

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SILVER JUBILEE INSTITUTION

(Affiliated to Bharathidasan University)

(Accredited by NAAC)



SUNDARAKKOTTAI, MANNARGUDI – 614016, TAMILNADU, INDIA.

B.Sc., COMPUTER SCIENCE

LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS-LOCF)

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

PROGRAMME CODE

3USCSC



SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

(Affiliated to Bharathidasan University, Tiruchirappalli)

Accredited by NAAC SUNDARAKKOTTAI,

MANNARGUDI-614016.

TAMILNADU, INDIA.

B.Sc., COMPUTER SCIENCE

CHOICE BASED CREDIT SYSTEM- LEARNING OUTCOMES BASED CURRICULUM FRAME WORK (CBCS-LOCF)

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

CHOICE BASED CREDIT SYSTEM

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

OUTCOME-BASED EDUCATION (OBE)

LEARNING OUTCOME-BASED CURRICULUM FRAMEWORK (LOCF)

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

Some important aspects of the Outcome Based Education Course: is defined as a theory, practical or theory cum practical subject studied in a semester. **Course Outcomes (COs):** 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 Specific Elective Courses (DSE) Elective course may be offered by the main discipline/subject of study is referred to as Discipline Specific Elective (DSE). These courses offer the flexibility of selection of options from a pool of courses. These are considered specialized or advanced to that particular programme and provide extensive exposure in the area chosen; these are also more applied in nature.

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

Non Major Elective (NME). A student shall choose at least two Non – major Elective Courses (NME) from outside his /her department. Non –Major Elective I – Those who choose Tamil in Part I can choose a non –major elective course offered by other departments. Those who do not choose Tamil in Part I must choose either a) Basic Tamil if Tamil language was not studied in school level or b) Special Tamil if Tamil language was studied upto 10th & 12th std.

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.

Undergraduate Programme:

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

Part -I : Languages (Tamil / Hindi / French / Sanskrit)

Part-II : General English

Part-III: Core Course (Theory, Practicals, Generic Elective courses , Discipline Specific Elective courses , Compulsory and Optional Allied courses, Project)

Part-IV: Non Major Elective, Foundation Course, Value Education, Environmental studies, Skill Enhancement Courses/ Soft Skills, Internship / field visit / industrial visit/ Case Study), Professional Competency Course

Part –V

Extension activity, Gender studies

EXAMINATION

Continuous Internal Assessment

(CIA): UG - Distribution of CIA Marks

Passing Minimum: 40 %

Assignment-3 = 30%

Test-3 (Best 2 out of 3) = 50%

Seminar = 10%

Attendance = 10%

Question Paper Pattern

Part A:

Part A 1 (10X1=10 marks)

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

Part A 2 (5X2=10 marks)

Match the following Short Answers

One question from Each unit

Total Marks – 20

Part B: (5X5=25 marks)

Paragraph Answers

Either/ or type, One Question from each unit

Part C: (10X3=30)

Essay Type Answers

Answer 3 out of 5

Questions One

Question from each unit

Part A: K1 Level

Part B: K2, K3 and K4 Level

Part C: K5 and K6 Level

Knowledge levels for assessment of Outcomes based on Blooms Taxonomy

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

WEIGHTAGE of K – LEVELS IN QUESTION PAPER

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

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

BLUE PRINT OF QUESTION PAPER FOR END SEMESTER EXAMINATION							
DURATION: 3. 00 Hours.				Max Mark : 75			
K- LEVELS	K1	K2	K3	K4	K5	K6	Total Marks
PART							
PART –A (One Mark, No choice) (10x1 =10)	10						10
(2-Marks, No choice) (5x2=10)	10						10
PART –B (5- Marks) (Either/or type) (5x5=25)		5	10	10			25
PART -C (10 Marks) (3 out of 5) (3x10=30) Courses having only K5,K6 levels, K5 level- 3 Questions, K6 level- 2 Questions (One K6 level question is compulsory)					20	10	30
Total	20	05	10	10	20	10	75

EVALUATION

GRADING SYSTEM

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

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

$\text{GPA} = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i}$	$\text{WAM (Weighted Average Marks)} = \frac{\sum_{i=1}^n C_i M_i}{\sum_{i=1}^n C_i}$
Where, C_i is the Credit earned for the Course i G_i is the Grade Point obtained by the student for the Course i M_i is the marks obtained for the course i and n is the number of Courses Passed in that semester.	

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

CLASSIFICATION OF FINAL RESULTS:

1. For each of the first three parts, there shall be separate classification on the basis of CGPA, as indicated in Table-2.
2. For the purpose of declaring a candidate to have qualified for the Degree of Bachelor of Arts/Science/Commerce/Management as Outstanding/Excellent/Very Good/Good/Above Average/Average, the marks and the corresponding CGPA earned by the candidate in Part-III alone will be the criterion, provided the candidate has secured the prescribed passing minimum in the all the Five parts of the Programme.
3. Grade in Part –IV and Part-V shall be shown separately and it shall not be taken into account for classification.
4. A Pass in PART- V will be mandatory although the marks will not count for the calculation of the CGPA.
5. Absence from an examination shall not be taken an attempt.

Table-1: Grading of the Courses - UG

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
40 and above and below 50	5	C
Below 40	NA	RA

The candidate's 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-3: 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
4.00 to 4.99	C	Average
Below 4.00	RA	Re-appearance

The candidates who have passed in the first appearance and within the prescribed duration of the UG 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 B.Sc., DEGREE

PO No.	Programme Outcomes <i>(Upon completion of the B.Sc. Degree Programme, the Undergraduate will be able to)</i>
PO-1	Disciplinary knowledge: Demonstrate comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate program of study in Bachelor of Science.
PO-2	Critical thinking, Problem Solving and Reflective thinking: think critically about the issues and identify, critically analyze and solve problems from the disciplines of concern using appropriate tools and techniques and the knowledge, skills and attitudes acquired and extrapolate the same to real life situations; show critical sensibility to life experiences, with self awareness and reflexivity of both self and society.
PO-3	Analytical & Scientific Reasoning: evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples and addressing opposing viewpoints; critically evaluate ideas, evidence, and experiences from an open minded and reasoned perspective.
PO-4	Research-related Skills: develop a sense of capability for relevant/appropriate inquiry and asking questions, synthesize, articulate and report results and to recognize and predict cause and effect relationships, define problems, formulate and establish hypothesis, analyze and interpret and draw conclusions from data, execute and report the results of an experiment or investigation.
PO-5	Digital literacy and Effective Communication: use ICT in a variety of learning situations and speak, read, write and listen clearly in person and through electronic media in English and in one or more Indian languages, and make meaning of the world by connecting people, ideas ,books, media and technology; efficiently communicate thoughts and ideas in a clear and concise manner.
PO-6	Individual and Team Work: effectively accomplish tasks individually as well as work effectively and respectfully as member or leader with diverse teams, facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interest so for a common cause and work efficiently as a member of a team.
PO-7	Multicultural Competence and Social Interaction: understand the values and beliefs of multiple cultures, global perspectives, engage and interact respectfully with diverse groups and elicit views of others, mediate disagreements and help reach conclusions in group settings.

PO-8	Awareness of Ethical issues, Human values and Gender Issues: 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 and understand the value of relationship between self and the community and aware of the various issues concerning women and society.
PO-9	Awareness of Environment and Sustainability: understand the impacts of technology and business practices in societal and environmental contexts, and sustainable development.
PO-10	Self directed and Lifelong learning: acquire knowledge and skills, including learning "how to learn", that are necessary for participating in learning activities throughout life and to engage in independent and life-long learning in the broadest context of socio-technological changes.

PROGRAMME SPECIFIC OUTCOMES FOR B.Sc., COMPUTER SCIENCE

PSO No.	Program Specific Outcomes (Upon completion of the B.Sc., COMPUTER SCIENCE Degree Programme, the Undergraduate will be able to)
PSO-1	Think in a critical and logical based manner
PSO-2	Familiarize the students with suitable software tools of computer science and industrial applications to handle issues and solve problems in mathematics or statistics and real time application related sciences.
PSO-3	Know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand.
PSO-4	Understand, formulate, develop programming model with logical approaches to a Address issues arising in social science, business and other contexts.
PSO-5	Acquire good knowledge and understanding to solve specific theoretical and applied problems in advanced areas of Computer science and Industrial statistics. .



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B.Sc., COMPUTER SCIENCE

CHOICE BASED CREDIT SYSTEM – LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS –LOCF)

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

ELIGIBILITY: Those who have completed in 10th, +2 examinations with Mathematics as one the core subject

Sem	Part	Nature of the Course	Course Code	Title of the Paper	Ins. Hours / Week	L	T	P	S	Credit	Exam Hours	Marks		Total
												CIA	ESE	
I	I	Language Course-I	U25LC101	Pothu Tamil-I Tamil Ilakkiya Varalaru -I	6	5	1	-	-	3	3	25	75	100
	II	English Language Course-I	U25ELC101	General English-I	6	5	1	-	-	3	3	25	75	100
	III	Core Course-I	U25CS101	Python Programming	5	4	1	-	-	5	3	25	75	100
		Core Practical-I	U25CS102P	Python Programming Lab	4	1	-	3	-	4	3	25	75	100
		Allied Course-I	U25AMA101	Statistics	3	2	1	-	-	2	3	25	75	100
		Allied course-II	U25AMA102	Numerical Analysis	2	1	1	-	-	-	-	-	-	-
IV		Non Major Elective –I Those who choose Tamil in Part I can choose a non-major elective course offered by other departments. Those who do not choose Tamil in Part I must choose either a) Basic Tamil if Tamil language was not studied in school level or b) Special Tamil if Tamil language was studied upto 10 th & 12 th std. Those who choose NCC in Part V must choose NCC course as Non Major Elective			2	1	1	-	-	2	3	25	75	100
		Foundation Course	U25FCCS11	Problem Solving Techniques	2	1	1	-	-	2	3	25	75	100
				TOTAL	30	20	7	3	-	21	-	-	-	700

II	I	Language Course-II	U25LC202	Pothu Tamil -II Tamil Ilakkiya Varalaru -II	6	5	1	-	-	3	3	25	75	100
	II	English Language Course-II	U25ELC202	General English – II	6	5	1	-	-	3	3	25	75	100
	III	Core Course-II	U25CS203	Data Structures and Algorithms	5	4	1	-	-	5	3	25	75	100
		Core Practical-II	U25CS204P	Data Structures and Algorithms Lab	4	1	-	3	-	4	3	25	75	100
		Allied Course-II	U25AMA102	Numerical Analysis	2	1	1	-	-	2	3	25	75	100
		Allied Course-III	U25AMA203	Operations Research	3	2	1	-	-	2	3	25	75	100
	IV	Non Major Elective-II Those who choose Tamil in Part I can choose a non-major elective course offered by other departments. Those who do not choose Tamil in Part I must choose either a) Basic Tamil if Tamil language was not studied in school level or b) Special Tamil if Tamil language was studied upto 10 th & 12 th std. Those who choose NCC in Part V must choose NCC course as Non Major Elective			2	1	1	-	-	2	3	25	75	100
		Skill Enhancement Course-I	U25SECS21	Fundamentals of ‘C’ Programming	2	1	1	-	-	2	3	25	75	100
		TOTAL				30	20	7	3	-	23	-	-	-
	III	I	Language Course-III	U25LC303	Pothu Tamil – III Tamilazha Varalarum Panpadum-III	6	5	1	-	-	3	3	25	75
II		English Language course-III	U25ELC303	General English –III	6	5	1	-	-	3	3	25	75	100
III		Core Course-III	U25CS305	Java Programming	4	3	1	-	-	4	3	25	75	100
		Core Practical-III	U25CS306P	Java Programming Lab	4	1	-	3	-	4	3	25	75	100
		Allied Course-IV	U25APH301	Applied Physics –I	2	1	1	-	-	2	3	25	75	100
		Allied Practical-I	U25APH302P	Applied Physics Practical	2	-	-	2	-	-	-	--	--	--

	IV	Skill Enhancement Course-II	U25SECS32	Fundamentals of office automation	2	1	1	-	-	2	3	25	75	100
		Skill Enhancement Course-III	U25SECS33	Basics of Data Analytics	2	1	1	-	-	2	3	25	75	100
	V	Special Course	25UGSC	Health and Wellness	2	-	-	1	-	1	-	-	-	-
	TOTAL				30	17	6	7	-	21	-	-	-	700
IV	I	Language Course-IV	U25LC404	Pothu Tamil – IV Tamilum Ariviyalum -IV	6	5	1	-	-	3	3	25	75	100
	II	English Language Course-IV	U25ELC404	General English – IV	6	5	1	-	-	3	3	25	75	100
	III	Core Course IV	U25CS407	Database Management System	5	4	1	-	-	5	3	25	75	100
		Core Practical -IV	U25CS408P	Database Management System Lab	4	1	-	3	-	4	3	25	75	100
		Allied Course – V	U25APH403	Applied Physics - II	3	2	1	-	-	2	3	25	75	100
		Allied Practical –I	U25APH302P	Applied Physics Practical	2	-	-	2	-	2	3	25	75	100
	IV	Skill Enhancement Course-IV	U25SECS44	Data Analytics Tools	2	1	1	-	-	2	3	25	75	100
		Skill Enhancement Course –V	U25SECS45	Multimedia Systems	2	1	1	-	-	2	3	25	75	100
	TOTAL				30	19	6	5	-	23	-	-	-	800
V	III	Core Course-V		Computer Networks	6	5	1	-	-	5	3	25	75	100
		Core Course - VI		PHP Programming	5	4	1	-	-	5	3	25	75	100
		Core Course-VII		Operating Systems	5	4	1	-	-	4	3	25	75	100
		Core Practical-V		PHP Programming Lab		-	1	3	-	4	3	25	75	100
		Elective Course-I		Artificial Intelligence/ Software Engineering /Microprocessor and Microcontroller	4	3	1	-	-	3	3	25	75	100
		Elective Course – II		Cloud Computing/Data Mining /Distributed Computing	4	3	1	-	-	3	3	25	75	100
	IV	Environmental Studies		Environmental Studies	2	1	1	-	-	2	3	25	75	100
		Internship/ Industrial visit/ Field visit		Internship/ Industrial visit/ Field visit	-	-	-	-	-	2	-	-	-	-
		TOTAL				30	20	7	3	-	28	-	-	700
	III	Core Course-VIII		Programming with .NET	6	5	1	-	-	4	3	25	75	100
		Core Practical-VI		Programming with .NET Lab	6	-	1	5	-	4	3	25	75	100

VI		Core Project		Project with viva-voce/ Group Project	5	-	1	4	-	5	3	25	75	100
		Elective Course-III		Introduction to Data Science/Software Testing/Machine Learning	4	3	1	-	-	3	3	25	75	100
		Elective Course- IV		Information Security/Internet of Things /Mobile Application Development	4	3	1	-	-	3	3	25	75	100
	IV	Value Education		Value Education	2	1	-	-	1	2	3	25	75	100
		Professional competency Course		Aptitude and reasoning skills for competitive examinations	2	1	1	-	-	2	3	25	75	100
	V	Gender Studies		Gender Studies	1	1	-	-	-	1	3	25	75	100
		Extension activity		Extension activity	-	-	-	-	-	1	-	-	-	-
		TOTAL			30	14	6	9	1	25	-	-	-	800
		GRAND TOTAL			180	110	39	30	1	141	-	-	-	4500
		*Extra Credit		Value Added Courses (At least One Per Year)						2	-	-	-	-

L-Lecture

T-Tutorial

P-Practical

S-Seminar

Credit Distribution for UG PROGRAMME-Science

S.No	Part	Subject	No. of Courses	Total Credits
1.	I	Language Course	4	12
2.	II	English Language Course	4	12
3.	III	Core Course –Theory	8	37
4.		Core Practical	6	24
5.		Core Project	1	05
6.		Allied Course – Theory	5	10
7.		Allied Practical	1	02
8.	IV	Elective Course	4	12
9.		Non-Major Elective	2	04
10.		Foundation Course	1	02
11.		Skill Enhancement Course	5	10
12.		Internship/ Industrial visit/ Field visit	1	02
13.		Environmental Studies	1	02
14.		Value Education	1	02
15.	V	Professional competency Course	1	02
16.		Gender Studies	1	01
17.		Extension Activity	1	01
18.		Special Course(Health and Wellness)	1	01
Total			48	141

* For those who studied Tamil upto 10th +2 (Regular Stream)

+ Syllabus for other Languages should be on par with Tamil at degree level

#those who studied Tamil upto 10th +2 but opt for other languages in degree level under Part I should study special Tamil in Part IV

** Extension Activities shall be outside instruction hours

Note:

	CIA	ESE
1. Theory	25	75
2. Practical	25	75
3. Separate passing minimum is prescribed for Internal and External marks		

FOR THEORY

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]

The passing minimum for University Examinations shall be 40% out of 75 marks[i.e. 30marks]

FOR PRACTICAL

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]

The passing minimum for University Examinations shall be 40% out of 75 marks [i.e. 30 marks]

NON MAJOR ELECTIVE (NME) OFFERED BY THE DEPARTMENT

Semester	Part	Course	Course Code	Title of the Paper
I	IV	NME –I	U25NMECS11	Understanding Internet
II		NME –II	U25NMECS22	Fundamentals of Communication Technology

SEMESTER III

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



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2025– 2026)

DEPARTMENT OF COMPUTER SCIENCE
B.Sc., COMPUTER SCIENCE

Semester: III –CC-III- JAVA PROGRAMMING

Ins. Hrs. /Week: 4

Course Credit: 4 Course Code:U25CS305

Unit -I: INTRODUCTION TO JAVA PROGRAMMING (12 Hours)

Introduction: Review of Object Oriented concepts – History of Java - Java buzzwords – JVM architecture - Data types - Variables - Scope and life time of variables - arrays - operators – control statements - type conversion and casting - simple java program - constructors - methods - Static block - Static Data – Static Method String and String Buffer Classes.

Unit-II: INHERITANCE, PACKAGES AND EXCEPTION HANDLING (12 Hours)

Inheritance: Basic concepts - Types of inheritance - Member access rules - Usage of this and Super key word - Method Overloading - Method overriding - Abstract classes - Dynamic method dispatch - Usage of final keyword.

Packages: Definition-Access Protection -Importing Packages. **Interfaces:** Definition–Implementation–Extending Interfaces. **Exception Handling:** try – catch- throw- throws – finally – Built-in exceptions - Creating own Exception classes.

Unit-III: MULTITHREADING AND I/O STREAMS (12 Hours)

Multi-threaded Programming: Thread Class - Runnable interface - Synchronization–Using synchronized methods– Using synchronized statement- Inter-thread Communication –Deadlock. **I/O Streams:** Concepts of streams - Stream classes- Byte and Character stream - Reading console Input and Writing Console output - File Handling.

Unit- IV: AWT CONTROLS AND GUI COMPONENTS (12 Hours)

AWT Controls: The AWT class hierarchy - user interface components- Labels- Button - Text Components - Check Box –Check Box Group - Choice - List Box - Panels – Scroll Pane – Menu - Scroll Bar. Working with Frame class - Colour - Fonts and layout managers.

Unit V EVENT HANDLING IN JAVA (12 Hours)

Event Handling: Events - Event sources - Event Listeners - Event Delegation Model (EDM) - Handling Mouse and Keyboard Events - Adapter classes - Inner classes.

Total Lecture Hours-60

COURSE OUTCOME

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

1. Understand the basic Object-oriented concepts. Implement the basic constructs of Core Java.
2. Implement inheritance, packages, interfaces and exception handling of Core Java.
3. Implement multi-threading and I/O Streams of Core Java
4. Implement AWT.
5. Implement Event handling.

TEXT BOOKS

1. Gary Cornell, Core Java 2 Volume I – Fundamentals, Addison Wesley, 2022
2. Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2020

REFERENCE BOOK(S)

1. Head First Java, O'Reilly Publications 3rd Edition, 2023.
2. Y. Daniel Liang, Introduction to Java Programming, 7th Edition, Pearson Education India, 2010

E-RESOURCES

1. <https://javabeginnerstutorial.com/core-java-tutorial>
2. <http://docs.oracle.com/javase/tutorial/>
3. <https://www.coursera.org/>
4. [Head First Java, 3rd Edition 2023 PDF book \(pdfs.net\)](#)

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO	Pos										PSOs				
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5
CO 1	3	3	2	2	3	2	2	2	2	3	3	3	3	3	3
CO 2	3	3	2	3	3	2	2	2	3	3	3	3	3	2	3
CO 3	3	3	2	3	3	2	2	2	3	3	3	3	3	2	3
CO 4	3	3	2	3	3	2	2	2	3	3	3	3	3	2	3
CO 5	3	3	3	3	2	3	3	3	2	3	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 2025– 2026)

DEPARTMENT OF COMPUTER SCIENCE

B.Sc., COMPUTER SCIENCE

Semester: III - CP-III: JAVA PROGRAMMING LAB

Ins. Hrs. /Week: 4 Course Credit:4 Course Code: U25CS306P

EXERCISE

1. Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer
2. Write a Java program to multiply two given matrices.
3. Write a Java program that displays the number of characters, lines and words in a text.
4. Generate random numbers between two given limits using Random class and print messages according to the range of the value generated.
5. Write a program to do String Manipulation using Character Array and perform the following string operations:
 - a. String length
 - b. Finding a character at a particular position
 - c. Concatenating two strings
6. Write a program to perform the following string operations using String class:
 - a. String Concatenation
 - b. Search a substring
 - c. To extract substring from given string
7. Write a program to perform string operations using String Buffer class:
 - a. Length of a string
 - b. Reverse a string
 - c. Delete a substring from the given string
8. Write a threading program which uses the same method asynchronously to print the numbers 1 to 10 using Thread1 and to print 90 to 100 using Thread2.

9. Write a program to demonstrate the use of following exceptions.
 - a. Arithmetic Exception
 - b. Number Format Exception
 - c. Array Index Out of Bound Exception
 - d. Negative Array Size Exception
10. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.

Total Hours: 60

COURSE OUTCOME

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

1. Understand the basic Object-oriented concepts. Implement the basic constructs of Core Java.
2. Implement inheritance, packages, interfaces and exception handling of Core Java.
3. Implement multi-threading and I/O Streams of Core Java
Implement AWT.
4. Implement Event handling.

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

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CO 4	3	3	2	3	3	2	2	2	3	3	3	3	3	2	3
CO 5	3	3	3	3	2	3	3	3	2	3	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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SUNDARAKKOTTAI, MANNARGUDI- 614016

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

DEPARTMENT OF COMPUTER SCIENCE

B.Sc., COMPUTER SCIENCE

Semester: III –SEC-II- FUNDAMENTALS OF OFFICE AUTOMATION

Ins. Hrs. /Week: 2 Course Credit: 2 Course Code:U25SECS32

UNIT-I: COMPUTER FUNDAMENTALS AND OPERATING SYSTEMS (6 Hours)

Introductory concepts: Memory unit – CPU-Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS – UNIX– Windows. Introduction to Programming Languages.

UNIT-II: WORD PROCESSING (6 Hours)

Word Processing: Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering, printing Preview, options, merge.

UNIT-III: SPREADSHEETS AND DATA ANALYTICS (6 Hours)

Spreadsheets: Excel – opening, entering text and data, formatting, navigating; Formulas – entering, handling and copying; Charts – creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.

UNIT- IV: DATABASE MANAGEMENT SYSTEMS (6 Hours)

Database Concepts: The concept of data base management system - Data field - records and files- Sorting and indexing data- Searching records - Designing queries, and reports - Linking of data files - Understanding Programming environment in DBMS - Developing menu drive applications in query language (MS – Access).

UNIT-V: POWERPOINT PRESENTATIONS (6 Hours)

Power point: Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition – Animation effects, Audio inclusion - timers.

Total Lecture Hours: 30

COURSE OUTCOME

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

1. Understand the basics of computer systems and its components.
2. Understand and apply the basic concepts of a word processing package.
3. Understand and apply the basic concepts of electronic spreadsheet software.
4. Understand and apply the basic concepts of database management system.
5. Understand and create a presentation using PowerPoint tool.

TEXT BOOK

1. Peter Norton, "Introduction to Computers" 6th Edition –Tata McGraw-Hill Publication, 2008.

REFERENCE BOOK(S)

1. Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, "Microsoft 2003", Tata McGraw-Hill Publication.

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

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

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2025– 2026)
DEPARTMENT OF COMPUTER SCIENCE
B.Sc., COMPUTER SCIENCE

Semester: III – SEC-III - BASICS OF DATA ANALYTICS

Ins. Hrs. /Week: 2 Course Credit: 2 Course Code: U25SECS33

UNIT-I: INTRODUCTION TO BIG DATA (6 Hours)

Introduction: Concepts and Terminology – Big Data Characteristics – Different Types of Data –case study Background – Business goals and Obstacles – Business Motivations and Drivers for Big Data Adoption-Marketplace Dynamic – Business Architecture- Business Process Management.

UNIT-II: BIG DATA ADOPTION AND ANALYTICS (6 Hours)

Big data Adoption and Planning Considerations: Organization Prerequisites – Data Procurement – Privacy – Security – Provenance – Limited Real-time Support

UNIT-III: BIG DATA ANALYTICS AND DATA MANAGEMENT (6 Hours)

Distinct Performance Challenges – Distinct Governance Requirements – Distinct Methodology – Big Data Analytics – Data Identification – Data Acquisition and Filtering – Data Extraction – Data validation and cleansing – Data Aggregation and Representation.

UNIT-IV: ENTERPRISE TECHNOLOGIES AND BUSINESS INTELLIGENCE (6 Hours)

Enterprise Technologies and Big Data Business Intelligence: Online Transaction and Processing (OLTP) – Online Analytical Processing (OLAP) – Extract Transform Load (ETL) – Data Warehouses – Data Marts.

UNIT-V BIG DATA PROCESSING CONCEPTS AND HADOOP (6 Hours)

Big Data Processing Concepts: Introduction – Parallel Data Processing – Distributed Data Processing – Hadoop – Processing Workloads – Cluster – Processing in Batch Mode – Map – Combine – Partition – Shuffle and Sort.

Total Lecture Hours-30

COURSE OUTCOME

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

1. Understand the fundamentals of data analytics and the data analysis process.
2. Identify different types of data and methods of data collection.
3. Perform data cleaning and preprocessing to improve data quality.
4. Use basic statistical techniques for analyzing data.
5. Create simple visualizations and reports using analytics tools.

TEXT BOOKS

1. Paul Buhler, Wajid Khattak and Thomas Erl, "Big Data Fundamentals: Concepts, Drivers& Techniques", Prentice Hall Publications, 1st Edition, January 2016.
2. Dr. A.V.K. Shanthi, Dr. Praveen Kumar Misra, Dr. Bramah Hazela, Dr. Saptarshi Gupta, published a book "Big Data Analytics- Discovering, Analysing, Visualizing and Presenting Data", by Scientific International Publishing House.
3. Soraya Sedkaoui",Data Analytics and Big Data", Wiley, 2018.

REFERENCE BOOK(S)

1. DT Editorial Services, "Big Data (Hadoop 2, Map Reduce", Hive, YARN, Pig, R and Data Visualization) Black Book", 1st Edition, Dreamtech Press, 2016.
2. Soumendra Mohanty, Madhu Jagadeesh, and Harsha Srivatsa, "Big Data Imperatives: Enterprise Big Data Warehouse, BI Implementations and Analytics", Apress Media, 2013.
3. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilly Media, 2012.

E-Resources

1. https://stratapps.com/learn-big-data/?utm_source=chatgpt.com
2. https://infoguides.rit.edu/DA?utm_source=chatgpt.com

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

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S-Strong-3

M-Medium-2

L-Low-1



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

SUNDARAKKOTTAI, MANNARGUDI- 614016

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

DEPARTMENT OF COMPUTER SCIENCE B.Sc., COMPUTER SCIENCE

Semester: III- SPECIAL COURSE- HEALTH AND WELLNESS

Ins. Hrs./Week:- 2

Course Credit :1 Course Code:25UGSC

1. Introduction to Holistic Well-being

1. Introduce the core components of Health & Well-being namely Physical, mental and emotional well-being
2. Provide worksheets on all the four components individually and explain the inter connectedness to give an overall understanding.

2. Wellness Wheel Exercise (Overall Analysis)

Guide students to assess their well-being in various life dimensions through exercises on various aspects of wellbeing, and explain the benefits of applying wellness wheel.

Introduce Tech Tools:

Explore the use of technology to support well-being.

Introduce students to apps for meditation, sleep tracking, or healthy recipe inspiration.

3. Breaking Bad Habits (Overall Analysis)

- Open a discussion on bad habits and their harmful effects.
- Provide a worksheet to the students to identify their personal bad habits.
- Discuss the trigger, cause, consequence and solution with examples.
- Guide them to replace the bad habits with good ones through worksheets.

4. Physical Well-being

1.Fitness

Introduce the different types of fitness activities such as basic exercises, cardiovascular exercises, strength training exercises, flexibility exercises, so on and so forth.

(Include theoretical explanations and outdoor activity).

2.Nutrition

Facilitate students to reflect on their eating habits, their body type, and to test their knowledge on nutrition, its sources and the benefits.

3.Yoga & Meditation

Discuss the benefits of Yoga and Meditation for one's overall health. Demonstrate different yoga postures and their benefits on the body through visuals (pictures or videos)

4.Brain Health

Discuss the importance of brain health for daily life.

Habits that affect brain health (irregular sleep, eating, screen time). Habits that help for healthy brains (reading, proper sleep, exercises). Benefits of breathing exercises and meditation for healthy lungs.

5.Healthy Lungs

Discuss the importance of lung health for daily life. Habits that affect lung health

(smoking, lack of exercises). Benefits of breathing exercises for healthy lungs.

6. Hygiene and Grooming

Discuss the importance of hygienic habits for good oral, vision, hearing and skin health. Discuss the positive effects of grooming on one's confidence level and professional growth. **Suggested Activities**

(sample):

Nutrition:

Invite a nutritionist to talk among the students on the importance of nutrition to the body or show similar videos shared by experts on social media. Organize a 'Stove less/fireless cooking competition' for students where they are expected to prepare a nutritious dish and explain the nutritive values in parallel.

5. Emotional Well-being

1.Stress Management

Trigger a conversation or provide self-reflective worksheets to identify the stress factors in daily life and their impact on students' performance.

Introduce different relaxation techniques like deep breathing, progressive muscle relaxation, or guided imagery.

(use audio recordings or visuals to guide them through these techniques).

After practicing the techniques, have them reflect on how these methods can help manage stress in daily life.

2.Importance of saying 'NO'

Explain the students that saying 'NO' is important for their Physical

Explain the students that saying 'NO' is important for their Physical and mental well-being, Academic Performance, Growth and Future, Confidence, Self-respect, Strong and Healthy Relationships, building reputation for self and their family (avoid earning a bad name).

Factors that prevent them from saying 'NO'. How to practice saying 'NO'.

3.Body Positivity and self-acceptance Discuss the following with the students. What is body positivity and self-acceptance? Why is it important?

Be kind to yourself.

Understand that everyone's unique. Suggested Activities

(Sample):

(Importance of saying 'NO')

Provide worksheets to self-reflect on... how they feel when others say 'no' to them the situations where they should say 'no'

Challenge students to write a song or rap about the importance of saying no and

how to do it effectively.

Students can perform their creations for the class.

6. Social Well-Being

1.Practicing Gratitude

Discuss the importance of practicing gratitude for building relationships with family, friends, relatives, mentors and colleagues.

Discuss how one can show gratitude through words and deeds. Explain how practicing gratitude can create 'ripple effect'

2.Cultivating Kindness and Compassion

Define and differentiate between kindness and compassion. Explore practices that cultivate these positive emotions Self-Compassion as the Foundation.

The power of small gestures. Understanding another's perspective. The fruits of compassion.

3.Practising Forgiveness

Discuss the concept of forgiveness and its benefits. Forgiveness: What is it? and What it isn't?

Benefits of forgiveness. Finding forgiveness practices.

4.Celebrating Differences

Appreciate the value of individual differences and foster inclusivity.

The World: A Tapestry of Differences (cultures, backgrounds, beliefs, abilities, and appearances).

Finding strength in differences (diverse perspectives and experiences lead to better problem- solving and innovation).

Celebrating differences, not ignoring them (respecting and appreciating the unique qualities). Activities for celebrating differences (share culture, learn about others, embrace new experiences)

5.Digital Detox

Introduce the students to:

The concept of a digital detox and its benefits for social well-being How to disconnect from devices more often to strengthen real-world connections

7. Intellectual Well-being

1. Being a lifelong Learner

Give students an understanding on:

The relevance of intellectual well-being in this 21st century to meet the expectations in personal and professional well-being

The Importance of enhancing problem-solving skills Cultivating habits to enhance the intellectual well-being (using the library extensively, participating in extra- curricular activities, reading newspaper etc.)

2.Digital Literacy

Discuss:

The key aspects of digital literacy and its importance in today's world. It is more than just liking and sharing on social media.

The four major components of digital literacy (critical thinking, communication, problem- solving, digital citizenship).

Why is digital literacy important? Boosting one's digital skills.

3.Transfer of Learning

Connections between different subjects how knowledge gained in

one area can be applied to others.

Suggested Activities (sample): Intellectual Well-being.

Provide worksheets to students for teaching them how to boost intellectual well-being. Ask the students to identify a long-standing problem in their locality and come up with a solution and present it in the classroom. Also organize an event like 'Idea Expo' to display the designs, ideas, and suggestions, to motivate the students to improve their intellectual well-being.

8. Environmental Well-being

1.The Importance of initiating a change in the environment.

The session could be around:

Defining Environmental well-being (physical, chemical, biological, social, and psychosocial factors) People's behaviour, crime, pollution, political activities, infra- structure, family situation etc.

Suggesting different ways of initiating changes in the environment (taking responsibility, creating awareness, volunteering, approaching administration).

Suggested Activities (sample).

Providing worksheets to self-reflect on how the environment affects their life, and the ways to initiate a change

Dedicate a bulletin board or wall space (or chart work) in the classroom for students to share their ideas for improving. Environmental well-being.

Creating a volunteers' club in the college and carrying out monthly activities like campus cleaning, awareness campaigns against noise pollution, (loud speakers in public places), addressing anti-social behaviour on the campus or in their locality.

9.Mental Well-being

1.Importance of self-reflection Discuss:

Steps involved in achieving mental well-being (self-reflection, self-awareness, applying actions, achieving mental well-being).

Different ways to achieve mental well-being (finding purpose, coping with stress, moral compass, connecting for a common cause).

The role of journaling in mental well-being

2.Mindfulness and Meditation Practices.

Benefits of practicing mindful habits and meditation for overall well-being.

1. Connecting with nature

Practising to be in the present moment Nature walk, feeling the sun, listening to the natural sounds Exploring with intention Hiking, gardening to observe the nature

Reflecting on the emotions, and feeling kindled by nature.

2. Serving people

Identifying the needs of others Helping others.

Volunteering your time, skills and listening

ear. Finding joy in giving.

3. Creative Expressions Indulging in writing poems, stories, music making/listening, creating visual arts to connect with inner selves.

Suggested Activities (Sample):

(Mindfulness and Meditation) Conducting guided meditation every day for 10 minutes and directing the students to record the changes they observe.

10. Situational Awareness (Developing Life skills)

1. Being Street smart

Discuss:

Who are street smart?

Why is it important to be street smart?

Characteristics of a street smart person: Importance of acquiring life skills to become street smart (General First-aid procedure, CPR Procedure, Handling emergency situations like fire, flood etc).

2. Digital Awareness

Discuss:

Cyber

Security

Information

Literacy.

Digital

Privacy

Fraud

Detection

Suggested Activities (sample):

(Street Smart) Inviting professionals to demonstrate the CPR Procedure

Conducting a quiz on Emergency Numbers

11. Understanding Addiction

Plan this session around:

Identifying the environmental cues, triggers that lead to picking up this habit
Knowing the impact of substance abuse Adverse health conditions, social isolation, ruined future, hidden financial loss and damaging the family reputation.

Seeking help to get out of this addiction.

Suggested Activities Provide Worksheets to check the students' level of understanding about substance addiction and their impacts.

Share case studies with students from real-life.

Play/share awareness videos on addiction/de-addiction, experts talk.

*Conduct awareness programmes on Drugs and its ill effects.

(Arrange Experts from the concerned government departments and NGOs working in drug addiction issues) and maintain the documents of the program

VALUE ADDED COURSE



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(For the Candidates admitted in the academic year 2025– 2026)
DEPARTMENT OF COMPUTER SCIENCE

Semester: III –VAC-II- Visual Design with Canva

Ins. Hrs. /Week: 2 Course Credit:2 Course Code: U25CSVA32

UNIT-I: INTRODUCTION TO CANVA

Getting started with Canva - Account setup - dashboard walkthrough Exploring Templates.

UNIT-II: BASIC DESIGN PRINCIPLES

Basic Design Principles - Color - fonts - alignment - contrast - balance

UNIT-III: CREATING POSTERS AND FLYERS

Creating Posters & Flyers - Using layout grids - adding custom elements

UNIT- IV: PRESENTATIONS AND INFOGRAPHICS

Presentation & infographics - slide creation - transitions – animations visual data

UNIT-V: RESUME AND PORTFOLIO DESIGN

Designing Resumes & Portfolios - Personal branding through design

COURSE OUTCOME

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

1. Navigate Canva's interface and use its features to create a wide variety of designs.
2. Apply fundamental design principles such as color theory, typography, alignment, and visual hierarchy in practical projects.
3. Design professional materials including social media graphics, posters, flyers, presentations, and resumes.
4. Customize Canva templates to suit specific branding or communication goals.
5. Develop a personal design project portfolio to showcase their Canva skills.

TEXT BOOK

1. Maggie Stara, "Mastering Canva: A Complete Guide to Graphic Design Without Graphic Designers", 2024.
2. Patrick Ejeke, "Professional Tips and Tricks When You Design with Canva", Kindle Edition, 2021.

REFERENCE BOOK(S)

1. Lasse Rouhiainen, "Canva: From Beginner to Advanced Graphic Designer".
2. Penny Lowy, "The Canva Content Planner: The Ultimate Guide to Create & Plan Your Social Media Content Using Canva".

E- RESOURCES

1. <https://designschool.canva.com>
2. <https://www.canva.com/education/>
3. <https://youtu.be/8zbpe43k4Qg>

SEMESTER IV



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2025– 2026)
DEPARTMENT OF COMPUTER SCIENCE
B.Sc., COMPUTER SCIENCE

Semester: IV –CC-IV-DATABASE MANAGEMENT SYSTEM

Ins. Hrs. /Week: 5

Course Credit: 5

Course Code: U25CS407

UNIT-I: INTRODUCTION TO DATABASE SYSTEMS

(15 Hours)

Definition of Database System-Database system Applications- Purpose of Database Systems - View of Data: Physical Level, View Level, Logical Level- Database Languages: Data Definition Language-Data Manipulation Language - Relational Databases - Database Design - Data Storage and Querying -Transaction Management- Data Mining and Information retrieval - Database Users and Administrators - History of Database Systems.

UNIT-II: RELATIONAL DATABASES AND SQL

(15 Hours)

Structure of Relational Databases - Database Schema - Keys - Schema Diagrams - Relational Query Languages - Relational Operations SQL: Overview of the SQL Query Language - SQL Data Definition: Basic Types - Basic Schema Definition. Basic Structure of SQL Queries: Queries on single relation - Queries on Multiple relation -Natural join.

UNIT-III: SQL OPERATIONS AND TRANSACTIONS

(15 Hours)

Additional Basic Operations- Set Operations: The Union operations – intersect operations- Except operations - Null Values -Aggregate Functions: Basic Aggregation-Aggregation with grouping-The having clause-Aggregation with null and Boolean values - Nested Sub-queries: Set membership- Set comparison-test for empty relation.-Modification of the Database: Deletion-Insertion-Update. Join Expressions - Transactions - Integrity Constraints.

UNIT-IV: RELATIONAL ALGEBRA AND DATABASE DESIGN

(15 Hours)

The Relational algebra: Fundamental Operations-Formal definition of the relational algebra-Additional relational algebra operations. The Tuple Relational Calculus - The Domain Relational Calculus Database Design. Database Design and the Entity Relationship Model: Overview of the Design Process – The Entity Relationship Model – Entity Relationship Diagrams - Basic structure – Mapping cardinal -Weak Entity set.

UNIT V FUNCTIONAL DEPENDENCY AND NORMALIZATION (15 Hours)

Functional dependency -Normalization - Why Normalization in DBMS - Normal form based on Primary keys-first Normal form(1NF) - Second Normal Form(2NF) - Third normal form (3 NF)- Boyce-codd Normal form (BCNF) - Fifth Normal Form (5NF) - Indexing – Types of Indexing- B+ Tree index files.

Total Lecture Hours-75

COURSE OUTCOME

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

1. Apply the basic concepts of Database Systems and Applications
2. Understand the basics of SQL and construct queries using SQL in database creation and interaction
3. Design a commercial relational database system by writing SQL queries
4. Analyze the concept of views transactions, views, Integrity Constraints.
5. Understand the concepts of Normal Form and indexing.

TEXT BOOK

1. Abraham Silberschatz, Henry Korth.F, Sudarshan.S 2010, Database System Concepts, Seventh Edition, McGraw-Hill, Newyork.
2. Ramiz Elmasri, Shamkant Navathe. B 2016, Fundamentals of Database Systems, Seventh Edition Pearson Publication, London.

REFERENCE BOOK(S)

1. Lisa Friedrichsen , Lisa Ruffolo , Ellen Monk , Joy Starks.L, Philip Pratt .J 2020, “Concepts of Database Management System”,10th Edition, Cengage Learning, Boston, Massachusetts.
2. Raghu Ramakrishnan 2014, Johannes Gehrke, “Database Management Systems”, Third Edition, McGraw-Hill Education, Newyork.
3. Ramez Elmasri 2014, Database Systems: Models, Languages, Design and Application, Pearson Education, London.

E-RESOURCES

1. https://www.tutorialspoint.com/dbms/database_normalization.html
2. <http://inst.eecs.berkeley.edu/~cs186/sp07/Spring07Lectures/25-Norm1.ppt>

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

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(For the Candidates admitted in the academic year 2025– 2026)
DEPARTMENT OF COMPUTER SCIENCE
B.Sc., COMPUTER SCIENCE

Semester: IV –CP-IV-DATABASE MANAGEMENT SYSTEM LAB

Ins. Hrs. /Week: 4

Course Credit: 4

Course Code:U25CS408P

EXERCISES:

- 1. Create a table and perform the following basic MySQL operations**
 - a) Set the primary key
 - b) Alter the structure of the table
 - c) Insert values
 - d) Delete values based on constraints
 - e) Display values using various forms of select clause
 - f) Drop the table
- 2. Develop MySQL queries to implement the following set operations**
 - a) Union
 - b) Union all
 - c) Inter
 - d) Intersect all
- 3. Develop MySQL queries to implement the following aggregate functions**
 - a) Sum
 - b) Count
 - c) Average
 - d) Maximum
 - e) Minimum
 - f) Group by clause & having clause
- 4. Develop MySQL queries to implement following join operations**
 - a) Natural join
 - b) Inner join
 - c) Outer join-left outer, right outer, full outer
 - d) Using join conditions
- 5. Develop MySQL queries to implement nested subqueries**
 - a) Set membership (int, not int)
 - b) Set comparison (some, all)
 - c) Empty relation (exists, not exists)
 - d) Check for existence of Duplicate tuples(unique, not unique)
- 6. Develop MySQL queries to create a views and expand it.**
- 7. Develop MySQL queries to implement**
 - a) String operations using %
 - b) String operations using '_'
 - c) Sort the element using asc,desc [*create necessary relations with requires attribute]
- 8. Consider the following database for a banking enterprise**

BRANCH(branch- name:string, branch city:string, assets:real)
ACCOUNT(accno:int,branch-name:string,balance: eal)
DEPOSITOR(customer- name:string, accno:int)
CUSTOMER(customer-name:string, customer-street:string,customer-city:string)

LOAN(loan number:int, branch-name:string,amount:real)
 BORROWER(customer- name:string, loan-number:int)

- Create the above tables by properly specifying the primary keys and the foreign keys
- Enter at least five tuples for each relation
- Find all the customers who have at least two accounts at the Main branch.
- Find all the customers who have an account at all the branches located in a specific city.
- Demonstrate how you delete all account tuples at every branch located in a specific city.
- Generate suitable reports.
- Create suitable front end for querying and displaying the results.

Total Lecture Hours:60

COURSE OUTCOME

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

- Develop Database tables and perform a basic MySQL operations
- Implement MySQL commands for data definition and data manipulation
- Obtain the skills to implement the aggregate functions
- Obtain the knowledge to set operations, join operations, nested sub queries, views etc
- Design database tables using primary key and foreign key

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO	Pos										PSOs				
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5
CO 1	3	3	3	3	3	2	2	3	3	3	3	3	2	3	3
CO 2	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3
CO 3	3	3	2	2	3	2	2	3	3	3	3	3	2	3	3
CO 4	3	3	2	2	3	3	2	3	3	3	3	3	2	3	3
CO 5	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3
S-Strong-3						M-Medium-2				L-Low-1					



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

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

Semester: IV –SEC-IV – DATA ANALYTICS TOOLS

Ins. Hrs. /Week: 2

Course Credit: 2

Course Code:U25SECS44

UNIT-I: INTRODUCTION TO RESEARCH TOOLS AND MEASUREMENT (6 Hours)

Introduction -Types of research tools: their development and uses-Basics of Behavioral Measurement: Concept, scope and need, Characteristics of a good research tool: Reliability, Validity and Norms Questionnaires, Interviews and observation schedules as tools of research.

UNIT-II:TESTS, SCALES AND SOCIO-METRIC TECHNIQUES (6 Hours)

Tests: Aptitude, Achievement and Projective and non-projective tests, Norm-referenced and criterion-referenced tests Scales: Rating scales, Attitude scales., Semantic Differential, Q Methodology
-Socio-metric techniques.

UNIT-III: EDUCATIONAL DATA AND DATA ANALYSIS (6 Hours)

Nature of educational data: Quantitative and Qualitative-Organization and analysis of qualitative data. Approaches to Qualitative data Analysis-Organization and presentation of quantitative data.

UNIT-IV PROBABILITY CURVE AND STATISTICAL TESTING (6 Hours)

Normal Probability Curve and its Applications -Inferential statistics: Standard errors, confidence limits Hypothesis testing- type I and type II errors-Test of significance, two tailed and one tailed tests. Parametric and Non Parametric Test: Concept and Assumptions

UNIT-V: RESEARCH DESIGN METHODS (6 Hours)

Research Design -Simple Random Design, Quasi-Experimental, Level X Treatment Design, Factorial design, Latin Square Design.

Total Lecture Hours-30

COURSE OUTCOME

1. Understand the basics of Data Analytics and its applications in various industries.
2. Use data analytics tools and software for data collection, cleaning, processing, and visualization.
3. Apply statistical and analytical techniques to interpret and analyze datasets.
4. Create charts, dashboards, and reports using popular analytics tools.
5. Perform data preprocessing and transformation for accurate analysis.

REFERENCE BOOK(S)

1. Asthana, H.S. & Bhushan, B.: Statistics for Social Sciences. Prentice Hall of India (2007)
2. Keeves, John P. (Ed.): Educational Research, Methodology and Measurement: An International Handbook.

E-Resources:

1. <https://research-methodology.net/research-methodology/research-methods/research-tools-and-instruments/>

PROGRAMME OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO	Pos										PSOs				
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5
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CO 3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	2
CO 4	3	3	3	3	2	3	3	3	3	3	3	3	3	3	2
CO 5	3	2	3	3	3	3	3	2	3	3	3	2	3	3	3
S-Strong-3					M-Medium-2					L-Low-1					

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(AUTONOMOUS)**



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

Semester: IV –SEC-V- MULTIMEDIA SYSTEMS

Ins. Hrs. /Week: 2

Course Credit: 2

Course Code:U25SECS45

UNIT-I: INTRODUCTION TO MULTIMEDIA SYSTEMS (6 Hours)

Introduction - Global structure of Multimedia - Medium - Multimedia system and properties.

UNIT-II: SOUND AND AUDIO SYSTEMS (6 Hours)

Sound / Audio System - Concepts of sound system - Music and speech –Speech Generation– Speech Analysis - Speech Transmission

UNIT-III: IMAGES AND GRAPHICS (6 Hours)

Images and Graphics - Digital Image Representation - Image and graphics Format - Image Synthesis, analysis and Transmission

UNIT-IV: VIDEO AND ANIMATION (6 Hours)

Video - Video signal representation - Computer Video Format - Computer- Based animation

UNIT-V: ANIMATION LANGUAGE AND TRANSMISSION (6 Hours)

Animation Language - Methods of controlling Animation- Display of Animation - Transmission of Animation

Total Lecture Hours: 30

COURSE OUTCOME

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

1. To understand the concepts, importance, application and the process of developing multimedia
2. To have basic knowledge and understanding about image related processing
3. To understand the framework of frames and bit images to animations
4. Speaks about the multimedia projects and stages of requirement in phases of project.
5. Understanding the concept of cost involved in multimedia planning, designing, and producing

TEXT BOOK

1. Multimedia Communications, Applications, Networks, Protocols and Standards, Fred Halsall, Pearson Education Asia
2. Multimedia Systems, John F. Koegel Buford, Pearson Education Asia.

REFERENCE BOOK(S)

1. Ralf Steinmetz & Klara Nahrstedt "Multimedia Computing, communication & Applications", Pearson Education, 2020.
2. Multimedia: Computing, Communications and Applications, Ralf Steinmetz and Klara Nahrstedt, Pearson Education Asia
3. Tay Vaughan, "Multimedia: Making It Work", 8th Edition, Osborne/McGraw-Hill, 2014.

E-Resources:

1. <https://www.geeksforgeeks.org/multimedia-systems-with-features-or-characteristics/Multimedia-javatpoint>

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

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CO 4	3	3	3	2	3	2	2	3	3	3	3	3	2	3	3
CO 5	3	3	3	2	3	2	3	3	3	3	3	3	2	3	3

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