M.Sc. Computer Science

Motto

Disseminating Technology in Young Minds.

ComSTA:

Vision

To endow young women to acquire specialized knowledge in Computer Science so to succeed in their profession, and contribute to society at large.

Mission

- Concentrate on the overall development of the students.
- To meet the challenges of industrial need.
- Better the nation through research in science and technology of computing.

Gnosis Club

Vision

GNOSIS inspires positive action and helps to create an environment of love respect and cooperation in society.

Mission

- To encourage the marginalized sectors of society.
- To proliferate the food with mortal by providing relevant and responsive programs.

Preamble

The M.Sc. Computer Science programme at St. Joseph's College of Arts and Science for Women, Hosur (Autonomous) is designed to cultivate advanced competencies in computing and research, empowering women to thrive as innovators, academicians, and industry leaders in a rapidly evolving technological landscape. This postgraduate programme integrates academic depth with ethical awareness and social responsibility, contributing to holistic professional development.

The curriculum spans advanced domains such as algorithm design, distributed computing, artificial intelligence, machine learning, data science, cybersecurity, IoT, cloud computing, and blockchain technologies. Emphasis is placed on in-depth theoretical frameworks, practical applications through lab-based learning, and independent research through dissertations and capstone projects. The curriculum is further enriched with internships, industrial visits, and academic seminars that expose students to real-time technological practices and professional environments.

The programme incorporates Capacity Development and Skill Enhancement Initiatives that build advanced problem-solving, critical thinking, and communication skills. Regular technical workshops, coding challenges, and collaborative projects prepare students for professional roles in both academic and corporate sectors.

Students are also engaged in Outreach Activities that foster civic responsibility and societal awareness. Additionally, interdisciplinary subjects such as Human Rights, Environmental Studies, Women Studies, and Indian Knowledge System are offered to nurture well-rounded individuals with strong ethical values and cultural sensitivity.

With the support of a dedicated faculty team and state-of-the-art computing infrastructure, the programme creates a research-oriented and learner-centric environment. It aspires to produce graduates who are technologically proficient, socially responsible, and globally competent, ready to pursue careers in software development, research and development, data science, system architecture, cybersecurity, higher education, or doctoral research in computer science and allied disciplines.

Nature and Extent of the Programme

The **Master of Science in Computer Science (M.Sc. CS)** is a postgraduate programme designed to provide advanced knowledge, research orientation, and specialized skills in the field of computer science and its applications. This programme builds upon foundational undergraduate education and equips learners with the ability to conceptualize, analyze, design, and implement complex computing systems and intelligent solutions for modern technological challenges.

Anchored in the **Learning Outcomes-based Curriculum Framework (LOCF)**, the M.Sc. CS programme emphasizes a deep integration of core theoretical concepts with advanced practical training. It reflects the evolving nature of computer science as both an academic discipline and a driver of innovation in diverse industries, including **software development, data science, cybersecurity, artificial intelligence, cloud computing, and academic research**.

The programme fosters a multidisciplinary outlook, enabling learners to apply computing principles in emerging domains such as **healthcare, finance, smart infrastructure, and environmental sustainability**. Through rigorous coursework, project-based learning, internships, and research components, the programme cultivates **advanced problem-solving skills, algorithmic thinking**, and the ability to contribute to new knowledge through innovation and inquiry.

Students are encouraged to explore specializations in areas like **machine learning, data analytics, IoT, blockchain technology, and data visualization**, aligning with national and global technological trends. The curriculum also integrates capacity building in ethical computing, societal impacts of technology, and lifelong learning skills—qualities essential for professionals and scholars in the 21st-century digital economy.

Graduates of the programme are well-positioned to pursue **doctoral research, academic careers, software engineering roles, system architecture, data-driven decision-making positions, and leadership roles in the tech industry, government, and interdisciplinary sectors**.

Aim of the Programme

The primary aim of the **M.Sc. Computer Science** postgraduate programme is to deepen students' expertise in advanced computing concepts, technologies, and research methodologies. The

programme is designed to cultivate critical thinking, innovation, and academic rigor, while preparing students for professional excellence, research leadership, and lifelong learning in the dynamic field of computer science.

To achieve this, the programme integrates:

- A **research-driven curriculum** that imparts in-depth theoretical knowledge and technical competence in advanced computing domains;
- Extensive **laboratory-based and project-oriented** learning to develop high-level problem-solving, system design, and programming skills;
- Exposure to **industry practices** through internships, expert lectures, industrial visits, and collaborative workshops;
- Academic and professional development opportunities, including seminars, paper presentations, and dissertation work;
- **Skill-building modules** that enhance analytical reasoning, scientific communication, leadership, and ethical computing practices essential for success in academic and industrial careers.

Duration of the Programme

The M.Sc. CS programme shall extend over a period of **two academic years,** comprising **six semesters**. Each academic year shall consist of **two semesters**:

- **Odd Semester**: June to November
- **Even Semester**: December to May

Each semester shall have **a minimum of 90 working days**, exclusive of examination days.

Eligibility for Admission

A candidate who has successfully completed a **B.Sc. in 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** from this University or from any other recognized University deemed equivalent by the Syndicate, subject to prescribed conditions, shall be eligible for admission to the M.Sc. Computer Science degree programme.

Such candidates shall be permitted to appear for and qualify in the M.Sc. Computer Science degree examinations as per the academic regulations of the institution.

Credit Requirements and Eligibility for Award of Degree

A candidate shall be eligible for the award of the degree only upon successful completion of the prescribed course of study at a college affiliated with the University for a minimum duration of two academic years, passing all examinations across the four prescribed semesters, and earning at least 92 credits as specified in the regulations, in addition to fulfilling all other applicable requirements.

PROGRAMME OUTCOMES (POs)

PO1: Apply knowledge of computing fundamentals, computing specialization, and domain-specific requirements to solve complex computing problems.
PO2: Identify, formulate, and analyze complex computing problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and computer science.
PO3: Design and develop solutions to complex computing problems that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PO4: Use modern tools and techniques, applying appropriate computing technologies to create innovative solutions.
PO5: Conduct investigations of complex computing problems using research-based knowledge and research methods, including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
PO6: Communicate effectively with the computing community and with society at large about complex computing activities, including comprehension and documentation of effective reports and presentations.
PO7: Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
PO8: Demonstrate understanding of professional, ethical, legal, security, and social issues and responsibilities relevant to professional computing practice.
PO9: Engage in independent and lifelong learning for continued professional development.
PO10: Apply project management principles and practices to manage computing projects in multidisciplinary environments.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: Analyze and apply computational concepts and algorithms to solve real-world problems in computer science.
PSO2: Develop software systems and solutions using current programming languages, tools, and techniques, with a strong foundation in data structures, algorithms, and computer system design.
PSO3: Conduct research and innovation in specialized areas of computer science, applying advanced knowledge in fields such as data science, artificial intelligence, and cloud computing.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Establish themselves as successful professionals in the computing industry or pursue higher studies in computer science or related fields.
PEO2: Demonstrate proficiency in modern computing technologies and problem-solving approaches, contributing effectively to industry and academia.
PEO3: Exhibit lifelong learning skills and ethical practices in professional environments to address societal needs through computing solutions.

MAPPING OF PEO WITH PO AND PSO:

PEO \ Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
PEO1	3	3	2	3	2	2	2	2	2	3	3	3	2
PEO2	3	3	3	3	3	2	2	2	2	3	3	3	3
PEO3	2	2	2	2	2	3	3	3	3	2	2	2	3

3 = Strongly Related, 2 = Moderately Related, 1 = Slightly Related

Course Components and Credit Distribution

The curriculum framework for the M.Sc Computer Science programme under the autonomous structure is designed to ensure holistic academic development, skill enhancement, and societal contribution. The credit distribution across the various components is as follows:

S. No.	Study Components	Part	Sem I		Sem II		Sem III		Sem IV		No. of Hours	Total Credit
			No. of Hours	Credit	No. of Hours	Credit	No. of Hours	Credit	No. of Hours	Credit		
1	Core Course / DSC	I	23	19	21	17	30	24	10	7	**84**	**67**
2	Elective / DSE	I	4	3	4	3			4	3	**12**	**9**
3	Project	I								5		**5**
4	EDC	II	3	2	3	2					**6**	**4**
5	IDC	II			2	2					**2**	**2**
6	SEC	II							4	2	**4**	**2**
7	Internship	II						2				**2**
8	Extension Activity	III								1		**1**
	Total		**30**	**24**	**30**	**24**	**30**	**26**	**18**	**18**	**108**	**92**

Details of Course of Study:

PART I – Core, Elective, and Project

This part comprises the Core Discipline Courses, Discipline Specific Elective, and a Project in the final semester. The content and structure of these courses are prescribed by the respective Board of Studies in Computer Science and approved by the Academic Council to align with current academic and industry standards.

PART II -Value and Skill-Oriented Courses

This part comprises the Skill Enhancement Course, Internship, and Extra Disciplinary Courses. The content and structure of these courses are prescribed by the respective Board of Studies in

Computer Science and approved by the Academic Council to align with current academic and industry standards.

PART III - Extension Activity

Students shall earn **a maximum of 1 credit** through participation in **Compulsory Extension Services**. Every student must enrol in **NSS, Red Ribbon Club, Youth Red Cross, Field Work, Outreach Activities or any other Clubs** recognized by the College.

Inclusion of Massive Open Online Courses (MOOCs) via SWAYAM and NPTEL

MOOC Courses for Credit Mobility

As part of the credit-based curriculum design and in alignment with the guidelines of higher education regulatory bodies, students are encouraged to enrol in Massive Open Online Courses (MOOCs) offered on SWAYAM or NPTEL platforms. These courses can be opted under Core, Elective, or Soft Skill categories. The student shall be eligible for award of the degree only upon submission of a valid certificate as proof of successful completion of the chosen MOOC course. **Two credits** will be given to candidates who successfully complete the course.

M.Sc. COMPUTER SCIENCE

CURRICULUM DESIGN

First Year

Semester I

S. No	Part	Nature of the Course	Course Code	Name of the Course	Hours per Week	Credits	Marks		
							CIA	ESE	Total
1	I	DSC I	25PCS1C01	Advanced Python Programming **(Skill Development, Employability)**	5	5	25	75	100
2		DSC II	25PCS1C02	Object Oriented Analysis and Design and C++ **(Skill Development, Employability)**	5	5	25	75	100
3		DSC III	25PCS1C03	Parallel and Distributed Computing **(Skill Development)**	5	5	25	75	100
4		DSE I		Elective I	4	3	25	75	100
5		DSC Practical I	25PCS1P01	Advanced Python Programming Lab **Skill Development, Employability)**	4	2	40	60	100
6		DSC Practical II	25PCS1P02	Algorithm and OOPS lab **(Skill Development, Employability)**	4	2	40	60	100
7	II	EDC I		EDC I	3	2	25	75	100
Total					**30**	**24**	**205**	**495**	**700**

Semester II

S. No	Part	Nature of the Course	Course Code	Name of the Course	Hours per Week	Credits	Marks		
							CIA	ESE	Total
1	I	DSC IV	25PCS2C04	Data Visualization **(Skill Development)**	6	6	25	75	100
2		DSC V	25PCS2C05	Digital Image Processing **(Skill Development, Employability)**	5	5	25	75	100
3		DSE II		Elective II	4	3	25	75	100
4		DSC Practical III	25PCS2P03	Data Visualization Lab **(Skill Development, Entrepreneurship)**	5	3	40	60	100
5		DSC Practical IV	25PCS2P04	Digital Image Processing Lab	5	3	40	60	100

				(Skill Development, Employability)					
6	II	EDC II		EDC II	3	2	25	75	100
7	II	IDC	25PHMR201	Human Rights	2	2	25	75	100
Total					**30**	**24**	**205**	**495**	**700**

Second Year

Semester III

S. No	Part	Nature of the Course	Course Code	Name of the Course	Hours per Week	Credits	Marks		
							CIA	ESE	Total
1	I	DSC VII	25PCS3C07	Advanced Java Programming **(Skill Development)**	5	5	25	75	100
2		DSC VIII	25PCS3C08	Advance Database Systems (**Skill Development, Employability)**	5	5	25	75	100
3		DSC IX	25PCS3C09	Artificial Intelligence and Machine Learning **(Skill Development, Entrepreneurship)**	5	4	25	75	100
4		DSC X	25PCS3C10	Data Mining and Warehousing **(Skill Development, Entrepreneurship)**	5	4	25	75	100
5		DSC Practical V	25PCS3P05	Advanced Java Programming Lab **Skill Development)**	5	3	40	60	100
6		DSC Practical VI	25PCS3P06	Advance Database Systems Lab (**Skill Development, Employability)**	5	3	40	60	100
7	II	Internship	25PCS3INT	Internship	-	2	-	-	-
Total					**30**	**26**	**180**	**420**	**600**

Semester IV

S. No	Part	Nature of the Course	Course Code	Name of the Course	Hours per Week	Credits	Marks		
							CIA	ESE	Total
SEMESTER IV									
1	I	DSC XI	25PCS4C11	Web Services **(Skill Development, Employability, Entrepreneurship)**	5	4	25	75	100
2		DSC Practical VII	25PCS4P07	Soft Skill Development Lab **(Skill Development, Employability)**	5	3	40	60	100
3		DSE III		Elective III	4	3	25	75	100
4		Project	25PCS4PRV	Project work and Viva-voce		5	50	50	100

5	II	SEC - Lab	25PCS4SP1	Web Application Development and Hosting Practical **(Skill Development, Employability, Entrepreneurship)**	4	2	40	60	100
6	III	Extension Activity	25PEXT401	Extension Activity	-	1	-	-	-
Total					**18**	**18**	**180**	**320**	**500**
Grand Total					**108**	**92**	**770**	**1730**	**2500**
		Extra Credit	Mandatory	Extra Credit - Swayam/MOOC/NPTEL Online Course	-	2	-	-	-

Note:

DSC	Discipline Specific Core
DSE	Discipline Specific Elective
IDC	Inter Disciplinary Course
EDC	Extra Disciplinary Course
SEC	Skill Enhancement Course

Discipline Specific Elective Courses

Semester	Part	Nature of the Course	Course Code	Name of the Course
I	I	DSE – I	25PCS1E01	Blockchain & Cryptocurrency **(Entrepreneurship, Employability)**
			25PCS1E02	Multimedia and it's Applications **(Skill Development, Employability)**
			25PCS1E03	Cyber Security **(Skill Development, Employability, Entrepreneurship)**
II	I	DSE – II	25PCS2E01	IOT Architecture & Protocols **(Employability, Skill Development)**
			25PCS2E02	Digital Forensics **(Employability, Skill Development)**
			25PCS2E03	Big Data Analytics **(Employability, Entrepreneurship)**
IV	I	DSE – III	25PCS4E01	Quantitative Aptitude **(Skill Development, Employability)**
			25PCS4E02	Bio Informatics **(Employability, Skill Development)**
			25PCS4E03	Computer Optimization Techniques **(Skill Development, Employability)**

EDC-EXTRA DISCIPLINARY COURSES

Students are expected to opt for EDC (Non-major elective) offered to other departments.

Semester	Part	Nature of the Course	Course Code	Name of the Course
I	II	EDC	25PCS1ED1	Principles of Information Technology **(Skill Development, Employability)**
II	II	EDC	25PCS2ED2	Fundamentals of Computer and Communication **(Skill Development)**
			25PCS2ED3	E-Commerce **(Entrepreneurship, Employability)**

M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS1C01	**ADVANCED PYTHON PROGRAMMING**	**DSC - THEORY**	**I**	**75**	**5**	**-**	**-**	**5**

Objective:
To develop practical proficiency in Python for data handling, application development, and system programming.

Unit	Course Content	Knowledge Levels	Sessions
I	Python: Introduction – **Numbers – Strings** **– Variables – Lists – Tuples – Dictionaries – Sets– Comparison. ****SDG 4 – Quality Education**	K1, K2, K3	15
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. ****SDG 8 – Decent Work & Economic Growth**	K2, K3, K4	15
III	Modules, Packages and Classes - **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.** **SDG 9 – Industry, Innovation & Infrastructure**	K2, K3, K4	15
IV	Data Types and Web - 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**.** SDG 8 – Decent Work & Economic Growth**	K2, K3, K4	15
V	Systems and Networks - 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. Expert lectures, online seminars – webinars. ****SDG 9 – Industry, Innovation & Infrastructure**	K3, K4, K5	15

Course Outcome	**CO1**: Understand the fundamentals of Python programming, including data types, variables, strings, lists, tuples, dictionaries, sets, and basic comparisons, as well as the overall Python programming environment.	K2
	CO2: Apply Python programming constructs including control statements, loops, comprehensions, functions, generators, decorators, error handling, and user-defined exceptions to solve complex problems.	K3
	CO3: Develop modular Python programs using packages, modules, object-oriented concepts, classes, inheritance, method overriding, and special methods.	K3
	CO4: Apply data handling and web programming skills including file I/O, structured text/binary files, relational and NoSQL databases, and web clients/servers for practical applications.	K4
	CO5: Implement systems and network-level programming including concurrency, threads, sockets, web services, cloud computing, and integrate advanced Python concepts to build scalable, real-world 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. Reference", Developer's Library, Fourth 2. Sheetal Taneja, Naveen Kumar, Approach", Pearson Publications. "Python Programming - A Modular
Website Link	1. https://realpython.com/ 2. https://docs.python.org/3/ 3. https://www.w3schools.com/python/ 4. https://www.programiz.com/python - programming
L – Lecture T – Tutorial P – Practical C – Credit	

Mapping of CO's with PO's and PSO's

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	2	1	1	1	2	2	1	2	2	1
CO2	3	3	2	3	2	2	2	2	2	1	3	3	2
CO3	3	3	3	3	2	2	2	2	2	2	3	3	3
CO4	3	2	3	3	2	2	2	2	2	2	3	3	3
CO5	3	3	3	3	3	3	3	2	2	3	3	3	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. D. T. Vimala	**Verified By HOD: Mrs. S. I. Anto Ramya**
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose** **Principal**

9/10/25 **Dr. R. Rathipriya M.Sc., M.Phil., M.C.A., Ph.D.,** Professor, Department of Computer Science, Periyar University, Salem -11	9/10/25 **Dr. P. Beaulah Soundarabai M.C.A., M.Phil., Ph.D.,** Associate Professor, Department of Computer Science, School of Sciences, Christ (Deemed to be University), Bengaluru	9/10/25 **Dr. J. Rajesh Dharmaraj M.Sc., M.B.A., Ph.D.,** Associate Professor, Department of Computer Science – PG, Jyoti Nivas College Autonomous, Bengaluru
9/10/25 **Mr. C. Rajiv Sharma M.Tech.,** Founder & CEO, NebulaSafe Tech, Hosur	9/10/25 **Ms. U. Preethi Kumari M.Tech.,** Packaged Application Developer, Accenture Pvt. Ltd, Bengaluru	

M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS1C02	**OBJECT ORIENTED ANALYSIS AND DESIGN AND C++**	**DSC - THEORY**	**I**	**75**	**5**	**-**	**-**	**5**
Objective: To understand object-oriented concepts, analysis and design principles, and their implementation using C++.								

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****. ****SDG 9 – Industry, Innovation and Infrastructure**	K1	15
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. ****SDG 4 – Quality Education**	K2	15
III	Introduction to C++ - Input and output statements in C++ - Declarations - Control structures - **Functions in C++**.** ****SDG 8 – Decent Work and Economic Growth**	K3	15
IV	Classes and Objects – Constructors and Destructors –operators overloading – Type Conversion. **Inheritance**** – Pointers and Arrays. ****SDG 12 – Responsible Consumption and Production**	K4	15
V	Memory Management Operators – **Polymorphism**** – Virtual functions – Files – **Exception Handling**** – String Handling - Templates. ****SDG 11 – Sustainable Cities and Communities**	K5	15

Course Outcome	**CO1:** Understand the principles of object-oriented development and modeling techniques.	K1
	CO2: Learn the key stages involved in object design.	K2
	CO3: Develop abstract, object-based views for general software systems.	K3
	CO4: Relate object-oriented analysis and design (OOAD) concepts with C++ implementation.	K4
	CO5: Apply fundamental OOP concepts and gain proficiency in writing C++ programs.	K5

Learning Resources	
Text Books	"Object Oriented Analysis and Design with Applications", Grady Booch, Second Edition, Pearson Education.
Reference Books	Balagurusamy "Object Oriented Programming with C++", TMH, Second Edition, 2003.
Website Link	1. https://onlinecourses.nptel.ac.in/noc19_cs48/preview 2. https://nptel.ac.in/noc/courses/noc16/SEM2/noc16-cs19/ 3..https://www.tutorialspoint.com/object_oriented_analysis_design/ooad_object_oriented_analysis.html
L – Lecture T – Tutorial P – Practical C - Credit	

Mapping of CO's with PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	2	2	1	1	2	1	2	-	1	3	2	1
CO2	2	3	-	2	1	2	1	1	1	1	2	2	1
CO3	2	2	3	2	1	2	1	-	1	3	3	3	1
CO4	3	3	2	3	2	3	-	2	2	1	-	3	2
CO5	3	3	3	3	-	3	2	2	2	3	3	3	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. Princy T.M	**Verified By HOD: Mrs. S. I. Anto Ramya**
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose** **Principal**

9/10/25 **Dr. R. Rathipriya M.Sc., M.Phil., M.C.A., Ph.D.,** Professor, Department of Computer Science, Periyar University, Salem -11	9/10/25 **Dr. P. Beaulah Soundarabai M.C.A., M.Phil., Ph.D.,** Associate Professor, Department of Computer Science, School of Sciences, Christ (Deemed to be University), Bengaluru	9/10/25 **Dr. J. Rajesh Dharmaraj M.Sc., M.B.A., Ph.D.,** Associate Professor, Department of Computer Science – PG, Jyoti Nivas College Autonomous, Bengaluru
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M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS1C03	**PARALLEL AND DISTRIBUTED COMPUTING**	**DSC - THEORY**	**I**	**75**	**5**	**-**	**-**	**5**

Objective:

To impart fundamental knowledge of parallel computing concepts, programming platforms, and algorithm design techniques. To develop skills in implementing and analysing parallel algorithms using shared memory and message-passing models for real-world applications

Unit	Course Content	Knowledge Levels	Sessions
I	Introduction to Parallel Computing - Motivating Parallelism - The computational power argument - the memory/disk speed argument - the data communication argument. - Scope of Parallel Computing - **Applications in various fields**** - Organization and Contents of the Text - Parallel Programming Platforms - Implicit Parallelism - Trends in microprocessor architectures, pipelining, and superscalar execution - Principles of Parallel Algorithm Design – Preliminaries - Decomposition – tasks – granularity - mapping. - Decomposition Techniques - Characteristics of Tasks and Interactions - Parallel Algorithm Models ****SDG 9 – Industry, Innovation, and Infrastructure**	K2	15
II	Basic Communication Operations - One-to-All Broadcast and All-to-One Reduction - All-to-All Broadcast and Reduction - All-Reduce and Prefix-Sum Operations - Scatter and Gather - Analytical Modeling of Parallel Programs - Sources of Overhead in Parallel Programs - **Performance Metrics for Parallel Systems**** - Execution time - total parallel overhead - speedup - efficiency. - Scalability of Parallel Systems - The is efficiency function and its practical implications - Minimum Execution Time and Minimum Cost-Optimal Execution Time ****SDG 12 – Responsible Consumption and Production**	K4	15
III	**Programming Shared Address Space Platforms**** - Thread Basics - The POSIX Thread API (Pthreads) - Thread creation - synchronization primitives - Open MP – Directives - clauses - and runtime library routines for parallel loops and sections. - Programming Message Passing Platforms - Principles of Message-Passing Programming - The Building Blocks - Send and Receive Operations – MPI - The Message Passing Interface Library initialization - communicators - point-to-point and collective communication operations. ****SDG 4 – Quality Education**	K3	15
IV	Parallel Algorithms and Applications – dense matrix Algorithms - Matrix-Vector Multiplication - Matrix-Matrix	K3	15

	Multiplication - Solving a System of Linear Equations - Sorting - Issues in Sorting on Parallel Computers - Sorting Networks - Bubble Sort and its Variants - Quicksort - Other Sorting Algorithms - **Graph Algorithms**** - Definitions and Representation - **Minimum Spanning Tree**** - Single-Source Shortest Paths - **All-Pairs Shortest Paths**** - Transitive Closure - Connected Components ****SDG 11 – Sustainable Cities and Communities**		
V	Search algorithms for discrete Optimization Problems - Definitions and Examples - Search Overhead Factor - Parallel Depth-First Search and Best-First Search -Dynamic Programming - Overview of Dynamic Programming - Serial and Parallel DP Formulations - The Fast Fourier Transform (FFT) - The Serial Algorithm - **The Parallel FFT Algorithm**** ****SDG 7 – Affordable and Clean Energy**	K4	15

Course Outcome	**CO1:** Understand the motivation, scope, and applications of parallel computing, and the principles of parallel algorithm design.	K2
	CO2: Analyze basic communication operations, performance metrics, and scalability measures of parallel systems.	K4
	CO3: Apply shared address space (Pthreads, Open MP) and message passing (MPI) programming models to develop parallel programs.	K3
	CO4: Apply concepts of shared memory and message-passing programming using Pthreads, Open MP, and MPI to implement parallel programs	K3
	CO5: Analyze and design parallel algorithms for matrices, sorting, graph problems, and optimization using appropriate strategies	K4

Learning Resources	
Text Books	1.Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar – Introduction to Parallel Computing, 2nd Edition, Addison Wesley, 2003.
Reference Books	1. Barry Wilkinson, Michael Allen – Parallel Programming: Techniques and Applications Using Networked Workstations and Parallel Computers, 2nd Edition, Pearson, 2005. 2. R. Gonzalez, R. Woods – Digital Image Processing, 4th Edition, Pearson, 2018. 3.S. Rajasekaran, G.A. Vijayalakshmi Pai – Neural Networks, Fuzzy Logic, and Genetic Algorithms: Synthesis and Applications, PHI Learning, 2017
Website Link	1. https://hpc.llnl.gov/documentation/tutorials 2. https://www.coursera.org/learn/introduction-high-performance-computing 3. https://en.wikipedia.org/wiki/Parallel_computing 4. https://researchcomputing.princeton.edu/support/knowledge-base/parallel-code
L – Lecture T – Tutorial P – Practical C - Credit	

Mapping of CO's with PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	1	1	2	2	1	3	2	2
CO2	3	3	2	3	2	1	1	1	2	-	3	2	2
CO3	3	2	3	3	2	-	2	1	2	2	3	3	2
CO4	3	2	3	3	2	1	2	-	2	2	3	3	2
CO5	3	3	3	3	3	1	1	1	2	2	3	3	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. R. Geetha	**Verified By HOD: Mrs. S. I. Anto Ramya**
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose** **Principal**

9/10/25 **Dr. R. Rathipriya M.Sc., M.Phil., M.C.A., Ph.D.,** Professor, Department of Computer Science, Periyar University, Salem -11	9/10/25 **Dr. P. Beaulah Soundarabai M.C.A., M.Phil., Ph.D.,** Associate Professor, Department of Computer Science, School of Sciences, Christ (Deemed to be University), Bengaluru	9/10/25 **Dr. J. Rajesh Dharmaraj M.Sc., M.B.A., Ph.D.,** Associate Professor, Department of Computer Science – PG, Jyoti Nivas College Autonomous, Bengaluru
9/10/25 **Mr. C. Rajiv Sharma M.Tech.,** Founder & CEO, NebulaSafe Tech, Hosur	9/10/25 **Ms. U. Preethi Kumari M.Tech.,** Packaged Application Developer, Accenture Pvt. Ltd, Bengaluru	

M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS1E01	**BLOCKCHAIN & CRYPTOCURRENCY**	**DSE - THEORY**	**I**	**60**	**4**	**-**	**-**	**3**

Objective:
To understand blockchain technology, its security, cryptography, regulation, and applications in various domains.

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****. ****SDG 16 – Peace, Justice and Strong Institutions**	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**.** ****SDG 9 – Industry, Innovation and Infrastructure**	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. ****SDG 4 – Quality Education**	K3	12
IV	**Cryptocurrency Regulation**** - Stakeholders, Roots of Bit coin, Legal views - exchange of cryptocurrency - Black Market - **Global Economy****. Crypto economics - assets - supply and demand - inflation and deflation - Regulation. ****SDG 8 – Decent Work and Economic Growth**	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. ****SDG 3 – Good Health and Well-Being**	K5	12

Course Outcome	**CO1:** Explain blockchain basics, industry impact, and DLT.	K1
	CO2: Describe blockchain networks, mining, and security.	K2
	CO3: Apply cryptography in blockchain and trust models.	K3
	CO4: Analyze cryptocurrency regulations and economics.	K4
	CO5: Identify blockchain applications and challenges in Industry 4.0 and Health 4.0.	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. Bashir, I. (Year). Mastering Blockchain: Unlocking the Power of Cryptocurrencies, Smart Contracts, and Decentralized Applications. Packt Publishing.
Reference Books	1. Antonopoulos, "Mastering Bitcoin: Unlocking Digital Cryptocurrencies" 2. Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System" 3. 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	

Mapping of CO's with PO's and PSO's

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	1	-	1	1	1	2	2	1	3	2	2
CO2	3	1	2	2	2	-	1	2	1	2	3	3	2
CO3	3	3	2	3	2	2	1	3	2	2	3	3	-
CO4	1	3	-	2	3	2	2	3	2	2	2	2	3
CO5	3	3	3	3	3	2	2	-	3	3	3	3	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. Princy T.M	**Verified By HOD: Mrs. S. I. Anto Ramya**
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose** **Principal**

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M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS1E02	**MULTIMEDIA AND ITS APPLICATIONS**	**DSE - THEORY**	**I**	**60**	**4**	**-**	**-**	**3**

Objective:

To provide a comprehensive understanding of multimedia elements text, images, audio, video, and animation and their integration in designing interactive multimedia systems. To equip students with the knowledge and skills required to plan, create, optimize, and deliver multimedia projects across diverse platforms such as the Web, CD/DVD, and streaming services.

Unit	Course Content	Knowledge Levels	Sessions
I	Definitions - Where to Use Multimedia - Delivering Multimedia - Text - **Using Text in Multimedia**** - Computers and Text - Font Editing and Design Tools - Hypermedia and Hypertext – Images - Making Still Images - Color - Image File Formats. ****SDG 4 – Quality Education**	K1, K2, K3	12
II	Sound - The Power of Sound - **Digital Audio**** - MIDI Audio - MIDI vs. Digital Audio - Multimedia System Sounds - Audio File Formats - Adding Sound to Your Multimedia Project – **Animation**** - The Power of Motion - Principles of Animation - Animation by Computer - Making Animations That Work - Using Video - How Video Works and Is Displayed - Digital Video Containers - Obtaining Video Clips - Shooting and **Editing Video**.** ****SDG 9 – Industry, Innovation and Infrastructure**	K2, K3	12
III	Making Multimedia - The Stages of a Multimedia Project - What You Need - The Intangibles - What You Need Hardware - What You Need Software - What You Need Authoring Systems - **Planning and Costing**** - The Process of Making Multimedia - Scheduling - Estimating - RFPs and Bid Proposals. ****SDG 8 – Decent Work and Economic Growth**	K3, K4	12
IV	Designing and Producing - Designing - Producing - Content and Talent - Acquiring Content - Ownership of Content Created for a Project - Acquiring Talent - The Internet and Multimedia - **Internet History**** - Internetworking - **Multimedia on the Web**.** ****SDG 10 – Reduced Inequalities**	K1, K2	12
V	Designing for the World Wide Web - Developing for the Web - Text for the Web - Images for the Web - Sound for the Web - Animation for the Web - Video for the	K4, K5	12

	Web - Delivering - Testing - Preparing for Delivery - Delivering on CD-ROM - Delivering on DVD - **Delivering on the World Wide Web****. ****SDG 17 – Partnerships for the Goals**		

Course Outcome	**CO1:** Describe multimedia fundamentals, elements, and applications.	K1, K2, K3
	CO2: Design and integrate text and images effectively for multimedia projects.	K2, K3
	CO3: Apply audio and animation techniques to enhance multimedia content.	K3, K4
	CO4: Produce and edit video content and manage multimedia project planning and costing.	K1, K2
	CO5: Deliver multimedia content on different platforms with appropriate optimization and design principles	K4, K5

Learning Resources	
Text Books	1. Tay Vaughan, "Multimedia: Making it Work", Latest Edition, McGraw Hill
Reference Books	1. Ralf Steinmetz and Klara Nahrstedt, "Multimedia: Computing, Communications and Applications", Pearson 2. Ze-Nian Li & Mark S. Drew, "Fundamentals of Multimedia", Springer 3. Adobe Creative Team,"Adobe Premiere Pro / Photoshop / Animate Classroom in a Book" series 4. Parag Havaldar and Gerard Medioni, "Multimedia Systems", Cengage Learning
Website Link	1.https://yslaiseblog.files.wordpress.com/2013/10/gfx-multimedia-making-it-work-8th-edition.pdf
L – Lecture	**T – Tutorial** **P – Practical** **C - Credit**

Mapping of CO's with PO's and PSO's

	PO1	**PO 2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	1	1	1	1	1	2	1	1	2	1	1
CO2	3	3	2	2	-	1	1	1	1	1	2	3	1
CO3	3	2	3	3	1	1	1	1	-	1	2	2	-
CO4	3	2	3	3	2	1	1	1	1	2	3	3	2
CO5	2	2	3	3	2	2	1	1	-	3	3	3	2

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. R. Geetha	**Verified By HOD: Mrs. S. I. Anto Ramya**
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose Principal**

9/10/25 **Dr. R. Rathipriya M.Sc., M.Phil., M.C.A., Ph.D.,** Professor, Department of Computer Science, Periyar University, Salem -11	9/10/25 **Dr. P. Beaulah Soundarabai M.C.A., M.Phil., Ph.D.,** Associate Professor, Department of Computer Science, School of Sciences, Christ (Deemed to be University), Bengaluru	9/10/25 **Dr. J. Rajesh Dharmaraj M.Sc., M.B.A., Ph.D.,** Associate Professor, Department of Computer Science – PG, Jyoti Nivas College Autonomous, Bengaluru
9/10/25 **Mr. C. Rajiv Sharma M.Tech.,** Founder & CEO, NebulaSafe Tech, Hosur	9/10/25 **Ms. U. Preethi Kumari M.Tech.,** Packaged Application Developer, Accenture Pvt. Ltd, Bengaluru	

M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS1E03	**CYBER SECURITY**	**DSE - THEORY**	**I**	**60**	**4**	**-**	**-**	**3**

Objective:
Develop the ability to identify, analyze, and differentiate between types of malware and advanced cyber threats, enabling students to assess risks and vulnerabilities.

Unit	Course Content	Knowledge Levels	Sessions
I	Introduction to Cyber Space and Cyber Crime History of the Internet - Internet Infrastructure and DNS-World Wide Web - Introduction to Cyber Crime - Classification and Reasons for Cyber Crimes - **Types of Cyber Crimes**** (e.g., hacking, phishing, cyber stalking, etc.). ****SDG 16 – Peace, Justice and Strong Institutions**	K2	12
II	**Cyber Threats and Malware:** Malware and its Types: Adware – Spyware – Trojans – Worms – Viruses – Scareware - Advanced Cyber Threats: **Botnets**** - **Logic Bombs**** - Cross Site Scripting - DoS Attacks - **Salami Attacks**** - Case studies and real-world examples. ****SDG 9 – Industry, Innovation and Infrastructure**	K4	12
III	**Cyber Security Tools and Techniques:** Authentication and Authorization - Encryption (Symmetric & Asymmetric) - **Digital Signatures**** - Antivirus and Firewalls – Steganography - Best Practices in Password Management and Two-Factor Authentication. ****SDG 4 – Quality Education**	K3	12
IV	**Cyber Forensics and Legal Framework**:** Computer Forensics: Tools and Procedures - Incident Response and Reporting - Collection and Preservation of Digital Evidence - Cyber Law Overview (Indian Context) - Importance of Reporting Cyber Crime. ****SDG 8 – Decent Work and Economic Growth**	K5	12

V	**Cyber Safety and Best Practices:** **Safe Browsing**** and Email Security - **Social Media Safety Guidelines**** - Smartphone and WLAN Security - **Secure Online Transactions**** - Cache Management and Use of Cleaners - Future Trends and Challenges in Cyber Security. ****SDG 17 – Partnerships for the Goals**	K3	12

Course Outcome	**CO1:** Explain the evolution and structure of the Internet, including key components such as DNS, IP addressing, and Internet infrastructure.	K2
	CO2: Define and categorize various types of malware, including adware, spyware, trojans, worms, viruses, and scareware.	K1
	CO3: Describe the purpose and functioning of digital signatures in ensuring data integrity and non-repudiation.	K2
	CO4: Demonstrate knowledge of evidence collection and preservation techniques, ensuring integrity and admissibility in legal proceedings.	K3
	CO5: Follow safety guidelines for using social media platforms, including managing privacy settings and protecting personal data.	K3

Learning Resources	
Text Books	1**.**Dr. Jeetendra Pande, **"**Introduction to Cyber Security" Published by Uttarakhand Open University, 2017.(Chapter: 1.2-6.4,9.3-12.2) 2.Anthony reyes, Kevin o'shea, Jim steele, Jon R. Hansen, Captain Benjamin R. Jean Thomas Ralph, "Cyber-crime investigations" - bridging the gaps between security professionals, law enforcement, and prosecutors, 2007. (Chapter: 4, 5, 6, 7, 8, 9,10)
Reference Books	1.Cyber Security Essentials by James Graham, Richard Howard & Ryan Olson (2011, CRC Press) 2.Cybersecurity and Cyberwar by P. W. Singer & Allan Friedman 3.Sebastian Klipper, "Cyber Security" Einblickfur Wirtschafts wissen schaftler Fachmedien Wiesbaden,2015.
Website Link	1. https://uou.ac.in/sites/default/files/slm/Introduction-cyber-security.pdf
L – Lecture T – Tutorial P – Practical C – Credit	

Mapping of CO's with PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	2	2	2	1	-	-	1	1	-	3	2	1
CO2	2	3	-	1	2	1	1	2	1	1	2	3	1
CO3	2	2	2	3	1	-	1	3	1	1	2	2	1
CO4	2	2	1	-	3	2	1	3	1	1	2	1	2
CO5	1	-	1	1	1	1	-	3	2	1	1	1	1

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. R. Geethapriya	**Verified By HOD: Mrs. S. I. Anto Ramya**
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose** **Principal**

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M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS1P01	**ADVANCED PYTHON PROGRAMMING LAB**	**DSC - PRACTICAL**	**I**	**60**	**-**	**-**	**4**	**2**

Objective:

To enable students to design and develop efficient, modular, and interactive applications using Python for problem - solving in real - world domains including data, web, and system programming.

Unit	Course Content	Knowledge Levels	Sessions
SDG 4 – Quality Education **SDG 9 – Industry, Innovation & Infrastructure**			
1	Write a Python Program using list, tuple, dictionary, and set	K3	6
2	Implement a menu - driven calculator using if - elif - else conditions and loops	K3	6
3	Use a lambda function to sort a list of tuples by their second element	K3	6
4	Programs using exception handling	K4	6
5	Use inheritance to define different types of books (e.g., EBook, Printed Book).	K4	6
6	Programs using polymorphism	K4	6
7	Programs to implement file operations	K3	6
8	Programs using modules	K3	6
9	Write a Python script that: Connects to a SQLite database, Creates a table, Inserts records, Queries and displays records.	K4	6
10	Programs for creating dynamic and interactive web pages using forms.	K5	6

Course Outcome	**CO1:** Apply Python data structures such as lists, tuples, dictionaries, and sets in real - time problem - solving.	K3
	CO2: Develop Python programs using control structures, functions, exception handling, and file operations to build modular and robust applications.	K4
	CO3: Demonstrate object - oriented programming concepts in Python using inheritance and polymorphism.	K4
	CO4: Implement modular programming and database applications using Python's standard libraries and SQLite.	K4
	CO5: Design dynamic and interactive web - based applications using Python and web technologies.	K5

Mapping of CO's with PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	-	1	2	3	3	3	3	2
CO2	3	3	3	3	3	2	2	2	3	3	3	3	3
CO3	3	3	3	3	2	1	2	1	3	3	3	3	3
CO4	3	3	2	3	3	2	1	2	3	3	3	3	3
CO5	3	3	3	3	3	1	3	2	3	3	3	3	3
CO6	3	3	-	3	2	2	2	-	3	3	3	3	-

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. D. T. Vimala	**Verified By HOD: Mrs. S. I. Anto Ramya**
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose** **Principal**

9/10/25 **Dr. R. Rathipriya M.Sc., M.Phil., M.C.A., Ph.D.,** Professor, Department of Computer Science, Periyar University, Salem -11	9/10/25 **Dr. P. Beaulah Soundarabai M.C.A., M.Phil., Ph.D.,** Associate Professor, Department of Computer Science, School of Sciences, Christ (Deemed to be University), Bengaluru	9/10/25 **Dr. J. Rajesh Dharmaraj M.Sc., M.B.A., Ph.D.,** Associate Professor, Department of Computer Science – PG, Jyoti Nivas College Autonomous, Bengaluru
9/10/25 **Mr. C. Rajiv Sharma M.Tech.,** Founder & CEO, NebulaSafe Tech, Hosur	9/10/25 **Ms. U. Preethi Kumari M.Tech.,** Packaged Application Developer, Accenture Pvt. Ltd, Bengaluru	

M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS1P02	**ALGORITHM AND OOPS LAB**	**DSC - PRACTICAL**	**I**	**60**	**-**	**-**	**4**	**2**
Objective: To apply object-oriented concepts using C++ to develop and manage real-world applications.								

S.No	Program List	Knowledge Levels	Sessions
SDG 4 – Quality Education			
1.	Write a program to traverse through binary search tree using traversals.	K4	5
2.	Write a program to sort an array of an elements using quick sort.	K5	5
3.	Develop a C++ program to simulate a bank account system using classes and objects.	K3	5
4.	Implement a C++ menu-driven application using control structures for a library management system.	K3	6
5.	Develop a C++ program using friend functions to access private data across two related classes (e.g., Person and Passport).	K4	6
6.	Overload operators to perform complex number arithmetic using class-based operator overloading.	K4	5
7.	Create a C++ program using pointers and dynamic memory allocation to manage student records.	K5	5
8.	Develop a runtime polymorphism program to simulate a shape drawing tool using virtual functions.	K4	6
9.	Write a C++ program to handle custom exceptions in a railway reservation system.	K5	6
10.	Design a string handling program for case conversion, palindrome checking, and frequency analysis using string class.	K3	6
11	Create a class template for a Stack data structure with push, pop, and display operations.	K5	5

Course Outcome	**CO1:** Apply object-oriented programming concepts to develop real-world applications in C++.	K3
	CO2: Implement control structures, functions, and file handling for structured program design.	K3
	CO3: Utilize advanced features like friend functions, operator overloading, and dynamic memory.	K3, K4
	CO4: Demonstrate the use of polymorphism, exception handling, and templates for flexible solutions.	K4
	CO5: Apply data structures and algorithms such as BST and quick sort for efficient data management.	K4

Mapping of CO's with PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	2	3	2	-	1	1	1	2	1	3	3	2
CO2	3	3	3	2	1	1	-	3	2	2	2	3	1
CO3	3	-	3	3	2	3	2	1	2	2	3	3	2
CO4	3	2	2	3	2	-	1	2	3	2	3	3	3
CO5	3	3	3	2	3	2	2	-	2	2	3	3	2

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. Princy. T. M	**Verified By HOD: Mrs. S. I. Anto Ramya**
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose** **Principal**

9/10/25 **Dr. R. Rathipriya M.Sc., M.Phil., M.C.A., Ph.D.,** Professor, Department of Computer Science, Periyar University, Salem -11	9/10/25 **Dr. P. Beaulah Soundarabai M.C.A., M.Phil., Ph.D.,** Associate Professor, Department of Computer Science, School of Sciences, Christ (Deemed to be University), Bengaluru	9/10/25 **Dr. J. Rajesh Dharmaraj M.Sc., M.B.A., Ph.D.,** Associate Professor, Department of Computer Science – PG, Jyoti Nivas College Autonomous, Bengaluru
9/10/25 **Mr. C. Rajiv Sharma M.Tech.,** Founder & CEO, NebulaSafe Tech, Hosur	9/10/25 **Ms. U. Preethi Kumari M.Tech.,** Packaged Application Developer, Accenture Pvt. Ltd, Bengaluru	

M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS2C04	**DATA VISUALIZATION**	**DSC - THEORY**	**II**	**90**	**6**	**-**	**-**	**6**

Objective:
To equip students with a comprehensive understanding of data visualization techniques and tools, with a specific focus on Tableau and students will develop the skills necessary to design meaningful dashboards and data stories that aid in insightful decision-making.

Unit	Course Content	Knowledge Levels	Sessions
I	**INTRODUCTION & DATA CONNECTIONS:**Data Visualization–Need for Tableau – **Connecting to Data Sources**:** Excel – JSON – CSV – Access – R Data – PDF – Custom SQL – Data Joins – Blending – Relationships vs Joins – Blending vs Relationships. ****SDG 9 – Industry, Innovation and Infrastructure**	K1	18
II	**MANAGING DATA:** Grouping Data - Nested Sort – Context Filter – Calendar View – **Sets** – Hierarchies**** – Conditional Filter – **Parameters**** – Top-N and Bottom–N – Customers by Sales. ****SDG 12 – Responsible Consumption and Production**	K2	18
III	**DIMENSIONS & BASIC CHARTS:** Dimensions & Measures – Measure – Names – Values – Discrete/Continuous – Aggregates – Pie, Bar, Line, Dual Axis, **Scatter**, Heatmaps**** – Cross Tab – Map – Histogram – Box Plot – Word Cloud – Bubble – Combined Axis – Gantt – Pie with Categories. ****SDG 11 – Sustainable Cities and Communities**	K3	18
IV	**CALCULATIONS IN TABLEAU:** Calculated Fields Parts **–** String, Number, Date, Logical – Aggregate Functions; Aggregate vs Disaggregate Functions – Quick Table Calculations – Level of Detail Expressions (LOD) – Lookup () Functions – **Forecasting****; Reference Lines, Bands, Distribution Bands, **Trend Lines****. ****SDG 13 – Climate Action**	K4	18
V	**ADVANCED VISUALIZATIONS & DASHBOARDS:** Waterfall, Funnel, Pareto, Donut, Bump, Bar-in-Bar Charts – Motion Chart – Benford Analysis – Sparklines – Tornado / Butterfly – Progress – Cohort – Control Chart – Bollinger	K5	18

	Bands – **Creating Dashboards****; Tableau Stories; Best Practices. ****SDG 17 – Partnerships for the Goals**		

Course Outcome	**CO1:** Understand the need for data visualization and connect Tableau with diverse data sources; apply joins, relationships, and blending effectively.	K1 K2
	CO2: Manage, organize, and filter data using Tableau's built-in features like sets, parameters, filters, hierarchies, and sorting.	K3 K4
	CO3: Interpret and utilize dimensions and measures to create fundamental charts and plots such as bar, line, scatter, and maps.	K2 K3
	CO4: Apply calculations, level of detail expressions, and analytical functions to perform forecasting and trend analysis.	K3 K4
	CO5: Develop and publish dashboards and interactive stories using advanced visualization techniques, applying best practices.	K4 K5

Learning Resources	
Text Books	1. Seema Acharya, Mastering Data Visualization using Tableau, Wiley India, 2024. (Unit I to Unit V) 2. Praveen Kumar, Data Visualization with Tableau, Gurucool. 3. Ben Fry, Visualizing Data, O'Reilly, 2007.
Reference Books	1. Joshua N. Milligan, Learning Tableau 10, Packt Publishing. 2. Colin Ware, Visual Thinking for Design, The Morgan Kaufmann Series, 2008. 3. Prachi Manoj Joshi & Parikshit Mahalle, Data Storytelling and Visualization with Tableau, CRC Press.
Website Link	1. https://www.coursera.org/in/articles/data-visualization 2. https://en.wikipedia.org/wiki/Data_and_information_visualization 3. https://www.thoughtspot.com/data-trends/data-visualization/types-of-charts-graphs 4. https://www.tableau.com/visualization/what-is-data-visualization 5. https://www.datacamp.com/tutorial/tableau-dashboard-tutorial
L – Lecture T – Tutorial P – Practical C – Credit	

Mapping of CO's with PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	-	-	1	2	2	3	3	-
CO2	3	3	2	3	2	2	1	2	2	2	3	3	2
CO3	2	2	2	2	-	2	1	1	2	-	3	3	2
CO4	3	3	3	3	2	2	-	1	2	2	3	3	3
CO5	2	2	3	3	3	3	2	2	3	3	3	3	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. M. Chellammal	**Verified By HOD: Mrs. S.I. Anto Ramya**
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose** **Principal**

9/10/25 **Dr. R. Rathipriya M.Sc., M.Phil., M.C.A., Ph.D.,** Professor, Department of Computer Science, Periyar University, Salem -11	9/10/25 **Dr. P. Beaulah Soundarabai M.C.A., M.Phil., Ph.D.,** Associate Professor, Department of Computer Science, School of Sciences, Christ (Deemed to be University), Bengaluru
9/10/25 **Dr. J. Rajesh Dharmaraj M.Sc., M.B.A., Ph.D.,** Associate Professor, Department of Computer Science – PG, Jyoti Nivas College Autonomous, Bengaluru	9/10/25 **Mr. C. Rajiv Sharma M.Tech.,** Founder & CEO, NebulaSafe Tech, Hosur
9/10/25 **Ms. U. Preethi Kumari M.Tech.,** Packaged Application Developer, Accenture Pvt. Ltd, Bengaluru	

M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS2C05	**DIGITAL IMAGE PROCESSING**	**DSC - THEORY**	**II**	**75**	**5**	**-**	**-**	**5**

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 relationship between Pixels – Linear & Nonlinear operations. ****SDG 9 – Industry, Innovation, and Infrastructure**	K1	15
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 – Combining spatial enhancement methods. ****SDG 4 – Quality Education**	K2	15
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. ****SDG 3 – Good Health and Well-being**	K3	15
IV	**Image compression:** Image Compression: Fundamentals – Image compression models – Elements of Information Theory – **Error Free compression** – Lossy compression**** – Image compression standards. ****SDG 12 – Responsible Consumption and Production**	K4	15
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. ****SDG 11 – Sustainable Cities and Communities**	K5	15

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: Analyze the concepts of filtering and segmentation for digital image retrieval	K4
	CO5: Evaluate the concepts of Multi-resolution process and recognize the objects in an efficient manner	K5

Learning Resources	
Text Books	• Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing", Second Edition, PHI/Pearson Education • 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 • https://nlist.inflibnet.ac.in/search/Record/978-3-540-44893-8
L – Lecture T – Tutorial P – Practical C – Credit	

Mapping of CO's with PO's and PSO's

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	1	-	-	1	-	-	2	-	2	-	-
CO2	3	3	2	1	2	-	-	-	2	-	3	2	1
CO3	2	3	3	3	2	2	1	1	2	1	3	3	3
CO4	2	3	2	3	2	1	-	-	1	-	3	3	3
CO5	2	2	3	3	3	2	-	1	2	1	3	3	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. V. Sathya	**Verified By HOD: Mrs. S. I. Anto Ramya**
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose** **Principal**

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9/10/25 **Mr. C. Rajiv Sharma M.Tech.,** Founder & CEO, NebulaSafe Tech, Hosur	9/10/25 **Ms. U. Preethi Kumari M.Tech.,** Packaged Application Developer, Accenture Pvt. Ltd, Bengaluru	

M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS2E01	**IOT ARCHITECTURE & PROTOCOLS**	**DSE THEORY**	**II**	**60**	**4**	**-**	**-**	**3**

Objective:
To provide foundational knowledge on IoT architecture, protocols, and design principles. To equip students with the ability to analyze interoperability and security challenges in IoT-based systems.

Unit	Course Content	Knowledge Levels	Sessions
I	**INTRODUCTION TO IoT:** Definition – Characteristics of IoT - IoT Conceptual Framework – Physical Design – Logical Design – IoT Enabling Technologies – IoT Architectural View – Technology Behind IoT – M2M Communication – Differences between IoT and M2M – **Examples of IoT****. ****SDG 11 – Sustainable Cities and Communities**	K1	12
II	**PROTOCOL STANDARDS:** Physical Link Layer – IEEE 802.3 – IEEE 802.11 – Network Layer – **IPv6 & IPv4**** – Transport Layer – TCP & UDP – Application Layer – HTTP – AMQP – SIP – IP based IoT – IEEE 802.15.4 & ZigBee – CoAP. ****SDG 9 – Industry, Innovation, and Infrastructure**	K2	12
III	**DESIGN PRINCIPLES:** Introduction – IoT/M2M Systems Layers and Designs Standardization – Communication Technologies – **Data Enrichment, Data Consolidation and device Management at Gateway**** – Web Communication Protocols – Message Communication Protocols – Internet Connectivity – Internet based Communication – Media Access Control. ****SDG 7 – Affordable and Clean Energy**	K3	12
IV	**INTEROPERABILITY: Web of Things**** – Web as a Platforms – Architectures – Level 0 to 3 – The Meaning of the Levels – Messaging Queues and Publish and Subscribe Communications – Advantages and Disadvantages of Pub/Sub Model – Data Formats: Media Types for Sensor Markup Language – JSON Representations – Single Datapoint – Multiple Datapoints. ****SDG 17 – Partnerships for the Goals**	K4	12
V	**SECURITY & PRIVACY:** Issues – Mechanisms – **Symmetric Key LWC Algorithms** – Asymmetric LWC Algorithms**** – Role of Authorization – Network Broker Communication – Gateway Based Communication – End to End Communication.	K5	12

	****SDG 16 – Peace, Justice, and Strong Institutions**		

Course Outcome	**CO1**: Explain the fundamental concepts, architecture, and M2M communication in IoT.	K1 K2
	CO2: Identify and differentiate IoT protocols and communication standards.	K2 K3
	CO3: Apply IoT design principles to develop real-time IoT/M2M applications.	K3 K4
	CO4: Analyze interoperability using RESTful APIs and data formats.	K4 K5
	CO5: Evaluate security and privacy mechanisms in IoT networks.	K4 K5

Learning Resources	
Text Books	1. Arshdeep Bahga & Vijay Madisetti, "Internet of Things" A Hands-on Approach, University Press. (Unit I) 2. Rajkamal, "Internet of Things – Architecture and Design Principles" McGrawHill (Unit I & Unit III) 3. Simone Cirani, Gianluigi Ferrari, Margo Picone, Luca veltri, "Internet of Things – Architecture, Protocols and Standards", Wiley Publication. (Unit II, Unit IV & Unit V)
Reference Books	1. Claire Rowland, Elizabeth Goodman, "Designing Connected Products: UX for the Consumer Internet of Things", O'Reilly Media Publication. 2. Dieter Uckelmann, Mark Harrison, Florian Michahelles, "Architecting the Internet of Things", Springer Publication.
Website Link	1. https://www.elprocus.com/iot-protocols-and-its-architectures/ 2. https://futurenetworks.ieee.org/standards 3. https://www.airtel.in/b2b/insights/blogs/difference-between-iot-and-m2m/ 4. https://en.wikipedia.org/wiki/Geography_Markup_Language 5. https://www.sciencedirect.com/science/article/abs/pii/S2542660523000823
L – Lecture T – Tutorial P – Practical C – Credit	

Mapping of CO's with PO's and PSO's

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	1	1	1	-	1	1	-	3	2	1
CO2	2	3	2	2	-	1	1	-	1	1	3	3	2
CO3	2	3	3	3	2	-	-	1	1	2	3	3	2
CO4	1	2	2	3	-	1	-	-	1	1	2	3	2
CO5	2	2	3	2	2	2	1	3	2	1	2	2	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. M. Chellammal	Verified By HOD: Mrs. S. I. Anto Ramya
Checked By CDC: Dr. Reena Raj	Approved By: Dr. J. Caroline Rose Principal

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Mr. C. Rajiv Sharma M.Tech., Founder & CEO, NebulaSafe Tech, Hosur	Ms. U. Preethi Kumari M.Tech., Packaged Application Developer, Accenture Pvt. Ltd, Bengaluru	

M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS2E02	**DIGITAL FORENSICS**	**DSE - THEORY**	**II**	**60**	**4**	**-**	**-**	**3**

Objective:
To provide knowledge of concepts, tools, and procedures used in computer forensics and digital investigations.

Unit	Course Content	Knowledge Levels	Sessions
I	Computer Forensics and Investigations as A Profession – Understanding Computer Forensics - Preparing for Computer Investigations - Understanding Computer Investigations **Procedures for Corporate High-Tech Investigations**** - Understanding Data Recovery Workstations and Software Conducting an Investigation – The Investigator's Office and Laboratory. ****SDG 16 – Peace, Justice, And Strong Institutions**	K2, K3,K4	12
II	**Data Acquisition**** – Understanding Storage Formats for Digital Evidence – Determining the Best Acquisition Method – Using Acquisition Tools - Validating Data Acquisition - Processing Crime and Incident Scenes – Identifying Digital Evidence – Preparing for A Search – Working with Windows and DOS System – Understanding File System – Exploring Microsoft File Structures. ****SDG 10 – Reduced Inequalities**	K3, K4,K5	12
III	Current Computer Forensics Tools – **Computer Forensics Software Tools**** – Computer Forensics Hardware Tools – Validating and Testing Forensics Software – Macintosh and Linux Boot Processes and File Systems – Examining Unix and Linux Disk Structures and Boot Processes - Computer Forensics Analysis and Validation – Validating Forensics Data – Addressing Data Hiding Techniques. ****SDG 9 – Industry, Innovation, and Infrastructure**	K2, K4,K5	12
IV	Recovering Graphics Files - Recognizing A Graphics File – Understanding Data Compression – Virtual Machines Overview – **Network Forensics Overview**** – Performing Live Acquisition - Using Network Tools – E-Mail Investigations – Investigating Email Crimes and Violations – Understanding Email Servers. ****SDG 8 – Decent Work and Economic Growth**	K3, K4	12
V	Cell Phone and **Mobile Device Forensics**** – Understanding Mobile Device Forensics – Understanding Acquisition Procedure for Cell Phones and Mobile Devices - Report Writing for High-Tech Investigations – Understanding the	K2, K3	12

	Importance of Reports – Guidelines for Writing Reports – Generating Report Findings with Forensics Software Tools. ****SDG 17 – Partnerships for the Goals**		

Course Outcome	**CO1:** Explain the scope and significance of computer forensics as a profession. Identify the steps involved in preparing and conducting a computer investigation.	K2, K3, K4
	CO2. Compare different storage formats for digital evidence. Apply appropriate acquisition methods and tools for different scenarios**.**	K3, K4, K5
	CO3: Categorize various software and hardware tools for computer forensics. Examine different operating system boot processes and file systems.	K2, K4, K5
	CO4: Recover and interpret graphics files using forensic tools. Analyze virtual machine environments for forensic evidence**.**	K3, K4
	CO5: Explain the principles and challenges of mobile device forensics. Perform acquisition procedures for mobile devices.	K2, K3

Learning Resources	
Text Books	1. Nelson, Phillips, Steuart – Guide to Computer Forensics and Investigations, Cengage, Eoghan Casey – Digital Evidence and Computer Crime, Academic Press 2. Bill Nelson et al. – Computer Forensics and Digital Investigation with Encase Forensic, Cengage
Reference Books	1.Guide to Computer Forensics and Investigations, Bill Nelson, Amelia Phillips, Christopher Steuart,Publisher: Cengage Learning, Edition: Latest (typically 5th Edition) 2. Digital Evidence and Computer Crime: Forensic Science, Computers and the Internet, Author: Eoghan Casey, Academic Press (Elsevier),3rd Edition or later 3. Incident Response & Computer Forensics, Jason Luttgens, Matthew Pepe, Kevin Mandia,Publisher: McGraw-Hill, 3rd Edition 4. Computer Forensics: Cybercriminals, Laws and Evidence, Marie-Helen Maras,Jones & Bartlett Learning
Website Link	1.https://erp.puri.sm/default.aspx/scholars/X68752/GuideToComputerForensicsAndInvestigations.pdf 2.https://vdoc.pub/documents/guide-to-computer-forensics-and-investigations-34bpi37p6g4g
L – Lecture T – Tutorial P – Practical C - Credit	

Mapping of CO's with PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	3	2	2	3	2	1	3	2	1	3	2	-
CO2	3	3	2	3	3	2	-	3	2	1	3	3	2
CO3	3	3	2	3	3	2	1	3	1	-	3	3	3
CO4	3	3	2	3	3	2	1	3	-	1	3	3	3
CO5	3	3	2	3	3	3	2	3	2	2	3	3	2

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. R. Geetha	**Verified By HOD: Mrs. S. I. Anto Ramya**
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose** **Principal**

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M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS2E03	**BIG DATA ANALYTICS**	**DSE THEORY**	**II**	**60**	**4**	**-**	**-**	**3**

Objective:

To equip students with foundational and advanced knowledge of big data concepts, technologies, and analytics methods for handling, processing, and extracting insights from massive and complex datasets. To develop proficiency in using big data tools, platforms, and analytical techniques for solving real-world data-driven problems across various application domains.

Unit	Course Content	Knowledge Levels	Sessions
I	Introduction – Definition and Features of Big Data – Big Data Value – The Development of Big Data - Challenges of Big Data – Related Technologies – Cloud Computing – IOT – Date Center – Hadoop **– Big Data Generation and Acquisition**** - Big Data Generation – Big Data Acquisition – Data Collection – Data Transportation – Data Pre-Processing. ****SDG 9 – Industry, Innovation, and Infrastructure**	K1, K2	12
II	Big Data Storage – Storage System for Massive Data – Distributed Storage System – Storage Mechanism for Big Data – Big Data Analysis – Traditional Data Analysis – Big Data Analytic Methods – Architecture for Big Data Analysis – **Big Data Applications**** – Application Evolution – Big Data Analysis Fields – Key Applications. ****SDG 8 – Decent Work and Economic Growth**	K2, K3	12
III	Data Analytics Lifecycle Overview – Discovery – **Data Preparation**** – Model Planning – **Model Building**** – Communication Results – Operationalize – Review of Basic Data Analytic Methods Using R - Advanced Data Analytical Theory and Methods for Clustering - Advanced Analytical Theory and Methods for Association Rules. ****SDG 4 – Quality Education**	K2, K3	12
IV	Advanced Analytical Theory and Methods for Regression – Advanced Analytical Theory and Methods for Classification – Advanced Analytical Theory and Methods for Time Series Analysis – **Advanced Analytical Theory and Methods for Text Analysis**.** ****SDG 3 – Good Health and Well-being**	K3, K4	12
V	Advanced Analytics – Technology and Tools – Map Reduce and Hadoop – **Analytics for Unstructured Data**** – The Hadoop Ecosystem –NoSQL – Advanced Analytics – Technology and Tools in Database Analytics – SQL Essentials – In Database Text Analysis. ****SDG 12 – Responsible Consumption and Production**	K4, K5	12

Course Outcome	**CO1:** Explain the concepts, features, challenges, and technologies related to big data generation and acquisition.	K1, K2
	CO2. Describe storage architectures and analytic methods used for processing and applying big data in various fields.	K2, K3
	CO3: Apply the stages of the data analytics lifecycle and implement basic analytic methods using R.	K2, K3
	CO4: Implement advanced analytical techniques for regression, classification, clustering, and text analysis.	K3, K4
	CO5: Utilize Hadoop, Nosql, and database analytics tools to process and analyze structured and unstructured data.	K4, K5

Learning Resources	
Text Books	1. Min Chen et al., "Big Data: Related Technologies, Challenges and Future Prospects", Springer. 2. EMC2 Education Services, "Data Science and Big Data Analytics", Wiley, 2015.
Reference Books	1. Tom White, "Hadoop: The Definitive Guide", 4th Edition, O'Reilly Media, 2015. 2. Jure Leskovec, Anand Rajaraman, Jeffrey Ullman, "Mining of Massive Datasets", 3rd Edition, Cambridge University Press, 2020. 3. Vignesh Prajapati, "Big Data Analytics with R and Hadoop", Packet Publishing, 2013. 4.Chirag Shah, "A Hands-On Introduction to Data Science", Cambridge University Press, 2020. 5. Pethuru Raj, Anupama Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press, 2017.
Website Link	1.https://people.ece.ubc.ca/minchen/min_paper/2014/2014-29-Springer-1-BigDataBook.pdf 2.https://download.e-bookshelf.de/download/0003/0393/80/L-G-0003039380-0035641061.pdf
L – Lecture T – Tutorial P – Practical C – Credit	

Mapping of CO's with PO's and PSO's

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	2	2	2	1	1	2	3	1	3	2	2
CO2	3	3	3	3	2	-	1	2	2	-	3	3	2
CO3	3	3	3	3	3	2	2	1	2	2	3	3	3
CO4	3	3	3	3	3	2	-	1	2	2	3	3	3
CO5	3	3	3	3	3	2	1	1	2	3	3	3	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. R. Geetha	**Verified By HOD: Mrs. S. I. Anto Ramya**
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose** **Principal**

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M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS2P03	**DATA VISUALIZATION LAB**	**DSC - PRACTICAL**	**II**	**75**	**-**	**-**	**5**	**3**

Objective:
The students will be able to Understand the fundamentals and workflow of data visualization using Tableau with the help of samples.

S. No.	List of Experiments	Knowledge Levels	Sessions
SDG 11 – Sustainable Cities & Communities SDG 9 – Industry, Innovation & Infrastructure			
1.	Getting Started – Tableau Workspace, Tableau Terminologies and Basic Functionalities.	K1	5
2.	Connecting to Data Source – Connecting to Database, Different types of Tableau Joins.	K1	5
3.	Import the Sample Superstore Excel file and navigate Tableau workspace: data pane, shelves, cards, and worksheet.	K1	5
4.	Use Superstore data to create a bar chart of total sales by region, a line chart of profit by month, and a pie chart of sales by category.	K2	5
5.	Create a bar chart of sales by sub-category, apply Top 5 filter, and sort by descending sales value.	K3	5
6.	Create a Category → Sub-category hierarchy and visualize sales by region, allowing drill-down from region to state.	K3	5
7.	Create a highlight table showing sales by category and region, with color gradient representing sales amount.	K3	5
8.	Plot a dual-axis chart showing sales and profit over time (by month). Combine them with synchronized axes for better comparison.	K4	5

9.	Import a COVID-19 dataset (date-wise cases) and create a time series line chart to show trends in confirmed cases for India.	K4	5
10.	Use Superstore data to create a map of profit by state. Use color and size to differentiate states with high or low profit.	K4	5
11.	Design a dashboard that includes a bar chart (sales by region), map (profit by state), and filter for category.	K5	5
12.	reate a parameter to switch between Sales and Profit, and a calculated field for Profit Ratio (Profit/Sales) and visualize it as a bar chart.	K5	5
13.	Visualize the countries data given in the dataset with respect to latitude and longitude along with country name using symbol maps.	K5	5
14.	Use Superstore data to generate a sales trend line by month and apply linear forecast for next 6 months using built-in analytics features.	K5	5
15.	Choose a retail dataset (e.g., Walmart, Flipkart, or custom CSV). Create a dashboard with filters, KPIs, charts, and maps to derive business insights and present conclusions.	K6	5

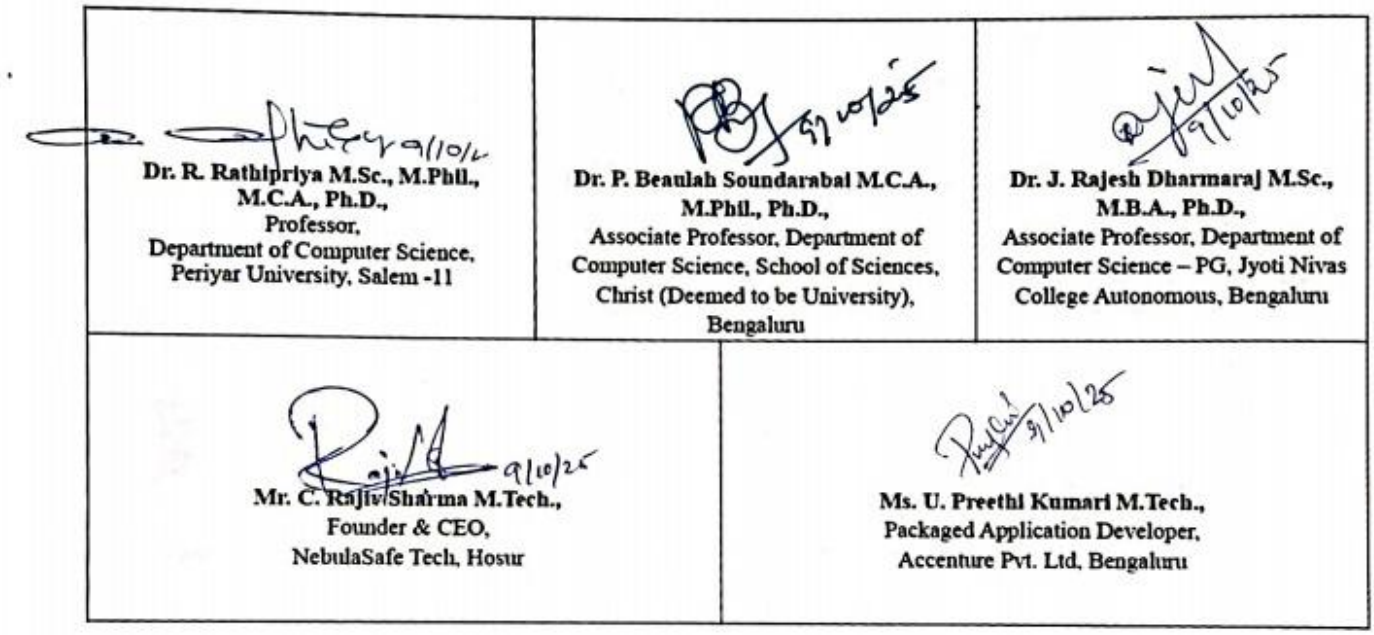
Course Outcome	**CO1:** Understand Tableau interface, data connections, and visualization workflow.	K1 K2
	CO2: Apply filters, parameters, hierarchies, and calculations to build effective visualizations.	K3 K4
	CO3: Design dashboards integrating multiple views with interactivity and filters.	K4 K5
	CO4: Analyze datasets using charts, maps, KPIs, and trend lines for insight generation.	K4 K5
	CO5: Apply forecasting and storytelling features to support data-driven decisions in real-time contexts.	K3 K6

Mapping of CO's with PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	2	1	-	2	2	3	3	-
CO2	3	3	3	-	3	3	2	1	2	3	3	3	2
CO3	3	2	3	3	3	3	2	1	2	3	3	3	3
CO4	3	3	2	3	-	3	1	2	-	3	3	3	3
CO5	3	3	3	3	3	3	3	-	2	3	3	3	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. M. Chellammal	**Verified By HOD:** Mrs. S.I. Anto Ramya
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose** Principal



M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS2P04	**DIGITAL IMAGE PROCESSING LAB**	**DSC PRACTICAL**	**II**	**75**	**-**	**-**	**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 Programs	Knowledge Levels	Sessions
SDG 3 – Good Health & Well-Being **SDG 12 – Responsible Consumption & Production**			
1	Implement Image enhancement Technique.	K1	9
2	Histogram Equalization	K1	8
3	Image Restoration	K2	8
4	Implement Image Filtering.	K2	8
5	Edge detection using Operators (Roberts, Prewitts and Sobelsoperators)	K3	9
6	Implement image compression.	K4	8
7	Image Subtraction	K4	8
8	Boundary Extraction using morphology	K5	9
9	Image Segmentation	K5	8

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

Mapping of CO's with PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	2	2	3	2	1	-	-	2	1	3	3	2
CO2	2	2	2	3	1	2	-	-	2	1	3	3	2
CO3	1	2	1	2	2	1	-	-	-	-	2	2	2
CO4	2	2	3	3	2	2	1	-	2	2	3	3	3
CO5	2	3	2	2	3	2	-	1	2	1	3	3	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. V. Sathya	**Verified By HOD: Mrs. S. I. Anto Ramya**
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose** **Principal**

9/10/25 **Dr. R. Rathipriya M.Sc., M.Phil., M.C.A., Ph.D.,** Professor, Department of Computer Science, Periyar University, Salem -11	9/10/25 **Dr. P. Beaulah Soundarabai M.C.A., M.Phil., Ph.D.,** Associate Professor, Department of Computer Science, School of Sciences, Christ (Deemed to be University), Bengaluru	9/10/25 **Dr. J. Rajesh Dharmaraj M.Sc., M.B.A., Ph.D.,** Associate Professor, Department of Computer Science – PG, Jyoti Nivas College Autonomous, Bengaluru
9/10/25 **Mr. C. Rajiv Sharma M.Tech.,** Founder & CEO, NebulaSafe Tech, Hosur		9/10/25 **Ms. U. Preethi Kumari M.Tech.,** Packaged Application Developer, Accenture Pvt. Ltd, Bengaluru

M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS1ED1	**PRINCIPLES OF INFORMATION TECHNOLOGY**	**EDC - THEORY**	**I**	**45**	**3**	**-**	**-**	**2**

Objective:

To introduce the fundamentals of information technology and its applications in business, data processing, internet usage, and e-commerce.

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****. ****SDG 9 – Industry, Innovation and Infrastructure**	K2	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. ****SDG 4 – Quality Education**	K1	9
III	**Processing Numerical Data:** Introduction – Use of Spreadsheets - Numerical Computation Examples. **Processing and Displaying Textual Data:** Introduction - Word Processor - Desktop Publishing - Page Description Language - Markup Languages. **Processing Multimedia Data**:** Introduction – Graphics Processing - Audio Signal Processing. ****SDG 8 – Decent Work and Economic Growth**	K3	9
IV	**Applications:** Introduction - Email - **Information Retrieval from the World Wide Web**** - Other Facilities Provided by Browsers - Audio on the Internet - Accessing Pictures and Video via Internet - **Cloud Computing****. ****SDG 10 – Reduced Inequalities**	K2	9
V	**Electronic commerce:** E-commerce system architecture - Digital signature - **Payment schemes in e-commerce**** - Cash transaction using e-Wallet - Electronic data interchange – advantage and disadvantage of e-commerce. **Societal impact:** Introduction - Social use of WWW -	K4	9

	Privacy, Security and Integrity of Information - Disaster Recovery- Intellectual Property Rights. ****SDG 12 – Responsible Consumption and Production**		

Course Outcome	**CO1:** Understand the importance of information technology and systems in the modern business environment.	K2
	CO2: Identify and describe the components of computer hardware and software and their roles in computing.	K1
	CO3: Apply spreadsheet, word processing, and multimedia tools for processing and presenting data.	K3
	CO4: Demonstrate the use of internet tools, browsers, and cloud services for retrieving and managing information.	K2
	CO5: Analyze e-commerce architecture, digital payments, and the societal implications of IT use.	K4

Learning Resources	
Text Books	1. V. Rajaraman, "Introduction to Information Technology, "Prentice Hall of India,2007 2. Turban, Rainer, Potter "Introduction to Information Technology," Second edition, Wiley India, 2007
Reference Books	1. Kenneth C. Laudon and Jane P. Laudon, Management Information Systems: Managing the Digital Firm, Pearson Education, 2018.
Website Link	1. https://edu.gcfglobal.org/en/topics/computers/ 2. https://edu.gcfglobal.org/en/topics/tech/ 3. https://edu.gcfglobal.org/en/topics/computers/
L – Lecture T – Tutorial P – Practical C - Credit	

Mapping of CO's with PO's and PSO's

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**
CO1	1	2	1	3	2	-	3	2	1	3	2	1	2
CO2	2	1	-	2	2	1	3	3	2	3	3	2	3
CO3	1	2	1	-	2	2	2	3	2	3	3	2	3
CO4	2	3	2	2	3	2	2	3	3	2	-	2	3
CO5	2	3	2	2	3	3	-	3	2	3	2	3	2

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. Princy T.M	**Verified By HOD: Mrs. S. I. Anto Ramya**
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose Principal**

9/10/25 **Dr. R. Rathipriya M.Sc., M.Phil., M.C.A., Ph.D.,** Professor, Department of Computer Science, Periyar University, Salem -11	9/10/25 **Dr. P. Beaulah Soundarabai M.C.A., M.Phil., Ph.D.,** Associate Professor, Department of Computer Science, School of Sciences, Christ (Deemed to be University), Bengaluru	9/10/25 **Dr. J. Rajesh Dharmaraj M.Sc., M.B.A., Ph.D.,** Associate Professor, Department of Computer Science – PG, Jyoti Nivas College Autonomous, Bengaluru
9/10/25 **Mr. C. Rajiv Sharma M.Tech.,** Founder & CEO, NebulaSafe Tech, Hosur	9/10/25 **Ms. U. Preethi Kumari M.Tech.,** Packaged Application Developer, Accenture Pvt. Ltd, Bengaluru	

M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS2ED2	**FUNDAMENTALS OF COMPUTERS AND COMMUNICATIONS**	**EDC - THEORY**	**I**	**45**	**3**	**-**	**-**	**2**

Objective:

To provide foundational knowledge of computer systems, including hardware, software, internet, and data communication technologies, operating systems, databases, security, cloud computing, and enterprise information systems.

Unit	Course Content	Knowledge Levels	Sessions
I	A Word of Computers - What Is a Computer - The Components of a Computer - Advantages and Disadvantages of Using Computers Network and The Internet - Computer Software - Examples of Computer Usages – **Computer Applications in Society**** – The Internet – The World Wide Web – Other Internet Services - Application Software – Business Software - Graphics and Multimedia Software – Software for Home – Personal and Education Use. ****SDG 4 – Quality Education**	K2	9
II	The Components of The System Unit - The System Unit Processor - Data Representation - Memory Ports and Connectors – Input and Output - What Is Input – Keyboard and Pointing Devices - Other Types of Input – Display Devices - Other Output Devices - Storage - Hard Disks - Flash Memory - Storage - **Cloud Storage** - Optical Discs**.** ****SDG 9 – Industry, Innovation And Infrastructure**	K1, K2	9
III	Operating Systems - System Software – Operating System Functions and Utility Programs – Types Of Operating System – Utility Programs Communications – **Uses of Computer Communication**** – Network Communications – Software Communications Devices - Communication Channel – Physical Transmission Media - **Wireless Transmission Media**.** ****SDG 11 – Sustainable Cities And Communities**	K2, K3	9

IV	Database Management – Databases – Data and Information File Processing Versus Databases – Database Management Systems – Relational –Object Oriented and Multidimensional Databases – **Computer Security and Safety** - Ethics and Privacy**** – Computer Security Risks - Internet and Network Attacks – Unauthorized Access and Use Hardware. ****SDG 16 – Peace, Justice and Strong Institutions**	K2, K4	9
V	Hardware Theft and Vandalism - Software Theft – Information Theft – Health Concern of Computer Use – Information System Management and Programming Languages – System Development Programming Language and Program Development Tools – What Is Enterprise Computing - Information System in The Enterprise – Wide Technologies and Methodologies **Virtualization and Cloud Computing****. ****SDG 12 – Responsible Consumption and Production**	K2, K3	9

Course Outcome	**CO1**: Understand the basic concepts of computers, their components, types of software, and the use of the internet and application software in daily life and various industries.	K2
	CO2: Identify and explain the components of the system unit including memory, input/output devices, and various storage technologies.	K1, K2
	CO3: Analyze the role and types of operating systems and utility programs, and understand computer communication principles including network hardware and media	K2, K3
	CO4: Explain database concepts and management systems and evaluate common computer security threats, safety practices, and ethical concerns.	K2, K4
	CO5: Understand the fundamentals of information systems development, programming tools, and technologies used in enterprise computing including virtualization and cloud.	K2, K3

Learning Resources	
Text Books	1. Gary B. Shelly, Thomas j. 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 3. Alexis Leon, Mathew‟s Leon, "Fundamentals of Computer Science and Communication Engineering", Vikas Publishing House, New Delhi, 1998.

Website Link	1.https://repository.dinus.ac.id/docs/ajar/Computers_Fundamentals.pdf
L – Lecture T – Tutorial P – Practical C - Credit	

Mapping of CO's with PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	2	2	2	1	2	1	2	2	1	2	2	1
CO2	3	2	2	3	2	-	1	2	2	2	3	3	-
CO3	3	3	3	3	2	2	1	3	2	2	3	3	2
CO4	3	3	2	2	2	2	1	3	2	-	2	3	2
CO5	3	3	3	3	2	2	2	3	3	3	3	3	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. R. Geetha	**Verified By HOD: Mrs. S. I. Anto Ramya**
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose** **Principal**

Dr. R. Rathipriya M.Sc., M.Phil., M.C.A., Ph.D., Professor, Department of Computer Science, Periyar University, Salem -11	Dr. P. Beaulah Soundarabai M.C.A., M.Phil., Ph.D., Associate Professor, Department of Computer Science, School of Sciences, Christ (Deemed to be University), Bengaluru	Dr. J. Rajesh Dharmaraj M.Sc., M.B.A., Ph.D., Associate Professor, Department of Computer Science – PG, Jyoti Nivas College Autonomous, Bengaluru
Mr. C. Rajiv Sharma M.Tech., Founder & CEO, NebulaSafe Tech, Hosur	Ms. U. Preethi Kumari M.Tech., Packaged Application Developer, Accenture Pvt. Ltd, Bengaluru	

M.Sc. Computer Science LOCF – CBCS with effect from 2025 - 2026 Onwards								
Course Code	**Course Title**	**Course Type**	**Sem**	**Hours**	**L**	**T**	**P**	**C**
25PCS2ED3	**E-COMMERCE**	**EDC - THEORY**	**II**	**45**	**3**	**-**	**-**	**2**

Objective:
To introduce concepts of e-commerce, its models, marketing strategies, security measures, and payment systems with relevance to emerging trends and Indian digital commerce.

Unit	Course Content	Knowledge Levels	Sessions
I	**INTRODUCTION:** Emergence of Internet – Emergence of World Wide Web – Advantages – Disadvantages – Transition to E-Commerce in India - **E-Commerce opportunities in India**** – E-Commerce vs Traditional – Limitations. ****SDG 8 – Decent Work and Economic Growth**	K1	9
II	**BUSINESS MODELS: Business to Consumer**** – **Business to Business**** – Consumer to Consumer – Consumer to Business – Brokerage Model – Aggregator Model – Info Mediary Model – Community Model. ****SDG 12 – Responsible Consumption and Production**	K2	9
III	**E-MARKETING:** Traditional Marketing – Identifying Web Presence Goal – The Browsing Behaviour Model – Online Marketing – E-Advertising – **Internet Marketing Trends**** – E-Branding – Marketing Strategies. ****SDG 9 – Industry, Innovation, and Infrastructure**	K3	9
IV	**E-SECURITY: Information System Security**** – Security on the Internet – E-Business risk Management Issues – information Security Environment in India – Dimensions of E-Commerce Security – Credit Card Fraud – Sniffing. ****SDG 16 – Peace, Justice, and Strong Institutions**	K4	9

V	**E-PAYMENT:** Main Concerns in Internet Banking – **Digital Token based E-Payment Systems**** – Classification of New Payment Systems – Properties of E-Cash – Risk and E-Payment Systems – Designing – Digital Signature. ****SDG 10 – Reduced Inequalities**	K5	9

Course Outcome	**CO1:** Understand the emergence of the internet, web evolution, and transition to e-commerce in India.	K1 K2
	CO2: Classify and compare different e-commerce business models like B2B, B2C, and aggregator models.	K2 K3
	CO3: Apply e-marketing strategies and analyze user browsing behavior for brand visibility and online engagement.	K3 K4
	CO4: Evaluate e-commerce security threats and risk management strategies with an understanding of legal and ethical frameworks.	K4 K5
	CO5: Design secure e-payment systems with knowledge of digital cash, tokens, and digital signature protocols.	K4 K5

Learning Resources	
Text Books	1. P. T. Joseph, S.J. – E-Commerce: An Indian Perspective, PHI Learning Pvt. Ltd. (Unit I to Unit V)
Reference Books	1. Kenneth C. Laudon & Carol G. Traver – E-Commerce: Business, Technology, Society, Pearson Education. 2. Dave Chaffey – Digital Business and E-Commerce Management, Pearson Education. 3. Bajaj & Nag – E-Commerce: The Cutting Edge of Business, Tata McGraw-Hill. 4. Ravi Kalakota & Andrew B. Whinston – Frontiers of Electronic Commerce, Addison-Wesley.
Website Link	1. https://www.tutorialspoint.com/e_commerce/index.htm 2. https://www.investopedia.com/terms/e/ecommerce.asp 3. https://www.nerdwallet.com/article/small-business/e-commerce-models 4. https://www.hostinger.com/in/tutorials/what-is-ecommerce 5. https://www.techtarget.com/searchcio/definition/e-commerce
L – Lecture T – Tutorial P – Practical C – Credit	

Mapping of CO's with PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	1	2	3	2	3	3	3	-
CO2	3	2	3	-	3	2	-	3	2	2	3	3	1
CO3	3	3	2	3	2	3	2	3	3	-	3	3	3
CO4	3	3	3	1	1	-	-	3	3	3	2	3	3
CO5	3	3	3	3	3	3	2	3	3	3	3	3	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

Course Designed By: Mrs. M. Chellammal	**Verified By HOD: Mrs. S. I. Anto Ramya**
Checked By CDC: Dr. Reena Raj	**Approved By: Dr. J. Caroline Rose** **Principal**

9/10/25 **Dr. R. Rathipriya M.Sc., M.Phil., M.C.A., Ph.D.,** Professor, Department of Computer Science, Periyar University, Salem -11	9/10/25 **Dr. P. Beaulah Soundarabai M.C.A., M.Phil., Ph.D.,** Associate Professor, Department of Computer Science, School of Sciences, Christ (Deemed to be University), Bengaluru	9/10/25 **Dr. J. Rajesh Dharmaraj M.Sc., M.B.A., Ph.D.,** Associate Professor, Department of Computer Science – PG, Jyoti Nivas College Autonomous, Bengaluru
9/10/25 **Mr. C. Rajiv Sharma M.Tech.,** Founder & CEO, NebulaSafe Tech, Hosur	9/10/25 **Ms. U. Preethi Kumari M.Tech.,** Packaged Application Developer, Accenture Pvt. Ltd, Bengaluru	