

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



**(AUTONOMOUS)
SILVER JUBILEE INSTITUTION**

(Affiliated to Bharathidasan University)

(Accredited by NAAC)

SUNDARAKKOTTAI, MANNARGUDI –614016, TAMILNADU, INDIA.

M.Sc., COMPUTER SCIENCE

LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK

(CBCS-LOCF)

(For the candidates admitted in the academic year 2025–2026)

PROGRAMME CODE

2PSCSC



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TAMILNADU, INDIA.

M.Sc., COMPUTER SCIENCE
CHOICE BASED CREDIT SYSTEM - LEARNING OUTCOMES BASED
CURRICULUM FRAMEWORK (CBCS - LOCF)

(For the candidates admitted in the academic year 2025-2026)

CHOICE BASED CREDIT SYSTEM

The credit based semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice based credit system provides a 'cafeteria' type approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning. Our College has moved to CBCS and implemented the grading system.

OUTCOME-BASED EDUCATION (OBE)

LEARNING OUTCOME-BASED CURRICULUM FRAMEWORK (LOCF)

The fundamental premise underlying the learning outcomes-based approach to curriculum planning and development is that higher education qualifications are awarded on the basis of demonstrated achievement of outcomes (expressed in terms of knowledge, understanding, skills, attitudes and values) and academic standards expected of graduates of a programme of study. Learning outcomes specify what graduates completing a particular programme of study are expected to know, understand and be able to do at the end of their programme of study. The expected learning outcomes are used as reference points that would help to formulate graduate attributes, qualification descriptors, programme learning outcomes and course learning outcomes which in turn will help in curriculum planning and development, and in the design, delivery and review of academic programmes. They provide general guidance for articulating the essential learning associated with programmes of study and courses within a programme, maintain national standards and international comparability of learning outcomes and academic standards to ensure global competitiveness, and to facilitate student/graduate mobility and provide higher education institutions an important point of reference for designing teaching-learning strategies, assessing student learning levels, and periodic review of programmes and academic standards.

Some important aspects of the Outcome Based Education

Course: is defined as a theory, practical or theory cum practical subject studied in a semester.

COURSE OUTCOME (COs): COURSE OUTCOME are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course. Generally three or more COURSE OUTCOME may be specified for each course based on its weightage.

Programme: is defined as the specialization or discipline of a Degree.

Programme Outcomes (POs): Programme outcomes are narrower statements that describe what students are expected to be able to do by the time of graduation. POs are expected to be aligned closely with Graduate Attributes.

Programme Specific Outcomes (PSOs): PSOs are what the students should be able to do at the time of graduation with reference to a specific discipline.

Some important terminologies repeatedly used in LOCF.

Core Courses (CC): A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course. These are the courses which provide basic understanding of their main discipline. In order to maintain a requisite standard certain core courses must be included in an academic program. This helps in providing a universal recognition to the said academic program.

Discipline Specific Elective Courses (DSE): Elective course may be offered by the main discipline/subject of study is referred to as Discipline Specific Elective (DSE). These courses offer the flexibility of selection of options from a pool of courses. These are considered specialized or advanced to that particular programme and provide extensive exposure in the area chosen; these are also more applied in nature.

Generic Elective Courses: An elective course chosen generally from an **unrelated discipline/subject**, with an intention to seek exposure is called a Generic Elective. Generic Elective courses are designed for the students of other disciplines. Thus, as per the CBCS policy, the students pursuing particular disciplines would have to opt Generic Elective courses offered by other disciplines, as per the basket of courses offered by the college. The scope of the Generic Elective (GE) Courses is positively related to the diversity of disciplines in which programmes are being offered by the college.

Non Major Elective (NME): A student shall choose at least two Non-major Elective(NME) Courses from outside his/her department.

Skill Enhancement Courses (SECs): These courses focus on developing skills or proficiencies in the student, and aim at providing hands-on training. Skill enhancement courses can be opted by the students of any other discipline, but are highly suitable for students pursuing their academic programme. These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge.

Field Study/Industrial Visit/Case Study: It has to be completed during the fifth semester of the degree programme. Credit for this course will be entered in the fifth semester's marks statement.

Internship: Students must complete internship during summer holidays after the fourth semester. They have to submit a report of internship training with the necessary documents and have to appear for a viva-voce examination during fifth semester. Credit for internship will be entered in the fifth semester's mark statement.

Extra Credit Courses: In order to facilitate the students, gaining knowledge/skills by attending online courses MOOC, credits are awarded as extra credits, the extra credit are at three semesters after verifying the course completion certificates. According to the guidelines of UGC, the students are encouraged to avail this option of enriching their knowledge by enrolling themselves in the Massive Open Online Courses (MOOC) provided by various portals such as SWAYAM, NPTEL etc.

Postgraduate Programme:

Programme Pattern: The Post Graduate degree programme consists of **FIVE** vital components. They are as follows:

- Part –A : Core Course (Theory, Practicals) Core Industry Module, Core Project
- Part-B (i) : Elective courses
- Part-B (ii) : Non Major Elective, Skill Enhancement course, Professional Competency course
- Part-B (iii) : Internship
- Part –C : Extension activity

EXAMINATION

Continuous Internal Assessment (CIA):

PG - Distribution of CIA Marks Passing Minimum: 50 %

Assignments – 3 = 30%

Tests – 2 = 50%

Seminar =10 % Attendance = 10 %

Question Paper Pattern

Part A: Includes two subsections

Part A1 (10X1=10 marks)

One word question/ Fill in the Blanks /True or False/ Multiple Choice Questions
Two Questions from Each unit

Part A2 (5X2=10 marks) Match the following Short Answers

One question from Each unit

Total Marks - 20

Part B: (5X5=25 marks) Paragraph Answers
Either/ or type, One Question from each unit

Part C: (10X3=30)

Essay Type Answers Answer 3 out of 5 Questions One Question from each unit

Part A: K1 Level

Part B: K2, K3 and K4 Level

Part C: K5 and K6 Level

Knowledge levels for assessment of Outcomes based on Blooms Taxonomy

S.No.	Level	Parameter	Description
1	K1	Knowledge / Remembering	It is the ability to remember the previously learned
2	K2	Comprehension / Understanding	The learner explains ideas or concepts
3	K3	Application / Applying	The learner uses information in a new way
4	K4	Analysis / Analyzing	The learner distinguishes among different parts
5	K5	Evaluation / Evaluating	The learner justifies a stand or decision
6	K6	Synthesis / Creating	The learner creates a new product or point of view

WEIGHTAGE of K –LEVELS IN QUESTION PAPER

(Cognitive Level) K-LEVELS →	Lower Order Thinking			Higher Order Thinking			Total
	K1	K2	K3	K4	K5	K6	
END SEMESTER EXAMINATIONS (ESE)	20	25			30		75
Continuous Internal Assessment (CIA)	20	25			30		75

QUESTION PATTERN FOR END SEMESTER EXAMINATION/ Continuous Internal Assessment

PART			MARKS
PART – A I. (No choice ,One Mark) TWO questions from each unit	(10x1=10)		20
II. (No choice, Two Mark) ONE question from each unit	(5x2=10)		
PART – B (Either/ or type,5-Marks) ONE question from each unit	(5x5=25)		25
PART – C (3 out of 5) (10Marks) ONE question from each unit	(3x10=30)		30
Total			75

BLUE PRINT OF QUESTION PAPER FOR END SEMESTER EXAMINATION							
DURATION: 3.00 Hours.							
Max Mark :75							
K-LEVELS	K1	K2	K3	K4	K5	K6	Total
PART							Marks
PART -A (One Mark, No choice) (10x1=10)	10						10
(2-Marks,No choice) (5x2=10)	10						10
PART -B (5-Marks)(Either/or type) (5x5=25)		5	10	10			25
PART -C (10 Marks)(3 out of 5) (3x10=30) Courses having only K5, K6 levels, K5 level- 3 Questions, K6 level- 2 Questions (One K6 level question is compulsory)					20	10	30
Total	20	05	10	10	20	10	75

EVALUATION

GRADING SYSTEM

Once the marks of the CIA and the end-semester examination for each of the courses are available, they will be added and converted as final mark. The marks thus obtained will then be graded as per the scheme provided in Table-1.

Grade Point Average (GPA) will be calculated from the first semester onwards for all semester. From the second semester onwards, the total performance within a semester and the continuous performance starting from the first semester are indicated by semester Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA), respectively. These two are calculated by the following formulae:

$\text{GPA} = \frac{\sum_{i=1}^n CG_i}{\sum_{i=1}^n C_i}$	$\text{WAM(Weighted Average Marks)} = \frac{\sum_{i=1}^n CM_i}{\sum_{i=1}^n C_i}$
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Where,

C_i is the Credit earned for the Course i

G_i is the Grade Point obtained by the student for the Course i

M_i is the marks obtained for the course i and

n is the number of Courses **Passed** in that semester.

CGPA: Average GPA of all the Courses starting from the first semester to the current semester.

CLASSIFICATION OF FINAL RESULTS:

- i. The classification of final results shall be based on the CGPA, as indicated in Table-2.
- ii. For the purpose of Classification of Final Results, the candidates who earn the CGPA 9.00 and above shall be declared to have qualified for the Degree as 'Outstanding'. Similarly the candidates who earn the CGPA between 8.00 and 8.99, 7.00 and 7.99, 6.00 and 6.99 and 5.00 and 5.99 shall be declared to have qualified for their Degree in the respective programmes as 'Excellent', 'Very Good', 'Good', and 'Above Average' respectively.
- iii. Absence from an examination shall not be taken an attempt.

Table- 1: Grading of the Courses

Marks Range	Grade Point	Corresponding Grade
90 and above	10	O
80 and above and below 90	9	A+
70 and above and below 80	8	A
60 and above and below 70	7	B+
50 and above and below 60	6	B
Below 50	NA	RA

NA- Not Applicable, RA- Reappearance

The candidates performance in every current semester is indicated by **Semester Grade Point Average (SGPA)** and from the second semester onwards, the continuous performance including previous semester/s is indicated by **Cumulative Grade Point Average (CGPA)**

Table-2: Final Result

CGPA	Corresponding Grade	Classification of Final Result
9.00 and above	O	Outstanding
8.00 to 8.99	A+	Excellent
7.00 to 7.99	A	Very Good
6.00 to 6.99	B+	Good
5.00 to 5.99	B	Above Average

* The candidates who have passed in the first appearance and within the prescribed duration of the PG Programme are eligible. If the candidate's Grade is O/A+ with more than one attempt, the performance is fixed as "Very Good".

Vision

Attaining Global Recognition in Computer Science Education and to Develop the Software Professionals

Mission

Imparting Quality Education through a Well – Designed Curriculum in tune with the Challenging Software Needs of the Industry

PROGRAMME OUTCOMES FOR M.Sc., DEGREE PROGRAMMES

PO.No.	Programme Outcomes <i>(Upon completion of the M.Sc., Degree Programme, the Post graduate will be able to)</i>
PO-1	Disciplinary Knowledge: demonstrate in-depth knowledge and understanding of theories, policies, and practices in one or more disciplines that form a part of a PostGraduate program of study in Master of Science.
PO-2	Critical Thinking and Problem Solving: apply analytic thought to a body of knowledge, analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence, identify relevant assumptions or implications, formulate coherent arguments, critically evaluate practices, policies and theories by following scientific approach to knowledge development: solve problems and extrapolate the same to real life situation
PO-3	Information/digital literacy and Communication Skills: use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources, and use appropriate software for analysis of data: communicate thoughts and ideas analytically and effectively in writing and orally using appropriate media, and present complex information in a clear and concise manner to different groups.
PO-4	Research-related skills: conduct independent inquiry in a chosen scientific discipline, demonstrate sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesizing and articulating; recognize cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; plan, execute and report the results of an experiment or investigation.
PO-5	Scientific reasoning and Reflective Thinking: Analyse, interpret and draw conclusions from quantitative/qualitative data and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective; critically and sensibly evaluate life experiences, with self awareness and reflexivity of both self and society.

PO-6	Multidisciplinary Approach, Innovation and Entrepreneurship: propose novel ideas of interdisciplinary approach in providing better solutions and new ideas for the sustainable developments; identify opportunities, entrepreneurship vision and use of innovative ideas to create value and wealth for the betterment of the individual and society.
PO-7	Moral and ethical awareness/reasoning: embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work, demonstrate the ability to identify ethical issues related to one's work, avoid unethical behavior such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights, appreciate environmental and sustainability issues, and adopt objective, unbiased and truthful actions in all aspects of work.
PO-8	Self directed Learning: work independently, identify appropriate resources required for a project, and manage a project till completion.
PO-9	Lifelong Learning: engage in continuous learning for professional growth and development, acquire knowledge and skills, adapt to changing environment and to changing trades and demands of work place through knowledge/skill development/reskilling.
PO-10	Multicultural Competence, Social Interaction and Effective Citizenship: understand the values and beliefs of multiple cultures, global perspectives, engage and interact respectfully with diverse groups and elicit views of others, mediate disagreements and help reach conclusions in group settings, and demonstrate empathetic social concern and equity centred national development

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO No.	Program Specific Outcomes (M.Sc., Computer Science)
PSO1:	Apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems of varying complexity.
PSO2:	Explore the concepts and theories behind computer science to develop innovative software applications.
PSO3:	Apply the latest trends in technology to design, develop and test software applications for specific needs.
PSO4:	Plan and take part in continuous learning and deliver efficient solutions for emerging challenges in the computation domain.
PSO5:	Implement new development tools, software framework, middleware, programming language or methodology to aid in the development of software projects.
PSO6:	Apply and Implement the working of compilers which also tends towards system programming and using various components to implement a efficient scalable software solution in the form of web application.
PSO7:	Understand the interdisciplinary nature of data, information and communications and Adapt new languages quickly.



M.Sc., COMPUTER SCIENCE

COURSE STRUCTURE UNDER CHOICE BASED CREDIT SYSTEM – LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS - LOCF)

(Applicable to the candidates admitted from the academic year 2025-2026)

ELIGIBILITY: Candidates who have passed B.Sc. Computer Science / B.Sc. Information Technology/ B.C.A / B.Sc. Software Development of this University or from a recognized University or an examination accepted by the Syndicate equivalent there to

Sem	Part	Course	Course Code	Title of the Paper	Ins. Hours / Week	L	T	P	S	Credit	Exam Hours	Marks		Total
												CIA	ESE	
I	Part A	Core Course-I	P25CS101	Discrete Mathematics	6	4	1	-	1	5	3	25	75	100
		Core Course -II	P25CS102	Python Programming	6	4	1	-	1	5	3	25	75	100
		Core Practical-I	P25CS103P	Python Programming Lab- Practical I	6	-	-	6	-	3	3	25	75	100
	Part B(i)	Elective Course- I	P25CSE11A / P25CSE11B / P25CSE11C	Mobile Computing/ Soft Computing / Programming the Web	5	4	1	-	-	3	3	25	75	100
		Elective Course-II	P25CSE12A / P25CSE12B / P25CSE12C	Internet of Things / Security Operations Centers / Digital Image Processing	5	4	1	-	-	3	3	25	75	100
	Part B(ii)	Non Major Elective-I			2	1	1	-	-	2	3	25	75	100
				TOTAL	30	17	5	6	2	21	-	-	-	600
II	Part A	Core Course-III	P25CS204	Design and Analysis of Algorithms	6	4	1	-	1	5	3	25	75	100
		Core Course-IV	P25CS205	Compiler Design	6	4	1	-	1	5	3	25	75	100
		Core Practical-II	P25CS206P	Design and Analysis of Algorithms Lab - Practical II	6	-	-	6	-	3	3	25	75	100
	Part B(i)	Elective Course-III	P25CSE23A / P25CSE23B / P25CSE23C	Cryptography and Network Security / Ethical Hacking / Computer Vision	5	4	1	-	-	3	3	25	75	100
		Elective Course - IV	P25CSE24A/ P25CSE24B/ P25CSE24C	Malware Analysis / Social Networking / Open Source Technologies	5	4	1	-	-	3	3	25	75	100
	Part B(ii)	Non Major Elective –II			2	1	1	-	-	2	3	25	75	100
				TOTAL	30	17	5	6	2	21	-	-	-	600

Sem	Part	Course	Course Code	Title of the Paper	Ins. Hours / Week	L	T	P	S	Credit	Exam Hours	Marks		Total
												CIA	ESE	
III	Part A	Core Course –V	P25CS307	Data Mining and Warehousing	6	4	1	-	1	5	3	25	75	100
		Core Course –VI	P25CS308	Advanced Software Engineering	6	4	1	-	1	5	3	25	75	100
		Core Practical-III	P25CS309P	Data Mining Lab- Practical III	6	-	-	6	-	3	3	25	75	100
		Core Industry Module	P25CSI31	Data Analytics	5	4	1	-	-	3	3	25	75	100
	Part B(i)	Elective Course-V	P25CSE35A/ P25CSE35B/ P25CSE35C	Computer Graphics and Multimedia / Research Methodology/ Web Services	5	4	1	-	-	3	3	25	75	100
	Part B(ii)	Skill Enhancement Course	P25SECS31	React JS	2	1	1	-	-	2	3	25	75	100
	Part B(iii)		P25CSIA31	Internship/Industrial Activity	-	-	-	-	-	2	-	-	-	-
				TOTAL	30	17	5	6	2	23	-	-	-	600
IV	Part A	Core Course - VII	P25CS410	J2EE Technologies	5	3	1	-	1	5	3	25	75	100
		Core Course-VIII	P25CS411	Artificial Intelligence and Machine Learning	5	3	1	-	1	5	3	25	75	100
		Core Practical-IV	P25CS412P	J2EE Technologies Lab Practical IV	6	-	-	6	-	3	3	25	75	100
		Core Project	P25CSPW	Project with Viva Voce	8	-	2	6	-	7	3	25	75	100
	Part B(i)	Elective Course- VI (Industry / Entrepreneurship)	P25CSE46A/ P25CSE46B/ P25CSE46C	Cloud Computing Technologies / Block Chain Technologies / Software Testing with Selenium	4	3	1	-	-	3	3	25	75	100
	Part B(ii)	Professional Competency Course	P25PCCS41	Computer Science for NET/SET	2	1	1	-	-	2	3	25	75	100
	Part C		P25CSEA	Extension Activity	-	-	-	-	-	1	-	-	-	-
				TOTAL	30	10	6	12	2	26	-	-	-	600
				GRAND TOTAL	120	61	21	30	08	91	-	-	-	2400
	Extra Credit			MOOC/ SWAYAM / NPTEL (optional)	-	-	-	-	-	2	-	-	-	-
				Value Added Courses (Atleast one per year)	-	-	-	-	-	2	-	-	-	-

L- Lecture,

T- Tutorial,

P-Practical,

S- Seminar

CREDIT DISTRIBUTION FOR M.SC., COMPUTER SCIENCE

S.No.	Part	Subject	No. of Courses	Total Credits
1.	Part A	Core Course	8	40
2.		Core Practical	4	12
3.		Core Project Work -VIVA VOCE	1	7
4.		Core Industry Module	1	3
5.	Part B (i)	Elective Course	6	18
6.	Part B (ii)	Non Major Elective	2	4
7.		Skill Enhancement Course	1	2
8.		Professional Competency Course	1	2
9.	Part B(iii)	Internship	1	2
10.	Part C	Extension Activity	1	1
Total			26	91

Part A component and Part B (i) will be taken into account for CGPA calculation for the postgraduate programme and the other components of Part B and Part C have to be completed during the duration of the programme as per the norms, to be eligible for obtaining the PG degree.

NON MAJOR ELECTIVE (NME) OFFERED BY THE DEPARTMENT

Semester	Part	Course	Course Code	Title of the Paper
I	Part B (ii)	NME-I	P25NMECS11	Data Mining
II		NME-II	P25NMECS22	Fundamentals of Cloud Computing

SEMESTER III

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2025 – 2026)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

Semester: III-CC-V - DATA MINING AND WAREHOUSING

Ins. Hrs. /Week: 6

Course Credit: 5

Course Code: P25CS307

UNIT-I INTRODUCTION TO DATA MINING

(20 Hours)

Overview of Data mining–Relational Databases–Data Warehouses–Transactional Databases–KDD vs Data Mining – Data Mining Functionalities–Classification of Data mining System–Basic Data mining tasks–Data Mining Issues. Applications and Trends in Data Mining: Data Mining Applications – Data Mining System Products and Research Prototypes –Additional Themes on Data mining–Social Implications of Data Mining.

UNIT-II DATA PREPROCESSING

(19 Hours)

Need to preprocess the Data–Descriptive Data Summarization – Data Cleaning- Data Integration and Transformation – Data Reduction – Data cube Aggregation – Attribute Subset Selection–Data Discretization and Concept Hierarchy Generation. Classification: Introduction–statistical based algorithms –Bayesian Classification – Distance Based Algorithms – Decision Tree Based algorithms – ID3.

UNIT-III CLUSTERING

(18 Hours)

Introduction – A Categorization of Major Clustering Methods – Hierarchical algorithms –Partitional algorithms – Minimum spanning Tree – K Means Clustering - Nearest Neighbour algorithm. Association Rules: Definition of Association rule – Methods to discover an association rule–Mining Various kinds of Association Rules – APRIORI algorithm– Partitioning algorithm.

UNIT-IV DATA WAREHOUSE AND OLAP TECHNOLOGY

(17 Hours)

An Overview - Definition of Data Warehouse - A Multidimensional Data Model – Schemas for Multidimensional databases – OLAP Operations in the Multidimensional Data Model–Data Warehouse Architecture – Metadata Repository – Types of OLAP Servers - Data Warehouse Implementation–Efficient Computation of Data Cubes–Indexing OLAP Data- Efficient Processing of OLAP Queries – From Data Warehousing to Data Mining – Data Warehouse Usage.

UNIT-V WEB MINING AND TEXT MINING

(16 Hours)

Web Mining: Mining the Web Page Layout Services – Mining the Web's Linking Structures to identify Authoritative Webpages – Mining Multimedia Data on the Web–Automatic Classification of Web Documents- Web usage mining. Text Mining: Text Data Analysis and Information Retrieval –Dimensionality Reduction for Text– Text Mining Approaches.

Total Lecture Hours - 90

COURSE OUTCOME

On the successful completion of the course, students will be able to

1. Understand the various techniques of Data Mining
2. Apply the usage of data preprocessing techniques
3. Implement the Concept of Clustering Algorithm in the real world problems
4. Apply the Association rule and APRIORI algorithm for mining frequent item sets
5. Interpret the concept of data warehouse Architecture, different types of OLAP servers and Web Mining and Text Mining

TEXT BOOKS

1. Jiawei Han and Micheline Kamber, "DataMining Concepts and Techniques", Morgan Kaufmann Publishers, Massachusetts, USA.x, 2006.
2. Margaret Dunham.H,"Datamining Introductory & Advanced Topics", Pearson Education,India, 2003.

REFERENCE BOOKS

1. Arun Pujari.K ,"Datamining Techniques", Universities Press(India) Pvt, Hyderabad, 2003
2. Max Bramer, "Principles of datamining",Springer 4thEdition, NewYork,USA,2020
3. Pieter Adriaans, Dolf Zantinge,"Data Mining" Pearson Education, India,1998.

E-RESOURCES

1. https://hanj.cs.illinois.edu/bk3/bk3_slidesindex.html
2. <https://www.slideshare.net/2cdude/data-warehousing-3292359>

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	2	2	2	2	2	2	2	2	3	2	1	3	3	2	2
CO2	3	3	2	2	2	2	2	2	2	2	3	2	1	3	3	2	2
CO3	3	2	2	2	2	2	2	2	2	2	3	3	2	3	2	2	2
CO4	3	2	2	2	2	2	2	2	2	2	3	3	2	3	2	2	2
CO5	3	2	2	2	3	2	2	2	2	2	3	3	3	3	2	2	2

S-Strong (3)

M-Medium (2)

L-Low (1)



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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., COMPUTER SCIENCE

Semester: III – CC -VI – ADVANCED SOFTWARE ENGINEERING

Ins. Hrs. /Week: 6

Course Credit: 5

Course Code: P25CS308

UNIT I NEED FOR SOFTWARE ENGINEERING (19 Hours)

About software and Software engineering – A systems approach – Engineering approach – Members of the development team – Change in S/w engineering. - Modeling the process and Life cycle: The meaning of process – S/w process models– Tools and techniques for projects modeling – Practical process modeling.

UNIT II PLANNING AND MANAGING THE PROCESS (20 Hours)

Tracking progress -Milestones-Difference between milestone and activity- Work breakdown and Activity Graphs- Activity Graph- Estimating completion- Tools to track progress-Project personnel : Staff roles and characteristics- Work styles- Rational extroverts- Project Organization: Chief programmer team- Egoless Approach-Effort estimation: Facilities Expert Judgement- Delphi Technique- Algorithmic Methods- COCOMO Model- Machine learning methods - Risk management: Risk Management Activities -The project plan-process models and project management.

UNIT III CAPTURING THE REQUIREMENTS (17 Hours)

The requirement process – Types of Requirements – Characteristics of requirements – Modeling Notations-Prototyping requirements – Requirements Documentation –validation and verification – Measuring requirements – Choosing a requirements specification Techniques.

UNIT IV DESIGNING THE SYSTEM (17 Hours)

Design Introduction - Modeling the Architectures-Decomposition and views – Architectural styles and strategies – Achieving Quality Attributes-Collaborative Design - Architectural Evaluation and Refinement - Documenting software Architectures – Programming standards and procedures – Programming guidelines – Documentation.

UNIT V SOFTWARE TESTING AND MAINTENANCE (17 Hours)

Testing strategic issues – Test strategies for conventional Software – Test strategies for object-oriented Software – Validation testing – System testing – Software testing. Fundamentals – Black-box and White-box testing – White box testing – Black box testing – McCall's Quality factors – ISO 9126 - QF- Software engineering – Software Maintenance.

Total Lecture Hours-90

COURSE OUTCOME

On the successful completion of the course, students will be able to

1. Describe software engineering layered technology and Process frame work
2. Analyze the role of project management including planning, scheduling, risk management, etc.
3. Analyze implementation issues such as modularity and coding standards.
4. Understand of approaches to verification and validation including static analysis, and reviews.
5. Understand of software testing approaches such as unit testing and integration testing.

TEXT BOOKS

1. Roger S. Pressman, "Software Engineering A Practitioner's Approach", 6th Edition, Tata Mc Graw Hill Publication, New Delhi, India.
2. Shari Lawrence P. Fleeger, 2001, "Software Engineering Theory and Practice", 2nd Edition, Pearson Education, Delhi.

REFERENCE BOOKS

1. Douglas Bell, “Software Engineering for Students-A Programming Approach”, 4th Edition, Pearson Education, Delhi, 2007.
2. Ian Sommerville, “Software Engineering”, 6th Edition, Pearson Education, Delhi, 2005.
3. Rajib Mall, “Fundamentals of Software Engineering”, 5th Edition, PHIlearning, Delhi.

E RESOURCES

1. https://books.google.com/books/about/Software_Engineering.html?id=fadQAAAAAAAJ
2. <https://shorturl.at/guBF9>
3. <https://www.tutorialspoint.com/sdlc/index.html>

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
	CO1	3	3	2	2	2	2	2	2	2	3	2	2	3	3	2	2
	CO2	3	3	2	3	2	2	2	2	2	3	3	2	3	3	2	3
	CO3	3	3	2	2	2	2	2	2	2	3	3	2	3	3	2	2
	CO4	2	2	3	3	2	2	2	2	2	3	2	2	2	2	3	3
	CO5	2	2	3	3	2	2	2	2	2	3	3	2	2	2	3	3
S-Strong (3)			M-Medium (2)							L-Low (1)							

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2025 – 2026)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

Semester: III – CP -III – DATA MINING LAB - PRACTICAL III

Ins. Hrs. /Week: 6

Course Credit: 3

Course Code: P25CS309P

EXERCISE

1. Write a R program using Simple Commands.
2. Write a R program using Control Structures.
3. Write a calculator program using R.
4. Write a R Program to perform Data Preprocessing:
 - a. Data type Conversion
 - b. Data Transformation
5. Write a R Program to apply Filters:
 - a. Replace Missing Values
 - b. Add Expression
6. Regression: Perform Simple Regression using R Package
7. Classification: Apply Naïve Bayes Rule by using R Package.
8. Clustering: Apply Partitioned Algorithm by using R Package.
9. Clustering: Apply Hierarchical Algorithm by using R Package.
10. Association Rule Mining: A- Priori Algorithm by using R Package.

COURSE OUTCOME

On the successful completion of the course, students will be able to,

1. Understand to import external data into R for data processing and statistical analysis
2. Implement the R data structures – vector and data frame
3. Understand to compute basic summary statistics
4. Implement the data visualizations in the ggplot package
5. Evaluate the fundamental error problems in R Studio.

TEXT BOOKS

1. Margaret H.Dunham, “Data Mining: Introductory and Advanced Topics”, Pearson education, 2003.
2. C.S.R. Prabhu, “Data Warehousing Concepts, Techniques, Products and Applications”, PHI, Second Edition.

REFERENCE BOOKS

1. Arun K.Pujari, "Data Mining Techniques", Universities Press(India) Pvt. Ltd., 2003.
2. Alex Berson, Stephen J.Smith, "Data Warehousing, Data Mining and OLAP", TMCH, 2001.

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOMES	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	PS01	PS02	PS03	PS04	PS05	PS06	PS07
	CO1	3	3	2	2	2	2	0	2	2	3	2	2	3	3	2	2
	CO2	3	3	2	2	2	2	0	2	2	3	2	2	3	3	2	2
	CO3	3	3	3	2	2	2	0	2	2	3	2	2	3	3	3	2
	CO4	2	3	2	2	2	2	2	2	2	3	3	2	2	3	2	2
	CO5	2	3	2	2	2	2	2	2	2	3	3	2	2	3	2	2
	S-Strong (3)			M-Medium (2)					L-Low (1)								

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2025 – 2026)
PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., COMPUTER SCIENCE

Semester: III– Core Industry Module - DATA ANALYTICS

Ins. Hrs. /Week: 5

Course Credit: 3

Course Code: P25CSI31

UNIT- I TYPES OF DIGITAL DATA

(15 Hours)

Data, Characteristics of data and Types of digital data: Unstructured, Semi-structured and Structured, Sources of data, Working with unstructured data, Evolution and Definition of big data, Characteristics and Need of big data, Challenges of big data, Data environment versus big data environment.

UNIT- II DATA ANALYTICS

(15 Hours)

Overview of business intelligence, Data science and Analytics, Meaning and Characteristics of big data analytics, Need of big data analytics, Classification of analytics, Challenges to big data analytics, Importance of big data analytics, Basic terminologies in big data environment.

UNIT- III BIG DATA TECHNOLOGIES AND DATABASES

(15 Hours)

Introduction to NoSQL, Uses, Features and Types, Need, Advantages, Disadvantages and Application of NoSQL, Overview of NewSQL, Comparing SQL, NoSQL and NewSQL, Introduction to MongoDB and its needs, Characteristics of MongoDB, Introduction of apache Cassandra and its needs, Characteristics of Cassandra.

UNIT- IV HADOOP FOUNDATION FOR ANALYTICS

(15 Hours)

History, Needs, Features, Key advantage and Versions of Hadoop, Essential of Hadoop ecosystems, RDBMS versus Hadoop, Key aspects and Components of Hadoop, Hadoop Architectures.

UNIT- V HADOOP MAPREDUCE AND YARN FRAMEWORK

(15 Hours)

Introduction to MapReduce, Processing data with Hadoop using MapReduce, Introduction to YARN, Components, Need and Challenges of YARN, Dissecting YARN, MapReduce application, Data serialization and Working with common serialization formats, Big data serialization formats.

Total Lecture Hours-75

COURSE OUTCOME

On the successful completion of the course, students will be able to

1. Outline the basics in Big Data Analytics
2. Interpret and demonstrate the knowledge of data analysis techniques
3. Understand, illustrate and evaluate the concepts and techniques of Data Science, Big Data Analytics and its tools
4. Collaborate, apply and review the computing for big data in Hadoop, and NoSQL environment
5. Comprehend, implement and review the concepts of data science and big data analytics projects using MapReduce, MongoDB, HIVE and PIG

TEXT BOOK

1. Seema Acharya and Subhashini Chellappan, "Big Data and Analytics", Wiley India Pvt. Ltd., 2016

REFERENCE BOOKS

1. Anand Rajaraman, Jure Leskovec, Jeffery D. Ullman, "Mining of Massive Datasets", Springer, July 2013.
2. Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, "Big Data", Wiley Publications, 2014.
3. Soumendra Mohanty, Madhu Jagadeesh and Harsha Srivatsa, "Big Data Imperatives : Enterprise Big Data Warehouse, BI Implementations and Analytics", Apress Media, Springer Science + Business Media New York, 2013
4. Tom White, "Hadoop: The definitive Guide", O'Reilly Media, 2010.

E- RESOURCES

1. <http://www.theartofcommander.com/text/dmwhite/dmwhite.htm>
2. <http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=AD0770256>
3. <https://www.datamentor.io/r-programming#tutorial>
4. <http://www.csis.pace.edu/~ctappert/cs816-15fall/books/2015DataScience&BigDataAnalytics.pdf>
5. <http://www.rdatamining.com/>
6. <https://www.analyticsvidhya.com/blog/2016/02/complete-tutorial-learn-data-science-scratch/>
7. https://www.tutorialspoint.com/data_mining/dm_classification_prediction.htm

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PS01	PS02	PS03	PS04	PS05	PS06	PS07
CO1	3	2	3	3	2	2	3	3	3	3	3	3	3	2	3	3	3
CO2	3	3	3	3	3	3	2	3	3	2	3	2	3	3	3	3	2
CO3	3	2	3	3	2	2	3	3	3	3	2	3	2	2	2	2	3
CO4	3	3	3	3	3	3	2	2	3	2	3	2	3	3	3	3	2
CO5	3	3	3	3	3	3	3	2	3	3	3	2	3	3	3	3	3
S-Strong (3)		M-Medium (2)					L-Low (1)										

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2025 – 2026)
PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

Semester: III-EC-V(a) – COMPUTER GRAPHICS AND MULTIMEDIA
Ins. Hrs. /Week: 5 Course Credit: 3 Course Code: P25CSE35A

UNIT – I GRAPHICS HARDWARE (14 Hours)

Basic of Computer Graphics – Applications - Display technology – Types of Display devices - Raster Scan display systems: Architecture and operations of Raster display - Random scan display systems: Architecture and operations of vector display - Input devices.

UNIT – II BASIC RASTER GRAPHICS FOR DRAWING 2_D PRIMITIVES (16 Hours)

Scan converting lines – circles – ellipse - Filling rectangles - polygons - generating characters - Antialiasing. Matrix representation and Homogeneous coordinates - Two dimensional transformations - 2D line clipping - polygon clipping algorithms - window to viewport transformation.

UNIT – III VIEWING IN 3D (14 Hours)

Three dimensional transformation: Translation, Scaling, Rotation, Shearing, Reflection in 3D using homogeneous coordinates - Projections: Parallel – Methods of projection 3D objects onto 2D viewing plane – Perspective projection – one point, two point, three point perspectives – Viewpoints: Camera positioning and Viewing coordinate system.

UNIT – IV REPRESENTATION OF CURVES & SURFACES (16 Hours)

Bezier method, B-spline methods. Visible surface determination: Z-buffer, Algos, List priority algorithms, Scan line algorithms. Light and shading models: Illumination models, shading models for polygons, shading algorithms, Gouraud & Phong, color models like RGB, YIU, copy, HSV etc.

UNIT – V INTRODUCTION TO MULTIMEDIA (15 Hours)

Multimedia components; multimedia hardware, SCSI, IDE, MCI, Multimedia data and file formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia tools, presentations tools, Authoring tools, presentations. Graphics animation : Tweening, Morphing simulating accelerator, motion specification.

Total Lecture Hours – 75

On the successful completion of the course, students will be able to,

- ## TEXT BOOKS

- ## REFERENCE BOOKS

1. R Steimnetz, K Nashtet, Multimedia Computing Communications & Appl., PHI,2004
2. John F.K. Buford, Multimedia System, Addison Wesley,1994.
3. Prabhat K. And leigh and Kiran Thakkar, Multimedia System Design, PHI, 2015.
4. Roger S. David Mathematical Elements for Computer Graphics, McGraw Hill,1990.

1. https://www.tutorialspoint.com/computer_graphics/computer_graphics_cur ves.htm
2. <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=2479>
3. https://www.tutorialspoint.com/computer_graphics/index.htm

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	
	CO1	3	2	3	2	3	2	3	2	2	3	2	3	2	3	2	2	3
	CO2	2	3	2	3	2	3	2	3	3	2	3	2	3	2	3	3	2
	CO3	3	2	3	2	3	2	3	2	2	3	2	3	2	3	2	2	3
	CO4	3	2	3	2	3	2	3	2	2	3	2	3	2	3	2	2	3
	CO5	2	3	2	3	2	3	2	3	3	2	3	2	3	2	3	3	2

S-Strong (3)

M-Medium (2)

L-Low (1)

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2025 – 2026)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

Semester: III-EC-V(b) – RESEARCH METHODOLOGY

Ins. Hrs. /Week: 5

Course Credit : 3

Course Code: P25CSE35B

UNIT-I RESEARCH FUNDAMENTALS

(14 Hours)

Motivation and Objectives – Research Methods and Methodology - Research types – Descriptive Vs Analytical, Applied Vs Fundamental, Quantitative Vs Qualitative, Conceptual Vs Empirical, concept of applied and Basic research process – Criteria of good Research.

UNIT-II RESEARCH FORMULATION AND PROBLEMS

(16 Hours)

Defining and formulating the Research problem – Selecting the problem – Necessity of defining the problem – Importance of Literature review in defining a problem – Literature collection - Literature review – Primary and secondary sources – Reviews – Monograph – Patents – Research Databases – Web as a source – Searching the web – Critical literature review – Identifying gap areas from literature and research database, Development of working hypothesis.

UNIT-III THESIS WRITING

(14 Hours)

Writing review and journal articles – manuscript publication - Thesis Writing: Planning a thesis – general format – page and chapter format – footnotes – tables and figures–references and appendices. Research Tools in Computer Science: LaTeX, R, WEKA, MATLAB, NS2. Copy Editing: Introduction to Copyediting, Objectives of Copyediting-correctness, consistency, coherence and clarity-Editing your own paper: Fixing grammar and usage errors, basic punctuation, consistent style and clear sentences-creating and using a style sheet for effective copyediting-Tools-Ms Editor, Grammarly, Quillbot.

UNIT-IV RESEARCH ETHICS

(16 Hours)

Philosophy - Definition, nature, scope and concept - Ethics – definition, moral philosophy, nature of moral judgments and reactions - Ethics with respect to science and research- Scientific misconducts– falsification, fabrication and plagiarism software – Turnitin, Urkund and other open source software tools - Redundant publications-duplicate and overlapping publications - Publication ethics- definition and importance. Publication misconduct-definition, concept, problems that lead to unethical behavior, types, Violation of publication ethics, authorship and contributor ship - Software tool to identify predatory publications developed by SPPU - Subject specific ethical issues-authorship, Conflicts of interest.

UNIT-V ETHICS IN INFORMATION TECHNOLOGY

(15 Hours)

Overview of Ethics: Definition of Ethics - The Importance of Integrity - The Difference Between Morals, Ethics, and Laws - Ethics in the Business World - Corporate Social - Improving Corporate Ethics Creating an Ethical Work Environment - Ethics in Information Technology – Ethics for IT Workers and IT users: IT Professionals - Professional Relationships - Professional Codes of Ethics - Professional Organizations.

Total Lecture Hours - 75

COURSE OUTCOME

On the successful completion of the course, students will be able to

1. Understand the basic concepts of research and its types
2. Analyze the research problems in the real world scenario
3. Understand scholarly writing and development of the skills to write the same
4. Use tools related to research in Computer Science and art of thesis writing
5. Apply the research ethics and publication ethics in Information technology to justify the morals of professional ethics

TEXT BOOKS

1. Garg B.L.Karadia, R.Agarwal, F and Agarwal, “An Introduction to Research Methodology” RBSA Publishers, U.K., 2002
2. George Reynolds, “Ethics in Information Technology” Thompson Course Technology, 2007 ISBN 13:978-1-4188-3631-3(Chapter:1,2,10)
3. Kothari C.R. Research Methodology – methods and techniques, 2nd Edition, Wishwa Prakashjan NewDelhi, 1999.
4. Sinha.S.C and Dhiman A.K, “Research Methodology”, Ess Ess Publications - Second Volume, 2002.
5. Vivek Kumar K.P. Eashwar, “Discover the editor in you”, Saurph Printers, 2023(Chapter 14).

REFERENCE BOOKS

1. Anderson, Durston and Poole, “Thesis and Assignment writing”, Wiley Eastern Ltd.ND, 1970.
2. Misra R.P. Research Methodology–A Hand Book, Concept publishing Company, NewDelhi, 1988.

E_RESOURCES

1. <https://ccsuniversity.ac.in/bridge-library/pdf/Research-Methodology-CR-Kothari.pdf>
2. https://repository.dinus.ac.id/docs/ajar/ethics_in_information_technology2c_5th_ed.03..pdf

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PS01	PS02	PS03	PS04	PS05	PS06	PS07
CO1	3	2	3	2	3	2	3	2	2	3	2	3	2	3	2	2	3
CO2	2	3	2	3	2	3	2	3	3	2	3	2	3	2	3	3	2
CO3	3	2	3	2	3	2	3	2	2	3	2	3	2	3	2	2	3
CO4	3	2	3	2	3	2	3	2	2	3	2	3	2	3	2	2	3
CO5	2	3	2	3	2	3	2	3	3	2	3	2	3	2	3	3	2

S-Strong (3)

M-Medium (2)

L-Low (1)

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2025 – 2026)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

Semester: III-EC-V(c) – WEB SERVICES

Ins. Hrs. /Week: 5

Course Credit: 3

Course Code: P25CSE35C

UNIT –I WEB SERVICES AND XML FUNDAMENTALS (15 Hours)

Definition of web services -Importance of Web Services - SOAP-WSDL - UDDI - Basic web services standards, technologies and concepts. XML Fundamentals: The Lingua Franca of web services - XML Documents. XML namespaces: Explicit and Default namespaces-inheriting namespaces- XML Schema - XML schema and namespaces- Implementing XML schema types-The any Element, Inheritance-Substitution groups-Global and local type declarations.

UNIT- II SOAP AND WSDL (15 Hours)

The SOAP Model - SOAP Messages-SOAP Envelope- SOAP Header - SOAP Body-SOAP Faults - SOAP with Attachments - WSDL: Structure - The types element-Managing WSDL descriptions - Using SOAP and WSDL Service implementation and Invoking web services.

UNIT –III UDDI AND QoS (15 Hours)

Introduction- UDDI specification - UDDI and lifecycle management. Conversation: Overview - Web Services Conversation Language (WSCL) -WSCL Interface components - Quality of Service: Importance QoS for web services-QoS metrics for web services.

UNIT -IV TRANSACTIONS (15 Hours)

ACID Transactions – Distributed Transactions and two-phase commit – Scaling transactions to web services – Web services transaction Protocol - Security: Everyday security basis – Security is an end-to-end process – Web service security issues – Types of Security attacks and threats - WS security.

UNIT –V XML AND HTML (15 Hours)

The limits of HTML - The scope of HTML – Structure - Structure and Content-Structure and Synthesis - Structure and Presentation - Representing Structure. The XML Language: Markup languages - Defining Markup Languages in XML - Linking in XML: Links- (Information, Resources, and Hot Spots) - Link Management - XML Style: The publishing Process Structuring data - Processing from one stage to the next-Choosing a client-side processing Application - Choosing a Server-side processing application.

Total Lecture Hours- 75

COURSE OUTCOME

On the successful completion of the course, students will be able to

1. Understand the Web Services standards and technologies
2. Apply the techniques of SOAP and WSDL Services.
3. Develop the UDDI and QoS Strategies and Web Services application development
4. Implement the concept of Transactions and security
5. Understand about XML Concepts, HTML and Apply Links in XML

TEXT BOOKS

1. Rick Darnell, "HTML 4 Unleashed", Second Edition, Sams Publication, USA, 1999.
2. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services - An Architect's Guide", New Jersey, Pearson Education, India, 2004.

REFERENCE BOOKS

1. Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services", First Indian Reprint, Pearson Education, India, 2005.
2. Ethan Cerami, "Web Services Essentials Distributed Applications with XML-RPC, SOAP, UDDI & WSDL", First Edition, O'Reilly, California, 2002.
3. Kumar. B.V, Subrahmanya. S.V, "Web Services: An Introduction"- McGraw Hill Education, New York, USA, 2012.

E-RESOURCES

1. <https://rb.gy/lsmpl>
2. <https://bit.ly/39ervBn>
3. <https://www.slideshare.net/gerardsylvester/webservices-presentation>
4. <http://shorturl.at/ajzGS>

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	3	3	3	2	3	3	2	3	3	3	2	3	3
CO2	2	3	2	3	2	3	2	3	2	2	3	2	3	2	3	3	2
CO3	3	2	3	2	3	2	3	3	3	3	3	3	3	3	3	2	3
CO4	2	3	2	3	2	3	2	3	3	2	3	2	2	2	3	3	2
CO5	3	2	3	2	3	3	3	2	2	3	2	3	3	3	2	2	3
S-Strong (3)			M-Medium (2)									L-Low (1)					



**SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2025 – 2026)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

Semester: III-SEC I- REACT JS

Ins. Hrs. /Week: 2

Course Credit:2

Course Code: P25SECS31

Unit I JAVASCRIPT ESSENTIALS

(6 Hours)

Introduction to JavaScript, Variables, Control statements, Array, Functions, popup boxes

Unit II JAVASCRIPT DOM & FORMS

(6 Hours)

Document Object Model, getElementById, innerHTML, Basic form validations

Unit III REACT BASICS & JSX

(6 Hours)

What is React, Why React, React project setup, JSX, Expressions, Attributes, Fragments

Unit IV COMPONENTS, STATE & PROPS

(6 Hours)

Functional components, Class components, Component composition, State with useState, Passing data with props, defaultProps

Unit V LISTS, EVENTS & FORMS

(6 Hours)

Rendering lists with map, key prop, Event handling, Synthetic events, Basic forms in React

Total Lecture Hours-30

COURSE OUTCOME

On the successful completion of the course, students will be able to

1. Understanding JavaScript Basics and DOM Manipulation.
2. Implementing JavaScript Features for User Interaction
3. Exploring and Using React for UI Development
4. Developing React Components and Managing State
5. Managing Events and Dynamic Data in React

TEXT BOOKS

1. Vipul A M, Prathamesh Sonpatki, "ReactJS by Example - Building Modern Web Applications with React", Packt Publishing, 2016.
2. Emma William, "React Js for Beginners A Comprehensive Beginner's Guide to ReactJS", 2021.
3. Thomas A Powell "HTML & CSS, the complete reference, fifth edition", McGraw Hill LLC, 2010.

REFERENCE BOOKS

1. Adam Boduch, Roy Derks, "React and React Native A Complete Hands-on Guide to Modern Web and Mobile Development", Packt Publishing, 2020.
2. Lionel Lopez, "Quickstart Step-By-Step Guide to Learning React Javascript Library", Createspace Independent Publisher, 2017.

E-RESOURCES

1. <http://React.js>

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	3	3	3	2	3	3	2	3	3	3	2	3	3
CO2	2	3	2	3	2	3	2	3	2	2	3	2	3	2	3	3	2
CO3	3	2	3	2	3	2	3	3	3	3	3	3	3	3	3	2	3
CO4	2	3	2	3	2	3	2	3	3	2	3	2	2	2	3	3	2
CO5	3	2	3	2	3	3	3	2	2	3	2	3	3	3	2	2	3

S-Strong (3)

M-Medium (2)

L-Low (1)

VALUE ADDED COURSE



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2025 – 2026)

**PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., COMPUTER SCIENCE**

Semester: III - VAC –II – DATA ANALYSIS USING PANDAS

Course Credit:2

Course Code: P25CSVA32

UNIT I INTRODUCTION TO PANDAS AND SERIES

(6 Hours)

Introduction to Pandas - Features and advantages of Pandas - Data structures in Pandas - Introduction to Series - Creating Series from: Arrays, Lists, Scalar values, Dictionaries - Mutable index in Series - Mathematical operations on Series

UNIT II OPERATIONS ON SERIES

(6 Hours)

Head() and Tail() functions - Selection in Series using: loc[], iloc[], [] operator - Indexing in Series - Slicing in Series - Boolean operations in Series

UNIT III DATA FRAME FUNDAMENTALS

(6 Hours)

Introduction to DataFrame - Properties of DataFrame - Creating DataFrames using: Series, Lists, Dictionaries, NumPy arrays - Iteration in DataFrame: iterrows(), iteritems() - Selecting rows and columns - Adding, renaming, and deleting columns

UNIT IV DATA MANIPULATION IN DATAFRAME

(6 Hours)

Accessing DataFrames using: loc(), iloc() - Head() and Tail() methods in DataFrame - Boolean indexing - Concatenation of DataFrames - Merge operations: Inner Join, Outer Join, Left Join, Right Join - Joining on Index

UNIT V CSV FILE HANDLING USING PANDAS

(6 Hours)

Introduction to CSV files - Structure and creation of CSV files - Reading CSV files using: pd.read_csv() - Exporting DataFrame to CSV using: to_csv()

Total Lecture Hours - 30

COURSE OUTCOME

On the successful completion of the course, students will be able to

1. Understand the fundamentals of Pandas and its data structures such as Series and DataFrame
2. Create and manipulate Series and DataFrame objects using different data sources
3. Apply indexing, slicing, selection, and iteration techniques on Pandas objects
4. Perform data manipulation operations such as concatenation, merging, and joining of DataFrames
5. Read, analyze, and export CSV data files using Pandas functions

TEXT BOOK

1. Daniely Y.Chen, “Pandas for Everyone – Python Data Analysis”, Addison - Weley Professional, 2022.

REFERENCE BOOK

1. Stefanie Molin, “Hands –on Data Analysis with Pandas”, Packet Publishing, 2021.
2. Bharti Motwani, “Data Analysis using Python”, Second Edition, Wiley Publication, 2025.

E-RESOURCES

1. <http://www.python4csip.com>
2. <https://www.geeksforgeeks.org>

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	3	3	3	2	3	3	2	3	3	3	2	3	3
CO2	2	3	2	3	2	3	2	3	2	2	3	2	3	2	3	3	2
CO3	3	2	3	2	3	2	3	3	3	3	3	3	3	3	3	2	3
CO4	2	3	2	3	2	3	2	3	3	2	3	2	2	2	3	3	2
CO5	3	2	3	2	3	3	3	2	2	3	2	3	3	3	2	2	3
S-Strong (3)			M-Medium (2)					L-Low (1)									

SEMESTER IV



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., COMPUTER SCIENCE

Semester: IV–CC-VII - J2EE TECHNOLOGIES

Ins. Hrs. /Week: 5

Course Credit: 5

Course Code: P25CS410

UNIT- I CLIENT – SERVER ARCHITECTURE

(15 Hours)

Introduction – Distributive Systems – Real Time Transmission – Software objects – Web Services – The Tier – Client, Resources and Components – Accessing Services – J2EE Multi-Tier Architecture– J2EE Best Practices – Clients – Client Presentation – Client Input Validation– Client Control– Duplicate Client Request– Session Management– Client-side Session State – Server-side Session State.

UNIT- II PRESENTATION SERVICES

(15 Hours)

Java and XML – Generating an XML Document – Parsing XML– Document Object model (DOM)– Simple API for XML (SAX)– Java Servlets – Java Servlets and Common Gateway Interface Programming–Benefits of Using a Java Servlet – A Simple Java Servlet– Anatomy of a Java servlet – Java Server Pages–JSP Installation – JSP Tags – Tomcat – Request String–User Sessions – Cookies –Session Objects.

UNIT- III INTERACTION SERVICES

(15 Hours)

Enterprise Java Beans – EJB Container – EJB Classes – EJB Interfaces – Deployment Descriptors – Session Java Bean – Stateless Vs Stateful – Creating a Session Java Bean – Entity Java Bean – Message Driven Bean – The JAR File –Java Mail – Java Remote Method Invocation – Remote method Invocation Concept– Server Side – Client Side.

UNIT- IV SECURITY SERVICES

(15 Hours)

Java Message Service – JMS Fundamentals – Components of a JMS Program – Messages – Message Selector – Sending Message to a Queue – Receiving Message from a Queue – Compiling and Running Queue Programs – Creating a Publisher – Creating a Subscriber – Security – J2EE Security Concepts–JVM Security – Security Management – Java API Security – Browser Security – Web Services Security–Web Services Security Classifications – Security Within a WebServices Tier– Programmatic Security.

UNIT- V J2EE DATABASES

(15 Hours)

J2EE Database Concepts – Data – Database – JDBC Objects – Database Connection – The Connection– Timeout - JDBC and Embedded SQL – Tables – Inserting Data into Tables – Selecting Data from a Table – Updating Tables – Deleting Data from Table.

Total Lecture Hours-75

COURSE OUTCOME

On the successful completion of the course, students will be able to

1. Develop own Web applications with various available resources
2. Understand different open-source frameworks
3. Evaluate Java Runtime Environment and Java Virtual Machine
4. Familiarize the concept of J2EE Architecture and Specifications
5. Effectively use J2EE Databases

TEXT BOOKS

1. James Holmes, “The Complete References Struts Second Edition”, Tata McGraw Hill Edition, India, 2007.
2. Jim Keogh, “The Complete Reference J2EE”, Tata McGraw – Hill Edition, India, 2002.

REFERENCE BOOKS

1. Jusin Couch, Daniel H. Steinberg, “J2EE Bible”, Wiley India (P) Ltd, New Delhi, 2002.
2. Paul Tremblett, “Instant Enterprise Java Y-Beans”, Tata McGraw Hill Publishing Company, NewDelhi, 2001.
3. Rick Cattell, “J2ee Technology in Practice: Building Business Applications with the Java 2Platform”, Enterprise Edition (Enterprise), Addison-Wesley Professional, Bostan, USA, 2001.

E-RESOURCES

1. http://ptgmedia.pearsoncmg.com/imprint_downloads/informit/sun/032124575X.pdf
2. https://www.lnjpitchapra.in/wp-content/uploads/2020/03/file_5e817ee54956f.pdf
3. <https://people.engr.ncsu.edu/efg/517/f02/common/syllabus/lectures/lec21.pdf>

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	3	3	3	3	3	2	2	3	3	3	3	3	3	3	2	2
CO2	3	2	3	2	2	3	3	3	2	2	2	3	2	3	3	2	3
CO3	3	3	2	3	3	3	3	2	3	2	2	2	2	3	3	3	2
CO4	3	2	3	2	3	2	3	3	2	2	2	3	3	3	2	3	3
CO5	3	3	2	3	3	3	2	2	3	3	3	2	3	2	2	2	2

S-Strong (3)

M-Medium (2)

L-Low (1)



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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

Semester: IV – CC -VIII - ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Ins. Hrs. /Week: 5

Course Credit: 5

Course Code: P25CS411

UNIT-I INTRODUCTION TO ARTIFICIAL INTELLIGENCE (18 Hours)

Various Definitions of AI-Foundation of AI-Strong and Weak AI-History of AI-Current Trends in AI: Game Playing-Logistic Planning-Robotics-Language understanding and Problem Solving- Human Vs Machine-Feature of Artificial Intelligence - Intelligent Agents: Agents and its Environment –Architecture of Agent- Role of an Agent Program-The weak and Strong Agent-The Environments-Types of Agents-Designing an Agent System.

UNIT- II PROBLEM SOLVING METHODS (18 Hours)

Problem Solving Strategies: Searching for Solution-Search Strategies- Control Strategy-Repeated States-Searching with partial Information-Heuristic Search Strategies: Heuristic Search-Local Search Algorithms and Optimization Problems - Constraint Satisfaction Problems: Constraint Satisfaction Problem Concepts-Constraints in CSPs-Backtracking Search-Local Search for CSP- Graph Structured CSP - Alpha-Beta Pruning: Steps in Alpha-Beta Pruning-Alpha Cutoff-Beta Cutoff-Algorithm for Alpha-Beta Pruning-Examples of Alpha-Beta Pruning.

UNIT-III KNOWLEDGE REPRESENTATION (18 Hours)

Knowledge Representation and Propositional Logic: Representation and Mappings-Approaches to Knowledge Representation-Propositional Logic-Semantics for Propositional Logic-Forward and Backward Chaining-Agent based on Propositional Logic – First Order Predicate Logic: First Order Logic-Quantifiers-Wumpus World represented using First Order Logic-Monotonic and Non-Monotonic Reasoning-Programming in AI using Prolog-Knowledge Representation and Ontological Engineering.

UNIT-IV INTRODUCTION TO SOFTWARE AGENT (18 Hours)

Software Agent and Multi Agent Systems: Intelligent Agent-Intelligent Programming Languages - Multiagent Systems and Agent's Communication: Need for Multi-agent Systems-Characteristics of Multi-agent Systems-Working Together in Multi-agent System-Artificial Neural Networks.

UNIT- V APPLICATIONS (18 Hours)

AI in Field of Natural Language Processing: Introduction to Natural Language Processing- Knowledge Level used in Natural Language Processing - NLP Techniques-Morphological Analysis- Advantages of NLP - Problems in NLP - NLP Systems and Research in NLP-Information Retrieval(IR)- Big Data and Information Retrieval-Speech Recognition. Robotics: Overview of Robotics-Robot Classification-Robot Characteristics-Use of Robots-Mapping for a Point Robot-

Contact-Inertial- Infrared Sensors-Sonar-Radar-Laser Rangefinders-Biological Sensing-Horizontal Decomposition- Middleware-Robotic Assistant for persons with Disability-Robotic as Therapist for Neurological Conditions-Exoskeleton Robots for Replacing Motor Functions.

Total Lecture Hours-75

COURSE OUTCOME

On the successful completion of the course, students will be able to,

1. Understand the problems that are amenable to solution by AI methods.
2. Understand the appropriate AI methods to solve a given problem.
3. Learn about the Formalise given problem in the language/framework of different AI methods.
4. Implement basic AI algorithm.
5. Understand the basic concepts of robotics.

TEXT BOOKS

1. Anamitra Deshmukh-Nimbalkar, " Artificial Intelligence", Technical Publications, FirstEdition, Jan 2020, Chennai, Tamil Nadu. 2020.
2. David L.Poole, Alan K.Mackworth, “Artificial Intelligence: Foundations of Computational Agents” , Cambridge University Press, Cambridge, England, 2010.
3. Elaine Rich and Kevin Knight," Artificial Intelligence”, Second Edition, Tata McGraw Hill Publishers Company Pvt Ltd, New Delhi, India. 1991.

REFERENCE BOOKS

1. Ethem Alpaydin, "Introduction to Machine Learning" (Adaptive computation and Machine Learning Series), Second Edition, The MIT Press, Cambridge. 2009.
2. Stuart Russel and Peter Norvig, "AI – A Modern Approach", 2nd Edition, Pearson Education, London, England. 2007.

E-RESOURCES

1. <https://bit.ly/3ehDIG4>
2. <https://bit.ly/3suPDWf>
3. <https://bit.ly/2Q6dlLv>

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
	CO1	3	2	3	2	3	2	3	2	2	3	2	3	2	3	2	3
	CO2	3	2	3	2	3	2	3	2	2	3	2	3	2	3	2	3
	CO3	2	3	2	3	2	3	2	3	3	2	3	2	3	2	3	2
	CO4	2	3	2	3	2	3	2	3	3	2	3	2	3	2	3	2
	CO5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	S-Strong (3)				M-Medium (2)						L-Low (1)						



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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., COMPUTER SCIENCE

Semester: IV–CP-III - J2EE TECHNOLOGIES LAB - PRACTICAL IV
Ins. Hrs. /Week: 6 Course Credit: 3 Course Code:P25CS412P

EXERCISES

1. To find the marks of the students using Remote Method Invocations.
2. To write a Servlet program to calculate the bonus of an employee
3. To write a Servlet program to implement Session Tracking.
4. To write a Servlet program to check authentication for user using Cookies.
5. To write a Servlet program and use JDBC in it.
6. To write a simple program for JSP.
7. To write a JSP program that works with JDBC.
8. To write a JSP Program with Bean Class.
9. To write a EJB Stateless Program to create bonus of an employee.

COURSE OUTCOME

On the successful completion of the course, students will be able to

1. Master the whole process of designing, implementing, and deploying J2EE Applications.
2. Implement and access web service components using EJB in java EE Applications.
3. Understand the concept of Servlet.
4. Analyse the concept of Core Java.
5. Apply the different open source formats.

TEXT BOOKS

1. James Holmes, "The Complete References Struts Second Edition", Tata McGraw Hill Edition, India, 2007.
2. Jim Keogh, "The Complete Reference J2EE", Tata McGraw – Hill Edition, India, 2002.

REFERENCE BOOKS

1. Jusin Couch, Daniel H. Steinberg, "J2EE Bible", Wiley India (P) Ltd, New Delhi, 2002.
2. Paul Tremblett, "Instant Enterprise Java Y-Beans", Tata McGraw Hill Publishing Company, NewDelhi, 2001.
3. Rick Cattell, "J2ee Technology in Practice: Building Business Applications with the Java 2Platform", Enterprise Edition (Enterprise), Addison-Wesley Professional, Bostan, USA, 2001.

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	3	2	2	2	3	3	3	2	2	2	3	3	3	2	2
CO2	2	3	2	3	3	3	2	2	3	3	3	2	3	3	3	3	2
CO3	3	3	2	3	3	3	2	2	2	3	3	3	3	3	3	3	3
CO4	2	3	2	3	3	3	2	2	2	3	3	3	2	2	2	3	3
CO5	3	2	3	2	2	3	3	3	3	2	2	3	2	2	2	2	3

S-Strong (3)

M-Medium (2)

L-Low (1)

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE

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SUNDARAKKOTTAI, MANNARGUDI- 614016

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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

Semester: IV–EC-VI(a) - CLOUD COMPUTING TECHNOLOGIES

Ins. Hrs. /Week: 4

Course Credit: 3

Course Code: P25CSE46A

UNIT-I COMPUTING BASICS

(12 Hours)

Introduction to Cloud computing definition- Characteristics of Cloud Computing- Cloud Models- Cloud Service Examples- Cloud based Services and Applications- Cloud concepts and Technologies.

UNIT-II CLOUD SERVICES AND PLATFORMS

(12 Hours)

Compute Services - Storage Services - Cloud Database Services - Application Services – Content Delivery Services - Analytics Services - Deployment And Management Service - Identity and Access Management Services - Open Source Private Cloud Software.

UNIT-III CLOUD APPLICATION DESIGN AND DEVELOPMENT

(12 Hours)

Design consideration- Reference Architecture for Cloud Application - Cloud Application Design Methodologies - Data Storage Approaches- Development in Python: Design Approaches – Application: Image Processing - Document Storage - Map Reduce - Social Media Analytics.

UNIT-IV PYTHON FOR CLOUD

(12 Hours)

Introduction- Installing Python- Data types & Data Structures- Control Flow- Functions Modules- Packages- File Handling- Date/Time Operations – Classes- Python for Cloud: Amazon Web Services –Google Cloud Platform - Windows Azure –Map Reduced – Packages of Interest – Designing a RESTful Web API.

UNIT-V MULTIMEDIA CLOUD & CLOUD SECURITY

(12 Hours)

Multimedia Cloud: Case Study: Live Video Stream App - Streaming Protocols – Case Study: Video Transcoding App-Cloud Security: CSA Cloud Security Architecture – Authentication - Authorization - Identity and Access management - Data Security - Key Management- Auditing- Cloud for Industry, Healthcare & Education.

Total Lecture Hours - 60

On the successful completion of the course, students will be able to

- ## TEXT BOOK

- ## REFERENCE BOOKS

- ## E RESOURCES

- COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)**

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
	CO1	3	2	3	3	2	3	3	3	3	3	3	3	3	3	3	3
	CO2	3	3	3	2	3	3	3	2	3	3	2	3	2	3	2	3
	CO3	2	3	2	3	3	3	2	3	2	2	3	2	3	2	3	2
	CO4	2	3	2	2	3	3	2	2	2	2	2	2	2	2	2	2
	CO5	3	2	3	3	2	2	3	3	3	3	3	3	3	3	3	3
	S-Strong (3)					M-Medium (2)					L-Low (1)						

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., COMPUTER SCIENCE

Semester: IV-EC-VI(b) - BLOCK CHAIN TECHNOLOGIES

Ins. Hrs. /Week: 4

Course Credit: 3

Course Code: P25CSE46B

UNIT- I INTRODUCTION TO BLOCK CHAIN

(12 Hours)

Introduction to Blockchain - The big picture of the industry – size, growth, structure, players. Bitcoin versus Cryptocurrencies versus Blockchain - Distributed Ledger Technology (DLT). Strategic analysis of the space – Blockchain platforms, regulators, application providers. The major application: currency, identity, chain of custody

UNIT – II NETWORKAND SECURITY

(12Hours)

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

UNIT – III CRYPTOCURRENCY

(12 Hours)

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

UNIT – IV CRYPTOCURRENCY REGULATION

(12 Hours)

Cryptocurrency Regulation - Stakeholders, Roots of Bitcoin, Legal views – exchange of cryptocurrency – Black Market – Global Economy. Crypto economics – assets, supply and demand, inflation and deflation – Regulation.

UNIT – V CHALLENGES IN BLOCK CHAIN

(12 Hours)

Opportunities and challenges in Block Chain – Application of block chain: Industry 4.0 – machine to machine communication – Data management in industry 4.0 –futureprospects.Block chain in Health 4.0 – Blockchain properties - Healthcare Costs - Healthcare Quality - Healthcare Value - Challenges for using blockchain for healthcare data

Total Lecture Hours - 60

COURSE OUTCOME

On the successful completion of the course, students will be able to

- 1.Demonstrate blockchain technology and crypto currency
- 2.Understand the mining mechanism in blockchain
- 3.Apply and identify security measures, and various types of services that allow people to trade and transact with bitcoins
- 4.Apply and analyze Blockchain in healthcare industry
- 5.Analyze security, privacy, and efficiency of a given Blockchain system

TEXT BOOKS

- 1.Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, “Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction”, Princeton University Press (July 19, 2016).
- 2.Antonopoulos, “Mastering Bitcoin: Unlocking Digital Cryptocurrencies”

REFERENCE BOOKS

1. Rodrigoda Rosa Righi, Antonio Marcos Alberti, Madhusudan Singh, "Blockchain Technology for Industry 4.0" Springer 2020.
2. Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System", 2008.

E-RESOURCES

1. <https://www.javatpoint.com/blockchain-tutorial>
2. <https://www.tutorialspoint.com/blockchain/index.htm>
3. <https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-cs01/>

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOMES	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	PS01	PS02	PS03	PS04	PS05	PS06	PS07	
	CO1	3	2	3	2	3	2	3	2	2	3	2	3	2	3	2	2	3
	CO2	3	2	3	2	3	2	3	2	2	3	2	3	2	3	2	2	3
	CO3	2	3	2	3	2	3	2	3	3	2	3	2	3	2	3	3	2
	CO4	2	3	2	3	2	3	2	3	3	2	3	2	3	2	3	3	2
	CO5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	S-Strong (3)			M-Medium (2)					L-Low (1)									

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., COMPUTER SCIENCE

Semester: II - EC-III(c) - SOFTWARE TESTING WITH SELENIUM
Ins. Hrs. /Week: 4 Course Credit: 3 Course Code: P25CSE46C

UNIT I SOFTWARE DEVELOPMENT LIFE CYCLE MODELS (12 Hours)

Software Development Life Cycle models: Phases of Software project – Quality, Quality Assurance, Quality control – Testing, Verification and Validation – Process Model to represent Different Phases - Life Cycle models. White-Box Testing: Static Testing – Structural Testing – Challenges in White-Box Testing - Black-Box Testing - Challenges in White Box Testing

UNIT II INTEGRATION TESTING, SYSTEM TESTING (12 Hours)

Integration Testing: Integration Testing as Type of Testing – Integration Testing as a Phase Testing – Scenario Testing – Defect Bash. System and Acceptance Testing: system Testing Overview– Functional versus Non-functional Testing – Functional testing - Nonfunctional Testing – Acceptance Testing – Summary of Testing Phases.

UNIT III PERFORMANCE TESTING AND REGRESSION TESTING (12 Hours)

Performance Testing: Factors governing Performance Testing – Methodology of Performance Testing – tools for Performance Testing – Process for Performance Testing – Challenges. Regression Testing– Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing. Test Planning – Test Management

UNIT IV INTRODUCTION TO SELENIUM (12 Hours)

Introduction - Selenium Tools and versions – Selenium Webdriver Architecture – Need for Selenium – Integrating python with Selenium – Installing Selenium – Installing drivers – Browser Commands – Opening Web Browser

UNIT V ACTIONS AND WEB ELEMENTS (12 Hours)

Mouse Actions: Click - Click and Hold - Context click - Double click – Drag and Drop - and Keyboard Actions: Key down – Key up – Send keys – Web Elements: Elements – Web Locators – Locating Elements – Navigation – Buttons – Checkbox – Select List – Frames and Textboxes – Assertions and Exceptions – Testing tools for Python

Total Lecture Hours-60

On the successful completion of the course, the students will be able to,

- ## TEXT BOOKS

- ## REFERENCE BOOK

- ## E-RESOURCES

- COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)**

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PS01	PS02	PS03	PS04	PS05	PS06	PS07
	CO1	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3
	CO2	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3
	CO3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3
	CO4	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
	CO5	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3
	S-Strong (3)			M-Medium (2)					L-Low (1)								



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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

Semester: IV– Professional Competency Course - COMPUTER SCIENCE FOR NET / SET

Ins. Hrs. /Week: 2

Course Credit:2

Course Code: P25PCCS41

UNIT - I DISCRETE STRUCTURES AND OPTIMIZATION AND

COMPUTER SYSTEM ARCHITECTURE

(6 Hours)

Discrete Structures and Optimization: Mathematical Logic -Sets and Relations - Counting, Mathematical Induction and Discrete Probability - Group Theory - Graph Theory - Boolean Algebra - Optimization - **Computer System Architecture** : Digital Logic Circuits and Components - Data Representation - Register Transfer and Microoperations - Basic Computer Organization and Design - Programming the Basic Computer - Microprogrammed Control - Central Processing Unit - Pipeline and Vector Processing - Input-Output Organization - Memory Hierarchy – Multiprocessors.

UNIT - II PROGRAMMING LANGUAGES, COMPUTER GRAPHIC,

DATABASE MANAGEMENT SYSTEMS

(6 Hours)

Programming Languages: Language Design and Translation Issues - Elementary Data Types - Programming in C - Object Oriented Programming - Programming in C++ - Web Programming - **Computer Graphics:** 2-D Geometrical Transforms and Viewing - 3-D Object Representation, Geometric Transformations and Viewing - **Database Management Systems:** Database System Concepts and Architecture - Data Modeling – SQL - Normalization for Relational Databases - Enhanced Data Models - Data Warehousing and Data Mining - Big Data Systems.

UNIT III SYSTEM SOFTWARE AND OPERATING SYSTEM AND

SOFTWARE ENGINEERING

(6 Hours)

System Software and Operating Systems: System Software - Basics of Operating System - Process Management – Threads - CPU Scheduling – Deadlocks - Memory Management - Storage Management - File and Input/Output Systems – Security - Virtual Machines – Linux operating Systems - Windows Operating Systems - Distributed Systems. **Software Engineering:** Software Process Models - Software Requirements - Software Design - Software Quality - Estimation and Scheduling of Software Projects - Software Testing - Software Configuration Management.

Unit IV DATA STRUCTURES AND ALGORITHMS AND THEORY OF

COMPUTATION AND COMPILERS

(6 Hours)

Data Structures and Algorithms: Data Structures - Performance Analysis of Algorithms and Recurrences - Design Techniques - Lower Bound theory - Graph Algorithms - Complexity Theory - Advanced Algorithms. **Theory of Computation** – **Compilers:** Regular Language Models - Context Free Language - Turing Machines(TM) - Unsolvable Problems and Computational Complexity - Syntax

Analysis - Semantic Analysis - Run Time System - Intermediate Code Generation - Code Generation and Code Optimization.

Unit V DATA COMMUNICATION AND COMPUTER NETWORKS AND ARTIFICIAL INTELLIGENCE (6 Hours)

Data Communication and Computer Networks: Network Models - Functions of OSI and TCP/IP Layers - World Wide Web (WWW) - Network Security - Mobile Technology - Cloud Computing and IoT - **Artificial Intelligence (AI):** Approaches to AI - Knowledge Representation – Planning - Natural Language Processing - Multi Agent Systems - Fuzzy Sets - Genetic Algorithms (GA) - Artificial Neural Networks (ANN).

Total Lecture Hours -30

COURSE OUTCOME

On successful completion of this course, students will be able to

1. Demonstrate the concepts of Discrete Structures and Optimization and Computer System Architecture
2. Analyze the applications of Programming Languages, Computer Graphics and Database Management Systems
3. Analyze the concepts of System Software, Operating System and Software Engineering
4. Understand the features of Data Structures and Algorithm, Theory of Computation and Compilers
5. Understand the Data Communication and Computer Networks and Artificial Intelligence (AI)

TEXT BOOKS

1. R.Gupta, "NTA-UGC-NET/JRF: Computer Sciences & Applications (Paper I & Paper II) Previous Years Papers (Solved)", [RPH Editorial Board](#), 2024.

REFERENCE BOOKS

1. Behrouz A.Forouzan, "Data Communications and Networking", 5th Edition, McGraw Hill Education.
2. Dhananjay Dhamdhare, "System Programming", 1st Edition, McGraw Hill Education.
3. Donald D.Hearn, M.Pauline Baker, "Computer Graphics C Version", 2nd Edition, Pearson Education India.
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COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	3	2	3	2	3	2	2	3	2	3	2	3	2	2	3
CO2	2	3	2	3	2	3	2	3	3	2	3	2	3	2	3	3	2
CO3	2	3	2	3	2	3	2	3	3	2	3	2	3	2	3	3	2
CO4	3	2	3	2	3	2	3	2	2	3	2	3	2	3	2	2	3
CO5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
S-Strong (3)						M-Medium (2)					L-Low (1)						