



SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

(Affiliated to Bharathidasan University, Tiruchirappalli)

(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 2026-2027)

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 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 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.**

Ability Enhancement Courses (AEC): Ability Enhancement Courses are designed to improve students' language proficiency, communication skills, analytical abilities, environmental awareness, and understanding of contemporary issues. These courses aim to enhance the overall academic and professional capabilities of students and facilitate their effective participation in higher education and employment.

Core Courses (CC): A course that is compulsorily studied by a student as a fundamental requirement of the programme is termed a Core Course (CC). These courses provide the basic knowledge and conceptual understanding of the major discipline. Core Courses constitute the foundation of the programme and ensure that all students acquire the essential competencies and academic standards prescribed for the degree. Successful completion of Core Courses is mandatory for the award of the degree.

Core Practical Courses (CP): Core Practical Courses are laboratory-based courses associated with the Core Theory Courses. These courses provide hands-on training, experimental skills, analytical techniques, and practical exposure necessary for understanding the concepts of the discipline. Students are required to successfully complete all prescribed practical courses as part of the programme requirements.

Allied Courses (MC): Allied Courses are courses offered from disciplines other than the major discipline. These courses provide students with opportunities to gain additional knowledge and skills in allied or complementary areas of study. Allied Courses promote multidisciplinary learning and broaden the academic perspective of students. The selection and completion of Allied Courses shall be governed by the regulations of the institution and the curriculum framework.

Allied Practical (MP): Allied Practical are practical components associated with the chosen Allied discipline. These courses provide laboratory or field-based exposure to the concepts learned in the Allied Courses and help students develop practical skills relevant to the selected area of study.

Interdisciplinary Courses (IDC): Interdisciplinary Courses are designed to provide knowledge and skills that integrate concepts from multiple disciplines. These courses encourage students to explore the interrelationship between different fields of study and develop a broader understanding of contemporary issues and applications. Students may choose Interdisciplinary Courses as prescribed in the curriculum and subject to eligibility requirements.

Discipline Specific Elective Courses (DSE): Discipline Specific Elective Courses are elective courses offered by the major discipline. These courses provide students with opportunities to acquire advanced knowledge and specialization in selected areas of the discipline. Students may choose courses from the prescribed list of electives based on their interests, aptitude, and career aspirations. These courses are generally application-oriented and provide in-depth exposure to specific domains of study.

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.

Value Added Courses (VAC): Value Added Courses are intended to provide additional knowledge, skills, attitudes, and competencies that complement the regular curriculum. These courses focus on holistic development, professional ethics, environmental awareness, personality development, life skills, and emerging areas of knowledge. Successful completion of the prescribed Value Added Courses may be mandatory or optional as specified in the curriculum.

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.

Project Work: Project Work provides students with an opportunity to apply the knowledge and skills acquired during the programme to investigate a specific problem or research topic. Students shall undertake the project under the guidance of a faculty member and submit a dissertation/report followed by evaluation and viva-voce examination, wherever prescribed.

Extension Activities: Students are encouraged to participate in extension and outreach activities such as National Service Scheme (NSS), National Cadet Corps (NCC), Youth Red Cross (YRC), Red Ribbon Club (RRC), Rotaract community engagement programmes, environmental awareness campaigns, and other socially relevant activities. Such participation may be recognized through credits, certificates, or awards as prescribed by the institution.

Undergraduate Programme:

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

Part -I: Ability Enhancement Course (Tamil / Hindi / French / Sanskrit)

Part-II: Ability Enhancement Course (English)

Part-III: Core Course (Theory, Practicals, Allied courses, Allied Practicals and Group Project)

Part-IV: Skill Enhancement Courses, Discipline Specific Elective Courses, Interdisciplinary Courses, Value Education, Health & Wellness, Introduction to Disaster Management, Summer Internship, Value Added Course, Environmental studies, Gender studies and Extension activity.

EXAMINATION

Continuous Internal Assessment (CIA):

UG - Distribution of CIA Marks

Passing Minimum: 40 %

Assignment-3	=	30%
Test-2	=	50%
Seminar	=	10%
Attendance	=	10%

Question Paper Pattern

Section A1 (10x1=10 marks)

One word question/ Fill in/ True or False/ Multiple Choice Questions

Two Questions from Each unit

Section A 2 (5x2=10 marks)

Short Answers / Match the following

One question from Each unit

Total Marks – 20

Section B: (5x4=20 marks)

Paragraph Answers

Either/ or type, One Question from each unit

Section C: (10x3=30)

Essay Type Answers

Answer 3 out of 5 Questions

One Question from each unit

Section A1 & A2: K1 Level

Section B: K2, K3 and K4 Level

Section C: K5 and K6 Level

Knowledge levels for assessment of Outcomes based on Blooms Taxonomy

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

WEIGHTAGE of K – LEVELS IN QUESTION PAPER

(Cognitive Level) K- LEVELS	Lower Order Thinking			Higher Order Thinking			Total	
	K1	K2	K3	K4	K5	K6		
END SEMESTER EXAMINATIONS (ESE)	20	20			30			70
Continuous Internal Assessment (CIA)	20	20			30			70
QUESTION PATTERN FOR END SEMESTER EXAMINATION/ Continuous Internal Assessment								
SECTION							MARKS	
SECTION – A1 (No choice ,One Mark) TWO questions from each unit (10x1 =10)							20	
SECTION –A2 (No choice ,Two Mark) ONE question from each unit (5x2 =10)								
SECTION - B (Either/ or type, 4-Marks) ONE questions from each unit (5x4 =20)							20	
SECTION - C (3 out of 5) (10 Marks) 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	K1	K2	K3	K4	K5	K6	Total Marks
SECTION							
SECTION –A1 (1 Mark, No choice) (10x1 =10)	10						10
SECTION –A2 (2-Marks, No choice) (5x2=10)	10						10
SECTION –B (4-Marks) (Either/or type) (5x4=20)		4	8	8			20
SECTION -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	04	08	08	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:

$$\text{GPA} = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i}$$

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

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-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
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 (Upon completion of the B.Sc. Degree Programme, the Undergraduate will be able to)
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 <i>(Upon completion of the B.Sc., COMPUTER SCIENCE Degree Programme, the Undergraduate will be able to)</i>
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. .



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 2026–2027)

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

Sem.	Part	Courses	Course Code	Title	Ins. Hrs.	Credits	Exam. Hours	Maximum Marks		
								Int.	Ext.	Total
I	I	Ability Enhancement Course – I (AEC - I)	U26TAEC11	(Tamil \$ / Other Languages +, #)	6	3	3	30	70	100
	II	Ability Enhancement Course – II (AEC - II)	U26EAEC11	English Course – I	6	3	3	30	70	100
	III	Core Course - I (CC - I)	U26CS101	Programming in C and Data Structures	4	4	3	30	70	100
		Core Practical - I (CP - I)	U26CS102P	Programming in C and Data Structures Lab	4	4	3	40	60	100
		Allied Course – 1 (AC - 1)	U26AMA101	Numerical Analysis and Statistics	3	3	3	30	70	100
		Allied Practical - I (AP-I)	U26AMA102P	Numerical Analysis and Statistics with MATLAB Programming Practical	3	3	3	40	60	100
	IV	Value Education	26UGVED	Value Education	2	2	3	30	70	100
		Interdisciplinary Course – I (IDC - I) #	U26IDCS11	Fundamentals of Information Technology	2	2	3	30	70	100
Total					30	24	--	--	--	800
II	I	Ability Enhancement Course – III (AEC - III)	U26TAEC22	(Tamil \$ / Other Languages +, #)	6	3	3	30	70	100
	II	Ability Enhancement Course – IV (AEC - IV)	U26EAEC22	English Course – II	6	3	3	30	70	100
	III	Core Course - II (CC - II)	U26CS203	Programming in Java	4	4	3	30	70	100
		Core Practical - II(CP - II)	U26CS204P	Object Oriented Programming using Java Lab	4	4	3	40	60	100
		Allied Course -II(AC-II)	U26AMA203	Operations Research	3	3	3	30	70	100
		Allied Practical - II (AP-II)	U26AMA204P	Operations Research with Excel Solver Practical	3	3	3	40	60	100
	IV	Skill Enhancement Course - I (SEC - I) ##	U26SECS21	Big Data Analytics using Pandas and Apache Spark	2	2	3	30	70	100
		Interdisciplinary Course – II (IDC - II) #	U26IDCS22	Working Principles of Internet	2	2	3	30	70	100
Total					30	24	--	--	--	800

Sem.	Part	Courses	Course Code	Title	Ins. Hrs.	Credits	Exam. Hours	Maximum Marks		
								Int.	Ext.	Total
III	I	Ability Enhancement Course – V(AEC - V)		(Tamil \$ / Other Languages +, #)	6	3	3	30	70	100
	II	Ability Enhancement Course – VI (AEC - VI)		English Course – III	6	3	3	30	70	100
	III	Core Course - III (CC - III)		Programming in Python	4	4	3	30	70	100
		Core Practical - III (CP -III)		Programming in Python Lab	4	4	3	40	60	100
		Allied Course – III(AC - III)		Applied Physics –I	3	3	3	30	70	100
		Allied Practical - III (AP-III)		Applied Physics Practical-I	3	3	3	40	60	100
	IV	Skill Enhancement Course - II (SEC - II) ##		Intelligent Computing Using AI Tools	2	2	3	30	70	100
		Interdisciplinary Course – III (IDC - III) \$\$		Digital Marketing	2	2	3	30	70	100
		Health & Wellness @			--	1	--	20	80	100
Total					30	25	--	--	--	900
	I	Ability Enhancement Course – VII (AEC - VII)		(Tamil \$ / Other Languages +, #)	6	3	3	30	70	100
IV	II	Ability Enhancement Course – VIII (AEC - VIII)		English Course – IV	6	3	3	30	70	100
	III	Core Course - IV (CC - IV)		RDBMS and NoSQL	4	4	3	30	70	100
		Core Practical - IV (CP -IV)		RDBMS and NoSQL Lab	4	4	3	40	60	100
		Allied Course – IV(AC -IV)		Applied Physics –II	3	3	3	30	70	100
		Allied Practical - IV(AP-IV)		Applied Physics Practical-II	3	3	3	40	60	100
	IV	Skill Enhancement Course - III (SEC - III) ##		Practical Machine Learning and Generative AI	2	2	3	30	70	100
		Interdisciplinary Course – IV (IDC - IV) \$\$		Introduction to Artificial Intelligence	2	2	3	30	70	100
	Total					30	24	--	--	--
Summer Internship / Industrial Activity during the Summer Vacation after II Year										
V	III	Core Course - V (CC - V)		Digital Electronics and Microprocessor	4	4	3	30	70	100
		Core Course - VI (CC - VI)		Data Communication and Network	5	4	3	30	70	100
		Core Course - VII (CC - VII)		Programming in PHP	5	4	3	30	70	100
		Core Course - VIII (CC - VIII)		Software Engineering	5	4	3	30	70	100
		Core Practical - V (CP - V)		PHP Programming Lab	5	4	3	40	60	100
	IV	Skill Enhancement Course - IV (SEC - IV)		Cloud Computing	2	2	3	30	70	100
		Discipline Specific Elective - I (DSEC-I)		Computer Graphics / Research Methodology / Fundamentals of Algorithms	2	2	3	30	70	100

Sem.	Part	Courses	Course Code	Title	Ins. Hrs.	Credits	Exam. Hours	Maximum Marks		
								Int.	Ext.	Total
		Introduction to Disaster Management			2	2	3	30	70	100
		Summer Internship / Industrial Activity @@		Summer Internship with Viva-Voce	--	2	--	20	80	100
		Total			30	28	--	--	--	900
VI	III	Core Course - IX (CC - IX)		Programming with .NET	4	4	3	30	70	100
		Core Course - X (CC - X)		Operating Systems	5	4	3	30	70	100
		Core Practical - VI (CP - VI)		Programming with .NET Lab	5	4	3	40	60	100
		Core Project Work (CPW) @@		Project Work (with Viva-Voce)	6	4	3	20	80	100
	IV	Skill Enhancement Course - V (SEC - V) ##		Internet of Things	2	2	3	30	70	100
		Discipline Specific Elective -II (DSEC-II)		Software Testing / Data Mining / Distributed Computing	2	2	3	30	70	100
		Environmental Studies			2	2	3	30	70	100
		Gender Studies			2	1	3	30	70	100
		Value Added Course		General Studies for Competitive Examinations	2	2	2	30	70	100
		Extension Activities *			--	1	--	--	--	--
		Total			30	26	--	--	--	900
Grand Total					180	151	--	--	--	5100

**Allied COURSE
(Allied Papers)**

S.No	Semester	Paper Name
1	I	Numerical Analysis and Statistics
2	I	Numerical Analysis and Statistics with MATLAB Programming Practical
3	II	Operations Research
4	II	Operations Research with Excel Solver Practical
5	III	Applied Physics –I
6	III	Applied Physics Practical –I
7	IV	Applied Physics –II
8	IV	Applied Physics Practical –II

SKILL ENHANCEMENT COURSE (SEC)		
S.No	Semester	Title of the paper
1	II	SEC-I Big Data Analytics using Pandas and Apache Spark
2	III	SEC-II Intelligent Computing Using AI Tools
3	IV	SEC-III Practical Machine Learning and Generative AI
4	V	SEC-IV Cloud Computing
5	VI	SEC-V Internet of Things

DISCIPLINE SPECIFIC ELECTIVE COURSE (DSEC)		
S.No	Semester	Title of the paper
1	V	DSEC-I Computer Graphics/Research Methodology /Fundamentals of Algorithms
2	VI	DSEC-II Software Testing /Data Mining /Distributed Computing

INTERDISCIPLINARY COURSE (IDC)

S.No.	Semester	Course Code	Title of the Paper
1	I	U26IDCS11	Fundamentals of Information Technology
2	II	U26IDCS22	Working Principles of Internet
3	III		Digital Marketing
4	IV		Introduction to Artificial Intelligence

VALUE ADDED COURSE *(VAC)**

Semester	Course	Course Code	Title of the Course
II	VAC-I	U26CSVA21	Introduction to Ancient Indian Technology
IV	VAC-II		Data Science Using Python and R Programming

INTERDISCIPLINARY COURSE (IDC) # FOR WHO HAVE NOT OPT TAMIL AS PART – I		
Those who have studied Tamil upto 10 th +2 but opt for other languages in degree	I Semester	Special Tamil – I
	II Semester	Special Tamil – II
Those who have not studied Tamil in school level	I Semester	Basic Tamil – I
	II Semester	Basic Tamil – II

INTERDISCIPLINARY COURSE (IDC) \$\$ FOR NCC CADETS ONLY	
NCC Course is a Compulsory Course for the NCC Cadets in the 3rd Semester:	NCC Course is a Compulsory Course for the NCC Cadets in the 4th Semester:
Introduction to NCC	1. Special Subject Army (or) 2. Special Subject Navy (or) 3. Special Subject Air force

SUMMARY OF CURRICULUM STRUCTURE OF UG PROGRAMMES – SCIENCE

Sl. No.	Part	Types of the Courses	No. of Courses	Credits for each Course	Total Credits	Marks
1.	I	Ability Enhancement Course (AEC-TAMIL)	4	3	12	400
2.	II	Ability Enhancement Course (AEC-ENGLISH)	4	3	12	400
3.	III	Core Course (CC)	10	4	40	1000
4.		Core Practical (CP)	6	4	24	600
5.		Allied Course (AC)	4	3	12	400
6.		Allied Practical (MP)	4	3	12	400
7.		Core Project Work (CPW)	1	4	4	100
8.	IV	Skill Enhancement Course (SEC)	5	2	10	500
9.		Discipline specific Elective Course (DSEC)	2	2	4	200
10.		Interdisciplinary Course (IDC)	4	2	8	400
11.		Value Education	1	2	2	100
12.		Health and Wellness	1	1	1	100
13.		Introduction to Disaster Management	1	2	2	100
14.		Summer Internship / Industrial Activity	1	2	2	100
15.		Value Added Course	1	2	2	100
16.		Environmental Studies	1	2	2	100
17.		Gender Studies	1	1	1	100
18.		EXTENSION ACTIVITIES (NCC / NSS / SPORTS / ANTI DRUG CELL / YRC & Any Other Activities	--	1	1	--
Total			51	-	151	5100
Additional Value Added Course in semester II and IV			2***	2	4***	200
MOOC-SWAYAM/NPTEL						

***Not included in the CGPA**

\$	For those who have studied Tamil upto 10 th +2 (Regular Stream)															
+	Syllabus for other Languages should be on par with Tamil at degree level															
#	Those who have studied Tamil upto 10 th +2 but opt for other languages in degree level under Part - I should study special Tamil and those who have not studied Tamil in the school level should study Basic Tamil in Part – IV under the Interdisciplinary Course.															
##	Naan Mudhalvan Scheme: As per the Naan Mudhalvan Scheme instructions, 5 courses from 2 nd to 6 th semester should be studied under Skill Enhancement Course.															
\$\$	NCC Course is one of the Choices in the Interdisciplinary Course. Only the NCC Cadets are eligible to choose this course. However, NCC Course is a Compulsory Course for the NCC Cadets.															
@	Health and Wellness: Assessments: • Use self-reflective worksheets to assess their understanding • submit the worksheets to internal audit / external audit • Every student’s activity report should be documented and the same have to be assessed by the Physical Director with Mentor. The evaluation should be for 100 marks. No examination is required. Scheme of Evaluation: <table><tr><th>Part</th><th>Description</th><th>Marks</th></tr><tr><td>A</td><td>Report</td><td>40</td></tr><tr><td>B</td><td>Attendance</td><td>20</td></tr><tr><td>C</td><td>Activities (Observation During Practice)</td><td>40</td></tr><tr><td colspan="2">Total</td><td>100</td></tr></table>	Part	Description	Marks	A	Report	40	B	Attendance	20	C	Activities (Observation During Practice)	40	Total		100
Part	Description	Marks														
A	Report	40														
B	Attendance	20														
C	Activities (Observation During Practice)	40														
Total		100														
@	Summer Internship / Industrial Activity Internship will be carried out during the summer vacation after the second 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 5th semester Mark Statement. Summer Internship / Industrial Activity & Project Work Scheme of Evaluation: <table><tr><th>Description</th><th>Marks</th></tr><tr><td>Report</td><td>80</td></tr><tr><td>Viva-Voce</td><td>20</td></tr><tr><td>Total</td><td>100</td></tr></table>	Description	Marks	Report	80	Viva-Voce	20	Total	100							
Description	Marks															
Report	80															
Viva-Voce	20															
Total	100															
*	Extension Activities shall be outside instruction hours.															

** Additional 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.

SEMESTER-I



SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS),
SUNDARAKKOTTAI, MANNARGUDI – 614016.
(For the candidates admitted in the academic year 2026– 2027)
PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE
B.Sc., COMPUTER SCIENCE

Semester: I -CC-I : PROGRAMMING IN C AND DATA STRUCTURES

Ins. Hrs. /Week: 4

Course Credit:4

Course Code:U26CS101

COURSE OBJECTIVES

- To understand the fundamentals of C programming language.
- To develop problem-solving skills using functions, arrays, strings, pointers, and file handling concepts in C.
- To apply structured programming techniques for designing efficient and modular programs.
- To understand the concepts of linear and non-linear data structures.
- To analyze and implement suitable data structures and algorithms for solving real-time computational problems efficiently.

UNIT-I : BASICS OF C

(10 Hours)

History of C and its importance – Structure of a C program – Data Types – Constants and Variables – Operators and Expressions – Order of Precedence, Evaluating of Arithmetic Expressions – Type Conversion- Decision Statements: if, if-else, and nested if statements.

UNIT-II : LOOPS STRUCTURES

(10 Hours)

For Loop, While, Do-while loop – Arrays: - One Dimensional Array, Two-dimensional Arrays, Character Arrays and Strings – Functions: Function with arrays - Function with decision and looping statements - Recursion.

UNIT-III: POINTERS

(13 Hours)

Introduction – Pointer Expressions – Chain of Pointers – Pointers and Arrays – Array of Pointers – Pointers as function arguments – Functions returning Pointers – Pointers to Functions – Function pointer – Structures - declaration, initialization, Array of Structures – Pointer to structures, Structures and functions – Typed of Enumerated data types, Unions.

UNIT-IV : FILES AND STRING PROCESSING

(12 Hours)

Strings Processing, Standard string library functions – Files: introduction and files functions – Writing and reading in Text mode – Simple application: Display the contents of a file. Write data to a file. Append data to an existing file – File IO– Reading and writing structures.

UNIT-V : STACK

(15 Hours)

Stack: LIFO concept, Stack operations, Array implementation of stack – Queue: FIFO concept, Queue operations, Array implementation of queue – Singly Linked List: concepts, operations – Doubly Linked List: concepts, operations – Trees: General trees, Binary trees.

Contemporary Developments Related to the Course during the Semester Concerned.

COURSE OUTCOME

1. Summarize the basic knowledge to develop C programs.
2. Manipulate Looping, arrays and functions.
3. Apply and write programs for solving real world problems.
4. Create open, read, manipulate, write and close files.
5. Understand the basic concepts in data structures.
6. Demonstrate programming and problem-solving skills effectively through seminars, and internal assessment activities.

1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, New Delhi, Seventh Edition, 2016.
2. E. Horowitz, S. Sahni and Susan Anderson Freed, "Fundamental Data Structures in C ", 2ed, Orient BlackSwan Publisher, 2009.

1. Yashavant Kanetkar, “Let us C”, BPB Publications, Tenth Edition, New Delhi, 2010.
2. Szuhay, Jeff, and Szuhay, Jeff, “Learn C Programming: A Beginner's Guide to Learning C Programming the Easy and Disciplined Way”, Packt Publishing, 2020.
3. Jena, Sisir Kumar, and Jena, Sisir Kumar, “C Programming: Learn to Code”, CRC Press, 2021.

1. <https://www.tutorialspoint.com/cprogramming/index.htm>
2. <https://www.w3schools.in/data-structures/intro>

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	3	2	2	2	1	3	3	3	3	3
CO 2	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2
CO 3	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2
CO 4	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2
CO 5	3	2	3	3	3	3	2	3	3	3	3	2	3	3	3

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 & RESEARCH DEPARTMENT OF COMPUTER SCIENCE
B.Sc., COMPUTER SCIENCE

Semester: I -CP-I : PROGRAMMING IN C AND DATA STRUCTURES LAB

Ins. Hrs. /Week: 4

Course Credit:4

Course Code:U26CS102P

COURSE OBJECTIVES

- To understand C programming fundamentals.
- To develop problem-solving skills using data structures.
- To implement stacks, queues, linked lists, and trees using C.
- To apply data structures in real-time applications.
- To improve programming and debugging skills.

EXERCISES

1. Write a C Program to display first Ten Natural Numbers and their sum.
2. Write a C Program to convert temperature from degree Centigrade to Fahrenheit.
3. Write a C Program to Find whether given number is Even or Odd.
4. Write a C Program to Find the greatest of Three numbers.
5. Write a C program to implement Browser Back Button operation using stack.
6. Write a C program to simulate a Printer Queue Management Concept using queue.
7. Write a C program to implement a Mobile Recharge Concept using Queue.
8. Write a C program to implement a Student Record Management System using singly linked list.
9. Write a C program to create and display a Binary Tree.
10. Write a C program to create and display a Doubly Linked List.

Total Hours: 60

COURSE OUTCOME

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

1. Develop basic C programs.
2. Implement stack operations and applications.
3. Implement queue operations and applications.
4. Create singly and doubly linked lists.
5. Design and display binary trees.
6. Demonstrate programming and problem-solving skills through lab activities.

TEXT BOOKS

1. Ellis Horowitz , Sartaj Sahni, Susan Anderson Freed, Second Edition , “Fundamentals of Data in C”, Universities Press.
2. E. Horowitz, S. Sahni and S. Rajasekaran, Second Edition , “Fundamentals of Computer Algorithms “ Universities Press

REFERENCE BOOK(S)

1. Seymour Lipschutz ,”Data Structures with C”, First Edition, Schaum’s outline Series in computers, Tata McGraw Hill.
2. R.Krishnamoorthy and G.Indirani Kumaravel, Data Structures using C, Tata McGrawHill – 2008.
3. A.K.Sharma, Data Structures using C , Pearson Education India,2011.
4. G. Brassard and P. Bratley, “Fundamentals of Algorithms”, PHI, New Delhi, 1997.
5. A.V. Aho, J.E. Hopcroft, J.D. Ullmann,, “The design and analysis of Computer Algorithms”, Addison Wesley, Boston, 1974

E- RESOURCES

- 1.Web resources from NDL Library, E-content from open source libraries

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	3	3	3	3	3	3	3	3	3	3
CO 2	3	3	1	3	2	3	3	3	1	3	3	3	1	3	2
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

Semester: I – Part IV-VALUE EDUCATION

Ins. Hrs. /Week: 2

Course Credit:2

Course Code:26UGVED

COURSE OBJECTIVES

- To understand the philosophy of life and values through Thirukural
- To analyse the components of values education to attain the sense of citizenship
- To understand different types of values towards National Integration and international understanding
- To learn yoga as value education to promote mental and emotional health
- To understand human rights, women rights and other rights to promote peace and harmony

UNIT - I: PHILOSOPHY OF LIFE AND SOCIAL VALUES

Human Life on Earth (Kural 629) -Purpose of Life (Kural 46) -Meaning and Philosophy of Life (Kural 131, 226) -Family (Kural 45), Peace in Family (Kural 1025) Society (Kural 446), The Law of Life (Kural 952), Brotherhood (Kural 807) Five responsibilities / duties of Man (a) to himself (b) to his family (c) to his environment (d) to his society, (e) to the Universe in his lives (Kural 43, 981).

UNIT-II: HUMAN VALUES AND CITIZENSHIP

Aim of education and value education: Evolution of value oriented education, Concept of Human values: types of Values- Character Formation – Components of Value education- A P J Kalam's ten points for enlightened citizenship- The role of media in value building

UNIT-III: VALUE EDUCATION TOWARDS NATIONAL AND GLOBAL DEVELOPMENT

Constitutional or national values: Democracy, socialism, secularism, equality, Justice, liberty, freedom and fraternity - Social Values: Pity and probity, self-control, universal brotherhood - Professional Values - Knowledge thirst, sincerity in profession, regularity, punctuality and faith -Religious Values: Tolerance, wisdom, character - Aesthetic Values- Love and appreciation of literature and fine arts and respect for the same- National Integration and International Understanding.

UNIT IV : YOGA AND HEALTH

Definition, Meaning, Scope of Yoga - Aims and objectives of Yoga - Yoga Education with modern context - Different traditions and schools of Yoga - Yoga practices: Asanas, Pranayama and Meditation.

UNIT V : HUMAN RIGHTS

Concept of Human Rights: Indian and international perspectives- Evolution of Human Rights- definitions under Indian and International documents - Broad classification of Human Rights and Relevant Constitutional Provisions: Right to Life, liberty and Dignity- Right to equality- Right against exploitation- Cultural and Educational Right- Economic Rights- Political Rights- Social Rights - Human Rights of Women and Children – Peace and harmony.

UNIT - VI: CURRENT CONTOURS: (for continuous internal assessment only):

Contemporary Developments Related to the Course during the Semester Concerned.

REFERENCE BOOK(S)

1. Thirukkural with English Translation of Rev. Dr. G.U. Pope, Uma Publication, 156, Serfoji Nagar, Medical College Road, Thanjavur 613 004
2. jUfFws - [p.A.Nghg - Mqfy nkho|ahffjJLd ckh E}y> nts|aLLfk jQrhT+H>
3. Leah Levin, Human Rights, NBT, 1998
4. V.R. Krishna Iyer, Dialectics and Dynamics of Human Rights in India, Tagore Law Lectures.
5. Yogic Thearpy - Swami Kuvalayananda and Dr.S.L.Vinekar, Government of India, Ministry of Health, New Delhi.
6. SOUND HEALTH THROUGH YOGA -Dr.K.Chandrasekaran, PremKalyan Publications, Sedaptti, 1999.
7. Grose. D. N – “A text book of Value Education’ New Delhi (2005)
8. Gawande . EN – “Value Oriented Education” – Vision for better living. New Delhi (2002) Saruptsons
9. Brain Trust Aliyar- “Value Education for Health, Happiness and Harmony” Erode (2004) Vethathiri publications

COURSE OUTCOME

After completion of the course, the student will be able to:

- Apply the values in thirukural to be peaceful, dutiful and responsible in family and society
- Develop character formation and sense of citizenship
- Be secular, self-control, sincere, respectful and moral.
- Master yoga, asana and meditation to promote mental health
- Be attitudinal to follow the constitutional rights

SEMESTER-II



SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS),
SUNDARAKKOTTAI, MANNARGUDI – 614016.
(For the candidates admitted in the academic year 2026– 2027)
PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE
B.Sc., COMPUTER SCIENCE

Semester: II -CC-II : PROGRAMMING IN JAVA

Ins. Hrs. /Week: 4

Course Credit:4

Course Code:U26CS203

COURSE OBJECTIVES

- To understand the basic concepts of Java programming language.
- To develop programs using classes, objects, and methods.
- To learn object-oriented programming concepts such as inheritance, polymorphism, and encapsulation.
- To develop Java applications using arrays, strings, exception handling, and packages.
- To apply Java programming concepts for solving real-world problems.

UNIT I : INTRODUCTION

(12 Hours)

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

(12 Hours)

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 : MULTI-THREADED PROGRAMMING

(12 Hours)

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

(12 Hours)

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

(12 Hours)

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

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

Contemporary Developments Related to the Course during the Semester Concerned.

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.
6. Demonstrate programming, problem-solving skills through assignments, seminars, and internal assessment activities.

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 \(pdffiles.net\)](#)

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 2026– 2027)
PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE
B.Sc., COMPUTER SCIENCE

Semester: II -CP-II : OBJECT ORIENTED PROGRAMMING USING JAVA LAB

Ins. Hrs. /Week: 4

Course Credit:4

Course Code:U26CS204P

COURSE OBJECTIVES

- To understand the fundamentals of Java programming language and object-oriented concepts.
- To develop problem-solving skills using classes, objects, and methods in Java.
- To apply inheritance, polymorphism, and exception handling in Java programs.
- To implement multithreading and string handling concepts for real-time applications.
- To design simple GUI applications using AWT and event handling mechanisms.

EXERCISES

1. Write a Java program to implement a Student Mark Calculation System using classes, objects, constructors, and methods.
2. Write a Java program to implement an Employee Management System using Inheritance with dynamic input.
3. Write a Java program to demonstrate Method Overloading using addition operations.
4. Write a Java program to implement Exception Handling using try-catch.
5. Write a Java program to simulate a Ticket Reservation System using multithreading.
6. Write a Java program to perform string operations using StringBuffer class.
7. (Length, Reverse, and Delete substring).
8. Write a Java AWT program to create a Simple Calculator Application using buttons, labels, and text fields.
9. Write a Java program to handle Button Click Event using event handling.

Total Hours: 60

COURSE OUTCOME

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

1. Develop Java programs using classes, objects, constructors, and methods.
2. Implement object-oriented concepts such as inheritance and method overloading.
3. Apply exception handling techniques to handle runtime errors effectively.
4. Develop multithreaded applications for real-time problem solving.
5. Perform string manipulations using StringBuffer class methods.
6. Design and implement simple GUI applications using AWT and event handling.

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 2026– 2027)
PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE
B.Sc., COMPUTER SCIENCE

Semester: II - SEC -I: BIG DATA ANALYTICS USING PANDAS AND APACHE SPARK

Ins. Hrs. /Week: 2

Course Credit: 2

CourseCode:U26SECS21

COURSE OBJECTIVES

- To understand the basics of data analytics and big data.
- To learn data handling techniques using Pandas.
- To perform basic data visualization and analysis.
- To understand Apache Spark and distributed data processing.
- To develop simple analytics applications using Pandas and Spark.

UNIT – I : INTRODUCTION TO DATA ANALYTICS (5 Hours)

Introduction to Data Analytics – Big Data Basics – Python for Data Science – Introduction to NumPy and Pandas – Jupyter Notebook Basics.

UNIT –II: DATA HANDLING USING PANDAS (5 Hours)

Pandas Series and DataFrames – Importing Data – Data Cleaning – Handling Missing Values – Filtering, Sorting and Grouping Data.

UNIT-III: DATA VISUALIZATION AND ANALYSIS (5 Hours)

Introduction to Matplotlib and Seaborn – Line Chart, Bar Chart and Pie Chart – Basic Statistical Analysis – Exploratory Data Analysis.

UNIT-IV: APACHE SPARK FUNDAMENTALS (5 Hours)

Introduction to Apache Spark – Spark Architecture – RDD Basics – Spark DataFrames – Transformations and Actions.

UNIT-V: ADVANCED SPARK ANALYTICS AND APPLICATIONS (5 Hours)

Introduction to Spark SQL – Querying Data using PySpark – Simple Machine Learning Concepts – Case Studies and Applications.

UNIT-VI:CIA COMPONENTS

Assignment on Pandas Operations - Seminar on Big Data Applications - Hands-on Exercises using Spark.

Total Lecture Hours-30

COURSE OUTCOME

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

1. Explain basic concepts of data analytics and big data.
2. Use Pandas for data manipulation and preprocessing.
3. Create charts and perform basic data analysis.
4. Apply Spark concepts for processing large datasets.
5. Use Spark DataFrames and Spark SQL for analytics.
6. Develop mini projects using Pandas and Spark tools.

TEXT BOOKS

1. Wes McKinney, Python for Data Analysis, O'Reilly Media, 2022.
2. Bill Chambers and Matei Zaharia, Spark: The Definitive Guide, O'Reilly Media, 2018.

REFERENCE BOOK(S)

1. Jake VanderPlas, *Python Data Science Handbook*, O'Reilly Media, 2017.
2. Holden Karau, *Learning Spark*, O'Reilly Media, 2020.
3. Mohammed Guller, *Big Data Analytics with Spark*, Apress, 2015.

E-REFERENCES

1. [Pandas Documentation](#)
2. [Apache Spark Documentation](#)
3. [Jupyter Notebook Documentation](#)
4. [Kaggle Datasets and Tutorials](#)
5. [Python Official Documentation](#)

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

**INTERDISCIPLINARY COURSE (IDC) OFFERED
BY THE DEPARTMENT**



SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS),
SUNDARAKKOTTAI, MANNARGUDI – 614016.
(For the candidates admitted in the academic year 2026– 2027)
PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE
B.Sc., COMPUTER SCIENCE

Semester: I -IDC-I : FUNDAMENTALS OF INFORMATION TECHNOLOGY

Ins. Hrs. /Week: 2

Course Credit:2

Course Code:U26IDCS11

COURSE OBJECTIVES

- To understand the basics of Information Technology.
- To learn computer hardware and software concepts.
- To use internet and office applications effectively.
- To understand basic networking and security concepts.
- To apply IT knowledge in daily life applications.

UNIT – I : BASICS OF COMPUTERS

(5 Hours)

Introduction to Computers - Generation of Computers - Classification of Digital Computer - Anatomy of Digital Computer.

UNIT-II : COMPONENTS OF COMPUTER

(5 Hours)

CPU and Memory - Secondary Storage Devices - Input Devices - Output Devices.

UNIT-III : SOFTWARE

(5 Hours)

Introduction to Computer Software - Programming Language - Operating Systems - Introduction to Database Management System.

UNIT – IV : NETWORKS AND INTERNET

(5 Hours)

Computer Networks - WWW and Internet - Email - Web Design

UNIT – V : APPLICATIONS OF COMPUTERS AND SECURITY

(5 Hours)

Computers at Home, Education, Entertainment, Science, Medicine and Engineering - Introduction to Computer Security - Computer Viruses, Bombs, Worms.

UNIT - VI CURRENT CONTOURS (for Continuous Internal Assessment Only):

Contemporary Developments Related to the Course during the Semester Concerned

Total Lecture Hours -30

COURSE OUTCOME

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

1. Understand basic concepts and terminologies in IT and IT-enabled services.
2. Understanding personal computers and their operations.
3. Understand about operating systems and database management
4. Comprehend about WWW, internet, email and web design concepts
5. Respond to computer security issues.
6. Demonstrate analytical skills through assignments, seminars, laboratory exercises, and internal assessment activities.

TEXT BOOKS

1. Alexis Leon and Mathews Leon, Fundamentals of Information Technology, Vikas Publishing House Pvt. Ltd, 2009.
2. Fundamentals of Computers and Information Technology, M.N Doja, 2005.
3. Ramesh Bangia, "Computer Fundamentals and Information Technology", Laxmi Publications Pvt Limited, 2008.

REFERENCE BOOK(S)

1. Bharihoke, "Fundamentals of Information Technology", Excel Books, 2009.
2. Ralph Stair, George Reynolds, "Fundamentals of Information Systems" Cengage Learning, 2015.

E- RESOURCES

1. https://gpwambala.ac.in/wp-content/uploads/2024/08/FIT_Comp_1sem.pdf
2. <https://www.coursera.org/learn/information-technology-it-fundamentals-for-everyone>

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	3	2	2	2	1	3	3	3	3	3
CO 2	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2
CO 3	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2
CO 4	3	3	3	3	2	3	3	3	3	2	3	3	3	3	2
CO 5	3	2	3	3	3	3	2	3	3	3	3	2	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 & RESEARCH DEPARTMENT OF COMPUTER SCIENCE
B.Sc., COMPUTER SCIENCE

Semester: II -IDC-II : WORKING PRINCIPLES OF INTERNET

Ins. Hrs. /Week: 2

Course Credit:2

Course Code:U26IDCS22

COURSE OBJECTIVES

1. To understand the basic concepts and architecture of the Internet.
2. To learn how Internet connections and communication systems work.
3. To gain knowledge about World Wide Web and common Internet tools.
4. To understand multimedia usage, intranet, and online shopping concepts.
5. To learn basic Internet security and safety measures.

UNIT – I : BASICS OF INTERNET

(5 Hours)

Introduction to Internet-The Internet's underlying Architecture

UNIT – II : CONNECTIONS OF INTERNET

(5 Hours)

Connecting to the Internet – Communicating on the Internet

UNIT – III : WWW

(5 Hours)

How the World Wide Web works. Common Internet tools

UNIT – IV : MULTIMEDIA IN INTERNET

(5 Hours)

Multimedia on the Internet – Intranet and shopping on the Internet

UNIT – V : SECURITY IN INTERNET

(5 Hours)

Safeguarding the Internet

UNIT - VI CURRENT CONTOURS (for Continuous Internal Assessment Only):

Contemporary Developments Related to the Course during the Semester Concerned.

Total Lecture Hours-30

COURSE OUTCOME

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

1. Understand the structure and functioning of the Internet and its architecture.
2. Explain Internet connectivity and communication mechanisms.
3. Describe the working of WWW and commonly used Internet tools.
4. Apply multimedia, intranet, and online services in practical usage.
5. Identify security threats and follow safe Internet practices.
6. Demonstrate knowledge through assignments, seminars, quizzes, and internal assessment activities related to current developments in Internet technologies.

TEXT BOOKS

1. Preston Gralla, "How the Internet Works", Pearson Education, Eighth Edition, 2006.
2. C.Xavier, Fundamentals of Internet and Emerging Technologies, New Age International Private Limited; First Edition ,2021
3. Alexis Leon, Internet for Everyone, S. Chand (G/L) & Company Ltd; Second Edition 2012.
4. Andrea C. Nakaya, "Internet and Social Media Addiction", Reference Point Press,2015.

REFERENCE BOOK(S)

1. Richard Fox, Wei Hao, "Internet Infrastructure: Networking, Web Services, and Cloud Computing", CRC Press, 2017.
2. Douglas E. Comer, "The Internet Book: Everything You Need to Know about Computer Networking and How the Internet Works", CRC Press, 2018.

E-RESOURCES

1. <https://www.geeksforgeeks.org/computer-science-tals/introduction-to-in>
2. <https://kimsbengaluru.edu.in/assets/pdfs/criterias/criteria-1/criteria-1.1.1/Principles%20of%20Internet%20.pdf>

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

VALUE ADDED COURSE

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS),

SUNDARAKKOTTAI, MANNARGUDI – 614016.

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

PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

B.Sc., COMPUTER SCIENCE

Semester: II -VAC-I : INTRODUCTION TO ANCIENT INDIAN TECHNOLOGY

Ins. Hrs. /Week:

Course Credit:2

Course Code:U26CSVA21

COURSE OBJECTIVES

- To introduce the fundamental concepts of ancient Indian technology and its historical significance.
- To understand scientific and technological contributions of ancient India in various fields.
- To explore traditional knowledge systems in engineering, mathematics, astronomy, and medicine.
- To analyze the innovations and techniques used in ancient Indian civilization.
- To develop awareness about India's heritage and its impact on modern technology.

UNIT-I : BASICS OF ANCIENT TECHNOLOGY

(6 Hours)

Meaning of ancient technology -Importance of technology in olden days -How early humans developed tools -Sources of ancient technology.

UNIT-II : STONE AGE TECHNOLOGY

(6 Hours)

Life during Stone Age -Stone tools and weapons -Discovery of fire -Beginning of agriculture-Domestication of animals -Pottery making and early villages.

UNIT-III : TECHNOLOGIES OF ANCIENT CIVILIZATIONS

(6 Hours)

Indus Valley Civilization-Egyptian Civilization -Chinese Civilization -Greek Civilization.

UNIT-IV :ANCIENT ENGINEERING AND CONSTRUCTION

(6 Hours)

Building methods in ancient times -Temples, pyramids, and monuments -Road and bridge construction -Water storage and management -Simple machines used in ancient days.

UNIT-V : EARLY TRANSPORT METHODS

(6 Hours)

Invention of the wheel -Boats and ships -Navigation methods -Ancient communication systems.

UNIT-VI : CONTINUOUS INTERNAL ASSESSMENT ACTIVITIES

Assignment writing and seminar presentation on ancient Indian technologies and civilizations. Quiz, group discussion, chart/model preparation, and field visit report related to ancient heritage and technological developments.

Total Lecture Hours-30

COURSE OUTCOME

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

1. Understand the concept and scope of ancient Indian technology.
2. Describe major scientific and technological contributions of ancient India.
3. Explain traditional knowledge systems in fields like mathematics, astronomy, and medicine.
4. Identify ancient engineering and architectural techniques used in India.
5. Relate ancient technologies with modern scientific developments.
6. Demonstrate understanding through assignments, seminars, and internal assessment activities on ancient Indian technological heritage.

TEXT BOOKS

1. Upinder Singh, "A History of Ancient and Early Medieval India", Pearson Education India, New Delhi, First Edition, 2008.
2. Upinder Singh, "The Idea of Ancient India", Penguin Random House India, New Delhi, First Edition, 2023.
3. Tony Joseph, "Early Indians: The Story of Our Ancestors and Where We Came From", Juggernaut Books, New Delhi, First Edition, 2018.
4. Neelam Yadav and Ravindra Goswami, "Scientific Marvels of Ancient India: Technological Insights from the Indian Knowledge System", Notion Press, Chennai, First Edition, 2025.

REFERENCE BOOK(S)

1. V. N. Prabhakar, "Handbook of Harappan Civilisation: Recent Insights and Discoveries", Springer Nature, Singapore, First Edition, 2025.
2. Upinder Singh, "The Discovery of Ancient India", Permanent Black, New Delhi, First Edition, 2004.
3. Sila Tripathi, "Ports and Maritime Trade of India: Bronze Age and Beyond", Springer Nature, Singapore, First Edition, 2026.
4. Anand Singh, "Nalanda: A Glorious Past", Kaveri Books, New Delhi, First Edition, 2024.

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					