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

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 2023-2024 and onwards)

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Regulation and Syllabus for
M.Sc. COMPUTER SCIENCE
(With effect from the Academic Year 2023-24)

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 sprite of entrepreneurship and enterprise
- To create a resource pool of socially responsible world citizens

QUALITY POLICY

To Seek – To Strive – To Achieve greater heights in Arts and Science, Engineering, Technological and Management Education without compromising on the Quality of Education.

DEPARTMENT OF COMPUTER SCIENCE

Vision:

To attain global recognition in computer science research and training to meet the growing needs of the industry and society.

Mission:

- To impart quality education Imparting through a well-designed curriculum in turn with the challenging software needs of the industry.
- To provide state-of-art research facilities to generate knowledge and develop technologies in the thrust areas of computer science.
- To develop linkages with world class organizations to strengthen industry-academia relationships for mutual benefit.

PREAMBLE

The post-graduation course in Computer science, provides the knowledge of additional technologies, tries to impart research oriented approach in the students. It aims to provide technology-oriented students with the knowledge and ability to develop creative solutions, and better understand the effects of future developments of computer systems and technology on people and society. The subjects covers the recent trends and techniques in IT industry and try to make students ready to work in IT industry. The syllabus is about developing skills to learn new technology, grasping the concepts and issues behind its use and the use of computers. Internship in the third semester makes it mandatory for each student to work in IT industry to complete his/her post-graduation course. This gives a student the exposure to the environment in IT industry, make students familiar for working in team and give a chance to students to learn recent technologies used in IT industries.

PROGRAMME LEARNING OUTCOME

NATURE AND EXTENT OF THE PROGRAMME

M.Sc. Computer Science is a two-year post-graduate programme with the objective to develop human resources with core competence in various thrust areas of Computer Science. The programme includes software engineering, system development, natural computation, mathematical foundations, data analytics, applied communications, network architecture, and database design. Enhance the opportunities to develop and hone core competency in the field of computer science and in the IT industry. To Yield the Guest lectures, Seminars, Workshop, related case studies from time to time to give an insight into the latest development and happenings in the industry.

AIM OF THE PROGRAMME

To Develop the Post Graduate in Computer Science with strong knowledge of theoretical computer science and who can be employed in research and development units of industries and academic institutions.

GRADUATE ATTRIBUTES

GA 1 Disciplinary Knowledge
GA 2 Self-directed Learning
GA 3 Multi-cultural Competency
GA 4 Research-related Skill
GA 5 Analytical Reasoning
GA 6 Moral and Ethical Reasoning
GA 7 Communication Skill

Disciplinary Knowledge:

a) Proficiency in writing in at least two dissimilar programming languages programs of modest complexity which are: readable, tested for correctness, efficient, and secure
b) Ability to design and apply appropriate algorithms and data structures for evolving efficient computing based solutions for new problems

Self-Directing Learning:

a) Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.

Multicultural Competence:

a) ability to engage with and understand literature from various nations and reasons and languages
b) ability to respect and transcend differences

Research-Related Skills:

a) ability to problematize; to formulate hypothesis and research questions, and to identify and consult relevant sources to find answers

Analytical Reasoning:

a) Develop ability to analytical reasoning for solving time critical/ hard problems

Moral and Ethical Reasoning:

a) ability to interrogate one's own ethical values, and to be aware of ethical issues
b) ability to read values inherited in literary texts and criticism vis, the environment, religion and spirituality, as also structures of power

Communication Skills:

a) ability to presenting data and findings to non-technical clients.
b) ability to use critical concepts and categories with clarity

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

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 acquire 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

REGULATIONS (2023-2024)

1. DURATION OF THE PROGRAME

1.1 Two years (Four semesters)

1.2 Each academic year shall be divided into two semesters. The odd semesters Shall consist of the period from June to November of each year and the even Semesters from December to May of each year.

1.3 There shall be not less than 90 working days for each semester.

2. ELIGIBILITY FOR ADMISSION

2.1 A candidate who has passed in B.Sc Computer Science / B.C.A / B.Sc Computer Technology / B.Sc Information Science / B.Sc Information Technology / B.Sc Data Analytics / B.Sc Data Science / B.Sc Artificial Intelligence and Data Science / B.Sc Cyber Security / B.Sc Internet of Things degree of this University or any of the degree of any other University accepted by the syndicate as equivalent thereto subject to such conditions as may be prescribed therefore shall be permitted to appear and qualify for the M.Sc Computer Science degree examination of this Branch at Muthayammal college of arts and science (Autonomous), Rasipuram.

3. CREDIT REQUIRMENTS AND ELIGIBILITY FOR AWARD OF DEGREE

3.1. A Candidate shall be eligible for the award of the Degree only if he/she has undergone the prescribed course of study in a College affiliated to the University for a period of not less than two academic years and passed the examinations of all the four Semesters prescribed earning a minimum of 91 credits as per the distribution given in Regulation fulfilled such other conditions as have been prescribed thereof.

4. COURSE OF STUDY, CREDITS AND SCHEME OF EXAMINATION

4.1 The Course Components and Credit Distribution shall consist of the following: (Minimum Number of Credits to be obtained)

S.No	Study Components	Credit Distribution
01	Core, Elective, EDC, and Project Courses	**84**
02	Internship	**02**
03	Human Rights	**02**
04	Professional Competency Skills	**02**
	Extension Activity	**01**
Total Credits		**91**

4.1.1 Extension Activity:

Students shall be awarded a maximum of 1 Credit for Compulsory Extension Service. All the Students shall have to enroll for clubs / NSO (Sports & Games) Retract / Youth Red Cross or any other Service Organizations in the College and shall have to put in compulsory minimum attendance of 40 hours which shall be duly certified by the Principal of the College before 31st March in a year. If a student lacks 40 hours attendance in the first year, he or she shall have to compensate the same during the subsequent years.

Those students who complete minimum attendance of 40 hours in one year will get 'half-a-credit and those who complete the attendance of 80 or more hours in Two Years will get 'one credit'. Literacy and Population Education and Field Work shall be compulsory components in the above extension service activities.

4.2 Inclusion of the Massive Open Online Courses (MOOCs) available on SWAYAM and NPTEL

4.2.1 Students can choose the MOOC Course Available on SWAYAM and NPTEL under Core, Elective or Soft skill category. He/ she will be awarded degree only after producing valid certificate of the MOOC course for credit Mobility

5. REQUIREMENTS FOR PROCEEDING TO SUBSEQUENT SEMESTER

5.1 Eligibility: Students shall be eligible to go to subsequent semester only if they earn sufficient attendance as prescribed by the Periyar University.

5.2. Attendance: All Students must earn 75% and above of attendance for appearing for the End Semester Examination.(Theory/Practical)

5.3. Condonation of shortage of attendance: If a Student fails to earn the minimum attendance (Percentage stipulated), the Principals shall condone the shortage of attendance up to a maximum limit of 10% (i.e. between 65% and above and less than 75%) after collecting the prescribed fee for Theory/Practical examination separately, towards the condonation of shortage of attendance. Such fees collected and should be remitted to the University.

5.4. Non-eligibility for condonation of shortage of attendance: Students who have secured less than 65% but more than 50% of attendance are NOT ELIGIBLE for condonation of shortage of attendance and such Students will not be permitted to appear for the regular examination, but will be allowed to proceed to the next year/next semester of the program and they may be permitted to take next University examination by paying the prescribed condonation fee

5.5. Detained students for want of attendance: Students who have earned less than 50% of attendance shall not be permitted to proceed to the next semester and to complete the Program of study. Such Students shall have to repeat the semester, which they have missed by rejoining after completion of final semester of the course, by paying the fee for the break of study as prescribed by the College from time to time.

5.6. Condonation of shortage of attendance for married women students: In respect of married women students undergoing PG programs, the minimum attendance for condonation (Theory/Practical) shall be relaxed and prescribed as 55% instead of 65% if they conceive during their academic career. Medical certificate from the Doctor (D.G.O) from the Government Hospital and the prescribed fee along with attendance details shall be forwarded to the college to consider the condonation of attendance mentioning the category

5.7. Zero Percent (0%) Attendance: The Students, who have earned 0% of attendance, have to repeat the program (by rejoining) without proceeding to succeeding semester and they have to obtain prior permission from the College/University immediately to rejoin the program.

5.8. Transfer of Students and Credits: The strength of the credits system is that it permits inter Institutional transfer of students. By providing mobility, it enables individual students to develop their capabilities fully by permitting them to move from one Institution to another in accordance with their aptitude and abilities by obtaining necessary permission from the university.

5.8.1. Transfer of Students is permitted from one Institution to another Institution for the same program with same nomenclature.

Provided, there is a vacancy in the respective program of Study in the Institution where the transfer is requested.

Provided the Student should have passed all the courses in the Institution from where the transfer is requested.

5.8.2 The marks obtained in the courses will be converted and grades will be assigned as per the College norms.

5.8.3 The transfer students are eligible for classification.

5.8.4 The transfer students are not eligible for Ranking, Prizes and Medals.

5.8.5 Students who want to go to foreign Universities up to two semesters or Project Work with the prior approval of the Departmental/College Committee are allowed to get transfer of credits and marks which will be converted in to Grades as per the University norms and are eligible to get CGPA and Classification; they are not eligible for Ranking, Prizes and Medals.

5.9. Students are exempted from attendance requirements for online courses of the College and MOOC's.

6. EXAMINATION AND EVALUATION

6.1. Register for all subjects: Students shall be permitted to proceed from the First Semester up to Final Semester irrespective of their failure in any of the Semester Examination. For this purpose, Students shall register for all the arrear subjects of earlier semesters along with the current (subsequent) Semester Subjects.

6.2. Marks for Internal and End Semester Examinations

Category	Theory	Practical
Internal Assessment	25	**40**
End semester Examination	**75**	**60**

6.3 Procedure for Awarding Internal Marks Internal Examination Marks – Theory

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

6.4. Awarding Marks for Attendance (out of 5)

Percentage of Attendance	Marks
Below 60%	0 marks
60% to 75%	3 marks
75% to 90%	4 marks
Above 90%	5 marks

6.5. Components for Practical CIA.

Components	Marks
CIA -I	15
CIA - II	15
Observation Note	05
Attendance	5
Total	40

6.6. Components for Practical ESE.

Components	Marks
Completion of Experiments	50
Record	05
Viva voce	05
Total	60

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

Internship/Industrial Training		Project Work		
	Marks	Components		Marks
CIA*1		CIA		
Work Diary	25	a) Attendance	20 Marks	50
Report	50	b) Review / Work Diary*1	30 Marks	
Viva-voce	25			
Examination				
Total	100	ESE*2		
		a) Final Report	120 Marks	150
		b) Viva-voce	30 Marks	
		Total		200

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

6.8. Guidelines for Professional Competency Skill- 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.

6.9 Components for Human Rights Course (CIA Only)

The Course Human Rights is to be treated as 100% C I A course which is offered in II Semester for I year PG students.

Total Marks for the Course =100

Components	Marks
Two Tests	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

QUESTION PAPER PATTERN FOR CIA I, II AND ESE	
(3 HOURS)	MAXIMUM:75Marks
SECTION-A (Objective Type) Answer ALL Questions **ALL Questions Carry EQUAL Marks**	**(10 x1=10 marks)**
SECTION-B (Analytical Type) Answer any THREE Questions out of FIVE Questions **ALL Questions Carry EQUAL Marks**	**(3 x 5 = 15 marks)**
SECTION-C (Either or Type) Answer ALL Questions **ALL Questions Carry EQUAL Marks**	**(5 x 10 = 50 marks)**

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

6.10 PASSING MINIMUM

6.10.1 There shall be no passing minimum for Internal.

6.10.2 For external examination, passing minimum shall be 50% [Fifty Percentage] of the maximum marks prescribed for the course for each Course/Practical/Project and Viva-Voce.

6.10.3 In the aggregate [External/Internal] the passing minimum shall be of 50%.

6.10.4 He / She shall be declared to have passed the whole examination, if he/she passes in all the Courses and Practical wherever prescribed as per the scheme of the examinations by earning 90 CREDITS. He/she shall also fulfill the extension activities prescribed earning a minimum of 1 credit to qualify for the Degree.

6.11 SUPPLIMENTARY EXAMINATION:

Supplementary Examinations is conducted for the students who appeared in the final semester examinations. Eligible criteria for appearing in the Supplementary Examinations are as follows:

6.11.1 Eligibility: A Student who is having arrear of only one theory course in any of the semester or two theory course in the Final semester of the PG degree programme alone is eligible for Supplementary Examinations.

6.11.2 Non-eligibility for those completed the program: Students who have completed their Program duration but having arrears are not eligible to appear for Supplementary Examinations.

6.12. RETOTALLING, REVALUATION AND PHOTOCOPY OF THE ANSWER SCRIPTS:

6.12.1 Re-totaling: All UG Students who appeared for their Semester Examinations are eligible for applying for re-totaling of their answer scripts.

6.12.2Revaluation: All current batch Students who have appeared for their Semester Examinations are eligible for Revaluation of their answer scripts. Passed out candidates are not eligible for Revaluation.

6.12.3 Photo copy of the answer scripts: Students who have applied for revaluation can apply for the Photocopy of answer scripts by paying prescribed fee.

7. CLASSIFICATION OF SUCCESSFUL STUDENTS

RANGE OF MARKS	GRADE POINTS	LETTER GRADE	DESCRIPTION
90-100	9.0-10.0	O	Outstanding
80-89	8.0-8.9	D+	Excellent
75-79	7.5-7.9	D	Distinction
70-74	7.0-7.4	A+	Very Good
60-69	6.0-6.9	A	Good
50-59	5.0-5.9	B	Average
00-49	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

7.1. Computation of Grade Point Average (GPA) in a Semester, Cumulative Grade Point Average(CGPA) and Classification

GPA for a Semester: = ∑iCiGi ,∑iCi

That is, GPA is the sum of the multiplication of grade points by the credits of the courses divided by the sum of the credits of the courses in a semester.

CGPA for the entire programme: = ∑n∑iCniGni ,∑n∑iCni That is, CGPA is the sum of the multiplication of grade points by the credits of the entire programme divided by the sum of the credits of the courses of the entire programme

Where,

Ci= Credits earned for course I in any semester,

Gi=GradePointsobtainedforcourseiinanysemestern=Semesterinwhichsuchcourseswere credited.

7.2 Letter Grade and Classification

CGPA	GRAD E	CLASSIFICATION OF FINAL RESULT
9.5-10.0	O+	First Class -Exemplary*
9.0 and above but below9.5	O	
8.5 and above but below 9.0	D++	First Class with Distinction*
8.0 and above but below 8.5	D+	
7.5 and above but below 8.0	D	
7.0 and above but below 7.5	A++	First Class
6.5 and above but below 7.0	A+	
6.0 and above but below 6.5	A	
5.5 and above but below 6.0	B+	Second Class
5.0 and above but below 5.5	B	
0.0 and above but below 5.0	**U**	Re-appear

*The Students who have passed in the first appearance and within the prescribed semester of the PG Program are eligible.

8. RANKING

Students who pass all the examinations prescribed for the Program in the FIRST APPEARANCE ITSELF ALONE are eligible for Ranking I, II and III.

9. MAXIMUM PERIOD FOR COMPLETION OF THE PROGRAM TO QUALIFY FOR A DEGREE

9.1. A Student who for whatever reasons is not able to complete the program within the normal period (N) or the Minimum duration prescribed for the programme, may be allowed two years period beyond the normal period to clear the backlog to be qualified for the degree. (Time Span =N+2years for the completion of programme.)

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S.No	Study Components	Sem I		Sem II		Sem III		Sem IV		No.of Course	Total Credit
		No.of Course	Credit	No.of Course	Credit	No.of Course	Credit	No.of Course	Credit		
1	DISCIPLINE SPECIFIC CORESES(DSC) - THEORY	3	12	3	12	4	16	1	4	11	44
2	DISCIPLINE SPECIFIC CORESES(DSC) - PRACTICAL	2	6	2	6	2	6	1	2	7	20
2	DISCIPLINE SPECIFIC ELECTIVE COURSES(DSE)	1	3	2	6	-	-	-	-	3	9
3	PROJECT WORK							1	4	1	4
4	INTERNSHIP					1	2			1	2
5	GENERIC ELECTIVE COURSES(GEC) -EDC					1	4			1	4
6	SKILL ENHANCEMENT COURSES(SEC)							1	3	1	3
7	HUMAN RIGHTS			1	2					1	2
8	ONLINE - COMPETITIVE EXAMINATION							1	2	1	2
9	EXTENSION ACTIVITY							1	1	1	1
	Cumulative Credits	6	21	8	26	8	28	6	16	28	91

Total No. of Subjects	28
Marks	2800

TOTAL CREDIT	91
Extra Credit	4
Total Credits	95

S.No.	COURSE_CODE	TITLE OF THE COURSE	Hrs.		CREDIT	MARKS		
			Lect.	Lab.		CIA	ESE	TOTAL
SEMESTER - I								
1	23M1PCSC01	ANALYSIS AND DESIGN OF ALGORITHMS	5	-	4	25	75	100
2	23M1PCSC02	OBJECT ORIENTED ANALYSIS AND DESIGN AND C++	5	-	4	25	75	100
3	23M1PCSC03	PYTHON PROGRAMMING	5	-	4	25	75	100
4	23M1PCSE01	ELECTIVE- I	5	-	3	25	75	100
5	23M1PCSP01	PRACTICAL : ALGORITHM AND OOPS	-	5	3	40	60	100
6	23M1PCSP02	PRACTICAL : PYTHON PROGRAMMING	-	5	3	40	60	100
		TOTAL	**20**	**10**	**21**	**180**	**420**	**600**
SEMESTER - II								
1	23M2PCSC04	DATA MINING AND WAREHOUSING	4	-	4	25	75	100
2	23M2PCSC05	ADVANCED OPERATING SYSTEMS	4	-	4	25	75	100
3	23M2PCSC06	ADVANCED JAVA PROGRAMMING	4	-	4	25	75	100
4	23M2PCSE04	ELECTIVE –II	4	-	3	25	75	100
5	23M2PCSE09	ELECTIVE –III	4	-	3	25	75	100
6	23M2PCSP03	PRACTICAL: DATA MINING USING R	-	4	3	40	60	100
7	23M2PCSP04	PRACTICAL: ADVANCED JAVA PROGRAMMING	-	4	3	40	60	100
8	23M2PHR01	HUMAN RIGHTS	2	-	2	100	-	100
		TOTAL	**22**	**8**	**26**	**305**	**495**	**800**

SEMESTER - III								
1	23M3PCSC07	DIGITAL IMAGE PROCESSING	4	-	4	25	75	100
2	23M3PCSC08	CLOUD COMPUTING	4	-	4	25	75	100
3	23M3PCSC09	NETWORK SECURITY AND CRYPTOGRAPHY	4	-	4	25	75	100
4	23M3PCSC10	DATA SCIENCE AND ANALYTICS	4	-	4	25	75	100
5	23M3PCSP05	PRACTICAL: DIGITAL IMAGE PROCESSING USING MAT	-	5	3	40	60	100
6	23M3PCSP06	PRACTICAL : CLOUD COMPUTING	-	5	3	40	60	100
7		EDC	4	-	4	25	75	100
8	23M3PCIS01	INTERNSHIP	-	-	2	100	-	100
		TOTAL	**20**	**10**	**28**	**305**	**495**	**800**
1	23M4PCSC11	ADVANCED WEB TECHNOLOGY	5	-	4	25	75	100
2	23M4PCSP07	PRACTICAL:WEB APPLICATION DEVELOPMENT AND HOSTING	-	5	2	40	60	100
3	23M4PCSPR1	PROJECT WORK		8	4	50	150	200
4	23M4PCSSP1	DATA VISUALIZATION	-	5	3	40	60	100
5	23M4PCSOE1	COMPUTER SCIENCE FOR COMPETITIVE EXAMINATIONS	-	-	2	100	-	100
6	23M4PEXA01	Extension Activity	-	-	1	-	-	-
		TOTAL	**5**	**18**	**16**	**255**	**345**	**600**
		OVERALL TOTAL	**67**	**46**	**91**	**1045**	**1755**	**2800**
1		MOOC Courses offered in SWAYAM / NPTEL	-	-	2	-	-	-
2		Value Added Course	30	-	2	-	-	-

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M1PCSC01	ANALYSIS AND DESIGN OF ALGORITHMS	DSC THEORY-I	I	5	3	2		4
Objective	Students able to learn the Elementary Data Structures and algorithms							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Introduction: -** Algorithm Definition and Specification – Space complexity- TimeComplexity- Asymptotic Notations - Elementary Data Structure: Stacks and Queues – Binary Tree - Binary Search Tree - Heap – Heapsort- Graph.	K1	12
II	**Basic Traversal And Search Techniques:** Techniques for Binary Trees- Techniques for Graphs - Divide and Conquer: - General Method – Binary Search – Merge Sort – Quick Sort.	K2	12
III	**The Greedy Method:** General Method – Knapsack Problem – Minimum Cost Spanning Tree – Single Source Shortest Path.	K3	12
IV	**Dynamic Programming:** General Method – Multistage Graphs – All Pair Shortest Path – Optimal Binary Search Trees – 0/1 Knapsacks – Traveling Salesman Problem – Flow Shop Scheduling.	K4	12
V	**Backtracking:** General Method – 8-Queens Problem – Sum Of Subsets – Graph Coloring – Hamiltonian Cycles – Branch And Bound: - The Method – Traveling Salesperson.	K5	12
Course Outcome	**CO1:** Demonstrate specific search and sort algorithms using divide and conquer technique.	K1	
	CO2: Gain good understanding of Greedy method and its algorithm.	K2	
	CO3: Able to describe about graphs using dynamic programming technique.	K3	
	CO4: Demonstrate the concept of backtracking & branch and bound technique.	K4	
	CO5: Explore the traversal and searching technique and apply it for trees and graphs.	K5	

Learning Resources	
Text Books	1. Ellis Horowitz,"Computer Algorithms", Galgotia Publications. 2. Alfred V.Aho, John E.Hopcroft,Jeffrey D.Ullman, "Data Structures and Algorithms".
Reference Books	1. Goodrich, "Data Structures & Algorithms in Java", Wiley 3rd edition. 2. Skiena,"The Algorithm Design Manual",SecondEdition,Springer , 2008 3. AnanyLevith,"Introduction to the Design and Analysis of algorithm", Pearson Education Asia, 2003.
Website Link	https://nptel.ac.in/courses/106/106/106106131/ https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm https://www.javatpoint.com/daa-tutorial

L-Lecture T- Tutorial P-Practical C-Credit

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M1PCSC01	ANALYSIS AND DESIGN OF ALGORITHMS	DSC THEORY-I	I	5	3	2		4

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	L	M	L	S	M
CO2	S	S	S	S	S	M	S	M	S	M
CO3	S	S	S	S	S	M	S	M	S	M
CO4	S	S	S	S	S	M	S	M	S	M
CO5	S	S	S	S	S	M	S	M	S	M

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

Tutorial Schedule	Conducting Group discussion
Teaching and Learning Methods	Handling classes through chalk & talk method and presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
P.SUBRAMANIAM HoD	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M1PCSC02	OBJECT ORIENTED ANALYSIS AND DESIGN AND C++	DSC THEORY-II	I	5	3	2		4
Objective	Students can able to Present the object model, classes and objects, object orientation, machine view and model management view and understand C++ language with respect to OOAD							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**The Object Model**: The Evolution of the Object Model – Elements of the Object Model – Applying the Object Model. Classes and Objects: The Nature of an Object – Relationship among Objects.	K1	12
II	**Classes and Object:** Nature of Class – Relationship Among classes – The Interplay of classes and Objects. Classification: The importance of Proper Classification –identifying classes and objects –Key Abstractions and Mechanism.	K2	12
III	**Introduction to C++:** Input and output statements in C++ - Declarations -control structures – Functions in C++.	K3	12
IV	**Classes and Objects** : Constructors and Destructors –operators overloading –Type Conversion- Inheritance – Pointers and Arrays.	K4	12
V	**Memory Management Operators**- Polymorphism – Virtual functions – Files –Exception Handling – String Handling -Templates.	K5	12
Course Outcome	**CO1:** Understand the concept of Object-Oriented development and modeling techniques	K1	
	CO2: Gain knowledge about the various steps performed during object design	K2	
	CO3: Abstract object-based views for generic software systems	K3	
	CO4: Link OOAD with C++ language	K4	
	CO5: Apply the basic concept of OOPs and familiarize to write C++ program	K5	

Learning Resources	
Text Books	1. "Object Oriented Analysis and Design with Applications", Grady Booch, Second Edition, Pearson Education. 2. "Object -Oriented Programming with ANSI & Turbo C++", Ashok N.Kamthane, First Indian Print -2003, Pearson Education.
Reference Books	1.Balagurusamy "Object Oriented Programming with C++", TMH, Second Edition, 2003.
Website Link	https://onlinecourses.nptel.ac.in/noc19_cs48/preview https://nptel.ac.in/noc/courses/noc16/SEM2/noc16-cs19/

L-Lecture T- Tutorial P-Practical C-Credit

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M1PCSC02	OBJECT ORIENTED ANALYSIS AND DESIGN AND C++	DSC THEORY-III	I	5	3	2		4

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	M	S	S
CO2	S	S	S	M	S	M	S	M	S	S
CO3	S	S	S	M	S	M	S	M	S	S
CO4	S	S	S	M	S	M	S	M	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 Conduct Class test and Group discussion
Teaching and Learning Methods	Handling classes through chalk & talk method and presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**ApprovedBy**
P.MUTHAMILSELVI	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M1PCSC03	PYTHON PROGRAMMING	DSC THEORY-III	I	5	3	2		4
Objective	Students can able to use functions for structuring Python programs.							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Python:** Introduction – Numbers – Strings – Variables – Lists – Tuples – Dictionaries – Sets– Comparison.	K1	12
II	**Code Structures:** if, elseif, and else – Repeat with while – Iterate with for – Comprehensions – Functions – Generators – Decorators – Namespaces and Scope – Handle Errors with try and except – User Exceptions.	K2	12
III	**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.	K3	12
IV	**Data Types:** Text Strings – Binary Data. **Storing and Retrieving Data:** File Input/Output – Structured Text Files – Structured Binary Files - Relational Databases – NoSQL Data Stores. **Web:** Web Clients – Web Servers – Web Services and Automation	K4	12
V	**Systems:** Files –Directories – Programs and Processes – Calendars and Clocks. **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.	K5	12
Course Outcome	**CO1:** Understand the basic concepts of Python Programming	K1	
	CO2: Understand File operations, Classes and Objects	K2	
	CO3: Acquire Object Oriented Skills in Python	K3	
	CO4: Develop web applications using Python	K4	
	CO5: Develop Client Server Networking applications	K5	

Learning Resources	
Text Books	1. Bill Lubanovic, “Introducing Python”, O‟Reilly, First Edition-Second Release, 2014. 2. Mark Lutz, “Learning Python”, O‟Reilly, Fifth Edition, 2013.
Reference Books	1.David M. Beazley,“Python Essential Edition,2009. 2.SheetalTaneja,Naveen Kumar, Approach”,Pearson Publications.
Website Link	https://www.programiz.com/python-programming/ https://www.tutorialspoint.com/python/index.htm

L-Lecture T- Tutorial P-Practical C-Credit

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M1PCSC03	PYTHON PROGRAMMING	DSC THEORY-III	I	5	3	2		4

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	S	M
CO2	S	S	S	S	S	S	S	M	S	M
CO3	S	S	S	S	S	S	S	M	S	M
CO4	S	S	S	S	S	S	S	M	S	M
CO5	S	S	S	S	S	S	S	M	S	M

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

Tutorial Schedule	Conducting group discussion
Teaching and Learning Methods	Handling classes through chalk & talk method and presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
A.M.NIRMALA	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M1PCSP01	PRACTICAL :ALGORITHM AND OOPS	DSC PRACTICAL -I	I	5		-	5	3
Objective	Students can able to understand the basic data structures like Stack, Queue, Trees and the application of OOPS concepts.							

S. No.	**List of Experiments / Programs**	**Knowledge Levels**	**Sessions**
1	Write a program to solve the tower of Hanoi using recursion.	K1	6
2	Write a program to traverse through binary search tree using traversals.	K2	6
3	Write a program to perform various operations on stack using linked list.	K3	6
4	Write a program to perform various operation in circular queue.	K3	6
5	Write a program to sort an array of an elements using quick sort.	K4	6
6	Write a program to solve number of elements in ascending order using heap sort.	K4	6
7	Write a program to solve the knapsack problem using greedy method	K4	6
8	Write a program to search for an element in a tree using divide & conquer strategy.	K5	6
9	Write a program to place the 8 queens on an 8X8 matrix so that no two queens Attack.	K6	6
10	Write a C++ program to perform Employee Details using files.	K6	6
Course Outcome	**CO1:** Understand the concepts of object oriented with respect to C++	K1	
	CO2: Able to understand and implement OOPS concepts	K2	
	CO3: Implementation of data structures like Stack, Queue, Tree , List using C++	K3	
	CO4: Application of the data structures for Sorting, Searching using different techniques.	K4,K5	

Learning Resources	
Text Books	1.Goodrich, “Data Structures & Algorithms in Java”, Wiley 3rd edition. 2.Skiena,”The Algorithm Design Manual”,SecondEdition,Springer , 2008
Reference Books	1. AnanyLevith,”Introduction to the Design and Analysis of algorithm”, Pearson Education Asia, 2003. 2. Robert Sedgewick,Phillipe Flajolet,”An Introduction to the Analysis of Algorithms”, Addison-Wesley Publishing Company,1996.
Website Link	https://onlinecourses.nptel.ac.in/noc19_cs48/preview https://nptel.ac.in/noc/courses/noc16/SEM2/noc16-cs19/

L-Lecture T-Tutorial P-Practical C-Credit

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M1PCSP01	PRACTICAL :ALGORITHM AND OOPS	DSC PRACTICAL I	I	5	-	-	5	3

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	S	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	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	Handling practical session through projector
Assessment Methods	CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
P.SUBRAMANIAM HoD	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M1PCSP02	PRACTICAL:PYTHON PROGRAMMING	DSC PRACTICAL –II	I	5	-	-	5	3
Objective	Students can learn core Python scripting elements such as variables and flow control structures and 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	K1	6
2	Programs using conditional branches, loops.	K1	6
3	Programs using functions	K2	6
4	Programs using exception handling	K3	6
5	Programs using classes and objects	K4	6
6	Programs using inheritance	K2	6
7	Programs using polymorphism	K3	6
8	Programs to implement file operations.	K4	6
9	Programs using modules.	K5	6
10	Programs for creating dynamic and interactive web pages usingforms.	K4,K5	6
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

L-Lecture T-Tutorial P-Practical C-Credit

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M1PCSP02	PRACTICAL:PYTHON PROGRAMMING	DSC PRACTICAL II	I	5	-	-	5	3

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 COand PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	To give more sample programs to related topic
Teaching and Learning Methods	Handling practical session through projector
Assessment Methods	Assignments, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
A.M.NIRMALA	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSC04	DATA MINING AND WAREHOUSING	DSC THEORY – IV	II	4	4			4
Objective	Students can develop skills of using recent data mining software for solving practical problems and apply critical thinking, problem-solving, and decision-making skills.							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	Basic data mining tasks – data mining versus knowledge discovery in databases – data mining issues – data mining metrics – social implications of data mining – data mining from a database perspective. Data mining techniques: Introduction – a statistical perspective on data mining – similarity measures – decision trees – neural networks – genetic algorithms.	K1	9
II	Classification: Introduction – Statistical – based algorithms - distance – based algorithms- decision tree - based algorithms - neural network – based algorithms –rule - based algorithms – combining techniques.	K2	9
III	Clustering: Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms - Partitional Algorithms. Association rules: Introduction - large item sets - basic algorithms – parallel & distributed algorithms – comparing approaches- incremental rules – advanced association rules techniques – measuring the quality of rules.	K3	10
IV	Data warehousing: introduction - characteristics of a data warehouse – data marts – other aspects of data mart. Online analytical processing: introduction - OLTP & OLAP systems Datamodeling –star schema for multidimensional view – data modeling – multifactstar schema or snow flake schema – OLAP TOOLS – State of the market – OLAP TOOLS and the internet.	K4	10
V	Developing a data WAREHOUSE: why and how to build a data warehouse –data warehouse architectural strategies and organization issues - design consideration – data content – metadata distribution of data – tools for data warehousing – performance considerations – crucial decisions in designing a data warehouse. Applications of data warehousing and data mining in government: Introduction - national data warehouses – other areas for data warehousing and data mining.	K5	10
Course Outcome	**CO1:** Understand the basic data mining techniques and algorithms	K1	
	CO2: Understand the Association rules, Clustering techniques and Data warehousing contents	K2	
	CO3: Compare and evaluate different data mining techniques like classification, prediction, Clustering and association rule mining	K3	
	CO4: Design data warehouse with dimensional modeling and apply OLAP operations	K4	
	CO5: Identify appropriate data mining algorithms to solve real world problems	K5	

Learning Resources

Text Books	1.Margaret H. Dunham, "Data Mining: Introductory and Advanced Topics", Pearson education,2003. 2.C.S.R. Prabhu, "Data Warehousing Concepts,Techniques, Productsand Applications", PHI, Second Edition.
Reference Books	1. Arun K.Pujari, "Data Mining Techniques", Universities Press (India) Pvt. Ltd.,2003. 2. Alex Berson, Stephen J. Smith, "Data Warehousing, Data Mining and OLAP", TMCH, 2001.
Website Link	https://www.javatpoint.com/data-warehouse https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-cs12

L-Lecture T- Tutorial P-Practical C-Credit

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards							
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSC04	DATA MINING AND WAREHOUSING	DSC THEORY – IV	II	4	4			4

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	S	S	M	M	M	M
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S

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

Tutorial Schedule	Conducting group discussion
Teaching and Learning Methods	Handling classes through chalk & talk method and presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
K.SHUNMUGAPRIYA	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSC05	ADVANCED OPERATING SYSTEMS	DSC THEORY - V	II	4	4			4
Objective	Students can able to learn basics of Operating system and different operating systems							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	Basics of Operating Systems: What is an Operating System? – Main frame Systems –Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems –Real-Time Systems – Handheld Systems – Feature Migration – Computing Environments –Process Scheduling – Cooperating Processes – Inter Process Communication- Deadlocks –Prevention – Avoidance – Detection – Recovery.	K1	9
II	Distributed Operating Systems: Issues – Communication Primitives – Lamport‟s Logical Clocks – Deadlock handling strategies – Issues in deadlock detection and resolution-distributed file systems –design issues – Case studies – The Sun Network File System-Coda.	K2	9
III	Realtime Operating Systems : Introduction – Applications of Real Time Systems – Basic Model of Real Time System – Characteristics – Safety and Reliability - Real Time Task Scheduling	K3	10
IV	Operating Systems for Handheld Systems: Requirements – Technology Overview –Handheld Operating Systems – PalmOS-Symbian Operating System- Android – Architecture of android – Securing handheld systems	K4	10
V	Case Studies : Linux System: Introduction – Memory Management – Process Scheduling – Scheduling Policy - Managing I/O devices – Accessing Files- iOS : Architecture and SDK Framework - Media Layer - Services Layer - Core OS Layer - File System.	K5	10
Course Outcome	**CO1:** Understand the design issues associated with operating systems	K1	
	CO2: Master various process management concepts including scheduling, deadlocks and distributed file systems	K2	
	CO3: Prepare Real Time Task Scheduling	K3	
	CO4: Analyze Operating Systems for Handheld Systems	K4	
	CO5: Analyze Operating Systems like LINUX and iOS	K5	

Learning Resources	
Text Books	1. Abraham Silberschatz; Peter Baer Galvin; Greg Gagne, “Operating System Concepts”, Seventh Edition, John Wiley & Sons, 2004. 2. MukeshSinghal and Niranjan G. Shivaratri, “Advanced Concepts in Operating Systems – Distributed, Database, and Multiprocessor Operating Systems”, Tata McGraw-Hill, 2001.
Reference Books	1. Rajib Mall, “Real-Time Systems: Theory and Practice”, Pearson Education India, 2006. 2. Pramod Chandra P.Bhatt, An introduction to operating systems, concept and practice, PHI, Third edition, 2010.
Website Link	https://onlinecourses.nptel.ac.in/noc20_cs04/preview https://www.udacity.com/course/advanced-operating-systems--ud189

L-Lecture T- Tutorial P-Practical C-Credit

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSC05	ADVANCED OPERATING SYSTEMS	DSC THEORY-V	II	4	4			4

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	S	S	M	M	M	M
CO2	S	M	S	S	S	S	S	M	S	M
CO3	S	M	S	S	S	S	S	M	S	M
CO4	S	M	S	S	S	S	S	M	S	M
CO5	S	M	S	S	S	S	S	M	S	M

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

Tutorial Schedule	Conducting group discussion
Teaching and Learning Methods	Handling classes through chalk & talk method and presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
V.ARBUTHARAJ	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSC06	ADVANCED JAVA PROGRAMMING	DSC THEORY-VI	II	4	4			4
Objective	Students can able to understand the concepts for distributed Application Architecture and learn JDBC,Servlet packages, JQuery, Java Server Pages and JAR file format							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	Java Basics Review: Components and event handling – Threading concepts – Networking features – Media techniques	K1	09
II	Remote Method Invocation-Distributed Application Architecture- Creating stubs and skeletons- Defining Remote objects- Remote Object Activation-Object Serialization-Java Spaces	K2	09
III	Java in Databases- JDBC principles – database access- Interacting- database search – Creating multimedia databases – Database support in web applications	K3	10
IV	Java Servlets: Java Servlet and CGI programming- A simple java Servlet-Anatomy of a java Servlet-Reading data from a client-Reading http request header-sending data to a client and writing the http response header-working with cookies Java Server Pages: JSP Overview-Installation-JSP tags-Components of a JSP page-Expressions- Scriptlets-Directives-Declarations-A complete example	K4	10
V	JAR file format creation – Internationalization – Swing Programming – Advanced java Techniques	K5	10
Course Outcome	**CO1:** Understand the advanced concepts of Java Programming	K1	
	CO2: Understand JDBC and RMI concepts	K2	
	CO3: Apply and analyze Java in Database	K3	
	CO4: Handle different event in java using the delegation event model, event listener and class	K4	
	CO5: Design interactive applications using Java Servlet, JSP and JDBC	K5	

Learning Resources	
Text Books	1. Jamie Jaworski, "Java Unleashed", SAMS Techmedia Publications,1999. 2. Campione, Walrath and Huml, "The Java Tutorial", AddisonWesley,1999.
Reference Books	1. Jim Keogh," The Complete Reference J2EE", Tata McGrawHill Publishing Company Ltd,2010. 2. David Sawyer McFarland, "JavaScript And JQuery- The Missing Manual", Oreilly Publications, 3rd Edition,2011.
Website Link	https://www.tutorialspoint.com/java/index.htm https://www.javatpoint.com/servlet-tutorial

L-Lecture T- Tutorial P-Practical C-Credit

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSC06	ADVANCED JAVA PROGRAMMING	DSC THEORY-VI	II	4	4			4

Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	S	S	S	M	M	M	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S

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

Tutorial Schedule	Conducting group discussion
Teaching and Learning Methods	Handling classes through chalk & talk method and presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
Dr.P.NANDHINI	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSP03	PRACTICAL:DATA MINING USING R	DSC PRACTICAL - III	II	4	4		4	3

Objective	Students can able to understand & write programs using the DM algorithms and apply statistical interpretations for the solutions

S. No.	**List of Experiments / Programs**	**Knowledge Levels**	**Sessions**
1	Implement Apriori algorithm to extract association rule of datamining.	K1	6
2	Implement k-means clustering technique.	K2	7
3	Implement any one Hierarchal Clustering.	K2	7
4	Implement Classification algorithm.	K3	7
5	Implement Decision Tree.	K4	7
6	Linear Regression.	K5	7
7	Data Visualization.	K5	7
Course Outcome	**CO1:** Able to write programs using R for Association rules, Clustering techniques	K1	
	CO2: To implement data mining techniques like classification, prediction	K2	
	CO3: Able to use different visualizations techniques using R	K3	
	CO4: To apply different data mining algorithms to solve real world applications	K4,K5	

Learning Resources	
Text Books	Margaret H. Dunham, "Data Mining: Introductory and Advanced Topics", Pearson education,2003. C.S.R. Prabhu, "Data Warehousing Concepts,Techniques, Productsand Applications", PHI, Second Edition
Reference Books	ArunK.Pujari, "Data Mining Techniques", Universities Press (India) Pvt. Ltd.,2003. Alex Berson, Stephen J. Smith, "Data Warehousing, Data Mining and OLAP", TMCH, 2001.
Website Link	https://www.javatpoint.com/data-warehouse https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-cs12/

L-Lecture T-Tutorial P-Practical C-Credit

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSP03	PRACTICAL :DATA MINING USING R	PRACTICAL III	I	4			4	3

Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	M	S	S	S	M	M	S	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	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	Handling classes through chalk & talk method and presentation
Assessment Methods	CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
K.SHUNMUGAPRIYA	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSP04	PRACTICAL:ADVANCED JAVA PROGRAMMING	DSC PRACTICAL -IV	II	4			4	3
Objective	Students able to learn Graphical User Interface (GUI) networking and database manipulation and use advanced technology in Java such as Remote method Invocation							

S. No.	**List of Experiments / Programs**	**Knowledge Levels**	**Sessions**
1	Creating Input output and Random files.	K1	5
2	Developing chat application with datagram sockets and datagram packets.	K1	5
3	Developing Simple client/server application.	K2	5
4	Developing mouse and keyboard events.	K2	5
5	Creating java program using swing components.	K3	5
6	Implementing RMI.	K3	5
7	Establishing JDBC Connectivity.	K4	5
8	Creating simple web applications using Servlets using GET POST Methods.	K5	6
9	Creating simple web applications using JSP.	K5	7
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

L-Lecture T-Tutorial P-Practical C-Credit

M.Sc., Computer Science Syllabus LOCF-CBCS with effective from 2023-2024 onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSP04	PRACTICAL:ADVANCED JAVA PROGRAMMING	DSC PRACTICAL IV	II	4			4	3

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
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	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
Dr.P.NANDHINI	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. COMPUTER SCIENCE – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M3PCSC07	DIGITAL IMAGE PROCESSING	DSC THEORY - VII	III	4	4			4
Objective	Students learn basic image processing techniques for solving real problems, Image compression and Segmentation procedures.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Introduction:** What is Digital image processing – the origin of DIP – Examples of fields that use DIP – Fundamentals steps in DIP – Components of an image processing system. Digital Image Fundamentals: Elements of Visual perception – Light and the electromagnetic spectrum – Image sensing and acquisition – Image sampling and Quantization – Some Basic relationshipbetween Pixels – Linear & Nonlinear operations	K1	10
II	**IMAGE ENHANCEMENT:** Image Enhancement in the spatial domain:-Background – some basic Gray level Transformations – Histogram Processing– Enhancement using Arithmetic / Logic operations – Basics of spatial -Filtering – Smoothing spatial filters – Sharpening spatial filters – Combiningspatial enhancement methods.	K2	10
III	**IMAGE RESTORATION :**Image Restoration: A model of the Image Degradation / Restoration Process – Noise models – Restoration is the process of noise only – Spatial Filtering – Periodic Noise reduction by frequency domain filtering – Linear- Portion – Invariant Degradations – Estimating the degradation function – Inverse filtering – Minimum mean square Error Filtering – Constrained least squares filtering – Geometric mean filter – Geometric Transformations.	K3	10
IV	**IMAGE COMPRESSION:** Image Compression: Fundamentals – Image compression models – Elements of Information Theory – Error Free compression – Lossy compression – Image compression standards.	K4	09
V	**IMAGE SEGMENTATION:** Image Segmentation: Detection and Discontinuities – Edge Linking and Boundary deduction – Thresholding – Region-Based segmentation – Segmentation by Morphological watersheds – The use of motion in segmentation. **Current Trends**: Automatic image enhancement	K5	09
Course Outcome	CO1Remembering the fundamentals of Digital Image Processing	K1	
	CO2:Understand the mathematical foundations for digital image representation, image acquisition, image transformation, and imageenhancement	K2	
	CO3:Apply, Design and Implement and get solutions for digital image	K3	
	processing problems		
	CO4:Analyze the concepts of filtering and segmentation for digital imageretrieval	K4	

	CO5:Evaluate the concepts of Multi-resolution process and recognize theobjects in an efficient manner	K5

Learning Resources	
Text Books	1.Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing", Second Edition, PHI/PearsonEducation 2.B. Chanda, D. Dutta Majumder, "Digital Image Processing and Analysis", PHI, 2003. .
Reference Books	Nick Efford, "Digital Image Processing a practical introducing using Java", Pearson Education, 2004.
Website Link	https://nptel.ac.in/courses/117/105/117105135/ https://www.tutorialspoint.com/dip/index.htm https://www.javatpoint.com/digital-image-processing-tutorial
Self Study Material	https://nlist.inflibnet.ac.in/search/Record/978-3-540-44893-8

	L-Lecture	T-Tutorial	P-Practical	C-Credit

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
23M3PCSC07	DIGITAL IMAGE PROCESSING	DSC THEORY-VII	III	4	4			4

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO6	PSO7	PSO8	PSO9	PSO10
CO1	S	M	S	S	S	M	S	M	M	S
CO2	S	S	S	S	S	M	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S

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

Tutorial Schedule	Conducting Group Discussion, Class test
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	Verified By	Approvd By
A.M.NIRMALA	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. Computer Science– Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M3PCSP05	**PRACTICAL : DIGITAL IMAGE PROCESSING USING MAT**	**DSC PRACTICAL- V**	**III**	5	-	-	5	3
Objective	Students can understand the basics of Digital Image Processing fundamentals, image enhancement and image restoration techniques, Image Restoration & Filtering Techniques using MATLAB							

S.No.	List of Experiments / Programs	Knowledge Levels	Sessions
1	Implement Image enhancement Technique..	K1	7
2	Histogram Equalization	K1	7
3	Image Restoration	K2	7
4	Implement Image Filtering.	K2	7
5	Edge detection using Operators (Roberts, Prewitts and Sobelsoperators)	K3	7
6	Implement image compression.	K4	7
7	Image Subtraction	K4	6
8	Boundary Extraction using morphology	K5	6
9	Image Segmentation	K5	6
Course Outcome	CO1:To write programs in MATLAB for image processing using the techniques	K1	
	CO2:To able to implement Image Enhancements & Restoration techniques	K2	
	CO3:Capable of using Compression techniques in an Image	K3	
	CO4:Must be able to manipulate the image and Segment it	K4,K5	

Learning Resources				
Text Books	1. Rafael C. Gonzalez, Richard E. Woods, “Digital Image Processing”, Second Edition,PHI/Pearson Education 2. B. Chanda, D. Dutta Majumder, “Digital Image Processing and Analysis”, PHI, 2003.			
Reference Books	1. Nick Efford, “Digital Image Processing a practical introducing using Java”, Pearson Education, 2004			
Website Link	1.https://nptel.ac.in/courses/117/105/117105135/ 2.https://www.tutorialspoint.com/dip/index.htm 3. https://www.javatpoint.com/digital-image-processing-tutorial			
	L-Lecture	**T-Tutorial**	**P-Practical**	**C-Credit**

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M3PCSP05	**PRACTICAL : DIGITAL IMAGE PROCESSING USING MAT**	**DSC PRACTICAL- V**	**III**	5	**-**	**-**	**-**	**3**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	L	S	S	S	M	S	S	S
CO2	S	M	M	M	M	S	S	M	S	S
CO3	S	M	M	M	M	S	M	M	S	M
CO4	M	M	M	L	S	S	M	S	M	M
CO5	M	M	M	M	M	S	S	S	S	M

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	Handling practical session through projector
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
S.JOTHIVEL	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. COMPUTER SCIENCE – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3PCSC08	CLOUD COMPUTING	DSC THEORY - VIII	III	4	4	-	-	4
Objective	Students gain knowledge on cloud computing, cloud services, architectures and applications.							

Unit	Course Content	Knowledge Levels	Sessions
I	**INTRODUCTION**: Cloud Computing Introduction-From- Collaboration to cloud- Working of cloud computing- pros and cons- benefits- developing cloud computing services- Cloud service development- discovering cloud services.	K1	10
II	**CLOUD COMPUTING**: CLOUD COMPUTING FOR EVERYONE Centralizing email communications- cloud computing for community- collaborating on schedules- collaborating on group projects and events- cloud computing for corporation-mapping- schedules-managing projects- presenting on road.	K2	10
III	**CLOUD SERVICES**:USING CLOUD SERVICES Collaborating on calendars- Schedules and task management- exploring on line scheduling and planning- collaborating on event management- collaborating on contact management- collaborating on project management- collaborating on word processing- spreadsheets- and databases	K3	10
IV	**OUTSIDE THE CLOUD** Evaluating web mail services- Evaluating instant messaging- Evaluating web conference tools- creating groups on social networks- Evaluating on line groupware- collaborating via blogs and wikis.	K4	09
V	**STORING AND SHARING** Understanding cloud storage- evaluating on line file storage- exploring on line book marking services- exploring on line photo editing applications-exploring photo sharing communities-is controlling it with web based desktops.	K5	09

	Current Trends: Cloud Storage		
	***SELF STUDY*--**		
Course Outcome	CO1:Remembering the concepts of Cloud and its services	K1	
	CO2:Understanding the Cloud for Event & Project Management	K2	
	CO3:Apply cloud in – Word Processing, Spread Sheets, Mail, Calendar, Database	K3	
	CO4:Analyze cloud in social networks	K4	
	CO5:Evaluate cloud storage and sharing	K5	

Learning Resources	
Text Books	Michael Miller, "Cloud Computing", Pearson Education, New Delhi, 2009.
Reference Books	Anthony T. Velte, "Cloud Computing: A Practical Approach", 1st Edition, Tata McGraw Hill Education Private Limited, 2009.
Website Link	1 https://nptel.ac.in/courses/106/105/106105167/ 2.https://www.tutorialspoint.com/cloud_computing/index.html 3.https://www.javatpoint.com/cloud-computing-tutorial
Self Study	https://ebookcentral.proquest.com/lib/inflibnet-ebooks/reader.action?docID=4657716

	L-Lecture	**T-Tutorial**	**P-Practical**	**C-Credit**

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**	
23M3PCSC08	CLOUD COMPUTING	DSC THEORY - VIII	III	4	4	-	-	4	

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	M	S	S	S	M	S	M	L
CO2	S	S	S	S	S	S	M	S	M	L
CO3	S	S	S	S	S	S	S	M	L	M
CO4	S	S	S	S	S	M	S	L	M	S
CO5	M	S	S	S	S	L	M	S	S	S

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

Tutorial Schedule	Conducting Group Discussion, Class test
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
A.M.NIRMALA	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M3PCSP06	**PRACTICAL : CLOUD COMPUTING**	**DSC PRACTICAL-VI**	**III**	**5**	**-**	**-**	**5**	**3**
Objective	Students learn how to use Python libraries and modules to solve problems.							

S.No.	**List of Experiments / Programs**	**Knowledge Levels**	**Sessions**
1	Write a program Working with Google Drive to make spreadsheets and notes.	K1	7
2	Write a program for Launch a Linux Virtual Machine.	K1	7
3	Write a program for To host a static website	K2	7
4	Write a program Exploring Google cloud for the following a) Storage b) Sharing of data c) manage your calendar, to-do lists, d) a document editing tool	K2	7
5	Write a program using Working and installation of Google App Engine)	K3	8
6	Write a program Working and installation of Microsoft Azure.	K4	8
7	Write a program To Connect Amazon Redshift with S3 bucket	K4	8
8	Write a program To Create and Query a NoSQL Table	K5	8

Course Outcome	CO1:To remembering the basics of Cloud Computing fundamentals, image enhancement and image restoration techniques			K1	
	CO2:To understand the programs in python for creating and processing using the techniques			K2	
	CO3:To apply the Working and installation of Microsoft Azure.			K3	
	CO4:Analyze the Redshift with S3 bucket			K4	
	CO5:Evaluate about Query a NoSQL Table			K5	
Learning Resources					
Text Books	1. Michael Miller, "Cloud Computing", Pearson Education, New Delhi, 2009.				
Reference Books	1. Anthony T. Velte, "Cloud Computing: A Practical Approach", 1st Edition, Tata McGrawHill Education Private Limited, 2009.				
Website Link	1.https://nptel.ac.in/courses/106/105/106105167/ 2. https://www.tutorialspoint.com/cloud_computing/index.htm 3. 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 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M3PCSP06	**PRACTICAL VI : CLOUD COMPUTING LAB**	**DSC PRACTICAL - VI**	**III**	5	**-**	**-**	**5**	**3**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	L	S	S	S	M	S	S	S
CO2	S	M	M	M	M	S	S	M	S	S
CO3	S	M	M	M	M	S	M	M	S	M
CO4	M	M	M	L	S	S	M	S	M	M
CO5	M	M	M	M	M	S	S	S	S	M

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	Handling practical session through projector
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
S.JOTHIVEL	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. COMPUTER SCIENCE – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3PCSC09	**NETWORK SECURITY AND CRYPTOGRAPHY**	**DSC THEORY IX**	**III**	**4**	**4**	**-**	**-**	**4**
Objective	Students can able to learn the Introduction to Cryptography, Web Security and Case studies in Cryptography and gain knowledge on classical encryption techniques and concepts of modular arithmetic and number theory.							

Unit	Course Content	Knowledge Levels	Sessions
I	**INTRODUCTION :**Introduction to Cryptography – Security Attacks – Security Services –Security Algorithm- Stream cipher and Block cipher - Symmetric and Asymmetric-key Cryptosystem Symmetric Key Algorithms: Introduction – DES – Triple DES – AES – IDEA – Blowfish – RC5.	K1	10
II	**CRYPTO SYSTEM:** Public-key Cryptosystem: Introduction to Number Theory - RSA Algorithm – Key Management Diffie-Hell man Key exchange – Elliptic Curve Cryptography Message Authentication and Hash functions – Hash and Mac Algorithm – Digital Signatures and Authentication Protocol.	K2	10
III	**NETWORK SECURITY:** Network Security Practice: Authentication Applications – Kerberos – X.509 Authentication services and Encryption Techniques. E-mail Security – PGP – S / MIME – IP Security	K3	10
IV	**WEB SECURITY:** Web Security - Secure Socket Layer – Secure Electronic Transaction. System Security - Intruders and Viruses – Firewalls– Password Security.	K4	09
V	**CASE STUDY:** Case Study: Implementation of Cryptographic Algorithms – RSA – DSA – ECC (C / JAVA Programming). Network Forensic – Security Audit - Other Security Mechanism: Introduction to: Stenography – Quantum Cryptography – Water Marking - DNA Cryptography **Current Trends:** Digital Certificates and Public Key Infrastructure (PKI)	K5	09

	…… Self Study.		
Course Outcome	CO1:Remembering the process of the cryptographic algorithms	K1	
	CO2:Understand different encryption and decryption techniques to solve problems related to confidentiality and authentication	K2	
	CO3:Apply and analyze appropriate security techniques to solve network security problem	K3	
	CO4:Analyze the suitable cryptographic algorithms	K4	
	CO5:Evaluate different digital signature algorithms to achieve authentication and design secure applications	K5	

Learning Resources	
Text Books	William Stallings, "Cryptography and Network Security", PHI/Pearson Education Bruce Schneir, "Applied Cryptography", CRC Press.
Reference Books	A.Menezes, P Van Oorschot and S.Vanstone, "Hand Book of Applied Cryptography", CRC Press, 1997 AnkitFadia,"Network Security",MacMillan.
Website Link	1.https://nptel.ac.in/courses/106/105/106105031/ 2. http://www.nptelvideos.in/2012/11/cryptography-and-network-security.html 3. https://www.tutorialspoint.com/cryptography/index.html
Self Study	https://ebookcentral.proquest.com/lib/inflibnet-ebooks/reader.action?docID=5121458

	L-Lecture	**T-Tutorial**	**P-Practical**	**C-Credit**

M.Sc. Computer Science– Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M3PCSC09	**NETWORK SECURITY AND CRYPTOGRAPHY**	**DSC THEORY IX**	**III**	**4**	**4**			**4**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	L	S	M	S	M	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	Conducting Group Discussion, Class test
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
A.M.NIRMALA	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3PCSC10	**DATA SCIENCE AND ANALYTICS**	**DSC THEORY-X**	**III**	**4**	**4**	**-**	**-**	**4**
Objective	Students learn basic image processing techniques for solving real problems, image transformation and Image enhancement techniques, Image compression and Segmentation procedures.							

Unit	Course Content	Knowledge Levels	Sessions
I	**INTRODUCTION OF DATA SCIENCE:** data science and big data – facets of data-data science process Ecosystem- The Data Science process – six steps- Machine Learning.	K1	10
II	**BASICS OF DATA ANALYTICS**: Data Analytics life cycle - review of data analytics - Advanced data Analytics-technology and tools.	K2	10
III	**DATA ANALYTICS USING R:**Basic Data Analytics using R : R Graphical User Interfaces – Data Import and Export – Attribute and Data Types –Descriptive Statistics – Exploratory Data Analysis – Visualization Before Analysis – Dirty Data – Visualizing a Single Variable – Examining Multiple Variables – Data Exploration Versus Presentation.	K3	10
IV	**CLUSTERING**: Overview of Clustering : K-means – Use Cases – Overview of the Method – Perform a K-means Analysis using R – Classification – Decision Trees – Overview of a Decision Tree – Decision Tree Algorithms – Evaluating a Decision Tree – Decision Tree in R – Bayes‟ Theorem – Naïve Bayes Classifier – Smoothing – Naïve Bayes in R	K4	10
V	**ARTIFICIAL INTELLIGENCE:** Artificial intelligence: Machine Learning and deep learning in data science - Clustering, association rules. Linear regression-logistic regression-Additional regression methods. **Current Trends:** Data science essentials in business	K5	8
	…… Self Study		

Course Outcome	CO1:Remembering the fundamentals of Digital Image Processing	K1	
	CO2:Understand the mathematical foundations for digital image representation, image acquisition, image transformation, and image enhancement	K2	
	CO3:Apply, Design and Implement and get solutions for digital image processing problems	K3	
	CO4:Analyzing the concepts of filtering and segmentation for digital image retrieval	K4	
	CO5:Evaluating the concepts of Multi-resolution process and recognize the objects in an efficient manner	K5	

Learning Resources	
Text Books	1. Introducing-Data-Science-Big-Data-Machine-Learning-and-more-using-Python-tools-2016. Pdf 2. Data science in big data analytics-Wiley 2015 John Wiley & Sons
Reference Books	1. A simple introduction to Data Science - Lars Nielson 2015 2. Introducing Data Science Davy Cielen, Arno D.B.Meysman, Mohamed Ali 2016 Manning Publication 3. R Programming for Data Science - Roger D.Peng 2015 Lean Publication 4. Data Science & Big Data Analytics: Discovering, Analyzing , Visualizing and Presenting Data
Website Link	1 https://www.tutorialspoint.com/python_data_science/index.html 2 https://www.javatpoint.com/data-science 3 https://nptel.ac.in/courses/106/106/106106179/
Self Study Material	https://www.sciencedirect.com/science/article/pii/S2772662224000468

	L-Lecture	**T-Tutorial**	**P-Practical**	**C-Credit**

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M3PCSC10	**DATA SCIENCE AND ANALYTICS**	**DSC THEORY-X**	**III**	**4**	**4**	**-**	**-**	**4**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	L	S	M	M	M	L
CO2	S	S	S	S	M	S	M	M	M	L
CO3	S	S	S	S	M	M	M	M	M	M
CO4	S	S	S	S	S	M	M	M	M	M
CO5	S	S	S	S	S	L	M	M	M	S

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

Tutorial Schedule	Conducting Group Discussion, Class test
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
S.JOTHIVEL	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M4PCSC11	ADVANCED WEB TECHNOLOGY	DSC THEORY-XI	IV	5	4	1	-	4
Objective	Students explore the backbone of web page creation by developing .NET skills, HTML and web control classes & depth knowledge about ADO.NET.							

Unit	Course Content	Knowledge Levels	Sessions
I	**OVERVIEW OF ASP.NET**-The.NET framework – Learning the .NET languages: Data types–Declaring variables-Scope and Accessibility-Variable operations - Object Based manipulation-Conditional Structures-Loop Structures-Functions and Subroutines. Types, Objects and Namespaces: The Basics about Classes- Value types and Reference types- Advanced class programming - Understanding name spaces and assemblies. Setting Up ASP.NET and IIS	K1	12
II	**Developing ASP.NET Applications**-ASP.NET Applications: ASP.NET applications – Cod behind-The Global. asax application file-UnderstandingASP.NETClassesASP.NET Configuration. Web Form fundamentals: A simple page applet-Improving the currency converter – HTML control classes – The page class Accessing HTML server controls. Web controls: Web Control Classes–Auto Post Back and Web Control events- Accessing web controls. Using VisualStudio.NET: Starting aVisualStudio.NET Project-Web form Designer Writing code-Visual studio.NET debugging. Validation and Rich Controls: Validation-A simple Validation example- Understanding regular expression - A validated customer form. State management-Tracing, Logging, and Error Handling.	K2	12
III	**Working with Data** - Overview of ADO.NET - ADO.NET and data management-Characteristics of ADO.NET ADO.NET object model. ADO.NET data access: SQL basics– Select ,Update, Insert, Delete statements- Accessing data- Creating a connection- Using a command with a Data Reader- Accessing Disconnected data - Selecting multiple tables – Updating Disconnected data. Data binding: Single value Data Binding-Repeated value data binding-Data binding with databases. Data list – Data grid– Repeater–Files, Streams and Email– Using XML	K3	12
IV	**Web Services** – Web services Architecture: Internet programming the hand now WSDL–SOAP-Communicating with a web service-Web	K4	12

	service discovery and UDDI. Creating Web services: Web service basics – The Stock Quote web service – Documenting the web service- Testing the web service - Web service Data types ASP.NET intrinsic objects. Using web services: Consuming a web service-Using the proxy class – An example with Terra Service.		
V	**Advanced ASP.NET** - Component Based Programming: Creating a simple component –Properties and state-Database components-Using COM components. Custom controls: User Controls – Deriving Custom controls. Caching and Performance Tuning: Designing and scalability – Profiling-Catching Output catching-Data catching. Implementing security: Determining security requirements – The ASP.NET security model-Forms authentication - Windows authentication. **CURRENT TRENDS** : Edge Computing.	K5	12
	…… Self Study		
Course Outcome	Remembering the idea about web services and technology	K1	
	Understanding a web page with Web form fundamentals and web control classes	K2	
	Applying the web page with database connectivity and web control	K3	
	Analyzing the knowledge of web service in server with security credentials	K4	
	Evaluate the knowledge of ASP.NET object, ADO.NET data access	K5	

Learning Resources	
Text Books	1. Mathew MacDonald, “ASP.NET Complete Reference”, TMH 2005.
Reference Books	1. Crouch Matt J, “ASP.NET andVB.NET Web Programming”, Addison Wesley2002. 2. J.Liberty, D.Hurwitz, “Programming ASP.NET”, Third Edition, O“REILLY,2006.
Website Link	1. https://www.geeksforgeeks.org/introduction-to-asp-net/ 2. https://www.javatpoint.com/asp-net-introduction
Self-study Material	https://www.globalmediainsight.com/blog/web-development-trends/#pwa

	L-Lecture	**T-Tutorial**	**P-Practical**	**C-Credit**

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**	
23M4PCSC11	**ADVANCED WEB TECHNOLOGY**	**DSC THEORY-XI**	**IV**	**5**	**4**	**1**	**-**	**4**	

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	S	M	M	M	M	M	M	M
CO2	M	M	S	M	S	S	S	M	M	M
CO3	M	M	M	M	M	M	M	M	M	M
CO4	M	M	S	M	L	M	M	S	M	M
CO5	M	M	M	L	M	M	M	M	M	M

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

Tutorial Schedule	Conducting Group Discussion, Seminar.
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation, Review of different web sites
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By
Dr.P.NANDHINI	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M4PCSP07	**PRACTICAL: WEB APPLICATION DEVELOPMENT AND HOSTING**	**DSC PRACTICAL - VII**	**IV**	**5**	**-**	**-**	**5**	**2**
Objective	Students able to design a web page using HTML tags, Framesets, hyperlinks and different formatting features of HTML tags, Forms & other controls in a web page, interactive applications using PHP.							

S.No.	List of Experiments / Programs	Knowledge Levels	Sessions
1	1. Develop a website for your college using advanced tags of HTML.	K1	7
2	2. Write names of several countries in a paragraph and store it as an HTML document, world.html. Each country name must be a hot text. When you click India (for example), it must open india.html and it should provide a brief introduction about India.	K1	7
3	3. Develop a HTML document to i)display Text with Bullets / Numbers - Using Lists ii) to display the Table Format Data	K2	7
4	4. Develop a Complete Web Page using Frames and Framesets which gives the Information about a Hospital using HTML.	K2	7
5	5. Write a HTML document to print your Bio-Data in a neat format using several components.	K3	7
6	6. Develop a HTML document to display a Registration Form for an inter-collegiate function.	K3	7
7	7. Using HTML form accept Customer details like Name, City, Pin code, Phone number and Email address and validate the data and display appropriate messages for violations using PHP (Eg. Name is Mandatory field; Pin code must be 6 digits, etc.).	K4	7
8	8. Write a program to accept two numbers n1 and n2 using HTML form and display the Prime numbers between n1 and n2 using PHP.	K4	7
9	Design a website for online shopping.	K5	4

Course Outcome	CO1: Remembering & implement the basic HTML tags to create static web pages.			K1	
	CO2: Understanding the Capable of using hyperlinks, frames, images, tables in a web page.			K2	
	CO3 : Applying and Analyzing the dynamic web applications using HTML forms			K3,K4	
	CO4: Evaluating the dynamic web applications in PHP & HTML tags using XAMPP.			K5	
Learning Resources					
Text Books	1. Ivan Bayross, "Web Enabled Commercial Applications Development Using HTML, JavaScript, DHTML and PHP", BPB Publications, 4th Revised Edition, 2010.				
Reference Books	1. A.K.Saini and SumintTuli, "Mastering XML", First Edition, New Delhi, 2002. 2. . https://www.youtube.com/watch?v=PlxWf493en4				
Website Link	1. https://www.tutorialspoint.com/xml/index.htm 2. https://www.tutorialspoint.com/internet_technologies/websites_development.htm				
	L-Lecture	**T-Tutorial**	**P-Practical**	**C-Credit**	

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M4PCSP07	**PRACTICAL: WEBAPPLICATION DEVELOPMENTAND HOSTING**	**DSC PRACTICAL - VII**	**IV**	**5**	**-**	**-**	**5**	**2**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	S	M	M	S	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	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	Handling practical session through projector
Assessment Methods	CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By
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S.NO.	SEM	COURSE_CODE	TITLE OF THE COURSE
1	I	23M1PCSE01	Advanced Software Engineering
2	I	23M1PCSE02	Multimedia and its applications
3	I	23M1PCSE03	Embedded Systems
4	II	23M2PCSE04	Artificial Intelligence & Machine Learning
5	II	23M2PCSE05	Internet of Things
6	II	23M2PCSE06	Mobile Computing
7	II	23M2PCSE07	Block Chain Technology
8	II	23M2PCSE08	Critical thinking, Design thinking and problem solving
9	II	23M2PCSE09	Web Services
10	II	23M2PCSE10	Robotic process automation for business

M.Sc. COMPUTER SCIENCE – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M1PCSE01	**ADVANCED SOFTWARE ENGINEERING**	**DSE THEORY -I**	**I**	**5**	**3**	**2**		**3**
Objective	Students can able to learn the concepts of Software Engineering. Design, Testing and Maintenance and Learn about Software Project Management, Software Design & Testing							

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	12
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 - Case study: Student Result management system. Software Quality Management – Software Quality, Software Quality Management System, ISO 9000, SEI CMM.	K2	12
III	**Software Project Management:** Responsibilities of a software project manager – Project planning – Metrics for Project size estimation – Project Estimation Techniques – Empirical Estimation Techniques – COCOMO – Halstead"s software science – Staffing level estimation – Scheduling – Organization and Team Structures – Staffing – Risk management – Software Configuration Management – Miscellaneous Plan.	K3	12
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 - IEEE Recommended Practice for Software Design Descriptions	K4	12
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 -	K5	12

	Reverse Engineering – Software Re-engineering - Configuration Management activities.		
Course Outcome	CO1: Understand about Software Engineering process	K1	
	CO2: Understand about Software project management skills, design and quality management	K2	
	CO3: Analyze on Software Requirements and Specification	K3	
	CO4: Analyze on Software Testing, Maintenance and Software Re-Engineering	K4	
	CO5: Design and conduct various types and levels of software quality for a software project	K5	

Learning Resources	
Text Books	1 .An Integrated Approach to Software Engineering – Pankaj Jalote, Narosa Publishing. House, Delhi, 3rd 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, 3 rd edition. 2 .A Practitioners Approach- Software Engineering, - R. S. Pressman, McGraw Hill. 3. Fundamentals of Software Engineering - Carlo Ghezzi, M. Jarayeri, D. Manodrioli,PHIPublication.
Website Link	https://www.javatpoint.com/software-engineering-tutorial https://onlinecourses.swayam2.ac.in/cec20_cs07/preview https://onlinecourses.nptel.ac.in/noc19_cs69/preview

	L-Lecture	**T-Tutorial**	**P-Practical**	**C-Credit**

M.Sc. COMPUTER SCIENCE – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M1PCSE01	**ADVANCED SOFTWARE ENGINEERING**	**DSE THEORY -I**	I	**5**	**3**	**2**		**3**

CO-PO Mapping

CO Number	PO1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	M	M
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S

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

Tutorial Schedule	Conducting Group Discussion, Class test
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
A.M.NIRMALA	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. COMPUTER SCIENCE – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M1PCSE02	**MULTIMEDIA AND ITS APPLICATIONS**	**DSE THEORY -I**	**I**	**5**	**3**	**2**		**3**
Objective	Students can understand the concepts of Multimedia, Images & Animation and introduce Multimedia authoring tools, High Definition Television and Desktop Computing – Knowledge based Multimedia systems							

Unit	Course Content	**Knowledge Levels**	**Sessions**
I	What is Multimedia? – Introduction to making Multimedia – Macintosh and Windows Production platforms – Basic Software tools.	K1	12
II	Making Instant Multimedia – Multimedia authoring tools – Multimedia building blocks – Text – Sound.	K2	12
III	Images – Animation – Video.	K3	12
IV	Multimedia and the Internet – The Internet and how it works – Tools for World Wide Web – Designing for the World Wide Web.	K4	12
V	High Definition Television and Desktop Computing – Knowledge based Multimedia systems	K5	12
Course Outcome	CO1: To introduce the students the concepts of Multimedia, Images & Animation	K1	
	CO2: To introduce Multimedia authoring tools	K2	
	CO3: To understand the role of Multimedia in Internet	K3	
	CO4: To know about High Definition Television and Desktop Computing	K4	
	CO5: To Know about Knowledge based Multimedia systems	K5	

Learning Resources	
Text Books	Tay Vaughan, "Multimedia making it work", Fifth Edition, Tata McGrawHill. John F. Koegel Bufford, "Multimedia Systems", Pearson Education.
Reference Books	Judith Jeffloate, "Multimedia in Practice (Technology and Applications)", PHI,2003.
Website Link	https://www.tutorialspoint.com/multimedia/index.htm https://www.tutorialspoint.com/basics_of_computer_science/basics_of_computer_science_multimedia.htm https://nptel.ac.in/courses/117/105/117105083/

	L-Lecture	T-Tutorial	P-Practical	C-Credit

M.Sc. COMPUTER SCIENCE – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
23M1PCSE02	**MULTIMEDIA AND ITS APPLICATIONS**	**DSE THEORY -I**	**I**	**5**	**3**	**2**		**3**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	M	M
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S

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

Tutorial Schedule	Conducting Group Discussion, Class test
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By
A.M.NIRMALA	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. COMPUTER SCIENCE – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M1PCSE03	**EMBEDDED SYSTEMS**	**DSE THEORY -I**	**I**	**5**	**3**	**2**		**3**

Objective	Students can gain the knowledge about the embedded software development and introduction to 8051 Microcontroller Instruction Set, concepts on RTOS & Software tools.

Unit	Course Content	Knowledge Levels	Sessions
I	8051 Microcontroller: Introduction - 8051 Architecture-Input/Output Pins, Ports and Circuits - External Memory - Counters / Timers - Serial Data Input / Output –Interrupts	K1	12
II	Instruction Set and Programming Moving Data-Addressing Modes-Logical operations Arithmetic Operation-Jump and Call Instructions-Simple Program. Applications: Keyboard Interface- Display Interface-Pulse Measurements-DIA and AID Conversions-Multiple Interrupts.	K2	12
III	CONCEPTS ON RTOS: Introduction to RTOS-Selecting an RTOS-Task and Task states - Tasks and data- Semaphores and shared data. MORE operating systems services: Interrupt Process communication - Message Queues, Mailboxes and pipes- Timer Functions-Events - Memory Management-Interrupt Routines in an RTOS Environment.	K3	12
IV	Basic Design using a RTOS: Principles - Encapsulating semaphores and Queues-Hard real time scheduling considerations-Saving memory space and power- introductions to RTL &QNX	K4	12
V	SOFTWARE TOOLS: Embedded software Development Tools: Hosts and Target Machines- 56 Linker/Locators for Embedded software-getting Embedded software into the Target systems. Debugging Techniques: Testing on your Host machine -Instruction set simulators- The assert macro-using laboratory tools.	K5	12
Course Outcome	CO1:Understand the concept of 8051 micro control	K1	
	CO2: Understand the Instruction Set and Programming	K2	
	CO3: Analyze the concepts of RTOS	K3	
	CO4: Analyze and design various real time embedded systems using RTOS	K4	
	CO5: Debug the malfunctioning system using various debugging techniques	K5	

Learning Resources	
Text Books	David E. Simon, "An Embedded Software primer" Pearson Education Asia, 2003. Kenneth J Ayala, "The 8051 Microcontroller and Architecture programming and application", Second Edition, Penram International.
Reference Books	Raj Kamal, "Embedded Systems – Architecture, programming and design", Tata McGraw – Hill, 2003.
Website Link	https://onlinecourses.nptel.ac.in/noc20_cs14/preview https://www.javatpoint.com/embedded-system-tutorial https://www.tutorialspoint.com/embedded_systems/index.htm

	L-Lecture	T-Tutorial	P-Practical	C-Credit

M.Sc. COMPUTER SCIENCE – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
23M1PCSE03	EMBEDDED SYSTEMS	DSE THEORY -I	I	5	3	2		3

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	L	L	S	M	S	S	M	M	S
CO2	M	M	S	S	M	S	M	S	S	S
CO3	M	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	Conducting Group Discussion, Class test
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By
A.M.NIRMALA	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. COMPUTER SCIENCE – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSE04	**ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING**	**DSE THEORY -II**	**II**	**4**	**4**	1	-	**3**
Objective	Students enable the students to learn the basic functions of AI, Heuristic Search Techniques.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Introduction**: AI Problems - Al techniques - Criteria for success. Problems, Problem Spaces, Search: State space search - Production Systems - Problem Characteristics - Issues in design of Search	K1	12
II	**Heuristic Search techniques**: Generate and Test - Hill Climbing-Best-First, Problem Reduction, Constraint Satisfaction, Means-end analysis. Knowledge representation issues: Representations and mappings -Approaches to Knowledge representations -Issues in Knowledge representations - Frame Problem.	K2	12
III	**Using Predicate logic**: Representing simple facts in logic - Representing Instance and Isa relationships - Computable functions and predicates - Resolution - Natural deduction. Representing knowledge using rules: Procedural Vs Declarative knowledge - Logic programming - Forward Vs Backward reasoning - Matching - Control knowledge.	K3	12
IV	**Understanding Machine Learning**: What Is Machine Learning?-Defining Big Data-Big Data in Context with Machine Learning-The Importance of the Hybrid Cloud-Leveraging the Power of Machine Learning-The Roles of Statistics and Data Mining with Machine Learning-Putting Machine Learning in Context-Approaches to Machine Learning.	K4	12
V	**Looking Inside Machine Learning**: The Impact of Machine Learning on Applications - Data Preparation-The Machine Learning Cycle.	K5	12

Course Outcome	CO1: Demonstrate AI problems and techniques	K1	
	CO2: Understand machine learning concepts	K2	
	CO3: Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning	K3	
	CO4: Analyze the impact of machine learning on applications	K4	
	CO5: Analyze and design a real world problem for implementation and understand the dynamic behavior of a system	K5	

Learning Resources	
Text Books	Elaine Rich and Kevin Knight," Artificial Intelligence", Tata McGraw Hill Publishers company Pvt Ltd, Second Edition, 1991. George F Luger, "Artificial Intelligence",4th Edition, Pearson Education Publ,2002.
Reference Books	Machine Learning For Dummies®, IBM Limited Edition by Judith Hurwitz, Daniel Kirsch.
Website Link	https://www.ibm.com/downloads/cas/GB8ZMQZ3 https://www.javatpoint.com/artificial-intelligence-tutorial https://nptel.ac.in/courses/106/105/106105077/

	L-Lecture	**T-Tutorial**	**P-Practical**	**C-Credit**

M.Sc. COMPUTER SCIENCE – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards									
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**	
23M2PCSE04	**ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING**	**DSE THEORY -II**	**II**	**4**	**4**			**3**	

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	L	L	S	S	S	S	M	M	S
CO2	S	S	S	S	S	S	M	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S

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

Tutorial Schedule	Conducting Group Discussion, Class test
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
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M.Sc. COMPUTER SCIENCE – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSE05	**INTERNET OF THINGS**	**DSE THEORY -II**	**II**	**4**	**4**			**3**

Objective	Students can able to learn the Architecture of IoT and IoT Technologies and developing IoT applications and Security in IoT, Basic Electronics for IoT, Arduino IDE, Sensors and Actuators Programming NODEMCU using Arduino IDE.

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	**Introduction to IoT**: Evolution of IoT – Definition & Characteristics of IoT - Architecture of IoT – Technologies for IoT – Developing IoT Applications – Applications of IoT – Industrial IoT – Security in IoT	K1	12
II	**Basic Electronics for IoT**: Electric Charge, Resistance, Current and Voltage – Binary Calculations – Logic Chips – Microcontrollers – Multipurpose Computers – Electronic Signals – A/D and D/A Conversion – Pulse Width Modulation.	K2	12
III	**Programming Fundamentals with C using Arduino IDE**: Installing and Setting up the Arduino IDE – Basic Syntax – Data Types/ Variables/ Constant – Operators – Conditional Statements and Loops – Using Arduino C Library Functions for Serial, delay and other invoking Functions – Strings and Mathematics Library Functions.	K3	12
IV	**Sensors and Actuators: Analog and Digital Sensors** – Interfacing temperature sensor, ultrasound sensor and infrared (IR) sensor with Arduino – Interfacing LED and Buzzer with Arduino.	K4	12
V	**Sending Sensor Data Over Internet**: Introduction to ESP8266 NODEMCU WiFi Module – Programming NODEMCU using Arduino IDE – Using WiFi and NODEMCU to transmit data from temperature sensor to Open Source IoT cloud platform (ThingSpeak).	K5	12
Course Outcome	CO1: Understand about IoT, its Architecture and its Applications	K1	
	CO2: Understand basic electronics used in IoT & its role	K2	
	CO3: Develop applications with C using Arduino IDE	K3	
	CO4: Analyze about sensors and actuators	K4	
	CO5: Design IoT in real time applications using today"s internet & wireless technologies	K5	

Learning Resources				
Text Books	Arshdeep Bahga, Vijay Madisetti, “Internet of Things: A Hands-On Approach”, 2014. ISBN: 978-0996025515 Boris Adryan, Dominik Obermaier, Paul Fremantle, “The Technical Foundations of IoT”, Artech Houser Publishers, 2017..			
Reference Books	Michael Margolis, “Arduino Cookbook”, O"Reilly, 2011 Marco Schwartz, “Internet of Things with ESP8266”, Packt Publishing, 2016. Dhivya Bala, “ESP8266: Step by Step Tutorial for ESP8266 IoT, Arduino NODEMCU Dev. Kit”, 2018.			
Website Link	https://onlinecourses.nptel.ac.in/noc20_cs66/preview https://www.javatpoint.com/iot-internet-of-things https://www.tutorialspoint.com/internet_of_things/index.htm			
	L-Lecture	**T-Tutorial**	**P-Practical**	**C-Credit**

M.Sc. COMPUTER SCIENCE – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSE05	**INTERNET OF THINGS**	**DSE THEORY -II**	**II**	**4**	**4**			**3**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	M	S	M	S	M	M	S	M
CO2	M	S	M	S	M	S	M	S	S	S
CO3	S	S	S	M	S	S	M	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	Conducting Group Discussion, Class test
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Verified By**	**Approved By**
A.M.NIRMALA	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSE06	**MOBILE COMPUTING**	**DSE THEORY -II**	**II**	**4**	**4**			**3**
Objective	Students can present the overview of Mobile computing, Applications and Architectures and describe the futuristic computing challenges. Enable the students to learn the concept of mobile computing.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Introduction**: Advantages of Digital Information - Introduction to Telephone Systems –Mobile communication: Need for Mobile Communication – Requirements of Mobile Communication – History of Mobile Communication.	K1	12
II	**Introduction to Cellular Mobile Communication** – Mobile Communication Standards –Mobility Management – Frequency Management – Cordless Mobile Communication Systems.	K2	12
III	**Mobile Computing: History of data networks** – Classification of Mobile data networks - CDPD System – Satellites in Mobile Communication: Satellite classification – Global Satellite Communication – Changeover from one satellite to other – Global Mobile Communication – Interferences in Cellular Mobile Communication	K3	12
IV	**Important Parameters of Mobile Communication System** – Mobile Internet: Working of Mobile IP – Wireless Network Security – Wireless Local Loop Architecture: Components in WLL – Problems in WLL – Modern Wireless Local Loop – Local Multipoint Distribution Service – Wireless Application Protocol.	K4	12
V	**WCDMA Technology** and Fiber Optic Microcellular Mobile Communication – Ad hoc Network and Bluetooth technology – Intelligent Mobile Communication system – Fourth Generation Mobile Communication systems.	K5	12
Course Outcome	CO1: Understand the need and requirements of mobile communication	K1,K2	
	CO2: Focus on mobile computing applications and techniques	K2,K3	
	CO3: Demonstrate satellite communication in mobile computing	K3,K4	
	CO4: Analyze about wireless local loop architecture	K4,K5	
	CO5:Analyze various mobile communication technologies	K5,K6	

Learning Resources	
Text Books	Arshdeep Bahga, Vijay Madisetti, “Internet of Things: A Hands-On Approach”, 2014. ISBN: 978-0996025515 Boris Adryan, Dominik Obermaier, Paul Fremantle, “The Technical Foundations of IoT”, Artech Houser Publishers, 2017..
Reference Books	Michael Margolis, “Arduino Cookbook”, O"Reilly, 2011 Marco Schwartz, “Internet of Things with ESP8266”, Packt Publishing, 2016. Dhivya Bala, “ESP8266: Step by Step Tutorial for ESP8266 IoT, Arduino NODEMCU Dev. Kit”, 2018.
Website Link	https://onlinecourses.nptel.ac.in/noc20_cs66/preview https://www.javatpoint.com/iot-internet-of-things https://www.tutorialspoint.com/internet_of_things/index.htm

	L-Lecture	T-Tutorial	P-Practical	C-Credit

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
23M2PCSE06	MOBILE COMPUTING	DSE THEORY -II	II	4	4			3

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	M	L	L	M	S	M	M	S	M
CO2	S	S	S	M	M	S	M	S	S	S
CO3	S	S	S	S	M	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	Conducting Group Discussion, Class test
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By
A.M.NIRMALA	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. Computer Science – **Syllabus LOCF – CBCS with effect from 2023-2024 Onwards**								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSE07	**Block Chain Technology**	**DSE THEORY -II**	**II**	**4**	**4**	**-**	**-**	**3**
Objective	Students can able to understand the fundamentals of block chain and crypto currency and understand the influence and role of block chain in various other fields							

Unit	**Course Content**	**Knowledge Levels**	**Sessions**
I	Introduction to Blockchain - The big picture of the industry – size, growth, structure, players. Bitcoin versus Crypto currencies versus Blockchain - Distributed Ledger Technology (DLT). Strategic analysis of the space – Blockchain platforms, regulators, application providers. The major application: currency, identity, chain of custody.	K1	12
II	**Network and Security:** Advantage over conventional distributed database, Blockchain Network, Mining Mechanism, Distributed Consensus, Blockchain 1.0, 2.0 and 3.0 – transition, advancements and features. Privacy, Security issues in Blockchain.	K2	12
III	Cryptocurrency - History, Distributed Ledger, Bitcoin protocols - Symmetric-key cryptography - Public-key cryptography - Digital Signatures -High and Low trust societies - Types of Trust model: Peer-to-Peer, Leviathan, and Intermediary. Application of Cryptography to Blockchain	K3	12
IV	Cryptocurrency Regulation - Stakeholders, Roots of Bit coin, Legal views - exchange of cryptocurrency - Black Market - Global Economy. Cyrptoeconomics – assets, supply and demand, inflation and deflation – Regulation.	K4	12
V	**Challenges in Block chain:** Opportunities and challenges in Block Chain – Application of block chain: Industry 4.0 – machine to machine communication – Data management in industry 4.0 – future prospects. Block chain in Health 4.0 - Blockchain properties - Healthcare Costs - Healthcare Quality - Healthcare Value - Challenges for using blockchain for healthcare data	K5	12
Course Outcome	**CO1:** Demonstrate blockchain technology and crypto currency	K1	
	CO2: Understand the mining mechanism in blockchain	K2	
	CO3: Apply and identify security measures, and various types of services that allow people to trade and transact with bitcoins	K3	
	CO4: Apply and analyze Blockchain in health care industry	K4	
	CO5: Analyze security, privacy, and efficiency of a given Blockchain system	K5	
Learning Resources			

Text Books	1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, "Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction", Princeton University Press (July 19, 2016) 2. Antonopoulos, "Mastering Bitcoin: Unlocking Digital Cryptocurrencies"
Reference Books	1. Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System" 2. Rodrigo da Rosa Righi, Antonio Marcos Alberti, Madhusudan Singh, "Blockchain Technology for Industry 4.0" Springer 2020.
Website Link	1. https://www.javatpoint.com/blockchain-tutorial 2. https://www.tutorialspoint.com/blockchain/index.html

L-Lecture	**T-Tutorial**	**P-Practical**	**C-Credit**

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M2PCSE07	**Block Chain Technology**	**DSE THEORY -II**	**II**	**4**	**4**	**-**	**-**	**3**

CO PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**M**	**S**	**M**
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	Conducting Group Discussion, Class test
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Designed By**	**Approved By**
P.SUBRAMANIAM HoD	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSE08	**Critical thinking, Design thinking and problem solving**	**DSE THEORY -II**	**II**	**4**	**4**	**-**	**-**	**3**
Objective	Students can learn critical thinking and its related concepts and to Learn design thinking and its related concepts							

Unit	Course Content	Knowledge Levels	Sessions
I	**Critical Thinking**: Definition, Conclusions and Decisions, Beliefs and Claims, Evidence – finding, evaluation, Inferences, Facts – opinion, probable truth, probably false, Venn diagram. Applied critical thinking: Inference, Explanation, Evidence, Credibility, Two Case Studies, critical thinking and science, critical evaluation, self-assessment	K1	12
II	**Design Thinking**: Introduction, Need of Design Thinking, problem to question - design thinking process, Traditional Problem Solving versus Design Thinking, phases of Design Thinking, problem exploration, Stake holder assessment, design thinking for manufacturers, smart Idea to implementation..	K2	12
III	**Thinking to confidence:** fear management, duty Vs passion, Team management, Tools for Thinking, prototype design, Relevance of Design and Design Thinking in engineering, human centered design, case study: apply design thinking in problem.	K3	12
IV	**Problem solving**: problem definition, problem solving methods, selecting and using information, data processing, solution methods, solving problems by searching, recognizing patterns, spatial reasoning, necessity and sufficiency, choosing and using models, making choices and decisions.	K4	12
V	**Reasoning**: Deductive and hypothetical reasoning, computational problem solving; generating, implementing, and evaluating solutions, interpersonal problem solving. Advanced problem solving: Combining skills – using imagination, developing models, Carrying out investigations, Data analysis and inference. Graphical methods of solution, Probability, tree diagrams and decision trees	K5	12

Course Outcome	**CO1:** Understand the concepts of Critical thinking and its related technology	K1	
	CO2: Focus on the explicit development of critical thinking and problem solving skills	K2	
	CO3: Apply design thinking in problems	K3	
	CO4: Make a decision and take actions based on analysis	K4	
	CO5: Analyze the concepts of Thinking patterns, Problem solving & Reasoning in real time applications	K5	

Learning Resources	
Text Books	3. John Butterworth and Geoff Thwaites, Thinking skills: Critical Thinking and Problem Solving, Cambridge University Press, 2013. 4. H. S. Fogler and S. E. LeBlanc, Strategies for Creative Problem Solving, 2nd edition, Pearson, Upper Saddle River, NJ, 2008.
Reference Books	3. A. Whimbey and J. Lochhead, Problem Solving & Comprehension, 6th edition, Lawrence Erlbaum, Mahwah, NJ, 1999. 4. M. Levine, Effective Problem Solving, 2nd edition, Prentice Hall, Upper Saddle River, NJ, 1994.
Website Link	3. https://www.tutorialspoint.com/critical_thinking/index.htm 4. https://www.tutorialspoint.com/design_thinking/design_thinking_quick_guide.htm

L-Lecture	**T-Tutorial**	**P-Practical**	**C-Credit**

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M2PCSE08	Critical thinking, Design thinking and problem solving	DSE THEORY -II	II	4	4	-	-	3

CO PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	S	S	S
CO2	S	S	M	S	S	S	M	S	S	S
CO3	S	S	M	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	Conducting Group Discussion, Class test
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Designed By**	**Approved By**
P.SUBRAMANIAM HoD	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSE09	**Web Services**	**DSE THEORY -II**	**II**	**4**	**4**	**-**	**-**	**3**
Objective	Students can able to Present the Web Services, Building real world Enterprise applications using Web Services with Technologies XML, SOAP, WSDL, and UDDI and Get overview of Distributed Computing, XML, and its technologies							

Unit	Course Content	Knowledge Levels	Sessions
I	**Introduction to web services** – Overview of Distributed Computing-Evolution and importance of web services-Industry standards, Technologies and concepts underlying web services-Web services and enterprises-web services standards organization-web services platforms.	K1	12
II	**XML Fundamentals** – XML documents - XML Namespaces- XML Schema –Processing XML.	K2	12
III	**SOAP**: The SOAP model- SOAP messages-SOAP encoding- WSDL: WSDL structure interface definitions-bindings-services-Using SOAP and WSDL-UDDI: About UDDI- UDDI registry Specification- Core data structures-Accessing UDDI	K3	12
IV	**Advanced web services technologies and standards**: Conversations overview-web services conversation language-WSCL interface components. Workflow: business process management work flows and workflow management systems Security: Basics-data handling and forwarding data storage-errors-Web services security issues.	K4	12
V	**Quality of Service**: Importance of QoS for web services-QoS metrics-holes-design patterns-QoS enabled web services-QoS enabled applications. Web services management-web services standards and future trends.	K5	12
Course Outcome	**CO1:** Understand web services and its related technologies	K1	
	CO2: Understand XML concepts	K2	
	CO3: Analyze on SOAP and UDDI model	K3	
	CO4: Demonstrate the road map for the standards and future of web services	K4	
	CO5: Analyze QoS enabled applications in web services	K5	

Learning Resources	
Text Books	1. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services: An Architects Guide", Prentice Hall, Nov 2003. 2.Keith Ballinger, "NET Web services: Architecture and Implementation with .Net", Pearson Education, First Edition, Feb 2003.
Reference Books	1.Ramesh Nagappan, "Developing Java Web Services: Architecting and developing secure Web Services Using Java", John Wiley and Sons, first Edition Feb 2003. 2.Eric A Marks and Mark J Werrell, "Executive Guide to Web services", John Wiley and sons, March 2003.
Website Link	1.https://www.tutorialspoint.com/webservices/index.htm 2.https://www.javatpoint.com/web-services-tutorial

	L-Lecture	T-Tutorial	P-Practical	C-Credit

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M2PCSE09	Web Services	DSE THEORY -II	II	4	4	-	-	3

CO PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	M	M	M	S
CO2	S	S	S	M	M	S	M	S	M	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	Conducting Group Discussion, Class test
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	Designed By	Approved By
P.SUBRAMANIAM HoD	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M2PCSE10	**Robotic process automation for business**	**DSE THEORY -II**	**II**	**4**	**4**	**-**	**-**	**3**
Objective	Students can able to learn the concepts of RPA, its benefits, types and models and to Gain the knowledge in application of RPA in Business Scenarios.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Introduction to RPA** - Overview of RPA - Benefits of RPA in a business environment - Industries & domains fit for RPA - Identification of process for automation - Types of Robots - Ethics of RPA & Best Practices - Automation and RPA Concepts - Different business models for implementing RPA - Centre of Excellence – Types and their applications - Building an RPA team - Approach for implementing RPA initiatives.	K1	12
II	**Role of a Business Manager in Automation initiatives** - Skills required by a Business Manager for successful automation - The importance of a Business Manager in automation - Analyzing different business processes - Process Mapping frameworks - Role of a Business Manager in successful implementation – Part 1 - Understanding the Automation cycle – First 3 automation stages and activities performed by different people.	K2	12
III	**Evaluating the Automation Implementation** Detailed description of last 3 stages and activities performed by different people - Role of a Business Manager in successful completion – Part 2 - Activities to be performed post-implementation - Guidelines for tracking the implementation success - Metrics/Parameters to be considered for gauging success - Choosing the right licensing option - Sending emails - Publishing and Running Workflows.	K3	12
IV	**Ability to process information through scopes/systems** - Understand the skill of information processing and its use in business - Leveraging automation - Creating a Robot - New Processes. Establish causality by variable behavior - Understand the skill of drawing inference or establishing causality by tracking the behavior of a variable as it varies across time/referenced variable - Leveraging automation for this skill - Robot & new process creation.	K4	12
V	**Inference from snapshots of curated terms** – Omni-source data curation - Multisource trend tracking - Understand the skill of drawing inference from the behavior of curated terms by taking snapshots across systems in reference to time/variable(s) - Leveraging automation for this skill – Robot creation and new process creation for this skill.	K5	12
Course Outcome	**CO1:** Demonstrate the benefits and ethics of RPA	K1	
	CO2: Understand the Automation cycle and its techniques	K2	
	CO3: Draw inferences and information processing of RPA	K3	
	CO4: Implement & Apply RPA in Business Scenarios	K4	
	CO5: Analyze on Robots & leveraging automation	K5	

Learning Resources	
Text Books	5. Alok Mani Tripathi" Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool" Packt Publishing Limited March 2018. 6. Tom Taulli "The Robotic Process Automation Handbook" Apress , February 2020.
Reference Books	5. Steve Kaelble" Robotic Process Automation" John Wiley & Sons, Ltd., 2018
Website Link	5. https://www.tutorialspoint.com/uipath/uipath_robotic_process_automation_introduction.htm 6. https://www.javatpoint.com/rpa

	L-Lecture	T-Tutorial	P-Practical	C-Credit

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M2PCSE10	Robotic process automation for business	DSE THEORY -II	II	4	4	-	-	3

CO PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	S	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S

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

Tutorial Schedule	Conducting Group Discussion, Class test
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	Designed By	Approved By
P.SUBRAMANIAM HoD	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

EFFECTIVE FROM THE ACADEMIC YEAR 2023-2024 Onwards

S.No.	SEM	COURSE_CODE	TITLE OF THE COURSE
1	III	23M3PCSED1	Fundamentals of Computers and Communications
2	III	23M3PCSED2	Principles of Information Technology
3	III	23M3PCSED3	E-Commerce

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3PCSED1	**Fundamentals of Computers and Communications**	**EDC-I**	**III**	**4**	**4**	**-**	**-**	**4**
Objective	Students can able to Know the basics of Computers and internal Components of Computers							
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 - Elements of information systems. The Components of the Systems Unit: Processor – Data representation – Memory – Mobile Computers and Devices.					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 Terminals – Biometric input - Input devices for physically challenged users-Output: What is output – display devices – Monitors – Printers –Speakers, Headphones and Ear phones – output device for physically challenged users – Storage devices.					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. Application Software: Application software – Business software – Graphics and Multimedia Software–Application software for Communication.					K3		10
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 –					K4		10

	Communication devices – Communications Channel – Physical transmission media and Wireless transmission media.		
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. Computer Security: Computer security risks – Internet and network attacks –Unauthorized access and use.	K5	10
Course Outcome	**CO1:** Know the basics and internal parts of Computers	K1	
	CO2: Gain the knowledge on OS and its types	K2	
	CO3: Understand the basics of networks and Internet	K3	
	CO4: Learn the databases and DBMS concepts	K4	
	CO5: Understand the role of RDBMS in IT	K5	

Learning Resources	
Text Books	1.Gary B. Shelly, Thomasj. Cashman, Misty E.Vermaat, "Introduction to Computers,"Cengage Learning, 2008
Reference Books	1.Reema Thareja, "Fundamentals of Computers", Oxford Univ. Press,2015 2.Deborah Morley, Charles S.Parker, "Understanding Computers-Today and Tomorrow",14th Edition, Thomson Course Technology, 2012
Website Link	1.https://www.javatpoint.com/computer-fundamentals-tutorial 2.https://www.tutorialspoint.com/computer_fundamentals/index.htm

	L-Lecture	**T-Tutorial**	**P-Practical**	**C-Credit**

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards										
Course Code	**Course Title**		**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**	
23M3PCSED1	**Fundamentals of Computers and Communications**		**EDC-I**	**III**	**4**	**4**	**-**	**-**	**4**	
CO PO Mapping										
CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	S	S	S	S	M	S	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S
Level of Correlation between CO and PO					L-LOW		M- MEDIUM		S-STRONG	
Tutorial Schedule					Conducting Group Discussion, Class test					
Teaching and Learning Methods					Handling classes through chalk & talk method, PPT presentation					
Assessment Methods					Seminar, Assignments, CIA-I, CIA-II and ESE					
Designed By			**Designed By**				**Approved By**			
P.SUBRAMANIAM HoD			P.SUBRAMANIAM HoD				Dr.S.SHAHITHA MEMBER SECRETARY			

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M3PCSED2	**Principles of Information Technology**	**EDC-II**	**III**	**4**	**4**	**-**	**-**	**4**
Objective	Students can able to learn the basic concept and skills associated with information technology and to know the Computer hardware and software technologies							

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	9
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.	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.	K3	10
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	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.	K5	10

Course Outcome	**CO1:** Understand the basics of information technology	K1,K2	
	CO2: Gain the knowledge of Hardware and Software technologies	K2	
	CO3: Learn the method of organizing data	K3	
	CO4: Assess the role of Information Science to an organization.	K4	
	CO5: Understanding the role of IT in organizations	K5	

Learning Resources	
Text Books	1.Turban, Rainer, Potter "Introduction to Information Technology," Second edition, Wiley India, 2007.
Reference Books	2.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 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M3PCSED2	**Principles of Information Technology**	**GEC-EDC-II**	**II**	**4**	**4**	**-**	**-**	**4**

CO PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	S	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S

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

Tutorial Schedule	Conducting Group Discussion, Class test
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	**Designed By**	**Approved By**
P.SUBRAMANIAM HoD	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3PCSED3	**E-Commerce**	**EDC-III**	**III**	**4**	**4**	**-**	**-**	**4**
Objective	Students can able to Know the mercantile and consumer process model To Understand the Consumer's and Merchant's perspective							
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		09
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		09
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.					K3		10
IV	Electronic Data Interchange – EDI Applications in Business – EDI: Legal, Security and Privacy issues EDI and Electronic Commerce – Standardization and EDI – EDI Software Implementation					K4		10
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.					K5		10

Course Outcome	**CO1:** Learn the introduction on e-commerce			K1	
	CO2: Understand the mercantile and consumer process models			K2	
	CO3: Analyse the consumers and merchant's perspective on e-commerce			K3	
	CO4: Getting an idea on Electronic Data Interchange			K4	
	CO5: Gaining the knowledge on Internet			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 ECommerce;" Macmillan, New Delhi.				
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 2023-2024 Onwards										
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**		
23M3PCSED3	**E-Commerce**	**EDC-III**	**III**	**4**	**4**	**-**	**-**	**4**		
CO PO Mapping										
CO Number	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	S	S	S	S	M	S	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S
Level of Correlation between CO and PO					L-LOW		M- MEDIUM		S-STRONG	
Tutorial Schedule					Conducting Group Discussion, Class test					
Teaching and Learning Methods					Handling classes through chalk & talk method, PPT presentation					
Assessment Methods					Seminar, Assignments, CIA-I, CIA-II and ESE					

Designed By	**Designed By**	**Approved By**
P.SUBRAMANIAM HoD	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M4PCSSP1	PRACTICAL: DATA VISUALIZATIONS	SEC - PRACTICAL - I	IV	5	-	-	5	3
Objective	Students can able to learn the basic functions and operations of Excel and Tableau and explore to design, build, and deploy various charts for applications							

S.No.	List of Experiments / Programs	Knowledge Levels	Sessions
1	Create Pie chart for Sales and Sales % by Country (sorted in descending order)	K1	6
2	Create Bar chart for Sales by Country by Year (rounded to nearest thousand and sorted by Grand Total)	K1	6
3	Create Line char for Sales by Ship Mode (First Class, Same Day, Second Class and Standard Class)	K2	6
4	Create Scatter chart for Sales by Ship Mode by Country (rounded to the nearest dollar and sorted by First Class)	K3	6
5	Create heat map for Sales by Category by Sub-Category (in thousands and sorted by sales value in descending order)	K3	6
6	Design and create the label for vendor list	K3	6
7	Design and create the dash board Implement the following using Tableau	K4	6
8	Sales by Ship Mode (First Class, Same Day, Second Class and Standard Class)	K4	6
9	Sales by Ship Mode by Country (rounded to the nearest dollar and sorted by First Class)	K5	6

10	Sales by Category by Sub-Category (in thousands and sorted by sales value in descending order)			K5	6
Course Outcome	CO1: Enable to create and apply Spreadsheet and Tableau for various data processing.			K1	
	CO2: Gains knowledge to create and design various visualization tools in Excel and Tableau.			K2	
	CO3: Comprehend, create and deploy labels and heat map.			K3	
	CO4: Enable to create and apply dashboard for various data processing.			K4	
	CO5: Evaluate data visualization tool for any data set.			K5	
Learning Resources					
Reference Books	**Learning Tableau** by Joshua N. Milligan. Tableau				
Website Link	Expert lectures, online seminars – webinars				
	L-Lecture	**T-Tutorial**	**P-Practical**	**C-Credit**	

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M4PCSSP1	PRACTICAL: DATA VISUALIZATIONS	SEC - PRACTICAL - I	**IV**	**5**	**-**	**-**	**5**	**3**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	L	M	S	S	S	S	S
CO2	S	M	S	S	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	M	S	S	M	L	S	S	S	S
CO5	M	S	M	L	S	M	S	S	S	M

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	Handling practical session through projector
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By
Dr.P.NANDHINI	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M4PCSSP2	Soft Skill Development Lab	**SEC-PRACTICAL - II**	**IV**	**5**	**-**	**-**	**5**	**3**
Objective	1. To enable students to gain basic communication skills in professional and social contexts effectively. 2. To acquire useful words and apply them in situational context. 3. To develop listening and reading skills through comprehension passages 4. To enrich the leadership qualities and interpersonal communication 5. To enhance essential characteristics in writing							

S.No.	List of Experiments / Programs	Knowledge Levels	Sessions
1	Characteristics of Technical Writing	K1	3
2	Development of Employability Skills	K2	3
3	Vocabulary Development	K2	3
4	Sentence Completion	K2	3
5	Error Spotting	K2	3
6	Interpretation of Verbal Analogy	K3	3
7	Interpretation of Reading (Comprehension -Conception)	K3	3
8	Interpretation of Reading (Comprehension -Reasoning)	K3	3

9	Practice for writing E-mails/Technical Blogs/Forums	K4	3
10	PPT Preparation / Demonstration of Technical Presentation	K4	3
11	Preparation of Resume	K5	3
12	Preparation for Job Interviews / Mock Interview Section	K5	3
13	Group Discussion Skills	K5	3
14	Developing Listening Skill(Comprehension)	K5	3
15	Practice for Short Speeches / Situational Conversation	K5	3
16	English through Mass Media	K5	3
17	Essential Grammar	K6	3
18	Communicating and collaborating with peer members	K6	3
19	Team Empowerment	K6	3
20	Persuasive Communication	K6	3
Course Outcome	CO1: Improves the professional communication skills	K1-K6	
	CO2: Apply useful words in the correct situation		
	CO3: Improves the listening and reading skills		
	CO4:. Acquire the leadership qualities		
	CO5: . Improves the writing ability		

Learning Resources				
Text Books	1. Uma Narula, “Development Communication: Theory and Practice”, Revised Edition, Har-Aanad Publication, 2019. 2. Annette Capel and Wendy Sharp, “Cambridge English: Objective First”, Fourth Edition, Cambridge University Press, 2013. 3. Emma Sue-Prince, “The Advantage: The 7 Soft Skills You Need to Stay One Step Ahead”, First Edition, FT Press, 2013. 4. Guy Brook-Hart, “Cambridge English: Business Benchmark”,Second Edition, Cambridge University Press, 2014. 5. Norman Lewis, “How to Read Better & Faster”, Binny Publishing House, NewDelhi, 1978.			
Reference Books	1. Michael McCarthy and Felicity O,,Dell, “English Vocabulary in Use:100 Units of Vocabulary Reference and Practice”, Cambridge UniversityPress,1996. 2. Murphy, Raymond, “Intermediate English Grammar”, Second Edition, Cambridge University Press, 1999.			
Website Link	Expert lectures, online seminars – webinars			
	L-Lecture	**T-Tutorial**	**P-Practical**	**C-Credit**

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards							
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
23M4PCSSP2	Soft Skill Development Lab	**SEC-PRACTICAL - II**	**IV**	**5**	**-**	**-**	**5**	**3**

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	L	M	S	S	S	S	S
CO2	S	M	S	S	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	M	S	S	M	L	S	S	S	S
CO5	M	S	M	L	S	M	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	Handling practical session through projector
Assessment Methods	Seminar, Assignments, CIA-I, CIA-II and ESE

Designed By	Verified By	Approved By
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M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M3PCSIS1	INTERNSHIP TRAINING	INTERNSHIP	III	-	-	-	-	2
Objective	To give optimum exposure on the practical aspects of mathematics in Industries							

Unit	Course Content	Knowledge Levels	Sessions
1	Duration of the internship training is 15 days during the Vacation which falls at the end of the 3rd Semester.	K4,K5	
2	The departments concerned will prepare on exhaustive panel of Institutions, Industries and practitioners.		
3	The individual student has to identify the institution / industry / practitioners of their choice and inform the same to the HOD / Staff-in-Charge.		
4	The students hereafter will be called Trainees should maintain a work diary in which the daily work done should be entered and the same should be attested by the Section in-charge.		
5	The departments should prepare an outline of the job to be done, Sections in which they have to be attached both in the office as well as in the field.		
6	The trainees should strictly adhere to the rules and regulations and office Timings of the institutions to which they are attached.		
7	The trainees have to obtain a certificate on successful completion of the Internship from the Chief Executive of the organization.		
8	A Staff member of a Department (Guide) will be monitoring the Performance of the Candidate.		
9	Schedule of visit to be made by the staff is to be prepared by the HOD / Staff-in-charge.		
10	Report writing manual and format should be prepared by the respective Departments.		

11	All model forms are to be attached wherever it is necessary.		
12	Report evaluation: External Viva-Voce examination will be conducted and the maximum mark is 100.		
13	Report should be properly submitted after the completion of internship Training.		
Course Outcome	**CO1:** Analyze and Evaluate to test the theoretical learning in practical situations by accomplishing the tasks assigned during the internship period.	K5	

Learning Resources

Website Link	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/

	L-Lecture	T-Tutorial	P-Practical	C-Credit

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem.	Hours	L	T	P	C
23M3PCSIS1	INTERNSHIP TRAINING	INTERNSHIP	III	-	-	-	-	2

CO PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	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	
Teaching and Learning Methods	Working with programming languages such as C++, Python and Java
Assessment Methods	CIA -100 % 1. Work Diary – 25% 2. Training Report and Viva-voce – 75%

Designed By	Designed By	Approved By
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M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M4PCSPR1	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	• 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	• 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 authors names to be in bold print. Title and Journal names should be in italic.		
Typing Instructions	**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.		
Justification	**Justification:** The text should be fully justified		

Margins	**Margins:** The margins for the regular text are as follows LEFT - 1.5" RIGHT - 1" TOP - 1" BOTTOM - 1"		
Paragraph Spacing	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. Provide double spaces between: (a) From top of page to chapter title, (a) Chapter title and first sentence of a chapter, 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. Use single space in references and double space between references.		
Tables	All tables should have sharp lines, drawn in black ink, to separate rows/columns as and when necessary. 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.		
Figures	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 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:		

	Fig. <blank><chapter number>.<serial number><left indent><figure		
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	1.Bert Bates, Karthy Sierra , Eric Freeman, Elisabeth Robson, "Head First Design Patterns", O'REILLY Media Publishers. 2.Mathew Mac Donald, "ASP.NET Complete Reference", TMH 2005.		
Reference Books	1.Jan Graba, "An Introduction to Network Programming with Java- Java 7 Compatible", 3rd Edition,Springer. 2.Crouch Matt J, "ASP.NET and VB.NET Web Programming", Addison Wesley		
Website Link	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/		

M. Sc-Computer Science Syllabus LOCF-CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
23M4PCSPR1	PROJECT WORK	PROJECT WORK	IV	8				4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO 4	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
A.M.NIRMALA	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
23M6PCSOE1	Computer Science for Competitive Examination	Self-study Online - Competitive Examination	6			2		2
Objective	Creating the awareness on competitive examination among students. Imparting knowledge about the appearing for Competitive Examination and it impacts and developing an attitude of appearing for such exams.							
Unit	**Course Content**					**Knowledge Levels**		**Sessions**
1	This course deals with the question related to Software Engineering, Internet of Things, Operating System, Computer Architecture, Database Management System, Computer Networks, Programming Languages, Java, Algorithms, Artificial Intelligence, and Mobile Computing. 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 TANCET, IBPS, SSC for creating MCQ pattern.					K1-K5		
	1. Objective type online examination will be conducted at the end of 4th semester. 2. Questions must be taken from all previous question papers of TANCET,IBPS And SSC. 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. 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.							

	Eg.1 One Tera byte (1 TB) is equal to? (a)1028 gb (b)1012 gb (c)1000 gb (d)1024 gb Eg.2 URL stands for: (a)Uniform Resource Locator (b)Uniform Resource Library (c)United Resource Locators (d)None of these 5. HOD's instruct to the faculty to prepare minimum 500 questions booklet (cumulatively for each programme) with solutions and circulate among the students.		
Course Outcome	**CO1:** Remember and understand the basic language implementation techniques	K1	
	CO2: Apply the problem and develop problem solving skills in competitive exams	K2	
	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**

Designed By	**Verified By**	**Approved By**
A.M.NIRMALA	P.SUBRAMANIAM HoD	Dr.S.SHAHITHA MEMBER SECRETARY

M.Sc. COMPUTER SCIENCE – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem.**	**Hours**	**L**	**T**	**P**	**C**
	MOBILE APP DEVELOPMENT USING FLUTTER	VALUE ADDED COURSE	IV	30				2
Objective	The student will be able to Design and Create their Own Android Application							

Unit		**Knowledge Levels**	**Sessions**
I	Flutter Installation and Environment Setup-Creating Simple Application in Flutter. Flutter - Application Architecture. Widgets in Flutter and Working with them-Flutter Layout Widgets.	K1	5
II	Flutter Widgets Concepts- Flutter UI and other components-Flutter & Dart Data types-Flutter App bar widgets-Flutter Bottom Navigation	K2,K3	5
III	Flutter Layouts for building Apps-Flutter Buttons and Functions-Flutter Stateful and Stateless Widgets-Flutter Navigation to screens-Flutter Local Assets	K3,K4	5
IV	Flutter Class reusable components-Flutter SQLite database Integration-Flutter SQLite table and DB formation-Flutter SQLite CRUD functions-Flutter JSON parsing	K4,K5	5
V	Flutter Database Concepts-Database model Using SQL Lite-Database Operations-Access the SQL Lite Database-Develop a Full Application.	K5	5

Course Outcome	CO1: Understand how to use Flutter to build apps that work on both iOS and Android platforms, making efficient use of a single code base	K1,K2	
	CO2: Learn how to implement local data storage using SQLite, allowing apps to store and retrieve data even when the device is offline	K3,K4	
	CO3: Understand how to perform CRUD (Create, Read, Update, Delete) operations in a Flutter app connected to an SQLite database	K4,K5	
	CO4: Understand how to create intuitive user experiences and implement design principles within your Flutter app	K5,K6	
	CO5: Apply your knowledge to real-world projects, building apps that incorporate both Flutter and SQLite functionalities	K6	

	L-Lecture	**T-Tutorial**	**P-Practical**	**C-Credit**

M.Sc. Computer Science – Syllabus LOCF – CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
	MOBILE APP DEVELOPMENT USING FLUTTER	VALUE ADDED COURSE	IV	30				2

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	S	M	S	S	S	M	S	M	L
CO2	S	S	S	S	S	S	M	S	M	L
CO3	S	S	S	S	S	S	S	M	L	M
CO4	S	S	S	S	S	M	S	L	M	S
CO5	M	S	S	S	S	L	M	S	S	S

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

Tutorial Schedule	Conducting Group Discussion
Teaching and Learning Methods	Handling classes through chalk & talk method, PPT presentation
Assessment Methods	EQuiz, Assignments, Group Discussion

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