h. Sams

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSED3	EDC - E – COMMERCE	GEC – EDC – I	II	4	4			4
Objective	1. To understand the E-Commerce strategy, technology adoption and its growth 2. To learn how the intermediation works in E-Commerce business							
Unit	Course Content						Knowledge Levels	Sessions
I	Electronic Commerce – Electronic Commerce Frame work – The Anatomy of Electronic Commerce Applications - Electronic Equipment Consumer Applications - Electronic Commerce Organization Applications - Components of I-Way – Network Access Equipment.						K1,K2	9
II	Architecture Framework for Electronic Commerce- World Wide Web as the Architecture –Consumer Oriented Applications – Mercantile Process Models – Mercantile Models from the Consumer"s Perspective and Merchant"s Perspective.						K2	9
III	Electronic Payment Systems: Types of Electronic Payment Systems – Digital Token based Electronic Payment Systems–Smart Card and Credit Card Based Electronic Payment Systems – Risk and Electronic Payment Systems – Designing Electronic Payment Systems.						K2,K3	9
IV	Electronic Data Interchange – EDI Applications in Business – EDI: Legal, Security and Privacy issues EDI and Electronic Commerce – Standardization and EDI – EDI Software Implementation.						K3,K4	9
V	Internet and World Wide Web: origin of the Internet – New uses for the Internet –Commercial use of the Internet–Growth of the Internet – Advertising on the Internet.						K4,K5	9
Course Outcome	CO1: Remember the foundations of E–Commerce						K1	
	CO2: Understand how to prepare E–Business plan and to address E–Commerce related issues						K2	
	CO3: Apply gain insights on Business incubators.						K3	
	CO4: Analyze design and develop E–marketing strategies and digital Payment systems.						K4	
	CO5: Evaluate comprehend E–marketing tools and E–Business entrepreneurship.						K5	
Learning Resources								
Text Books	1. Kalakota and Whinston, "Frontiers of Electronic Commerce", Pearson Education, 2004. 2. Gray P.Scheider, "Fourth Annual Edition Electronic Commerce", Thomson Course Technology, 2003.							
Reference Books	1. Kamalesh K. Baja, Debjani Nag, "E-Commerce–The Cutting Edge of Business", TMH Publications, 2005. 2. Agarwala, K.N, Deeksha Agarwala, "Business on the Net: What"s and How"s of E-Commerce;" Macmillan, New Delhi.							
Website Link	https://www.tutorialspoint.com/e_commerce/index.htm							
	L-Lecture	T-Tutorial	P-Practical		C-Credit			

M.Sc-Computer Science Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2PCSE D3	EDC - E – COMMERCE	GEC – EDC – I	II	4				4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	L	S	S	S	M	S	S
CO2	S	S	M	M	M	S	S	S	S	M
CO3	S	S	S	M	S	S	M	S	S	L
CO4	M	M	M	S	M	S	S	M	S	S
CO5	S	M	S	L	S	S	S	S	M	L
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk, Presentation, Real Time Examples
Assesment Methods	Attendance, Internal Examinations, Class Test, Assignment

Designed By	Verified By	Approved By
<i>[Signature]</i>	<i>[Signature]</i>	<i>A-h-Bann</i>

