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 2026–2027)

PROGRAMME CODE **2PSCSC**

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TAMILNADU, INDIA.

M.Sc., COMPUTER SCIENCE

CHOICE BASED CREDIT SYSTEM - LEARNINIG OUTCOMES BASED CURRICULUM

FRAMEWORK (CBCS - LOCF)

(For the candidates admitted in the academic year 2026-2027)

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 with in 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 Outcomes (COs): Course Outcomes 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 outcomes 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 Centric Elective Courses (DCEC): Elective course may be offered by the main discipline/subject of study is referred to as Discipline Centric Elective Course (DCEC). 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.

Discipline Centric Elective Practical (DCEP): Discipline Centric Elective Practical (DCEP): An elective practical course offered by the parent discipline/subject of study. These practical courses provide flexibility through a choice of options from a pool of practical subjects. They are specialized and advanced in nature, offering extensive hands-on experience and application-

oriented learning in the selected area. **DCEP courses shall be offered only in Semesters I, II, and III.**

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 Course (NMEC): A student shall choose at least two Non-major Elective(NMEC) 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.

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/ /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: (5X4=20 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 previouslylearned
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 pointof 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	20		30			**70**
Continuous Internal Assessment (CIA)	20	20		30			**70**

QUESTION PATTERN FOR END SEMESTER EXAMINATION/ Continuous Internal Assessment		
PART		**MARKS**
PART – A I. (No choice ,One Mark) **TWO** questions from each unit **II.** (No choice, Two Mark) **ONE** question from each unit	**(**10x1=10)**(**5x2=10)	**20**
PART – B (Either/ or type,4-Marks) **ONE** question from each unit	(5x4=20)	**20**
PART – C (3 out of 5) (10Marks) **ONE** question from each unit	(3x10=30)	**30**
	Total	**70**

BLUE PRINT OF QUESTION PAPER FOR END SEMESTER EXAMINATION							
DURATION: 3.00 Hours. **Max Mark :70**							
K-LEVELS **PART**	**K1**	**K2**	**K3**	**K4**	**K5**	**K 6**	**Total Marks**
PART –A (One Mark, No choice) (10x1=10)	10						**10**
(2-Marks,No choice) (5x2=10)	10						**10**
PART –B (4-Marks)(Either/or type) (5x4=20)		5	5	10			**20**
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**	**05**	**10**	20	10	**70**

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:

$GPA=\frac{\sum_{i=1}^{n} C_i G_i}{\sum_{i=1}^{n} C_i}$	$WAM(\text{Weighted Average Marks})=\frac{\sum_{i=1}^{n} C_i M_i}{\sum_{i=1}^{n} C_i}$

Where,
Ci is the Credit earned for the Course i
Gi is the Grade Point obtained by the student for the Course i
Mi 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**
Below50	**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 (*Upon completion of the M.Sc., Degree Programme, the Post graduate will be able to)*
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 Post Graduate 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 evaluatepractices, 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 ofinterdisciplinary approach in providing better solutions and new ideas for the sustainabledevelopments; 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 fora 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 thevalues 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 softwareapplications for specific needs.
PSO4:	Plan and take part in continuous learning and deliver efficient solutions for emergingchallenges 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 systemprogramming 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 communicationsand Adapt new languages quickly.

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M.Sc., COMPUTER SCIENCE

CHOICE BASED CREDIT SYSTEM-LEARNING OUT COMES BASED CURRICULUM FRAMEWORK (CBCS - LOCF)

(Applicable to the candidates admitted from the academic year 2026-2027)

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	Course	Code	Course Title	Ins. Hrs	Credit	Exam Hrs	Marks		Total
							Int.	Ext	
I	Core Course - I (CC - I)	P26CS101	Mathematical Foundations of Computer Science	6	4	3	30	70	100
	Core Course - II (CC - II)	P26CS102	Advanced Data Structures and Algorithms	6	4	3	30	70	100
	Core Practical – I (CP - I)	P26CS103P	Advanced Data Structures and Algorithms Lab	4	4	3	40	60	100
	Discipline Centric Elective Course - I (DCEC - I)	P26CSDE11A	Network Security and Cryptography	5	4	3	30	70	100
		P26CSDE11B	Big Data Analytics						
		P26CSDE11C	Python Programming						
	Discipline Centric Elective Practical - I (DCEP - I)	P26CSDE12AP	Network Security and Cryptography Lab	2	2	3	40	60	100
		P26CSDE12BP	Big Data Analytics Lab						
		P26CSDE12CP	Python Programming Lab						
	Generic Elective Course – I (GEC - I)	P26CSGE11A	Mathematics for Machine Learning	5	3	3	30	70	100
		P26CSGE11B	Biological Databases						
		P26CSGE11C	Advanced Software Engineering						
	Skill Enhancement Course - I (SEC - I)	P26SECS11	React JS	2	2	3	30	70	100
	Value Added Course - I (VAC - I) *	P26CSVA11	Advanced AI Applications in Computer Science	-	2*	2	30	70	100*
		Total		**30**	**23**	**-**	**-**	**-**	**700**
II	Core Course - III (CC - III)	P26CS204	Advanced Database Management Systems	6	4	3	30	70	100
	Core Course – IV (CC - IV)	P26CS205	Advanced Operating Systems	6	4	3	30	70	100
	Core Practical - II (CP - II)	P26CS206P	Advanced Database Management Systems Lab	4	4	3	40	60	100
	Discipline Centric Elective Course - II (DCEC - II)	P26CSDE23A	Python Programming for Machine Learning	4	4	3	30	70	100
		P26CSDE23B	Blockchain Technology						
		P26CSDE23C	Web Programming						
	Discipline Centric Elective Practical - II (DCEP - II)	P26CSDE24AP	Python Programming for Machine Learning Lab	2	2	3	40	60	100
		P26CSDE24BP	Blockchain Technology Lab						

		P26CSDE24CP	Web Programming Lab						
	Generic Elective Course - II (GEC - II)	P26CSGE22A	Probability and Statistics	4	3	3	30	70	100
		P26CSGE22B	Information Security						
		P26CSGE22C	Internet of Things						
	Skill Enhancement Course - II (SEC - II)	P26SECS22	Node JS	2	2	3	30	70	100
	Non-Major Elective - I (NMEC -I)	P26NMECS21	Internet and Web Basics	2	2	3	30	70	100
			Total	**30**	**25**	**-**	**-**	**-**	**800**
Summer Internship / Industrial Activity during the Summer Vacation after 1st Year									
III	Core Course - V (CC - V)		Machine Learning	6	4	3	30	70	100
	Core Course - VI (CC - VI)		Mobile Application Development	6	4	3	30	70	100
	Core Practical - III (CP - III)		Machine Learning Lab	4	4	2	40	60	100
	Discipline Centric Elective Course - III (DCEC - III)		Full Stack Development	5	4	3	30	70	100
			Natural Language Processing						
			Data Mining and Warehousing						
	Discipline Centric Elective Practical - III (DCEP - III)		Full Stack Development Lab	2	2	2	40	60	100
			Natural Language Processing Lab						
			Data Mining Lab						
	Generic Elective Course - III (GEC - III)		Optimization Techniques	5	3	3	30	70	100
			Foundations of Cognition and Problem Solving						
			Research Methodology and IPR						
	Non-Major Elective - II (NMEC - II)		Fundamentals of Cloud Computing	2	2	3	30	70	100
	Summer Internship / Industrial Activity @				2		20	80	100
	Value Added Course – II (VAC - II)*		Web Development	-	2*	2	30	70	100*
			Total	**30**	**25**	**-**	**-**	**-**	**800**
IV	Core Course - VII (CC - VII)		Cloud Computing Technologies	6	4	3	30	70	100
	Core Course - VIII (CC - VIII)		J2EE Technologies	6	4	3	30	70	100
	Core Practical - IV (CP - IV)		J2EE Technologies Lab	6	4	3	30	70	100
	Discipline Centric Elective Course - IV (DCEC - IV)		Ethical Hacking	4	4	2	30	70	100
			Social Networking						
			Computer Vision						
	Entrepreneurship / Industry Based Course		Data Analytics	3	3	3	30	70	100
	Project Work @			5	5	-	20	80	100

	Extra credit course*		Two credit for each VAC and NPTEL /SWAYAM/MOOC*		2*				
		Total		**30**	**24**	**-**	**-**	**-**	**600**
		Grand Total		**120**	**97**	**-**	**-**	**-**	**2900**

LIST OF DISCIPLINE CENTRIC ELECTIVE COURSE

Discipline Centric Elective Course - I (DCEC - I)	
1.	Network Security and Cryptography
2.	Big Data Analytics
3.	Python Programming
Discipline Centric Elective Course - II (DCEC - II)	
1.	Python Programming for Machine Learning
2.	Blockchain Technology
3.	Web Programming
Discipline Centric Elective Course - III (DCEC - III)	
1.	Full Stack Development
2.	Natural Language Processing
3.	Data Mining and Warehousing
Discipline Centric Elective Course - IV (DCEC - IV)	
1.	Ethical Hacking
2.	Social Networking
3.	Computer Vision

LIST OF GENERIC ELECTIVE COURSE (GEC)

GENERIC ELECTIVE COURSE - I (GEC - I)	
1.	Mathematics for Machine Learning
2.	Biological Databases
3.	Advanced Software Engineering
GENERIC ELECTIVE COURSE - II (GEC - II)	
1.	Probability and Statistics
2.	Information Security
3.	Internet of Things
GENERIC ELECTIVE COURSE - III (GEC - III)	
1.	Optimization Techniques
2.	Foundations of Cognition and Problem Solving
3.	Research Methodology and IPR

SUMMARY OF CURRICULUM STRUCTURE OF PG PROGRAMMES: SCIENCE

Sl. No.	Types of the Course	No. of Courses	Credits for each Course	Total Credits	Marks
1.	Core Course (CC)	8	4	32	800
2.	Core Practical (CP)	4	4	16	400
3.	Discipline Centric Elective Course(DCEC)	4	4	16	400
4.	Discipline Centric Elective Practical(DCEP)	3	2	6	300
5.	Generic Elective Course (GEC)	3	3	9	300
6.	Skill Enhancement Course (SEC)	2	2	4	200
7.	Non-Major Elective Courses (NMEC)	2	2	4	200
8.	Internship / Industrial Activity @	1	2	2	100
9.	Entrepreneurship / Industry Based Course	1	3	3	100
10.	Project Work @	1	5	5	100
Total		**29**	**-**	**97**	**2900**
Value Added Courses *		2*	2	4*	200

*	**The value added courses credit will not be included in the total CGPA. These courses are extra-credit courses. Instruction hours for these courses is 30 hours**
@	Summer Internship will be carried out during the summer vacation after the First year. Viva Voce will be conducted by the college and Marks shall be sent to the University and the same will be included in the 3rd semester Mark Statement. **Summer Internship / Industrial Activity& Project** **Scheme of Evaluation:**

Description	Marks
Report	80
Viva	20
Total	100

SEMESTER - I

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: I - CC-I – MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
Ins. Hrs. /Week: 6 Course Credit: 4 Course Code: P26CS101

COURSE OBJECTIVES

- To know the notations used in associated with computer science and engineering.
- To learn the rudiments of elementary mathematical reasoning (elementary proofs; proofs (by induction, Normal forms).
- To understand basic set-theoretical notions: relations, functions, graphs, equivalence relations, and orderings.
- To understand the fundamentals of counting and discrete probability.
- To understand the concept of Recurrence Relations

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UNIT-I SETS RELATIONS AND FUNCTIONS (19 Hours)

Statements and Notation-Connectives- Negation-Conjunction-Disjunction, Conditional and Biconditional- Statement formulas and Truth Tables.-Well-formed formulas-Tautologies, equivalence of formulas- Duality Law- Tautological Implications- Functionally Complete Sets of Connectives Other connectives. Normal Forms: Disjunctive Normal Forms- Conjunctive Normal Forms-Principal Disjunctive Normal Forms (PDNF)- Principal Conjunctive Normal Forms (PCNF)

UNIT-II MATHEMATICAL LOGIC (18 Hours)

Logical inferences-Methods of proof of an implication-First Order Logic and other methods of proof-Rules of Inference for Quantified Propositions- Mathematical induction. Relations and Directed Graphs- Special properties of binary relations-Equivalence relation- Ordering relations Lattices and Enumerations.

UNIT-III GRAPHS (18 Hours)

Operations on relations- Paths and Closures- Directed graphs and Adjacency matrices. Wars hall's algorithm- Transitive closure. Basic concepts-Representation of Graphs-Isomorphism and sub graphs-Planar graphs- Multi graphs- Euler circuits- Euler Graphs and Hamiltonian graphs Chromatic number.

UNIT-IV ELEMENTARY COMBINATIONS (18 Hours)

Basics of counting- Combinations and Permutations- Enumeration of combinations and permutations- Enumerating Combinations and Permutations with repetitions- Enumerating permutations with constrained repetitions- The Principle of Inclusion- Exclusion

UNIT-V RECURRENCE RELATIONS (17 Hours)

Generating functions of Sequences- Recurrence relations, solving recurrence relations by Substitution and Generating functions- The method of Characteristic roots- Solutions of Inhomogeneous Recurrence Relations.

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only-Self Study):

Applications of Graph- Applications of Discrete Mathematics in Computer Science-Graph Theory Applications in Social Networks and Routing Algorithms- Case Studies on Discrete Mathematical Models in Real-World Problems.

Total Lecture Hours-90

COURSE OUTCOME

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

1. Understand truth tables, the concept of logical equivalence and its relationship to equivalent logic circuits and Normal Forms
2. Apply rules in inference theory, and extend this to predicate calculus using quantifiers.
3. Able to do simple proofs by mathematical induction. Know the properties of equivalence relations and partial orderings. Understand lattices and Hassle Diagrams.
4. Use graphs as representing relations, Identify isomorphism invariants of graphs, and algorithms for relations based on graphs or matrices (e.g. transitive closure).
5. Know the fundamentals of counting and discrete probability
6. Design mathematical and graph-based models for solving practical computer science problems.

TEXT BOOKS

1. Joe L. Mott. Abraham Kandel and Theodore P.Baker, Discrete Mathematics for Computer Scientists & Mathematicians. PHI,Second Edition 2017(For Units II to V).
2. J P Trembly and RManohar,Discrete Mathematical Structures with applications to Computer Science. TMH 2017 (For Unit I).

REFERENCE BOOK(S)

1. Swapankumar Chakraborthy, Bikash Kanti Sarkar, Discrete Mathematics. Oxford
2. Dr.J Rajendra Prasad, T.Rama Rao, A.Madana Mohana Rao, Mathematical Foundations of Computer Science.

E-RESOURCES

1.http://nptel.ac.in/courses.php
2.http://jntuk-coeerd.in/

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	3	3	3	3	2	3	2	3	3	2	3	2
CO2	3	3	2	3	3	2	3	2	2	3	2	3	3	2	3	2	3
CO3	2	3	2	3	3	2	3	3	3	2	3	2	3	3	3	3	2
CO4	3	3	3	3	3	3	2	3	2	3	3	3	2	3	3	3	3
CO5	3	3	2	3	3	2	2	2	3	2	2	3	2	3	3	3	2

S-Strong (3) **M-Medium (2)** **L-Low (1)**

SEMESTER: I - CC-II – ADVANCED DATA STRUCTURES AND ALGORITHMS

Ins. Hrs. /Week: 6 Course Credit: 4 Course Code: P26CS102

COURSE OBJECTIVES

- To understand the fundamental data structures such as arrays, linked lists, stacks, queues, graphs and sorting techniques.
- To learn hashing concepts, collision resolution techniques and efficient hash table implementations.
- To study priority queues and heap data structures for efficient data organization and processing.
- To understand tree-based data structures including AVL trees, B-trees and Red-Black trees with insertion and deletion operations.
- To analyze graph algorithms for traversal, shortest path computation and optimization problems.

UNIT – I INTRODUCTION (19 Hours)

Arrays – Singly Linked List – Circularly Linked List – Stack – Queues – List Abstract Data Type (ADT) – Iterators – Graphs and Sorting 1- Graphs: Graph ADT – Data Structures for Graphs – Graph Traversals – Directed Acyclic Graphs – Shortest Paths – Minimum Spanning Tree - Sorting: Merge Sort – Quick Sort – Selection Sort.

UNIT – II HASHING (18 Hours)

General Idea, Hash Function, Separate Chaining, Hash Tables without linked lists: Linear Probing, Quadratic Probing, Double Hashing, Rehashing, Hash Tables in the Standard Library, Universal Hashing, Extendible Hashing.

UNIT – III PRIORITY QUEUES (HEAPS) (18 Hours)

Model, Simple implementations, Binary Heap: Structure Property, Heap Order Property, Basic Heap Operations: insert, delete, Percolate down, Other Heap Operations.

UNIT – IV TREES (18 Hours)

AVL: Single Rotation, Double Rotation, B-Trees. Multi-way Search Trees– Trees: Searching for an Element in a Tree, Inserting a New Element in a Tree, Deleting an Element from a Tree. Red-Black Trees – Properties of red-black trees, Rotations, Insertion, Deletion.

UNIT – V GRAPHS ALGORITHMS (17 Hours)

Elementary Graph Algorithms: Topological sort, Single Source Shortest Path Algorithms: Dijkstra's, Bellman-Ford, All-Pairs Shortest Paths: Floyd-Warshall's Algorithm.

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only-Self study):

Time complexity: best case, worst case,-Applications of trees, graphs-Role of graph algorithms in modern techniques.

Total Lecture Hours : 90

COURSE OUTCOME

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

1. Understand the implementation of symbol table using hashing techniques
2. Develop and Analyse algorithms for red-black trees, B-trees and Splay trees
3. Develop algorithms for text processing applications
4. Analyze disjoint sets of data structures.
5. Identify suitable data structures and develop algorithms for computational problems
6. Design efficient solutions using advanced graph algorithms and data structures for modern applications.

TEXT BOOKS

1. Mark Allen Weis, Data Structures and Algorithm Analysis in C++, Mark Allen Weiss, 4th Edition, 2014, Pearson.
2. Thomas H Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Introduction to Algorithms, 3rd Edition, 2009, The MIT Press.

REFERENCE BOOKS

1. Ellis Horowitz, Satraj Sahani and Rajasekharam, Fundamentals of Computer Algorithms, 2nd Edition, 2009, University Press Pvt. Ltd.
2. ReemaThareja, S. Rama Sree,Advanced Data Structures, Oxford University Press, 2018.

E-RESOURCES

1. http://www.coursera.org/learn/advanced-data-structures
2. http://ocw.mit.edu/6-851S12 (MITOPENCOURSEWARE, Massachusetts Institute of Technology)
3. http://freevideolectures.com/Course/2279/Data-Structures-And- Algorithms

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	2	2	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	2	3	3	2	3	2	3	3	3	3	3
CO3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	2	2	3
CO4	3	2	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2
CO5	3	3	3	2	3	3	2	3	3	1	3	3	3	3	3	3	2

S-Strong (3) **M-Medium (2)** **L-Low**

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: I - CP-I – ADVANCED DATA STRUCTURES AND ALGORITHMS LAB

Ins. Hrs. /Week: 4 Course Credit: 4 Course Code: P26CS103P

COURSE OBJECTIVES

- To understand the implementation and operations of linear data structures such as linked lists, stacks and queues.
- To develop programming skills for performing insertion, deletion, traversal and manipulation of various data structures.
- To learn and implement sorting techniques such as Quick Sort and Merge Sort for efficient data processing.
- To understand the construction and traversal operations of binary trees and advanced tree structures including AVL Trees, Splay Trees and B-Trees.
- To analyze the efficiency and applications of different data structures and algorithms in solving computational problems.

EXERCISES

1. Develop a program to perform the following operations on doubly linked list.
   i)Creation ii) Insertion iii) Deletion iv) Traversal in both ways
2. Develop a program that implements stack and its operations using
   i) Arrays ii) linked list.
3. Develop a programs that implements Queue and its operations using
   i) Arrays ii) linked list.
4. Develop a program that implements the Quick sort method to sort a given list of integers in ascending order.
5. Develop a program that implement the Merge sort method to sort a given list of integers in ascending order.
6. Develop a program to perform the following:
   i) Creating a Binary Tree of integers ii) Traversing the above binary tree in preorder, inorder and postorder.
7. Develop a program to perform the following:
   i) Creating a AVL Tree of integers ii) Traversing the above binary tree in preorder, inorder and postorder.
8. Develop a program that uses functions to perform the following:
   i) Creating a SplayTree of integers ii) Traversing the above binary tree in preorder, inorder and postorder.
9. Develop program to perform the following:
   i) Creating a B-Tree of integers ii) Traversing the above binary tree in preorder, inorder and postorder.

Total Lecture Hours:60

COURSE OUTCOME

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

1. Apply linear and non-linear data structures to solve computational problems.
2. Implement stack and queue operations using arrays and linked list techniques.
3. Analyze and implement sorting algorithms for efficient data processing.
4. Design and traverse tree structures including Binary Tree, AVL Tree, Splay Tree, and B-Tree.

5. Implement graph algorithms and disjoint set operations for optimization problems.
6. Design efficient solutions using suitable data structures and algorithms for computational problems.

TEXT BOOK

1. Mark Allen Weis, Data Structures and Algorithm Analysis in C++, Mark Allen Weiss, 4th Edition, 2014, Pearson.

REFERENCE BOOK

1. Ellis Horowitz, Satraj Sahani and Rajasekharam, Fundamentals of Computer Algorithms, 2nd Edition, 2009, University Press Pvt. Ltd.

E-RESOURCES

1. **TutorialsPoint Data Structures Using C++**
2. **Linked List Tutorial – Programiz**
3. **Stacks and Queues – Programiz**
4. **Sorting Algorithms – Visualgo**
5. **Binary Tree Data Structure – GeeksforGeeks**

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	2	2	3	3	3	2	3	3	3	3	3	2	3	3
CO2	3	3	2	3	3	3	3	3	3	2	2	3	3	2	3	2	3
CO3	2	2	3	3	3	2	3	2	3	3	3	3	3	2	3	3	3
CO4	3	2	3	2	2	3	2	3	3	3	3	2	3	2	3	3	2
CO5	3	3	2	3	3	2	3	3	2	3	3	3	2	3	2	2	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 2026– 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: I - DCEC-I (A) - NETWORK SECURITY AND CRYPTOGRAPHY

Ins. Hrs. /Week: 5 Course Credit:4 Course Code: P26CSDE11A

COURSE OBJECTIVES

- To understand the fundamentals of network security architecture, security attacks, services and mechanisms.
- To learn classical and modern cryptographic techniques including symmetric key, public key and hash-based encryption methods.
- To study transport layer security protocols such as SSL, TLS, HTTPS and SSH for secure communication.
- To understand wireless network security mechanisms, mobile security strategies and IP security protocols.
- To develop knowledge on system security concepts including intrusion detection, malware analysis, firewalls and cyber security countermeasures.

UNIT-I COMPUTER AND NETWORK SECURITY CONCEPTS (15 Hours)

Introduction: The OSI Security Architecture-Security attacks-Security Services-Security mechanisms - A model for network Security - **Classical Encryption Techniques:** Symmetric Cipher model: Cryptography – Cryptanalysis and Brute-Force Attack. **Substitution Techniques**: Caesar Cipher – Monoalphabetic Ciphers – Playfair Cipher – Hill Cipher – Polyalphabetic Ciphers – One Time Pad. Transposition Techniques–Rotor Machines– Steganography.

UNIT- II BLOCK CIPHERS AND DATA ENCRYPTION STANDARDS (15 Hours)

Traditional Block Cipher Structure-Stream Ciphers and block Ciphers –Motivation for the Feistel Cipher Structure – The Fiestel Cipher- **The Data Encryption Standard:** DES Encryption – DES Decryption. **The Strength of DES:** The use of 56-Bit Keys – The Nature of the DES Algorithm Timing Attacks. **Block Cipher Design Principles:** Number of Rounds – Design of function F Key Schedule Algorithm. **Public-Key Cryptography and RSA:** Public Key Cryptosystems- Applications for Public-Key Cryptosystems Requirements for public-Key Cryptography–Public Key Cryptanalysis-The RSA Algorithm. **Cryptographic Hash Functions:** Applications of Cryptographic Hash Functions –SHA-3.

UNIT- III TRANSPORT LEVEL SECURITY (15 Hours)

Web Security Considerations- Web Security Threats- Web Traffic Security Approaches. **Secure Socket Layer :** SSL Architecture – SSL Record Protocol – Change Cipher Spec Protocol – Alert Protocol – Handshake Protocol- Cryptographic Computations. **Transport Layer Security**: Version Number- Message Authentication Code – Pseudorandom Function –Alert Codes – Cipher Suites – Client Certificate types – Certificate-Verify and Finished Messages – Cryptographic Computations- Padding. HTTPS – Secure Shell(SSH) - secure electronic transaction (SET).

UNIT-IV WIRELESS NETWORK SECURITY (15 Hours)

Wireless Security - Wireless Network Threats – Wireless Security Measures. **Mobile Device Security:** Security Threats – **Mobile Device Security Strategy. IEEE 802.11. Wireless LAN Overview:** The Wi-Fi Alliance – IEEE 802 Protocol Architecture – IEEE 802.11 Network Components and Architectural Model – IEEE 802.11 Services. **IEEE 802.11i Wireless LAN Security:** IEEE 802.11i Services – IEEE 802.11i Phases of Operations – Discovery Phase – Authentication Phase – Key Management Phase – Protected data Transfer Phase – The IEEE Pseudo random Function. **IP Security:** Overview-IP Security policy – Encapsulating Security Payload – Combining Security Associations – Internet Key Exchange.

UNIT- V SYSTEM SECURITY (15 Hours)

System Security: Intruders-Intrusion Detection-Password Management- Malicious Software: Types of Malicious Software(Malware)-Advanced Persistent Threat-Viruses-Worms-Spam E-mail, Trojans- System Corruption-Zombie, Bots - Information Theft - Keyloggers, Phishing, Spyware- Countermeasures-Distributed Denial of Service attacks- Firewalls: The Need for Firewalls-Firewall characteristics and Access Policy-Types of Firewalls-Firewall basing-Firewall Location and Configurations.

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only-self study):

Modern cryptography algorithms-Comparision of encryption and decryption standards.

Total Lecture Hours-75

COURSE OUTCOME

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

1. Understand the concepts, methods of Network Security using cryptography basics.
2. Analyze and design classical encryption techniques and block ciphers.
3. Acquire knowledge about Public Key cryptography.
4. Evaluate Hash Functions in network security.
5. Analyze about IP security, Wireless Network security.
6. Analyze the working mechanisms of symmetric and asymmetric cryptographic algorithms.

TEXT BOOKS

1. Behrouz A. Ferouzan, “Cryptography & Network Security”, Tata Mc Graw Hill, India ,2015.
2. William Stalings, “Network Security Essentials-Applications and Standards”, Sixth Edition,Pearson Publications, India, 2016.

REFERENCE BOOKS

1. Johannes A. Buchaman, “Introduction to cryptography” (2nd edition), 2004. ISBN 0387207562, Springer Publications, United States, 2004.
2. Robert Collins, “Network Security Monitoring: Basics for Beginners”, 2017.
3. William Stallings, “Cryptography and Network Security”-Principles and Practices, Prentice-Hall,Seventh edition, **ISBN:**10:1-292-15858-1, India, 2017.
4. Neal Krawetz, “Introduction to Network Security”, Charles River media Publications, 2007.

E-RESOURCES

1. http://surl.li/hbwqu
2. http://uru.ac.in/uruonlinelibrary/Cyber_Security/Cryptography_and_Network_Secury. pdf
3. https://youtu.be/2Z3toEiY5ll

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	2	2	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3
CO2	2	3	3	3	3	3	2	3	3	2	3	2	3	3	3	3	3
CO3	2	3	3	3	3	3	2	3	3	3	3	3	3	3	2	3	3
CO4	3	3	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2
CO5	3	3	3	3	3	3	2	3	3	2	3	3	3	3	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 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: I-DCEC-I (B) - BIG DATA ANALYTICS

Ins. Hrs. /Week: 5 **Course Credit: 4** **Course Code: P26CSDE11B**

COURSE OBJECTIVES

- To understand the concepts, characteristics and challenges of digital data and big data environments.
- To learn the fundamentals of data analytics, business intelligence and big data analytics techniques.
- To study NoSQL, NewSQL and modern database technologies used for big data management.
- To understand the architecture, ecosystem and components of Apache Hadoop for big data analytics.
- To develop knowledge on Hadoop MapReduce, YARN framework and data serialization techniques for processing large-scale data.

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.

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only-Self Study):

Case Studies on Big Data Applications in Healthcare, Banking, Education and Social Media -Recent Trends and Future Scope of Big Data Technologies.

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 DataAnalytics 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 analyticsprojects using MapReduce, MongoDB, HIVE and PIG
6. Evaluate recent trends, tools and future developments in Big Data technologies.

TEXT BOOK

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

REFERENCE BOOK(S)

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, MadhuJagadeesh 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.thearling.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

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	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 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: I – DCEC-I (C)- PYTHON PROGRAMMING

Ins. Hrs. /Week: 5 **Course Credit: 4** **Course Code: P26CSDE11C**

COURSE OBJECTIVES

- To understand the concepts of cloud deployment and real-time data visualization using Python technologies.
- To learn the application of Python frameworks and tools in web development, data science and automation.
- To develop analytical skills for designing and deploying Python-based applications in cloud environments.
- To analyze case studies related to modern Python applications and emerging technologies.
- To build practical solutions using Python for real-world data-driven and automated systems.

UNIT I INTRODUCTION **(15 Hours)**

Fundamental ideas of Computer Science **-** Strings, Assignment, and Comments - Numeric Data types and Character sets – Expressions – Loops and Selection Statements: Definite iteration: the for Loop - selection: if and if-else statements - Conditional iteration: the while Loop .

UNIT II STRINGS AND TEXT FILES **(15 Hours)**

Accessing Characters and substrings in strings - Data encryption-Strings and Number systems- String methods – Text - Lists and Dictionaries: Lists – Dictionaries – Design with Functions: A Quick review- Problem solving with top-Down Design - Design with recursive Functions - Managing a Program's namespace - Higher-Order Functions

UNIT III DESIGN WITH CLASSES **(15Hours)**

Getting inside Objects and Classes – Data-Modeling Examples – Building a New Data Structure – Two – Dimensional Grid - Structuring Classes with Inheritance and Polymorphism - Graphical User Interfaces - The Behavior of terminal-Based programs and GUI-Based programs - Coding Simple GUI-Based programs - Windows and Window Components - Command Buttons and responding to events.

UNIT IV WORKING WITH PYTHON PACKAGES **(15 Hours)**

NumPy Library-Ndarray – Basic Operations – Indexing, Slicing and Iteration – Array manipulation - Pandas –The Series – The DataFrame - The Index Objects – Data Vizualization with Matplotlib – The Matplotlib Architecture – pyplot – The Plotting Window – Adding Elements to the Chart – Line ChartS– Bar Charts – Pie charts

UNIT V DJANGO **(15 Hours)**

Installing Django – Building an Application – Project Creation – Designing the Data Schema - Creating an administration site for models - Working with Query Sets and Managers – Retrieving Objects – Building List and Detail Views.

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only- Self study):

Introduction to Cloud Deployment for Python Applications- Real-Time Data Visualization Techniques- Case Studies on Python Applications in Web Development, Data Science and Automation.

Total Lecture Hours-75

COURSE OUTCOME

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

1. Comprehend the programming skills in python and develop applications using conditional branches and looping
2. Create python applications with strings and functions
3. Understand and implement the Object Oriented Programming paradigm with the concept of objects and classes, Inheritance and polymorphism
4. Evaluate the use of Python packages to perform numerical computations and data visualization
5. Design interactive web applications using Django
6. Evaluate case studies related to Python applications in web development, data science and automation.

TEXT BOOKS

1. Antonio Mele, “Django 3 By Example”, Third Edition, 2020.
2. Fabio Nelli, “Python Data Analytics: With Pandas, NumPy, and Matplotlib”, Second Edition, KindleEdition, 2018.
3. K.A. Lambert, “Fundamentals of Python: first programs”, Second Edition, Cengage Learning, 2018.

REFERENCE BOOKS

1. Jeff McNeil , “Python 2.6 Text Processing: Beginners Guide”, Packet Publications, 2010.
2. Mark Pilgrim, “Dive Into Python” , 2nd edition, Apress, 2009.

E_RESOURCES

1. https://www.computer-pdf.com/
2. https://rb.gy/mnhgz5
3. http://www.oreilly.com/programming/free/functional-programming-python.csp

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	*3*	2	*3*	2	*3*	2	2	*3*	*3*	2	*3*	2	*3*	2
CO2	2	*3*	*3*	*3*	2	2	*3*	2	*3*	2	2	*3*	2	*3*	*3*	2	*3*
CO3	2	*3*	2	2	*3*	*3*	2	*3*	2	*3*	*3*	2	*3*	2	*3*	*3*	*3*
CO4	*3*	2	*3*	2	*3*	2	*3*	2	*3*	*3*	*3*	*3*	*3*	2	2	2	*3*
CO5	*3*	2	*3*	*3*	2	*3*	2	*3*	2	*3*	2	2	2	*3*	2	*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 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: I–*D*CEP-I(A) – NETWORK SECURITY AND CRYPTOGRAPHY LAB

Ins. Hrs. /Week: 2 **Course Credit:2** **Course Code: P26CSDE12AP**

COURSE OBJECTIVES

- To understand the fundamental concepts of cryptography and network security techniques.
- To learn classical and modern encryption and decryption algorithms such as Caesar Cipher, DES, AES and RSA.
- To develop programming skills for implementing secure communication techniques including Diffie–Hellman Key Exchange and Digital Signatures.
- To understand elliptic curve cryptography and steganography techniques for secure data transmission.
- To analyze the effectiveness of cryptographic algorithms in ensuring confidentiality, integrity and authentication of information.

EXERCISES

1. Write a Program to do Encryption and Decryption using Ceasar Cipher .
2. For a Given Text, Perform Encryption and Decryption using Data Encryption Standard.
3. Write a Program to do Encryption and Decryption using Advanced Encryption Standard.
4. For a Text of 30 Words, Perform Encryption and Decryption using RSA (Rivest–Shamir– Adleman Algorithm).
5. Write a Program to do Encryption and Decryption using Diffie-Hellman Key Exchange.
6. Write a Program that Performs Encryption and Decryption using Elliptic Curve Arithmetic.
7. Write a Program to do Encryption and Decryption using Digital Signature.
8. For a Given Text and Image, Perform Steganography.

Total Lecture Hours:30

COURSE OUTCOME

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

1. Understand and apply the Network Security Principles and methods for delivering and maintaining Security in applications,
2. Evaluate and Logic in Network Security Algorithms to establish appropriate strategies for development and deployment.
3. Understand the Art of Network Security Programming
4. Develop and apply Current Standard-Compliant Programming Techniques for the Successful Deployment of Security Applications.
5. Understand the Testing and Debugging of the Program Written
6. Design secure applications using modern cryptographic and information hiding techniques.

TEXT BOOKS

1. William Stallings, *Cryptography and Network Security: Principles and Practice*, 8th Edition, Pearson Education, 2023.
2. Behrouz A. Forouzan and Debdeep Mukhopadhyay, *Cryptography and Network Security*, 3rd Edition, McGraw Hill Education, 2015.
3. Charles P. Pfleeger and Shari Lawrence Pfleeger, *Security in Computing*, 5th Edition, Pearson Education, 2015.

REFERENCE BOOKS

1. Atul Kahate, *Cryptography and Network Security*, 4th Edition, McGraw Hill Education, 2019.
2. Bruce Schneier, *Applied Cryptography: Protocols, Algorithms and Source Code in C*, 20th Anniversary Edition, Wiley India, 2015.
3. Jonathan Katz and Yehuda Lindell, *Introduction to Modern Cryptography*, 3rd Edition, CRC Press, 2020.
4. Neal Koblitz, *A Course in Number Theory and Cryptography*, 2nd Edition, Springer, 2012.

E-RESOURCES

1.https://www.coursera.org/courses?query=cryptography
2.https://www.cybrary.it

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	3	2	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	3
CO3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	2	3	3
CO4	3	3	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2
CO5	3	3	2	3	3	3	3	3	1	3	3	3	3	3	2	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 2026 – 2027)
PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., COMPUTER SCIENCE

SEMESTER: I–*D*CEP-I(B) – BIG DATA ANALYTICS LAB

Ins. Hrs. /Week: 2 **Course Credit:2** **Course Code: P26CSDE12BP**

COURSE OBJECTIVES

- To understand the fundamentals of R programming for statistical analysis and data science applications.
- To learn data handling, import/export operations and matrix manipulations using R programming.
- To perform statistical and data preprocessing techniques for effective data analysis.
- To apply machine learning techniques such as regression, clustering, classification and association rule mining using R.
- To develop analytical and visualization skills for solving real-world data science and predictive modeling problems.

EXERCISE

1. To get the input from the user and perform numerical operations (MAX, MIN, AVG, SUM, SQRT, ROUND) using in R.
2. To perform data import/export (.CSV, .XLS, .TXT) operations using data frames in R.
3. To get the input matrix from the user and perform Matrix addition, subtraction, multiplication, inverse transpose, and division operations using vector concept in R.
4. To perform statistical operations (Mean, Median, Mode, and Standard deviation) using R.
5. To perform data pre-processing operations i) Handling Missing data ii) Min-Max normalization
6. To perform dimensionality reduction operation using PCA for Houses Data Set
7. To perform Simple Linear Regression with R.
8. To perform K-Means clustering operation and visualize for iris data set
9. Write R script to diagnose any disease using KNN classification and plot the results.
10. To perform market basket analysis using Association Rules (Apriori).

Total Lecture Hours:30

COURSE OUTCOME

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

1. Perform numerical operations by developing programs using R language.
2. Perform statistical operations through R language.
3. Perform data pre-processing operations by applying R language.
4. Perform market basket analysis using Association Rules by applying Apriori algorithm using R language.
5. Perform different data processing techniques through R language.
6. Design predictive and data-driven solutions using R programming and machine learning algorithms.

TEXT BOOKS

1. Hadley Wickham and Garrett Grolemund, *R for Data Science*, O'Reilly Media, 2017.
2. Norman Matloff, *The Art of R Programming*, No Starch Press, 2011.
3. Tilman M. Davies, *The Book of R: A First Course in Programming and Statistics*, No Starch Press, 2016.

REFERENCE BOOKS

1. Brett Lantz, *Machine Learning with R*, 3rd Edition, Packt Publishing, 2019.
2. Gareth James, Daniela Witten, Trevor Hastie and Robert Tibshirani, *An Introduction to Statistical Learning with Applications in R*, Springer, 2021.
3. Jared P. Lander, *R for Everyone: Advanced Analytics and Graphics*, 2nd Edition, Addison-Wesley Professional, 2017.
4. Roger D. Peng, *R Programming for Data Science*, Leanpub Publications, 2016.
5. Andrie de Vries and Joris Meys, *R for Dummies*, Wiley Publishing, 2015.

E-RESOURCES

1.https://cran.r-project.org
2.https://www.datacamp.com/tracks/r-programming

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	3	2	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	3
CO3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	2	3	3
CO4	3	3	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2
CO5	3	3	2	3	3	3	3	3	1	3	3	3	3	3	2	3	2

S-Strong (3) M-Medium (2) L-Low (1)

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

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(For the Candidates admitted in the academic year 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: I–DCEP-I (C) - PYTHON PROGRAMMING LAB

Ins. Hrs. /Week: 2 **Course Credit:2** **Course Code: P26CSDE12CP**

COURSE OBJECTIVES

- To understand the fundamentals of R programming for statistical computing and data analysis.
- To learn data handling, preprocessing and visualization techniques using R.
- To apply statistical and machine learning techniques using R programming.
- To develop analytical skills for solving real-world data science problems.
- To implement predictive models and data mining applications using R tools and packages.

EXERCISE:

1. Program using elementary data items, lists, dictionaries and tuples
2. Program using conditional branches, loops
3. Program using functions
4. Program using classes and objects
5. Program using inheritance
6. Program using polymorphism
7. Program using Numpy
8. Program using Pandas
9. Program using Matplotlib
10. Program for creating dynamic and interactive web pages using forms

Total Lecture Hours:30

COURSE OUTCOME

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

1. Comprehend the programming skills in python and write scripts
1. Create python applications with elementary data items, lists, dictionaries and tuples
2. Implement the Object Oriented Programming concepts such as objects and classes, Inheritance and polymorphism
3. Assess the use of Python packages to perform numerical computations and perform data visualization
4. Create interactive web applications using Django
5. Apply R programming for numerical computations, matrix operations and data preprocessing.
6. Design predictive analytics and data mining solutions using R programming tools.

TEXT BOOKS

1. Hadley Wickham and Garrett Grolemund, *R for Data Science*, O'Reilly Media, 2017.
2. Norman Matloff, *The Art of R Programming*, No Starch Press, 2011.
3. Tilman M. Davies, *The Book of R: A First Course in Programming and Statistics*, No Starch Press, 2016.

REFERENCE BOOKS

1. Jared P. Lander, *R for Everyone: Advanced Analytics and Graphics*, 2nd Edition, Addison-Wesley Professional, 2017.
2. Gareth James, Daniela Witten, Trevor Hastie and Robert Tibshirani, *An Introduction to Statistical Learning with Applications in R*, Springer, 2021.
3. Roger D. Peng, *R Programming for Data Science*, Leanpub Publications, 2016.
4. Andrie de Vries and Joris Meys, *R for Dummies*, Wiley Publishing, 2015.
5. Brett Lantz, *Machine Learning with R*, 3rd Edition, Packt Publishing, 2019.

E-RESOURCES

1.https://www.geeksforgeeks.org/r-programming-language-introduction/?utm_source=chatgpt.com
2.https://posit.co/products/open-source/rstudio/?utm_source=chatgpt.com

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	3	2	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	3
CO3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	2	3	3
CO4	3	3	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2
CO5	3	3	2	3	3	3	3	3	1	3	3	3	3	3	2	3	2

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: I – GEC-I(A) – MATHEMATICS FOR MACHINE LEARNING

Ins. Hrs. /Week: 5 Course Credit: 3 Course Code: P26CSGE11A

COURSE OBJECTIVES

- To understand advanced concepts and emerging trends in cryptography and cyber security.
- To learn modern security techniques used in blockchain, cloud computing and IoT environments.
- To study ethical hacking, cyber forensics and biometric authentication methods.
- To analyze real-world cyber security attacks and prevention mechanisms.
- To develop practical knowledge for designing secure communication and information protection systems.

UNIT I – LINEAR ALGEBRA FOR MACHINE LEARNING (15 Hours)

Scalars, Vectors and Matrices-Matrix Operations-Systems of Linear Equations-Vector Spaces and Subspaces -Eigenvalues and Eigenvectors-Singular Value Decomposition (SVD)-Orthogonality and Projections-Applications of Linear Algebra in Machine Learning

UNIT II – CALCULUS AND OPTIMIZATION (15 Hours)

Functions and Limits-Differentiation and Partial Derivatives-Chain Rule and Gradient-Jacobian and Hessian Matrices-Optimization Techniques-Gradient Descent Algorithm-Convex Functions and Convex Optimization-Applications in Neural Networks and Regression

UNIT III – PROBABILITY THEORY (15 Hours)

Basics of Probability-Conditional Probability and Bayes Theorem-Random Variables and Probability Distributions-Expectation, Variance and Covariance-Gaussian DistributionJoint and Marginal Probability-Independence and Correlation-Applications in Machine Learning Models

UNIT IV – STATISTICS FOR MACHINE LEARNING (15 Hours)

Descriptive Statistics-Sampling Techniques-Hypothesis Testing-Correlation and Regression Maximum Likelihood Estimation-Statistical Inference-Bias and Variance-Statistical Methods in Data Analysis

UNIT V – MATHEMATICAL FOUNDATIONS OF MACHINE LEARNING (15 Hours)

Distance Measures and Similarity Metrics-Loss Functions and Cost Functions-Information Theory and Entropy-Principal Component Analysis (PCA)-Dimensionality

Reduction Techniques-Support Vector Machine Mathematics-Mathematical Concepts in Deep Learning-Applications in Artificial Intelligence.

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only Self Study):

Cyber Forensics and Digital Evidence- Modern Cryptographic Algorithms and Applications- Case Studies on Real-Time Cyber Security Attacks and Prevention Techniques- Security Challenges in Internet of Things (IoT).

Total Lecture Hours: 75

COURSE OUTCOME

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

1. Explain the concepts of linear algebra and calculus used in machine learning.
2. Apply probability and statistical techniques in machine learning problems.
3. Analyze optimization methods and mathematical models for ML algorithms.
4. Evaluate statistical and probabilistic approaches in data-driven applications.
5. Develop mathematical solutions for machine learning and AI applications.
6. Evaluate modern security solutions and prevention mechanisms for real-world cyber threats.

TEXT BOOKS

1. Marc Peter Deisenroth, A. Aldo Faisal and Cheng Soon Ong, *Mathematics for Machine Learning*, Cambridge University Press, 2020.
2. Kevin P. Murphy, *Machine Learning: A Probabilistic Perspective*, MIT Press, 2012.
3. Stephen Boyd and Lieven Vandenberghe, *Introduction to Applied Linear Algebra – Vectors, Matrices and Least Squares*, Cambridge University Press, 2018.

REFERENCE BOOKS

1. Gilbert Strang, *Linear Algebra and Learning from Data*, Wellesley-Cambridge Press, 2019.
2. Christopher M. Bishop, *Pattern Recognition and Machine Learning*, Springer, 2006.
3. Trevor Hastie, Robert Tibshirani and Jerome Friedman, *The Elements of Statistical Learning*, 2nd Edition, Springer, 2009.
4. Ian Goodfellow, Yoshua Bengio and Aaron Courville, *Deep Learning*, MIT Press, 2016.
5. Sheldon Ross, *Introduction to Probability and Statistics for Engineers and Scientists*, Academic Press, 2014.

E-RESOURCES

1. Mathematics for Machine Learning Book
2. MIT OpenCourseWare – Linear Algebra
3. Khan Academy – Probability and Statistics
4. Coursera – Mathematics for Machine Learning Specialization
5. Stanford Machine Learning Course

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	*3*	2	*3*	2	*3*	2	2	*3*	*3*	2	*3*	2	*3*	2
CO2	2	*3*	*3*	*3*	2	2	*3*	2	*3*	2	2	*3*	2	*3*	*3*	2	*3*
CO3	2	*3*	2	2	*3*	*3*	2	*3*	2	*3*	*3*	2	*3*	2	*3*	*3*	*3*
CO4	*3*	2	*3*	2	*3*	2	*3*	2	*3*	*3*	*3*	*3*	*3*	2	2	2	*3*
CO5	*3*	2	*3*	*3*	2	*3*	2	*3*	2	*3*	2	2	2	*3*	2	*3*	2

S-Strong (3) **M-Medium (2)** **L-Low (1)**

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

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(For the Candidates admitted in the academic year 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: I – GEC-I (B) – BIOLOGICAL DATABASES

Ins. Hrs. /Week: 5 Course Credit: 3 Course Code: P26CSGE11B

COURSE OBJECTIVES

- To understand the fundamentals of bioinformatics and biological database systems.
- To learn the structure, organization and retrieval methods of nucleotide and protein databases.
- To study biological database search tools and sequence analysis techniques used in bioinformatics.
- To analyze biological data using alignment, phylogenetic and data mining methods.
- To explore the applications of biological databases in genomics, proteomics, drug discovery and personalized medicine.

UNIT I – INTRODUCTION TO BIOLOGICAL DATABASES (15 Hours)

Introduction to Bioinformatics-Biological Data and Information-Characteristics of Biological Databases-Database Management System (DBMS) Concepts-Types of Databases:Primary Databases,Secondary Databases,Composite Databases-Biological Data Storage and Retrieval-File Formats in Bioinformatics-Data Submission and Data Mining.

UNIT II – NUCLEOTIDE SEQUENCE DATABASES (15 Hours)

DNA and RNA Sequence Databases-Genome Databases-Structure and Features of Nucleotide Databases-International Nucleotide Sequence-databases: GenBank, EMBL,DDBJ,Sequence Submission and Retrieval Methods-Sequence Annotation-FASTA and GenBank Formats-Genome Browsers.

UNIT III – PROTEIN DATABASES (15 Hours)

Protein Sequence Databases-Protein Structure Databases-Major Protein Databases: UniProt,PDB,Swiss-Prot-PIR-Protein Classification Databases-Motif and Domain Databases-Protein Structure Visualization-Proteomics Databases.

UNIT IV – BIOLOGICAL DATABASE SEARCH AND ANALYSIS TOOLS (15 Hours)

Sequence Similarity Searching-Pairwise Sequence Alignment-Local and Global Alignment-Multiple Sequence Alignment-Search Algorithms and Tools: BLAST, FASTA-Phylogenetic Analysis-Genome Data Analysis-Biological Data Mining Techniques.

UNIT V – APPLICATIONS OF BIOLOGICAL DATABASES (15 Hours)

Metabolic Pathway Databases-Gene Expression Databases-Disease Databases-Drug Databases-Structural Genomics and Functional Genomics-Database Integration and Data Warehousing-Applications in: Drug Discovery, Agriculture, Personalized Medicine, Biotechnology Research-Ethical Issues and Future Challenges in Biological Databases.

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only Self Study):

Applications of Artificial Intelligence in Genomics and Proteomics- Next Generation Sequencing (NGS) Databases- Case Studies on Biological Database Applications in Healthcare and Biotechnology .

Total Lecture Hours: 75

COURSE OUTCOME

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

1. Explain the concepts and types of biological databases.
2. Illustrate the structure and organization of nucleotide and protein databases.
3. Apply sequence retrieval and alignment tools for biological data analysis.
4. Analyze biological information using database search algorithms and bioinformatics tools.
5. Evaluate the applications of biological databases in genomics, proteomics and medicine.
6. Design bioinformatics-based solutions for applications in drug discovery, agriculture and personalized medicine.

TEXT BOOKS

1. Andreas D. Baxevanis, Gary D. Bader and David S. Wishart, *Bioinformatics*, 4th Edition, Wiley-Blackwell, 2020.
2. David W. Mount, *Bioinformatics: Sequence and Genome Analysis*, 2nd Edition, Cold Spring Harbor Laboratory Press, 2004.
3. S. Ignacimuthu, *Bioinformatics*, Narosa Publishing House, 2012.

REFERENCE BOOKS

1. Arthur M. Lesk, *Introduction to Bioinformatics*, 5th Edition, Oxford University Press, 2019.
2. T. K. Attwood and D. J. Parry-Smith, *Introduction to Bioinformatics*, Pearson Education, 2001.
3. Jean-Michel Claverie and Cedric Notredame, *Bioinformatics for Dummies*, Wiley Publishing, 2006.
4. Rastogi S. C., Mendiratta N. and Rastogi P., *Bioinformatics: Methods and Applications*, 4th Edition, PHI Learning, 2013.
5. Jin Xiong, *Essential Bioinformatics*, Cambridge University Press, 2006.

E-RESOURCES

1. NCBI – National Center for Biotechnology Information
2. UniProt Protein Database
3. Protein Data Bank (PDB)
4. European Bioinformatics Institute (EMBL-EBI)
5. BLAST Search Tool

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	*3*	2	*3*	2	*3*	2	2	*3*	*3*	2	*3*	2	*3*	2
CO2	2	*3*	*3*	*3*	2	2	*3*	2	*3*	2	2	*3*	2	*3*	*3*	2	*3*
CO3	2	*3*	2	2	*3*	*3*	2	*3*	2	*3*	*3*	2	*3*	2	*3*	*3*	*3*
CO4	*3*	2	*3*	2	*3*	2	*3*	2	*3*	*3*	*3*	*3*	*3*	2	2	2	*3*
CO5	*3*	2	*3*	*3*	2	*3*	2	*3*	2	*3*	2	2	2	*3*	2	*3*	2

S-Strong (3) **M-Medium (2)** **L-Low (1)**

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

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(For the Candidates admitted in the academic year 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: I GEC-I(C) – ADVANCED SOFTWARE ENGINEERING

Ins. Hrs. /Week: 5 Course Credit: 3 Course Code: P26CSGE11C

COURSE OBJECTIVES

- To understand the principles, methodologies and life cycle models of software engineering.
- To learn software project planning, effort estimation, risk management and project tracking techniques.
- To study requirements engineering, software design and architectural modeling concepts.
- To understand software testing, quality assurance and maintenance processes for reliable software systems.
- To develop practical knowledge for designing and managing efficient software development projects.

UNIT I NEED FOR S/W ENGINEERING (15 Hours)

About software and S/w 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 (15 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 (15 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 (15Hours)

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 (15 Hours)

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

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only Self Study):

Cloud-Based Software Engineering- Software Engineering for Artificial Intelligence Applications- Software Metrics and Project Analytics- ase Studies on Real-World Software Engineering Projects.

Total Lecture Hours: 75

COURSE OUTCOME

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

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.
6. Design reliable and efficient software systems using modern software engineering practices and tools.

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=fadQAAAAMAAJ
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
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CO2	3	3	2	3	2	2	2	2	2	2	3	3	2	3	3	2	3
CO3	3	3	2	2	2	2	2	2	2	2	3	3	2	3	3	2	2
CO4	2	2	3	3	2	2	2	2	2	2	3	2	2	2	2	3	3
CO5	2	2	3	3	2	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

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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: I -SEC-I – REACT JS

Ins. Hrs. /Week: 2 **Course Credit: 2** **Course Code: P26SECS11**

COURSE OBJECTIVES

- To understand the fundamentals of JavaScript and React for modern web development.
- To learn DOM manipulation, form validation and event handling using JavaScript.
- To develop reusable and interactive user interface components using React and JSX.
- To understand state management, props and component-based application development in React.
- To build responsive and dynamic front-end web applications using modern JavaScript frameworks and tools.

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.

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only Self Study):

Introduction to Single Page Applications- API Integration using Fetch and Axios- Case Studies on Modern Web Applications using React.

Total Lecture Hours-30

COURSE OUTCOME

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

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
6. Analyze component-based architecture and modern front-end development practices.

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
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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)**

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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: I - VAC - I: ADVANCED AI APPLICATIONS IN COMPUTER SCIENCE

Ins. Hrs. / Week: Course Credit: 2 Course Code: P26CSVA11

COURSE OBJECTIVES

- To understand advanced concepts and architectures in Artificial Intelligence.
- To explore machine learning, deep learning, and neural network techniques for real-world applications.
- To develop intelligent systems using Natural Language Processing and Computer Vision.
- To analyze AI applications in cybersecurity, cloud computing, IoT, and data analytics.
- To enhance practical skills through AI-based projects, case studies, and research activities.

UNIT I FOUNDATIONS OF ADVANCED ARTIFICIAL INTELLIGENCE

Introduction to Advanced AI – Evolution of AI – Intelligent Agents – Knowledge Representation – Search Techniques – Expert Systems – Fuzzy Logic – Evolutionary Computing – AI Architectures – Ethical Issues and Responsible AI – AI Development Platforms and Tools.

UNIT II MACHINE LEARNING AND DEEP LEARNING

Supervised Learning – Unsupervised Learning – Reinforcement Learning – Classification and Regression – Clustering Algorithms – Artificial Neural Networks – Deep Neural Networks – Convolutional Neural Networks (CNN) – Recurrent Neural Networks (RNN) – Transfer Learning – Model Evaluation Techniques.

UNIT III NATURAL LANGUAGE PROCESSING AND GENERATIVE AI

Introduction to NLP – Text Processing – Tokenization – Sentiment Analysis – Chatbots and Virtual Assistants – Large Language Models – Prompt Engineering – Generative AI Concepts – AI-based Content Generation – Speech Recognition – Machine Translation – Ethical Challenges in Generative AI.

UNIT IV COMPUTER VISION AND INTELLIGENT SYSTEMS

Image Processing Fundamentals – Feature Extraction – Object Detection – Face Recognition – Video Analytics – AI in Robotics – Autonomous Systems – Smart Surveillance – Medical Image Analysis – AI for Augmented and Virtual Reality – Edge **AI Applications.**

UNIT V AI APPLICATIONS IN EMERGING TECHNOLOGIES

AI in Cybersecurity – AI for Cloud Computing – AI in Internet of Things (IoT) – Predictive Analytics – AI in Healthcare – AI in Finance and Business Intelligence – Smart Cities – Industrial Automation – AI in Scientific Research – Future Trends in Artificial Intelligence.

UNIT VI CIA COMPONENTS (CONTINUOUS INTERNAL ASSESSMENT)CIA ACTIVITIES

Assignment on Machine Learning Algorithms - Seminar Presentation on Generative AI Applications - Mini Project using AI Tools or Frameworks -Case Study Analysis on AI-based Solutions -Model Development and Practical Demonstration - Online Quiz / Objective Test / Viva Voce.

COURSE OUTCOME

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

1. Explain advanced AI concepts, architectures, and intelligent systems.
2. Apply machine learning and deep learning techniques for problem solving.
3. Develop NLP and Generative AI based applications.
4. Design computer vision and intelligent automation solutions.
5. Analyze AI applications in cybersecurity, healthcare, IoT, and cloud environments.
6. Create AI-based projects and evaluate ethical and societal impacts of AI technologies.

TEXT BOOKS

1. Artificial Intelligence: A Modern Approach, Stuart Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach*, 4th Edition, Pearson Education, 2021.
2. Deep Learning, Ian Goodfellow, Yoshua Bengio and Aaron Courville, *Deep Learning*, MIT Press, 2016.
3. Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow, Aurélien Géron, *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow*, 3rd Edition, O'Reilly Media, 2022.

REFERENCE BOOKS

1. Machine Learning, Tom M. Mitchell, *Machine Learning*, McGraw-Hill Education, 2017.
2. Natural Language Processing with Python, Steven Bird, Ewan Klein and Edward Loper, *Natural Language Processing with Python*, O'Reilly Media, 2009.
3. Python Machine Learning, Sebastian Raschka and Vahid Mirjalili, *Python Machine Learning*, 3rd Edition, Packt Publishing, 2019.
4. Computer Vision: Algorithms and Applications, Richard Szeliski, *Computer Vision: Algorithms and Applications*, Springer, 2022.

E-RESOURCES

1. Coursera – Artificial Intelligence Courses
2. edX – AI and Machine Learning Programs
3. TensorFlow Documentation
4. OpenAI Documentation
5. Google AI Resources

SEMESTER II

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: II – *CC*-III– ADVANCED DATABASE MANAGEMENT SYSTEMS

Ins. Hrs. /Week: 6 Course Credit: 4 Course Code: P26CS204

COURSE OBJECTIVES

- To understand advanced database design concepts and normalization techniques.
- To study parallel and distributed database architectures and query processing methods.
- To explore object-oriented, spatial, temporal, XML, and multimedia database systems.
- To gain knowledge of emerging database technologies and their real-world applications.
- To develop the ability to analyze and design modern database applications efficiently.

UNIT – I RELATIONAL AND PARALLEL DATABASE DESIGN (18 Hours)

Basics, Entity Types, Relationship Types, ER Model, ER-to-Relational Mapping algorithm. Normalization: Functional Dependency, 1NF, 2NF, 3NF, BCNF,4NF and 5NF. Architecture, I/O Parallelism, Interquery Parallelism, Intraquery Parallelism, Intraoperation Parallelism, Interoperation Parallelism.

UNIT – II DISTRIBUTED AND OBJECT BASED DATABASES (18 Hours)

Architecture, Distributed data storage, Distributed transactions, Commit protocols, Concurrency control, Query Processing. Complex Data Types, Structured Types and Inheritance, Table Inheritance, array and Multiset, Object Identity and Reference Types, Object Oriented versus Object Relational.

UNIT – III SPATIAL DATABASE (18 Hours)

Spatial Database Characteristics, Spatial Data Model, Spatial Database Queries, Techniques of Spatial Database Query, Logic based Databases: Introduction, Overview, Propositional Calculus, Predicate Calculus, Deductive Database Systems, Recursive Query Processing

UNIT – IV XML DATABASES (18 Hours)

XML Hierarchical data model, XML Documents, DTD, XML Schema, XML Querying, XHTML, Illustrative Experiments

UNIT – V TEMPORAL DATABASES (18 Hours)

Introduction, Intervals, Packing and Unpacking Relations, Generalizing the relational Operators, Database Design, Integrity Constraints, Multimedia Databases:

Multimedia Sources, Multimedia Database Queries, Multimedia Database Applications.

UNIT – VI: CURRENT CONTOURS (For continuous internal assessment only Self Study)

Cloud Database Management Systems- Graph Databases and Knowledge Representation- Case Studies on Multimedia, Spatial and Temporal Database Applications.

Total Lecture Hours:90

COURSE OUTCOME

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

1. Design relational databases using ER modeling, normalization techniques, and parallel database concepts.
2. Analyze distributed and object-based database architectures for efficient data management.
3. Apply spatial and logic-based database concepts for advanced query processing.
4. Design and query XML databases using XML schema and hierarchical data models.
5. Understand temporal and multimedia databases for handling time-dependent and multimedia information.
6. Evaluate emerging trends and standards in modern database technologies.

TEXT BOOKS

1. Database System Concepts – 6th Edition, McGraw-Hill International Edition, 2011.
2. An Introduction to Database Systems – 8th Edition, Pearson Education Reprint, 2016.
3. Fundamentals of Database Systems – 7th Edition, Pearson, 2016.
4. Database Systems: A Practical Approach to Design Implementation and Management – Pearson Education, 2014.

REFERENCE BOOKS

1. Distributed Database Systems – Springer.
2. Database Management Systems – McGraw-Hill.
3. Principles of Database and Knowledge Base Systems – Computer Science Press.
4. Fundamentals of Database Technology – Pearson Education.

E-RESOURCES

- GeeksforGeeks – Normal Forms in DBMS
- Simplilearn – SQL Normalization Tutorial
- TutorialsPoint – Spatial Databases
- Oracle Spatial Database Documentation
- NPTEL – Database Management Systems

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	3	3	2	3	3	3	3	2	3	2	3	3
CO2	3	3	2	3	2	2	3	3	3	2	3	3	3	3	2	3	3
CO3	3	3	3	3	3	2	2	3	2	3	3	2	2	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3	2	2	3	3	2	3	2	3
CO5	3	2	3	3	3	3	3	2	3	3	2	3	3	3	3	3	2

S-Strong (3) **M-Medium (2)** **L-Low (1)**

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

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(For the Candidates admitted in the academic year 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: II– CC-IV –ADVANCED OPERATING SYSTEMS

Ins. Hrs. /Week: 6 Course Credit: 4 Course Code:P26CS205

COURSE OBJECTIVES

- To understand the architecture and design principles of multiprocessor, distributed, database and mobile operating systems.
- To study process synchronization, scheduling, memory management and distributed communication techniques in operating systems.
- To learn distributed file systems, shared memory concepts and concurrency control algorithms used in advanced operating systems.
- To understand mobile operating system architectures, kernel structures and power management approaches.
- To develop analytical skills for designing and managing modern operating system environments in distributed and mobile computing systems.

UNIT I INTRODUCTION (18 Hours)

Multiprocessor Operating Systems: System Architectures- Structures of OS – OS design issues – Process synchronization – Process Scheduling and Allocation- memory management.

UNIT DISTRIBUTED OPERATING SYSTEMS (18 Hours)

Distributed Operating Systems: System Architectures- Design issues – Communication models – clock synchronization – mutual exclusion – election algorithms- Distributed Deadlock detection.

UNIT III DISTRIBUTED SCHEDULING AND FILE SYSTEMS (18 Hours)

Distributed Scheduling - Distributed shared memory - Distributed File system – Multimedia file systems - File placement – Caching.

UNIT IV DATABASE OPERATING SYSTEMS (18 Hours)

Database Operating Systems: Requirements of Database OS – Transaction process model – Synchronization primitives - Concurrency control algorithms.

UNIT V MOBILE OPERATING SYSTEMS (18 Hours)

Mobile Operating Systems: ARM and Intel architectures - Power Management - Mobile OS Architectures - Underlying OS - Kernel structure and native level programming – Runtime issues-Approaches to power management.

UNIT VI CURRENT CONTOURS (For continuous internal assessment only):

Real-Time Operating Systems (RTOS)- Green Computing and Energy-Efficient Operating Systems- Modern Mobile Platforms and Embedded Systems- Recent Trends in Operating - System Design and Development.

Total Lecture Hours-90

COURSE OUTCOME

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

1. Knowledge about advance concepts in OS
2. Demonstrate the various issues in distributed operating systems
3. Identify the different features of data base operating systems
4. Ability to develop modules for Mobile devices
5. Ability to develop OS for distributed operating system
6. Design solutions for modern operating system challenges in distributed, mobile and cloud computing environments.

TEXT BOOKS

1.MukeshSinghal and Niranjan G. Shivaratri, ―Advanced Concepts in Operating Systems Distributed, Database, and Multiprocessor Operating Systems‖, Tata McGraw-Hill, 2001

REFERENCE BOOKS

1 . A S Tanenbaum, Distributed Operating Systems, Pearson Education Asia, 2001

2. Source Wikipedia, Mobile Operating Systems, General Books LLC, 2010

3. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "Operating System Concepts", Wiley, Eighth Edition, 2008.

E-RESOURES

1. http://www.uobabylon.edu.iq/download/M.S%202013-2014/Operating_System_Concepts,_8th_Edition%5BA4%5D.pdf 2. http://index-of.es/Varios-2/Modern%20Operating%20Systems%204th%20Edition.pdf

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	3	3	2	3	3	3	3	2	3	2	3	3
CO2	3	3	2	3	2	2	3	3	3	2	3	3	3	3	2	3	3
CO3	3	3	3	3	3	2	2	3	2	3	3	2	2	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3	2	2	3	3	2	3	2	3
CO5	3	2	3	3	3	3	3	2	3	3	2	3	3	3	3	3	2

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–CP-II – ADVANCED DATABASE MANAGEMENT SYSTEMS LAB

Ins. Hrs. /Week: 4 Course Credit:4 Course Code: P26CS206P

COURSE OBJECTIVES

- To understand the architecture and design principles of multiprocessor, distributed, database and mobile operating systems.
- To study process synchronization, scheduling, memory management and distributed communication techniques in operating systems.
- To learn distributed file systems, shared memory concepts and concurrency control algorithms used in advanced operating systems.
- To understand mobile operating system architectures, kernel structures and power management approaches.
- To develop analytical skills for designing and managing modern operating system environments in distributed and mobile computing systems.

EXERCISES

1. Usage of Data Definition Language (DDL) Commands.
2. Usage of Data Manipulation Language (DML).
3. Data communication using SQL Functions.
4. Database Design and Normalization.
5. Usage of Join Commands.
6. Implementing Sub Queries.
7. Creating Views.
8. Creating and Executing Triggers.
9. Creating and Executing Procedures.
10. Apply PL/SQL for Processing Databases.

Total Lecture Hours : 60

COURSE OUTCOME

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

1. Apply SQL commands for database creation, modification, and management.
2. Design relational databases using normalization techniques.
3. Implement data retrieval and manipulation using SQL functions and queries.
4. Develop advanced SQL concepts including joins, subqueries, and views.
5. Create database automation using triggers and procedures.
6. Develop PL/SQL programs to process and manage database operations efficiently.

TEXT BOOKS

1. Database System Concepts – McGraw-Hill.
2. Fundamentals of Database Systems – Pearson Education.
3. SQL PL/SQL The Programming Language of Oracle – BPB Publications.
4. An Introduction to Database Systems – Pearson Education.

REFERENCE BOOKS

1. Database Management Systems – McGraw-Hill.
2. Oracle Database PL/SQL Language Reference.
3. Database Systems A Practical Approach to Design Implementation and Management – Pearson.
4. Learning SQL – O'Reilly Media.

E-RESOURCES

1. Oracle SQL Documentation
2. MySQL Documentation
3. W3Schools SQL Tutorial
4. GeeksforGeeks DBMS Tutorial
5. TutorialsPoint SQL Tutorial
6. NPTEL Database Management Systems

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	3	2	3	3	3	3	3	3	3	3
CO2	3	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	3
CO4	3	3	3	3	3	3	2	3	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	3

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(For the Candidates admitted in the academic year 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: II– DCEC-II *(A)* –PYTHON PROGRAMMING FOR MACHINE LEARNING

Ins. Hrs. /Week: 4 Course Credit: 4 Course Code: P26CSDE23A

COURSE OBECTIVES

- To understand the fundamentals of Python programming and its applications in machine learning and data science.
- To learn data handling, preprocessing and visualization techniques using Python libraries.
- To study machine learning algorithms, model training and evaluation techniques using Python tools.
- To understand advanced machine learning, deep learning and neural network concepts for intelligent systems.
- To develop practical skills for designing and deploying machine learning solutions for real-world applications

UNIT I INTRODUCTION TO PYTHON PROGRAMMING (12 Hours)

Introduction to Python-Features and Applications of Python-Installing Python and IDEs-Python Syntax and Variables-Data Types and Operators-Conditional Statements and Loops,Functions and Modules-File Handling and Exception Handling-Introduction to NumPy Arrays.

UNIT II DATA HANDLING AND VISUALIZATION (12 Hours)

Introduction to Data Science Libraries-NumPy Operations-Pandas Data Structures-Data Cleaning and Preprocessing-Handling Missing Data-Data Transformation Techniques-Data Visualization using:Matplotlib,Seaborn-Exploratory Data Analysis (EDA).

UNIT III MACHINE LEARNING FUNDAMENTALS (12 Hours)

Introduction to Machine Learning-Types of Machine Learning-Supervised Learning-Unsupervised Learning-Reinforcement Learning-Data Splitting and Model Training Regression Algorithms-Classification Algorithms-Model Evaluation Techniques Introduction to Scikit-learn.

UNIT IV ADVANCED MACHINE LEARNING WITH PYTHON (12 Hours)

Clustering Algorithms-Dimensionality Reduction-Feature Engineering-Decision Trees and Random Forest--Support Vector Machines-K-Means Clustering-Principal Component Analysis (PCA)-Hyperparameter Tuning-Model Optimization Techniques.

UNIT V DEEP LEARNING AND APPLICATIONS (12 Hours)

Introduction to Deep Learning-Artificial Neural Networks-Tensor Flow and Keras Basics-Building Deep Learning Models-Convolutional Neural Networks (CNN)-Natural Language Processing Basics-Machine Learning Model Deployment-Real-Time Applications of Machine Learning-Ethics and Challenges in AI and ML.

UNIT VI CURRENT CONTOURS (For continuous internal assessment only Self Study)

Machine Learning in Cloud Computing- Applications of AI in Healthcare, Banking and Cyber Security- Real-Time Data Analytics using Python.

Total lecture Hours: 60

COURSE OUTCOME

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

1. Explain Python programming concepts and libraries used in machine learning.
2. Apply Python tools for data preprocessing and visualization.
3. Develop machine learning models using Python libraries.
4. Analyze the performance of machine learning algorithms and models.
5. Design intelligent applications using machine learning and deep learning techniques.
6. Design intelligent applications using Python, machine learning and deep learning frameworks.

TEXT BOOKS

1. Andreas C. Müller and Sarah Guido, *Introduction to Machine Learning with Python*, O'Reilly Media, 2016.
2. Sebastian Raschka and Vahid Mirjalili, *Python Machine Learning*, 3rd Edition, Packt Publishing, 2019.
3. Jake VanderPlas, *Python Data Science Handbook*, O'Reilly Media, 2016.

REFERENCE BOOKS

1. Aurélien Géron, *Hands-On Machine Learning with Scikit-Learn, Keras and TensorFlow*, 3rd Edition, O'Reilly Media, 2022.
2. Wes McKinney, *Python for Data Analysis*, 3rd Edition, O'Reilly Media, 2022.
3. François Chollet, *Deep Learning with Python*, 2nd Edition, Manning Publications, 2021.
4. John Hearty, *Advanced Machine Learning with Python*, Packt Publishing, 2016.
5. Ethem Alpaydin, *Introduction to Machine Learning*, 4th Edition, MIT Press, 2020.

E-RESOURCES

1. Python Official Documentation
2. Scikit-learn Documentation
3. TensorFlow Official Documentation
4. Kaggle Learn – Machine Learning Courses
5. Coursera – Machine Learning with Python

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	3	3	2	3	3	3	3	2	3	2	3	3
CO2	3	3	2	3	2	2	3	3	3	2	3	3	3	3	2	3	3
CO3	3	3	3	3	3	2	2	3	2	3	3	2	2	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3	2	2	3	3	2	3	2	3
CO5	3	2	3	3	3	3	3	2	3	3	2	3	3	3	3	3	2

S-Strong (3) **M-Medium (2)** **L-Low (1)**

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

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(For the Candidates admitted in the academic year 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: II– DCEC-II *(B)* –BLOCKCHAIN TECHNOLOGY

Ins. Hrs. /Week: 4 Course Credit: 4 Course Code:P26CSDE23B

COURSE OBJECTIVES

- To understand the fundamentals, architecture and working principles of blockchain technology.
- To study different types of blockchains, consensus mechanisms and cryptocurrency concepts.
- To learn public and private blockchain systems and smart contract implementation techniques.
- To understand security, privacy and scalability challenges in blockchain environments.
- To develop knowledge on blockchain applications in banking, healthcare and other real-world domains.

UNIT I FUNDAMENTALS OF BLOCK CHAIN (12 Hours)

Introduction - Origin of Blockchain–Blockchain Solution - Components of Blockchain - Components of Blockchain - Block in Blockchain - The Technology and the Future .

UNIT II BLOCKCHAIN TYPES AND CONSENSUS MECHANISM (12 Hours)

Introduction - Decentralization and Distribution - Types of Blockchain - Consensus Protocol - CRYPTOCURRENCY - BITCOIN, ALTCOIN and TOKEN: Introduction - Bitcoin and Cryptocurrency Basics - Types of Cryptocurrency - Cryptocurrency Usage.

UNIT III PUBLIC BLOCKCHAIN SYSTEM (12 Hours)

Introduction - Public Blockchain - Popular Public Blockchains - The BitcoinClockchain– Etherum Blockchain.

UNIT IV PRIVATE BLOCKCHAIN SYSTEM (12 Hours)

Introduction - Key Characteristics of Private Blockchain - Why We Need Private Blockchain - Private Blockchain Examples - Private Blockchain and Open Source - E-Commerce Site Examples - Varous Commands in E-Commerce Blockchain - Smart Contract in Private Environment - State Machine - Different Algorithms of Permissioned Blockchain - Byzantine Fault - Multichain

UNIT V SECURITY IN BLOCKCHAIN (12 Hours)

Introduction - Security Aspects in Bitcoin - Security and Privacy Challenges of Blockchain in General - Performance and Scalability - Identity Management and Authentication - Regularity Compliance and Assurance - Safeguarding Blockchain Smart Contract - Security Aspects in Hyperledger Fabric - APPLICATIONS OF BLOCKCHAIN: Blockchain in Banking and Finance – Blockchain in Healthcare.

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only Self Study):

Introduction to Decentralized Finance- Blockchain Scalability and Interoperability Issues- Ethical and Legal Issues in Blockchain Technology- Case Studies on Real-World Blockchain Applications.

Total Lecture Hours-60

COURSE OUTCOME

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

1. Understand the Basic Idea of Block chain Technology.
2. Identify the Differences between Public and Private Block chain Technologies.
3. Know about Crypto currency - Bit coin, Altcoin and Token
4. Understanding the Security Challenges
5. Know about Applications in Block chain Technology
6. Design secure and efficient blockchain-based applications for real-world scenarios.

TEXT BOOKS

1.Blockchain Technology, ChandramouliSubramaniam, Asha A George, Abhilash K A, MeeraKarthikeyan, University Press, 2020

REFERENCE BOOKS

1. Blockchain Basics: A Non-Technical Introduction, Daniel Drescher, Apress, 2017

2. BlockChainFrom Concept to Execution, DebajaniMohanty, BPB, 2018

E-RESOURCES

1. https://www.pdfdrive.com/blockchain-books.html
2. https://www.blockchain.com/

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	3	3	2	3	3	3	3	2	3	2	3	3
CO2	3	3	2	3	2	2	3	3	3	2	3	3	3	3	2	3	3
CO3	3	3	3	3	3	2	2	3	2	3	3	2	2	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3	2	2	3	3	2	3	2	3
CO5	3	2	3	3	3	3	3	2	3	3	2	3	3	3	3	3	2

S-Strong (3) **M-Medium (2)** **L-Low (1)**

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

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(For the Candidates admitted in the academic year 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: II–DCEC-*II (C)* –WEB PROGRAMMING

Ins. Hrs. /Week: 4 Course Credit: 4 Course Code: P26CSDE23C

COURSE OBJECTIVES

- To understand the fundamentals of CSS, JavaScript and dynamic web technologies for web application development.
- To learn styling techniques, DOM manipulation and event handling using CSS, JavaScript and jQuery.
- To develop dynamic and interactive web applications using PHP, MySQL and Ajax.
- To understand Angular framework concepts including components, data binding and services.
- To build responsive and modern web applications using front-end and back-end web technologies.

UNIT I INTRODUCTION TO CSS (12 Hours)

Importing style sheet- CSS Rules – Style Types – CSS Selectors –Fonts and Typography – Managing Text styles – color- positioning elements – Box model and Layout – Advanced CSS and CSS3: Attribute Selectors – Box -sizing Property – CSS3 Backgrounds – Borders- Multicolumn Layout – Text effects

UNIT II ACCESSING CSS FROM JAVASCRIPT (12 Hours)

Revisiting the getElement By Id function – Accessing CSS properties from JavaScript – Inline Javascript – Adding NEW elements – Using Interrupts – Introduction to jQuery: selectors- Handling events – Event functions and Properties -Special effects – Manipulating the DOM – Dynamically Applying classes – Modifying Dimensions – DOM Traversal - Using jQuery without selectors

UNIT III INTRODUCTION TO DYNAMIC WEB CONTENT (12 Hours)

HTTP and HTML- The Request /Response Procedure – Benefits of PHP. My SQL, Javascript, CSS and HTML5- Introduction to PHP- Expressions and Control Flow in PHP – PHP Functions and Objects- Arrays – File Handling

UNIT IV ACCESSING MYSQL USING PHP (12 Hours)

Form Handling – Cookies, Sessions, and Authentication – Exploring JavaScript - Functions – Objects – Arrays-JavaScript and PHP validation and Error Handling: Validating User Input with JavaScript–Using Ajax

UNIT V LEARNING ANGULAR (12 Hours)

Jumping into typescript – Angular components - Expressions – Data binding – Advanced Angular: Events and Change detection – Implementing Angular services in Web applications.

UNIT VI CURRENT CONTOURS (For continuous internal assessment only Self Study)

Front-End Frameworks and Libraries- Web Security and Authentication Techniques- Case Studies on Modern Dynamic Web Applications.

Total Lecture Hours : 60

COURSE OUTCOME

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

1. Understand the concepts of dynamic web design
2. Apply the concepts of data driven web design using PHP with MySQL
3. Analyze the usage of SQL language, JavaScript, jQuery, PHP and CSS for real time applications
4. Design dynamic web application using server and client side
5. Create Web application using Angular framework
6. Design responsive and secure dynamic web applications using modern web development frameworks and tools.

TEXT BOOKS

1. Robin Nixon (2017).Learning PHP, MySQL& JavaScript with jQuery, CSS &HTML5, (4/e) with jQuery, Thomson Press (India) Ltd., Delhi.
2. K.Meena, R.Slvakumar,A .B.Karthick Anand Babu, Web Programming with PHP and Mysql, Himalaya Publications. Mumbai, 2012. (ISBN: 978- 93 - 5051 - 581• 5).

REFERENCE BOOKS

1. Brad Dayley, Brendan Dayley, Caleb Dayley (2018), Node.js, MongoDB and Angular Web Development: The definitive guide to using the MEAN stack to build web applications (Developer's Library), (2/e), Pearson education
2. Ralph Moseley,M.T.Savaliya, (2013). Developing Web Applications, (2/e), Wiley India Pvt. Ltd., NewDelhi.
3. Nicholas C.Zakas(2012).Professional JavaScript for Web Developers(3/e),Wiley IndiaPvt. Ltd., New Delhi.

E-RESOURCES

1. https://www.tutorialspoint.com/php/php_and_mysql.htm
2. https://www.w3schools.com/angular/default.asp
3. https://angular.io/start
4. https://www.greengeeks.in/tutorials/make-dynamic-website/

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	2	2	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	2	3	3	2	3	2	3	3	3	3	3
CO3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	2	2	3
CO4	3	2	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2
CO5	3	3	3	2	3	3	2	3	3	1	3	3	3	3	3	3	2

S-Strong (3) **M-Medium (2)** **L-Low**

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: II–DCE*P-II* (A) - PYTHON PROGRAMMING FOR MACHINE LEARNING LAB

Ins. Hrs. /Week: 2 Course Credit:2 Course Code: P26CSDE24AP

COURSE OBJECTIVES

- To understand the fundamentals of machine learning algorithms and data classification techniques.
- To learn supervised and unsupervised learning methods using real-world datasets.
- To implement machine learning algorithms such as Decision Trees, Naïve Bayes, Neural Networks and Clustering techniques using Python/Java.
- To analyze model performance using accuracy, precision, recall and evaluation metrics.
- To develop practical skills in applying machine learning techniques for prediction, classification and data analysis problems.

EXERCISES

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.
3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
4. Build an Artificial Neural Network by implementing the Back-propagation algorithm and test the same using appropriate data sets.
5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.
7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.
8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.

Total Lecture Hours: 30

COURSE OUTCOME

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

1. Comprehend the programming skills in python and write scripts
2. Create python applications with elementary data items, lists, dictionaries and tuples
3. Implement the Object Oriented Programming concepts such as objects and classes, Inheritance and polymorphism
4. Assess the use of Python packages to perform numerical computations and perform data visualization
5. Create interactive web applications using Django
6. Design intelligent solutions for real-world data analysis and prediction problems using machine learning techniques.

TEXT BOOKS

1. Tom M. Mitchell, *Machine Learning*, McGraw-Hill Education, 2017.
2. Ethem Alpaydin, *Introduction to Machine Learning*, 4th Edition, MIT Press, 2020.
3. Stephen Marsland, *Machine Learning: An Algorithmic Perspective*, 2nd Edition, CRC Press, 2015.

REFERENCE BOOKS

1. Trevor Hastie, Robert Tibshirani and Jerome Friedman, *The Elements of Statistical Learning*, 2nd Edition, Springer, 2017.
2. Peter Flach, *Machine Learning: The Art and Science of Algorithms that Make Sense of Data*, Cambridge University Press, 2012.
3. Christopher M. Bishop, *Pattern Recognition and Machine Learning*, Springer, 2016.
4. Aurélien Géron, *Hands-On Machine Learning with Scikit-Learn, Keras and TensorFlow*, 3rd Edition, O'Reilly Media, 2022.
5. Andreas C. Müller and Sarah Guido, *Introduction to Machine Learning with Python*, O'Reilly Media, 2016.

E-RESOURCES

1. Scikit-learn Documentation
2. TensorFlow Tutorials
3. Kaggle – Machine Learning Datasets and Courses
4. Machine Learning Mastery
5. Coursera – Machine Learning Courses

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	3	2	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	3
CO3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	2	3	3
CO4	3	3	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2
CO5	3	3	2	3	3	3	3	3	1	3	3	3	3	3	2	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 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: II–DCEP-II (B) – BLOCKCHAIN TECHNOLOGY LAB

Ins. Hrs. /Week: 2 **Course Credit:2** **Course Code: P26CSDE24BP**

COURSE OBJECTIVES

- To understand the fundamentals of blockchain technology and distributed ledger concepts.
- To learn the implementation of blockchain structures such as blocks, Merkle trees and peer-to-peer networks.
- To develop practical skills in cryptocurrency wallet creation, mining and smart contract development.
- To implement blockchain algorithms and applications using Java programming.
- To analyze the security and integrity mechanisms used in blockchain systems.

EXERCISES

1. Creating Merkle tree
2. Creation of Block
3. Block chain Implementation Programming code
4. Creating ERC20 token
5. Java code to implement blockchain in Merkle Trees
6. Java Code to implement Mining using block chain
7. Java Code to implement peer-to-peer using block chain
8. Creating a Crypto-currency Walle

Total Lecture Hours: 30

COURSE OUTCOME

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

1. Knowledge of Blockchain Concepts and creating basic blocks.
2. Proficiency in Blockchain Development.
3. Ability to Design and Implement Blockchain Applications.
4. Evaluation and Analysis of Blockchain Systems.
5. Knowledge of crypto currency and creating a basic form of it.
6. Design blockchain-based solutions for secure decentralized applications.

TEXT BOOKS

1. Imran Bashir, *Mastering Blockchain*, 4th Edition, Packt Publishing, 2023.
2. Andreas M. Antonopoulos, *Mastering Bitcoin: Programming the Open Blockchain*, 2nd Edition, O'Reilly Media, 2017.
3. Narayan Prusty, *Building Blockchain Projects*, Packt Publishing, 2017.

REFERENCE BOOKS

1. Arshdeep Bahga and Vijay Madisetti, *Blockchain Applications: A Hands-On Approach*, VPT Publications, 2017.
2. Melanie Swan, *Blockchain: Blueprint for a New Economy*, O'Reilly Media, 2015.
3. Alex Leverington, *Ethereum Programming*, Packt Publishing, 2017.
4. Joseph Bonneau et al., *Bitcoin and Cryptocurrency Technologies*, Princeton University Press, 2016.
5. Siraj Raval, *Decentralized Applications: Harnessing Bitcoin's Blockchain Technology*, O'Reilly Media, 2016.

E-RESOURCES

1. Ethereum Official Documentation
2. Hyperledger Foundation
3. Bitcoin Developer Guide
4. Solidity Documentation
5. IBM Blockchain Learning 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	2	3	3	2	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	3
CO3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	2	3	3
CO4	3	3	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2
CO5	3	3	2	3	3	3	3	3	1	3	3	3	3	3	2	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 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: II –DCEP-II (C) – WEB PROGRAMMING LAB

Ins. Hrs. /Week: 2 Course Credit:2 Course Code: P26CSDE24CP

COURSE OBJECTIVES

- To understand the fundamentals of client-side and server-side web programming techniques.
- To learn HTML, CSS, JavaScript, jQuery and PHP for developing dynamic web applications.
- To develop practical skills in form validation, event handling and file operations in web environments.
- To understand database connectivity and session management using PHP and MySQL.
- To design interactive, responsive and database-driven web applications using modern web technologies.

EXERCISE

1. Develop a Program to pass information between web pages using GET and POST methods.
2. Develop a Program string functions to manipulate strings.
3. Develop a Program to implement file operations.
4. Develop a Program to create menus, styles, Animation using CSS.
5. Develop a Program to validate the HTML form fields using Javascript.
6. Develop a Program to using jQuery and CSS.
7. Develop a Program to handle events and special effects using jQuery
8. Develop a Program to implement explode and implode functions
9. Develop a Program to create data base connectivity using PHP and MySQL
10. Using PHP, Create Admin Login, Logout form using session variables.

Total Lecture Hours : 30

COURSE OUTCOME

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

1. Develop dynamic web pages using HTML, CSS, JavaScript, PHP, and MySQL.
2. Implement client-side and server-side scripting techniques for web applications.
3. Design interactive web interfaces using CSS, animations, jQuery, and event handling.
4. Validate HTML form fields using JavaScript for secure and accurate data entry.
5. Apply PHP string handling and file handling operations in web development.
6. Create database-driven applications using PHP and MySQL connectivity.

TEXT BOOKS

1. Web Technologies – Oxford University Press.
2. Internet and World Wide Web How to Program – Pearson Education.
3. Programming PHP – O'Reilly Publications.
4. JavaScript and jQuery – Wiley Publications.

REFERENCE BOOKS

1. PHP and MySQL Web Development – Pearson Education.
2. HTML and CSS: Design and Build Websites – Wiley Publications.
3. Learning PHP, MySQL and JavaScript – O'Reilly Publications.
4. Web Programming with HTML5, CSS and JavaScript – Jones & Bartlett Learning.

E-RESOURCES

- W3Schools Web Tutorials
- MDN Web Docs
- PHP Official Documentation
- jQuery Official Website
- MySQL Documentation
- JavaScript Info

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	2	2	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	2	3	3	2	3	2	3	3	3	3	3
CO3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	2	2	3
CO4	3	2	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2
CO5	3	3	3	2	3	3	2	3	3	1	3	3	3	3	3	3	2

S-Strong (3) **M-Medium (2)** **L-Low**

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: II– GEC-II (A) –PROBABILITY AND STATISTICS

Ins. Hrs. /Week: 4 Course Credit: 3 Course Code:P26CSGE22A

COURSE OBJECTIVES

- To understand the fundamentals of probability theory and statistical distributions.
- To learn sampling techniques and statistical estimation methods for data analysis.
- To study hypothesis testing and inferential statistical methods for decision making.
- To understand analysis of variance (ANOVA) and experimental design techniques.
- To develop analytical skills for solving real-world problems using probability an statistical methods.

UNIT I PROBABILITY THEORY (12 Hours)

Random variables – probability density and distribution functions-moment generating and characteristic functions – Binomial, Poisson, Normal distributions and their applications.

UNIT II SAMPLING THEORY (12 Hours)

Sampling distributions – Standard error – t, F, Chi square distributions – applications.

UNIT III ESTIMATION THEORY (12 Hours)

Interval estimation for population mean, standard deviation, difference in means, preparation ratio of standard deviations and variances.

UNIT IV TESTING OF HYPOTHESIS AND ANOVA (12 Hours)

Hypothesis testing – Small samples – Tests concerning proportion, means, standard deviations – Tests based on chi square – and Redistribution test -Design of experiments.

UNIT V ANOVA (12 Hours)

Design of experiments – One, Two factor Models.

UNIT VI CURRENT CONTOURS (For continuous internal assessment only Self Study)

Applications of ANOVA in Research and Industry-Time Series Analysis Basics-Ethical Issues in Statistical Data Analysis.

Total Lecture Hours-60

COURSE OUTCOME

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

1. Analyze the performance in terms of probabilities and distributions achieved by the determined solution.
2. Evaluating various test statistics for the samples.
3. Create an ability to apply statistical tests in experiments as well as to analyze and interpret data.
4. Use the statistical tools for their project and future research.
5. Explain the concepts in design of experiments in real life problems
6. Design statistical models and solutions for real-world research and industrial applications.

TEXT BOOK

1. Gupta and Kapoor, "Fundamentals of Applied Statistics", Sultan Chand and sons, 4th Edition, New Delhi, 2019.

REFERENCE BOOKS

1.Hooda, "Statistics for Business and Economics", Macmillan, 3rd Edition, India, 2003.

2. John.E.Freunds, "Mathematical statistics with applications", Pearson Education, 8 th Edition, New Delhi, 2013.

3. Levin and Rubin, "Statistics for Management", Pearson Education India, 7th Edition, New Delhi, 2013

2.Amazon web services for mobile developers : building apps with AWS, Mishra, Abhishek, Sybex Publications, 2018

E-RESOURCES

1.https://s3-ap-southeast-1.amazonaws.com/tv-prod/documents%2FnullAmazon+Web+Services+in+Action.pdf

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	3	3	2	3	3	3	3	2	3	2	3	3
CO2	3	3	2	3	2	2	3	3	3	2	3	3	3	3	2	3	3
CO3	3	3	3	3	3	2	2	3	2	3	3	2	2	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3	2	2	3	3	2	3	2	3
CO5	3	2	3	3	3	3	3	2	3	3	2	3	3	3	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 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: II– GEC-II (B) –INFORMATION SECURITY

Ins. Hrs. /Week: 4 Course Credit: 3 Course Code: P26CSGE22B

COURSE OBJECTIVES

- To understand the fundamental concepts, principles and importance of information security.
- To learn cryptographic techniques, network security mechanisms and secure communication methods.
- To study system security threats, malicious software and access control techniques.
- To understand risk management, security standards and legal aspects related to information security.
- To develop analytical and practical skills for protecting information systems against cyber threats and attacks.

UNIT I INTRODUCTION TO INFORMATION SECURITY (12 Hours)

CIA Triad, security trends, legal/ethical issues, and security policies.

UNIT II CRYPTOGRAPHY (12 Hours)

Classical ciphers, symmetric encryption (DES, AES), public-key cryptography (RSA, Diffie-Hellman), hash functions (SHA), digital signatures, and certificates.

UNIT III NETWORK SECURITY (12 Hours)

Denial-of-Service (DoS) attacks, firewalls, Intrusion Detection Systems (IDS), VPNs, and wireless security.

UNIT IV SYSTEM AND SOFTWARE SECURITY (12 Hours)

Malicious software (viruses, worms, Trojans), buffer overflows, operating system security, and access control mechanisms.

UNIT V RISK MANAGEMENT & COMPLIANCE (12 Hours)

Security standards, auditing, risk analysis, and information security laws.

UNIT-VI CURRENT CONTOURS (For continuous internal assessment only Self Study)

Digital Forensics and Incident Response- Security Challenges in Artificial Intelligence - Systems- Emerging Trends in Information Security and Cyber Defense.

Total Lecture Hours-60

COURSE OUTCOME

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

1. Explain the principles, models and challenges of information security systems.
2. Apply cryptographic techniques and network security mechanisms to secure information systems.
3. Analyze security threats, vulnerabilities and malicious attacks in computing environments.
4. Apply security policies, standards, and risk management frameworks.
5. Evaluate risk management strategies, security policies and compliance requirements for organizations.
6. Design secure information systems and defense mechanisms against modern cyber threats.

TEXT BOOKS

1. William Stallings, *Cryptography and Network Security: Principles and Practice*, 8th Edition, Pearson Education, 2023.
2. Charles P. Pfleeger and Shari Lawrence Pfleeger, *Security in Computing*, 5th Edition, Pearson Education, 2015.
3. Behrouz A. Forouzan and Debdeep Mukhopadhyay, *Cryptography and Network Security*, 3rd Edition, McGraw Hill Education, 2015.

REFERENCE BOOKS

1. Atul Kahate, *Cryptography and Network Security*, 4th Edition, McGraw Hill Education, 2019.
2. Nina Godbole and Sunit Belapure, *Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives*, Wiley India, 2011.
3. Jonathan Katz and Yehuda Lindell, *Introduction to Modern Cryptography*, 3rd Edition, CRC Press, 2020.
4. Michael E. Whitman and Herbert J. Mattord, *Principles of Information Security*, 7th Edition, Cengage Learning, 2021.
5. Mark Stamp, *Information Security: Principles and Practice*, 3rd Edition, Wiley India, 2022.

E-RESOURCES

1. NIST Computer Security Resource Center
2. OWASP Foundation
3. Cybersecurity and Infrastructure Security Agency (CISA)
4. Khan Academy – Cryptography Course
5. Coursera – Cyber Security Courses
6. edX – Information Security Courses

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	3	3	2	3	3	3	3	2	3	2	3	3
CO2	3	3	2	3	2	2	3	3	3	2	3	3	3	3	2	3	3
CO3	3	3	3	3	3	2	2	3	2	3	3	2	2	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3	2	2	3	3	2	3	2	3
CO5	3	2	3	3	3	3	3	2	3	3	2	3	3	3	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 2026 – 2027)
PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., COMPUTER SCIENCE

SEMESTER: II– GEC-II (C) –INTERNET OF THINGS
Ins. Hrs. /Week: 4 Course Credit: 3 Course Code: P26CSGE22C

COURSE OBJECTIVES

- To understand the fundamentals, architecture and enabling technologies of the Internet of Things (IoT).
- To learn IoT system architecture, communication protocols and design methodologies for smart applications.
- To develop practical skills in interfacing IoT devices using Raspberry Pi and Arduino platforms.
- To understand cloud integration, RESTful APIs and industrial IoT applications.
- To design and implement IoT-based solutions for real-world smart systems and industrial environments.

UNIT I BASICS OF INTERNET OF THINGS (12 Hours)

Definition – Characteristics – Physical Design of IoT– Logical Design of IoT– IoT Enabling Technologies – IoT Levels and Deployment Templates – **Domain Specific IoT**: Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health, and Lifestyle

UNIT II IoT ARCHITECTURE AND DESIGN METHODOLOGY (12 Hours)

M2M high-level ETSI architecture – IETF architecture for IoT – **IoT and M2M**:M2M – Difference between IoT and M2M – SDN and NFV for IoT. IoT System Management – Need for System Management – SNMP – Network Operator Requirements – NETCONF –YANG – IoT Systems Management with NETCONF-YANG – IoT Design Methodology.

UNIT III IoT WITH RASPBERRY Pi (12 Hours)

IoT Device – Raspberry Pi Board – Linux on Raspberry Pi – Raspberry Pi interfaces – Programming Raspberry Pi with Python – Other IoT devices – Cloud Storage Models and Communication APIs: WAMP – Xively Cloud for IoT– Django – Designing RESTful Web API

UNIT IV IoT WITH ARDUINO (12 Hours)

Arduino Basics: Hardware Requirements – Software Requirements – Arduino Programming. Internet Connectivity: Arduino Uno Wired Connectivity – Arduino Uno Wireless Connectivity – Arduino Yun Wireless Connectivity. Communication Protocols: HTTP – MQTT

UNIT V INDUSTRIAL APPLICATIONS (12 Hours)

Cisco IoT system – IBM Watson IoT Platform – Manufacturing – Converged Plantwide Ethernet Model (CPwE) – Power Utility Industry – GridBlocks Reference Model – Smart and Connected Cities: Layered Architecture, Smart Lighting, Smart Parking Architecture, and Smart Traffic Control.

UNIT VI CURRENT CONTOURS (For continuous internal assessment only Self Study)

IoT Security and Privacy Challenges- Cloud-Based IoT Analytics and Big Data Processing- Case Studies on Smart City and Industrial IoT Applications.

Total Lecture Hours-60

COURSE OUTCOME

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

1. Understand the fundamentals of IOT
2. Analyze the Design of IOT systems
3. Develop programs for IOT systems
4. Identify wireless sensor networks
5. Understand protocols and routing methods for wireless sensor networks
6. Design intelligent IoT-based solutions integrating sensors, cloud platforms and communication technologies for real-world applications.

TEXT BOOKS

1. Arshdeep Bahga and Vijay Madisetti, , “Internet of Things: Hands-on Approach”, UniversityPress, Hyderabad, 2015
2. Kazem Sohraby, Daniel Minoli and TaiebZnati, “Wireless Sensor Networks: Technology, Protocols and Application”, Wiley Publications, New Delhi, 2010.

REFERENCE BOOKS

1. Carlos De Morais Cordeiro and Dharma Prakash Agrawal, “Ad Hoc and Sensor Networks: Theory and Applications”, World Scientific Publishing, 2011.
2. Edgar Callaway, “Wireless Sensor Networks: Architecture and Protocols”, Auerbach Publications, 2003.
3. Erdal cayırcı and Chunming Rong, “Security in Wireless Ad Hoc and Sensor Networks”, John Wiley and Sons, 2009.
4. Michael Miller, “The Internet of Things”, Pearson Education, India, 2015.
5. Waltenegus Dargie and Christian Poellabauer, “Fundamentals of Wireless Sensor Networks: Theory and Practice”, John Wiley and Sons Ltd, 2010.

E-RESOURCES

1. https://www.geeksforgeeks.org/introduction-to-internet-of-things-iot-set-1/
2. https://data-flair.training/blogs/iot-applications/
3. https://www.sciencedirect.com/topics/computer-science/wireless-sensor-networks

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	3	3	2	3	3	3	2	2	2	3	2	3
CO2	3	3	2	3	3	3	3	3	2	3	2	3	3	3	3	3	2
CO3	2	3	2	3	3	3	2	3	3	3	3	3	3	2	3	3	3
CO4	3	2	3	2	3	2	3	3	3	2	2	3	3	3	3	3	3
CO5	3	3	3	3	2	3	3	2	3	3	3	3	2	3	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 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: II– SEC-II –NODE JS

Ins. Hrs. /Week: 2 Course Credit: 2 Course Code: P26SECS22

COURSE OBJECTIVES

- To understand the fundamentals and architecture of Node.js for server-side web application development.
- To learn asynchronous programming, event-driven concepts and core modules in Node.js.
- To develop web applications and RESTful APIs using Express.js framework.
- To understand database integration, real-time communication and deployment techniques using Node.js.
- To build scalable, secure and high-performance server-side applications using modern Node.js technologies and tools.

UNIT I INTRODUCTION TO NODE.JS (6 Hours)

Introduction to Server-Side JavaScript-Features and Architecture of Node.js-Installing Node.js and npm-Node.js Runtime Environment-Event-Driven Programming-Asynchronous Programming Concepts-Node.js Modules-File System Operations-Buffers- Streams and Events.

UNIT II NODE.JS CORE MODULES AND WEB SERVER (6 Hours)

Working with Core Modules-HTTP Module-Creating Web Servers-URL and Query String Modules-File Upload Handling-Working with JSON Data-Event Loop and Callback Functions-Error Handling in Node.js-Package Management using npm.

UNIT III EXPRESS.JS FRAMEWORK (6 Hours)

Introduction to Express.js-Routing in Express.js-Middleware Functions-Request and Response Handling Template Engines-RESTful API Development-CRUD Operations-Authentication and Authorization-Session and Cookie Management.

UNIT IV DATABASE CONNECTIVITY AND REAL-TIME APPLICATIONS (6 Hours)

Database Integration with Node.js-Working with MongoDB-Mongoose ODM-MySQL Connectivity Data Validation Techniques-Real-Time Communication using Socket.IO-Chat Application Development-API Testing Tools-Deployment Basics.

UNIT V ADVANCED NODE.JS APPLICATIONS (6 Hours)

Asynchronous Programming with Promises and Async/Await-Microservices Architecture-Node.js Security Best Practices-Performance Optimization-Logging and Debugging-Testing Frameworks Cloud Deployment of Node.js Applications-Introduction to DevOps with Node.js-Future Trends in Node.js Development.

UNIT VI CURRENT CONTOURS (For continuous internal assessment only Self Study)

Real-Time Applications using WebSockets- Security and Performance Monitoring in Node.js- Case Studies on Modern Full-Stack Web Applications.

COURSE OUTCOME

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

1. Explain the architecture and programming concepts of Node.js
2. Develop server-side applications using Node.js and Express. jsImplement RESTful APIs and database connectivity in Node.js applications
3. Analyze asynchronous operations and real-time communication techniques.
4. Design scalable and secure web applications using Node.js technologies.
5. Design secure and efficient full-stack applications using Node.js and modern web technologies.
6. Implement database connectivity, authentication and real-time communication in Node.js applications.

TEXT BOOKS

1. Alex Young and Marc Harter, Node.js in Action, 2nd Edition, Manning Publications, 2017.
2. Ethan Brown, Web Development with Node and Express, 2nd Edition, O'Reilly Media, 2019.
3. Shelley Powers, Learning Node, 2nd Edition, O'Reilly Media, 2016.

REFERENCE BOOKS

1. David Herron, Node.js Web Development, 5th Edition, Packt Publishing, 2020.
2. Sandro Pasquali, Mastering Node.js, Packt Publishing, 2017.
3. Brad Dayley, Node.js, MongoDB and Angular Web Development, Addison-Wesley Professional, 2018.
4. Azat Mardan, Practical Node.js, Apress, 2018.
5. Mike Cantelon, Marc Harter, T. J. Holowaychuk and Nathan Rajlich, Node.js in Practice, Manning Publications, 2015.

E-RESOURCES

1. Node.js Official Documentation
2. Express.js Official Documentation
3. MongoDB Documentation
4. NodeSchool Interactive Tutorials
5. freeCodeCamp – Node.js Tutorials

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	3	3	2	3	3	3	3	2	3	2	3	3
CO2	3	3	2	3	2	2	3	3	3	2	3	3	3	3	2	3	3
CO3	3	3	3	3	3	2	2	3	2	3	3	2	2	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3	2	2	3	3	2	3	2	3
CO5	3	2	3	3	3	3	3	2	3	3	2	3	3	3	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 2026 – 2027)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

SEMESTER: II– NMEC-I – INTERNET AND WEB BASICS

Ins. Hrs. /Week: 2 Course Credit: 2 Course Code: P26NMECS21

COURSE OBJECTIVES

- To understand the fundamentals of the Internet and World Wide Web.
- To learn the structure and development of web pages using HTML and CSS.
- To develop interactive web pages using JavaScript and client-side scripting techniques.
- To understand web hosting, networking concepts, and Internet security mechanisms.
- To explore emerging web technologies and modern web application trends.

UNIT I INTRODUCTION TO CLOUD COMPUTING (6 Hours)

Cloud Computing Basics –History of cloud computing-Importance of Cloud Computing in the current Era-Characteristics of Cloud Computing Pros and Cons of Cloud Computing

UNIT II TYPES OF CLOUD (6 Hours)

Public and Private Cloud - Cloud Infrastructure. Working of Cloud Computing: Trends in Computing - Cloud services models – Cloud Deployment Models.

UNIT III CLOUD COMPUTING TECHNOLOGY (6Hours)

Cloud Life Cycle Model- Reference Model for Cloud Computing. Foundations: Introduction to Virtualization-Types of Virtualization-Virtual Clustering.

UNIT IV CLOUD COMPUTING TOOLS (6 Hours)

Moving Applications to the Cloud – Cloud Opportunities - Cloud Mashaps – Apache Hadoop – Cloud Tools.

UNIT V CLOUD APPLICATIONS (6 Hours)

Microsoft Cloud Services - **Google Cloud Applications:** Google Applications Utilizing Cloud- Google App Engine. **Amazon Cloud Services:** Understanding Amazon Web Components and Services-Elastic Compute Cloud.

UNIT-VI CURRENT CONTOURS (For continuous internal assessment only Self Study):

Cloud Security and Privacy Issues- Cloud Migration Strategies and Challenges-Case Studies on Real-Time Cloud Applications.

Total Lecture Hours-30

COURSE OUTCOME

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

1. Explain the concepts, architecture, and services of the Internet and Web technologies
2. Develop web pages using HTML and CSS for effective presentation of information.
3. Implement client-side scripting techniques using JavaScript to create

dynamic web applications.

4. Analyze web hosting environments, networking concepts, and security requirements of web systems
5. Design simple web applications by integrating modern web technologies and best practices.
6. Evaluate emerging trends in web technologies, web accessibility, SEO, Progressive Web Applications (PWA), and cloud-based web solutions

TEXT BOOKS

1. Internet and World Wide Web – How to Program, Paul Deitel, Harvey Deitel, Pearson Education, 6th Edition, 2020.
2. Web Technologies, Uttam K. Roy, Oxford University Press, 2018.

REFERENCE BOOKS

1. HTML and CSS: Design and Build Websites, Jon Duckett, Wiley Publications, 2014.
2. JavaScript and JQuery: Interactive Front-End Web Development, Jon Duckett, Wiley Publications, 2015.
3. Web Technologies: Black Book, Dreamtech Press, 2019.
4. Learning Web Design, O'Reilly Media, 5th Edition, 2018.

E-RESOURCES

1. W3Schools Web Development Tutorials
2. MDN Web Docs
3. HTML5 Tutorial by TutorialsPoint
4. CSS Tutorial by TutorialsPoint

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	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	2	3	3	3	3	3	3	3	2	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3
CO4	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	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)**