

B.Sc., Data Science

SYLLABUS

PROGRAMME CODE:3UGDAS



2026-2027

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS)

(Affiliated to Bharathidasan University, Tiruchirappalli)
(Accredited by NAAC)

**Sundarakkottai, Mannargudi-614016,
Thiruvarur (Dt.), Tamil Nadu, India.**



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

(Affiliated to Bharathidasan University, Tiruchirappalli)
(Accredited by NAAC & An ISO 9001:2015 Certified Institution)
SUNDARAKKOTTAI, MANNARGUDI-614016.
TAMILNADU, INDIA.

B.Sc., Data 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 (AC): 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 (AP): 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), 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, Practical's, Allied courses, Allied Practical's 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:

- For each of the first three parts, there shall be separate classification on the basis of CGPA, as indicated in Table-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.
- Grade in Part –IV and Part-V shall be shown separately and it shall not be taken into account for classification.
- A Pass in PART- V will be mandatory although the marks will not count for the calculation of the CGPA.
- 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 pervious 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

To Empower the women students by providing excellent software engineering skills to meet the global needs of IT industry

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Mission

- Providing quality education in computer science and its applications by updated knowledge through technology transfer
- Enhancing professional skills to satisfy the needs of the Software industries and Technical skills of the individual towards competitive world.

Programme Outcomes:

PO No.	Program Outcomes (<i>Upon completion of the B.Sc. Data Science Degree Program, the Undergraduate will be able to</i>)
PO-1	Disciplinary knowledge: Demonstrate comprehensive knowledge and understanding off or a range of computer applications, computer organization, techniques of Computer Networking, Software Engineering, Web development, Database management and Advance Java that form a part of an undergraduate programme of study.
PO-2	Critical thinking and Problem Solving: 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.
PO-3	Scientific reasoning: Analyze, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.
PO-4	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.
PO-5	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 interests of a common cause and work efficiently as a member of a team.
PO-6	Multicultural Competence, Social Interaction and Effective Citizenship: Understand the Values and beliefs of multiple cultures, global perspectives, engage and interact respectfully with diverse groups and elicit views of others, mediate disagreements and help reach conclusions in group settings, and demonstrate empathetic social concern and equity centred national development.
PO-7	Moral and Ethical Awareness: Embrace moral/ethical values in conducting one's life, Formulateaposition/argumentaboutanethicalissuefrommultipleperspectives,and use ethical practices in all work.
PO-8	Environment and Sustainability: Understand the impacts of technology and business practices in societal and environmental contexts, and sustainable development.
PO-9	Human values and Gender Issues: Understand major ideas, values, beliefs, the nature of the individual and the relationship between self and the community and aware of the various issues concerning women and society.
PO-10	Self-directedandLifelonglearning: Acquireknowledgeandskills,includinglearning “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.

PSO. No.	PROGRAMME SPECIFIC OUTCOME Students will be able to
PSO1	Apply the concepts and practical knowledge in analysis, design and development of computing systems and applications to multi-disciplinary problems.
PSO2	To provide a concrete foundation and enrich their abilities to qualify for Employment, Higher studies and Research in Data science with ethical values
PSO3	Develop Data Science professional to manage various IT controls in business organizations.
PSO4	Explore technical comprehension in varied areas of Data Science and experience a conducive environment in cultivating skills for thriving career and higher studies.
PSO5	Familiarity and practical competence with a broad range of programming language and open-source platforms

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**SUNDARAKKOTTAI, MANNARGUDI – 614 016,
TAMILNADU, INDIA.**

Department of Computer Applications

B.Sc., Data Science

CHOICE BASED CREDIT SYSTEM

LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK

(CBCS- LOCF)

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

ELIGIBILITY: A candidate should have passed the 12th Standard with Computer Science or Mathematics.

Se m	Part	Courses	Course Code	Title of the Course	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)	U26DS101	Programming in C and Data Structures	4	4	3	30	70	100
		Core Practical – I (CP - I)	U26DS102P	Programming in C and Data Structures Lab	4	4	3	40	60	100
		Allied Course – I (AC - I)	U26AMT101	Algebra and Calculus	3	3	3	30	70	100
		Allied Practical - I (AP-I)	U26AMT102P	Data Analytics using Spreadsheets Lab-I	3	3	3	40	60	100
	IV	Value Education	26UGVED	Value Education	2	2	3	30	70	100
		Interdisciplinary Course – I (IDC - I) #			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)	U26DS203	Programming in Python	4	4	3	30	70	100
		Core Practical – II (CP - II)	U26DS204P	Programming in Python Lab	4	4	3	40	60	100
		Allied Course – II (AC -II)	U26AMT203	Optimization Techniques	3	3	3	30	70	100
		Allied Practical - II (AP-II)	U26AMT204P	Data Analytics using Spreadsheets Lab-II	3	3	3	40	60	100
	IV	Skill Enhancement Course - I(SEC -I) ##	U26SEDS21	Cyber Security	2	2	3	30	70	100
		Interdisciplinary Course – II (IDC - II) #			2	2	3	30	70	100
	Total				30	24	--	--	--	800

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)		Database Systems	4	4	3	30	70	100
		Core Practical - III (CP - III)		Database Systems Lab	4	4	3	40	60	100
		Allied Course – III (AC -III)		Statistics-I	3	3	3	30	70	100
		Allied Practical - III (AP-III)		Statistics for Data Science Lab using SPSS- I	3	3	3	40	60	100
	IV	Skill Enhancement Course - II (SEC - II) ##		AI in Data Science	2	2	3	30	70	100
		Interdisciplinary Course – III (IDC - III) \$\$			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)		Big Data Analytics with NoSQL Database	4	4	3	30	70	100
		Core Practical - IV (CP – IV)		Big Data Analytics Lab	4	4	3	40	60	100
		Allied Course – IV (AC -IV)		Statistics-II	3	3	3	30	70	100
		Allied Practical - IV (AP-IV)		Statistics for Data Science Lab using SPSS –II	3	3	3	40	60	100
	IV	Skill Enhancement Course – III (SEC – III) ##		Shell Programming	2	2	3	30	70	100
		Interdisciplinary Course – IV (IDC – IV) \$\$			2	2	3	30	70	100
	Total				30	24	-	-	-	800
	Summer Internship / Industrial Activity during the Summer Vacation after II Year									
V	III	Core Course – V (CC – V)		Data Mining and Data Warehousing	4	4	3	30	70	100
		Core Course – VI (CC – VI)		Fundamentals of Algorithms	5	4	3	30	70	100
		Core Course – VII (CC – VII)		Operating Systems	5	4	3	30	70	100
		Core Course – VIII (CC – VIII)		Cloud Computing	5	4	3	30	70	100
		Core Practical – V(CP – V)		Data Mining Lab	5	4	3	40	60	100
	IV	Skill Enhancement Course –IV (SEC – IV)		Software Engineering	2	2	3	30	70	100
		Discipline Specific Elective Course – I (DSEC – I)		Distributed Computing/ Internet of Things /Blockchain Technologies	2	2	3	30	70	100
		Introduction to Disaster Management			2	2	3	30	70	100
		Summer Internship / Industrial Activity @@		Summer Internship with Viva-Voce	--	2	3	20	80	100
	Total				30	28	-	-	-	900

VI	III	Core Course – IX(CC – IX)		Computer Networks	4	4	3	30	70	100
		Core Course- X(CC – X)		Machine Learning	5	4	3	30	70	100
		Core Practical- VI(CP – VI)		Machine Learning 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)		Web Technologies	2	2	3	30	70	100
		Discipline Specific Elective Course – II (DSEC – II) ##		Artificial Intelligence /Deep Learning/ Natural Language Processing	2	2	3	30	70	100
		Value Added Course		General Studies for Competitive Examinations	2	2	2	30	70	100
		Environmental Studies			2	2	3	30	70	100
	V	Gender Studies			2	1	3	30	70	100
		Extension Activities *			--	1	-	--	--	--
	Total				30	26	-	--	--	900
	Grand Total				180	151	-	--	--	5100

**ALLIED COURSE
(Allied Papers)**

S.NO	First Year Students	Second Year Students
1	Mathematics	Statistics

SKILL ENHANCEMENT COURSE (SEC)

S.No	Semester	Sec	Course Code	Title of paper
1	II	I	U26SEDS21	Cyber Security
2	III	II		AI in Data Science
3	IV	III		Shell Programming
4	V	IV		Software Engineering
5	VI	V		Web Technologies

DISCIPLINE SPECIFIC ELECTIVE COURSE (DSEC)

S.No	Semester	Course Code	Title of the Paper
1	V		Distributed Computing/Internet of Things / Blockchain Technologies
2	VI		Artificial Intelligence /Deep Learning/ Natural Language Processing

VALUE ADDED COURSES

S. No	Semester	Course Code	Title of the Paper
1	II	U26DSVA21	Introduction to Ancient Indian Technology
2	IV	-	Data Science Using Python and R Programming

**INTER DISCIPLINARY 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

**INTER DISCIPLINARY COURSE (IDC) \$\$
FOR NCC CADETS ONLY**

NCC Course is a Compulsory Course for the NCC Cadets in the III Semester:	NCC Course is a Compulsory Course for the NCC Cadets in the IV 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**

S. 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 (MC)	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.		Inter Disciplinary 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 Courses			-	2	2	-

\$	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 Inter disciplinary 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 Inter disciplinary 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 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)
DEPARTMENT OF COMPUTER APPLICATIONS
B.Sc., DATA SCIENCE

Semester: I-CC-I: Programming in C and Data Structures

Ins. Hrs./Week:4

Course Credit:4

Course Code: U26DS101

COURSE OBJECTIVES:

- To understand the fundamentals of C programming including data types, operators, expressions, and decision-making statements.
- To develop problem-solving skills using loops, arrays, functions, and recursion in C programming.
- To gain knowledge of pointers, structures, unions, and enumerated data types for efficient data handling.
- To learn string processing and file handling techniques for input, output, and data storage operations.
- To understand and implement basic data structures such as stacks, queues, linked lists, and trees using C programming.

UNIT-I: Basic of C

(12-Hours)

Basic of C: History of C- Importance of C – Basic Structure of C programs –Constants, Variables and Data Types – Operators and Expressions – Managing Input and Output Operations - Decision Making and Branching-Decision Making and Looping.

UNIT-II: Arrays and Functions

(12-Hours)

Arrays – Character Arrays and Strings: Declaring and Initializing String Variables-String Handling Functions. User defined Functions: Need for User-Defined Functions-Elements of User-Defined Functions-Definition of Functions-Return Values and their Types-Functions Calls-Function Declaration-Categories of Functions-Return Values-Nesting of Functions - Recursion – Passing arrays to Functions-Passing Strings to Functions-The scope, Visibility and Lifetime of Variables.

UNIT-III: Pointers

(12-Hours)

Structures: Defining a Structure-Declaring Structure Variables TypeDef Declaration-Accessing Structure Members-structure Initialization-Copying and Comparing Structure Variables- Array of Structures - Structures and functions-Unions. Pointers: Understanding Pointers-Accessing the Address of a Variable – Declaring Pointer Variables – Initialization of Pointer Variables - Accessing a Variable through its Pointer – Chain of Pointers –Pointer Expressions-Pointer Increments and Scale Factor - Pointers and Arrays – Pointers and Character Strings- Array of Pointers – Pointers as Function Arguments – Functions Returning Pointers – Pointers to Functions – Pointer and Structures- File Management in C.

UNIT-IV: Stack and Queues

(12-Hours)

Linked Lists: Introduction-Singly Linked Lists-Circular Linked Lists- Doubly Linked List-Stack: Array Representation of Stack - Operations on a Stack - Applications of Stacks. Queues: Array Representation of Queues - Types of Queues – Applications of queues. Trees: Basic Terminology – Types of Trees – Traversing a Binary Tree – Applications of Trees.

UNIT-V: Graphs

(12-Hours)

Graph Terminology – Directed Graphs-Representation of Graph - Graph Traversal – Topological Sorting- Shortest Path. Searching and Sorting: Linear Search-Binary Search – Bubble Sort-Insertion Sort-Selection Sort- Merge Sort – quick Sort.

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

Hash tables, collision resolution methods, heap data structures, priority queues, and their operations. The unit also covers applications of data structures in problem-solving, memory management concepts, and an introduction to algorithm analysis, including time and space complexity.

Total Lecture Hours: 60

COURSE OUTCOMES:

On completion of this course, students will be able to

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. Apply algorithms for efficient problem solving.

TEXT BOOK(S)

1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, New Delhi, Seventh Edition, 2016.
2. Reema Thareja, "Data structures Using C Second Edition.

REFERENCE BOOK(S)

1. Byron S. Gottfried, "Programming with C", Schaum's Outline Series, TataMcGraw Hill Edition, New Delhi, 1991.
2. E. Karthikeyan, "A Textbook on C Fundamentals, Data Structures and Problem Solving", Prentice-Hall of India Private Limited, New Delhi, 2008.
3. Yashavant Kanetkar, "Let us C", BPB Publications, Tenth Edition, New Delhi, 2010.
4. Szuhay, Jeff, and Szuhay, Jeff, "Learn C Programming: A Beginner's Guide to Learning C Programming the Easy and Disciplined Way", Packt Publishing, 2020.
5. Jena, Sisir Kumar, and Jena, Sisir Kumar, "C Programming: Learn to Code", CRC Press, 2021.

E-RESOURCES

1. <https://www.tutorialspoint.com/cprogramming/index.htm>
2. <https://www.w3schools.in/data-structures/intro>
3. <http://www.programiz.com/c-programming>
4. http://www.tutorialpoint.com/data_structures_algorithms/index.html
5. http://www.onlinegdb.com/online_c_compiler

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1		1						3	2			
CO2	3	3	2	1	1						3	3	1		
CO3	3	3	2	2	2						3	3	2	1	
CO4	3	3	3	2	2				1	1	3	3	2	2	1
CO5	3	3	3	3	2				1	1	3	3	3	2	1
CO6	2	2	2	2	3	2	1	2	2	3	3	2	2	2	

Strong-3 Medium-2 low-1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI-614016.

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

**DEPARTMENT OF COMPUTER APPLICATIONS
B.Sc., DATA SCIENCE**

Semester: I-CP-1: Programming in C and Data Structures Lab

Ins. Hrs./Week: 4

Course Credit: 4

Course Code:U26DS102P

COURSE OBJECTIVES

- Understand the fundamentals of C programming.
- Apply arrays, pointers, and functions in programs.
- Perform file handling operations using C.
- Implement basic data structures in C.
- Use sorting and searching techniques to solve problems.

LIST OF PROGRAMS

1. Write a Program
 - (i) To convert temperature from degree Centigrade to Fahrenheit,
 - (ii) Find whether given number is Even or Odd,
 - (iii) Find the greatest of Three numbers.
2. Write a Program to display Monday to Sunday using switch statement
3. Write a Program to display first Ten Natural Numbers and their sum.
4. Write a Program to perform Multiplication of Two Matrices.
5. Write a Program
 - (i) To find the maximum number in an Array using pointer.
 - (ii) To reverse a number using pointer.
 - (iii) To add two numbers using pointer.
6. Write a Program to create a file containing Student Details.
7. Write a program for insertion and deletion operations in an array.
8. Write a program to implement a stack using singly linked list, Implement Queue using Linked List.
9. Write a program to perform insertion operation in a binary search tree.
10. Write a program to sort an array using Bubble Sort, Selection Sort and Insertion Sort.

Total Lab Hours:60

COURSE OUTCOMES:

On completion of this course, students will be able to

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. Develop basic problem-solving skills using C programming concepts

TEXT BOOK(S)

1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, New Delhi, Seventh Edition, 2016.
2. Reema Thareja, "Data structures Using C Second Edition.

REFERENCE BOOK(S)

1. Byron S. Gottfried, "Programming with C", Schaum's Outline Series, TataMcGraw Hill Edition, New Delhi, 1991.
2. E. Karthikeyan, "A Textbook on C Fundamentals, Data Structures and Problem Solving", Prentice-Hall of India Private Limited, New Delhi, 2008.
3. Yashavant Kanetkar, "Let us C", BPB Publications, Tenth Edition, New Delhi, 2010.
4. Szuhay, Jeff, and Szuhay, Jeff, "Learn C Programming: A Beginner's Guide to Learning C Programming the Easy and Disciplined Way", Packt Publishing, 2020.

E-RESOURCES

1. <https://www.tutorialspoint.com/cprogramming/index.htm>
2. <https://www.w3schools.in/data-structures/intro>
3. <http://www.programiz.com/c-programming>
4. http://www.tutorialspoint.com/data_structures_algorithms/index.html
5. http://www.onlinegdb.com/online_c_compiler

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO 5
CO1	3	2	1		1						3	2			
CO2	3	3	2	1	1						3	3	1		
CO3	3	3	2	2	2						3	3	2	1	
CO4	3	3	3	2	2				1	1	3	3	2	2	1
CO5	3	3	3	3	2				1	1	3	3	3	2	1
CO6	2	2	2	2	3	2	1	2	2	3	3	2	2	2	

Strong-3 Medium-2 low-1



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

SUNDARAKKOTTAI, MANNARGUDI-614016.
(For the Candidates admitted in the academic year 2026-2027)
DEPARTMENT OF COMPUTER APPLICATIONS
B.Sc., DATA SCIENCE

Semester: I-VE: Value Education

Ins. Hrs./Week: 2

Course Credit: 2

Course Code:26UGVED

COURSE OBJECTIVES

- Learn life philosophy and social values.
- Understand human values and citizenship.
- Know constitutional and cultural values.
- Practice yoga for health.
- Understand human rights and equality.

UNIT-I: PHILOSOPHY OF LIFE AND SOCIAL VALUES

Human Life on Earth(Kural629)-Purpose of Life(Kural46)-Meaning and Philosophy of Life (Kural 131, 226) -Family (Kural 45), Peace in Family (Kural1025) Society(Kural446), The Law of Life (Kural 952),Brotherhood(Kural807)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(Kural43,981).

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- APJ 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.

UNITV: HUMAN RIGHTS

Concept of Human Rights: Indian and international perspectives- Evolution of Human Rights- definitions under Indian and International documents -Broad classificationofHumanRightsandRelevantConstitutionalProvisions:Rightto Life, liberty ad 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)

COURSE OUTCOMES

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

REFERENCE BOOKS:

1. Thirukkural with English Translation of Rev.Dr.G.U.Pope, Uma Publication, 156, Serfoji Nagar, Medical College Road, Thanjavur 613 004
2. LeahLevin,HumanRights,NBT, 1998
3. V.R.KrishnaIyer,Dialectics and Dynamics of Human Rights in India, Tagore Law Lectures.
4. Yogic Thearpy – Swami Kuvalayananda and Dr.S.L.Vinekar,Government Of India, Ministry of Health, New Delhi.
5. SOUNDHEALTH THROUGH YOGA- Dr.K.Chandrasekaran, Prem KalyanPublications, Sedapatti, 1999.
6. Grose.D.N–“A text book of Value Education’ NewDelhi(2005)
7. Gawande . EN – “Value Oriented Education” – Vision for better living. New Delhi (2002) Saruptsons
8. Brain Trust Aliyar- “Value Education for Health, Happiness and Harmony” Erode (2004) Vethathiri publications

SEMESTER – II



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

SUNDARAKKOTTAI, MANNARGUDI-614016.
(For the Candidates admitted in the academic year 2026-2027)
DEPARTMENT OF COMPUTER APPLICATIONS
B.Sc., DATA SCIENCE

Semester: II-CC-II: Programming in Python

Ins. Hrs./Week: 4

Course Credit: 4

Course Code: U26DS203

COURSE OBJECTIVES:

- Apply object-oriented programming concepts such as classes, inheritance, and polymorphism in Python programs.
- Develop Python programs using decision-making, looping, input/output, and data handling techniques.
- Utilize lists, tuples, strings, dictionaries, and sets for efficient data manipulation and processing.
- Implement functions, modules, file handling, exception handling, and regular expressions in Python applications.
- Perform basic data analysis and data manipulation using Python data frames and libraries.

UNIT-I: Introduction

(12-Hours)

Object Oriented Programming: Procedural and Object-Oriented Programming – Classes – Working with instances – techniques for designing classes. – Inheritance: introduction to inheritance – Polymorphism.

UNIT-II: Python Installation

(12-Hours)

Python: Installing python- The python Interpreter – Interactive mode – Writing and running programs in script mode- IDLE programming environment – Input, processing and output – Displaying output with print function- print function – strings and string literals-comments- variables. Reading input from the keyboard- operators- more about output- decision structures and Boolean logic-repetition structures

UNIT-III: List, Tuples

(12-Hours)

Lists, Tuples, Strings, Dictionaries and Set: Sequences– Introduction to Lists – List slicing – ‘in’ operator– list methods and built-in-functions –copying lists–processing lists –Two Dimensional Lists– Tuples. Strings: Basic String Operations– String Slicing Testing, Searching and manipulating strings – Dictionaries and Set: Dictionaries – Set – Serializing Objects.

UNIT-IV: File Handling

(12-Hours)

Functions, Modules and File Handling: Functions: Introduction to functions – Defining and calling functions – designing a program to use functions – Local variables – passing arguments to functions – Global variable and Global Constants - Value returning functions: Generation – user defined value returning functions - Modules: math module- Storing functions in modules Files: Introduction to File Input and Output–Using Loops to process files–processing records- Exceptions–Python Standard Library-Regular Expression.

UNIT -V: Data Analysis

(12-Hours)

Data Analysis using Python: Load data into a Data Frame- Fundamentals of Data Manipulation with Python.

UNIT – VI: CURRENT CONTOURS (FOR Continuous Internal Assessment Only)

Python Applications: Development of simple real-world applications using Python – Problem identification and requirement analysis – Algorithm and flowchart design -Data Manipulation and Analysis using Data Frames – Testing and Debugging.

Total Lecture Hours: 60

COURSE OUTCOMES

Upon successful completion of this course the students would be able to

1. Interpret and manipulate the OOPs Concepts
2. Install python and write programs to solve simple problems
3. Explain basic data structures in Python
4. Store and manipulate data using file system
5. Implement Python packages and libraries
6. Develop Python applications for real-world problem solving.

TEXT BOOK(S)

1. Allen B.Downey, “Think Python: How to Think Like a Computer Scientist“,2ndedition,Updatedfor Python 3, Shroff O ‘Reilly Publishers, 2016
2. Satyanarayana, Radhika Mani, Jagadesh, ”Python Programming”, Universities Press (India) Pvt. Ltd 2018.

REFERENCE BOOK(S)

1. WesleyChun “Core python Programming” Pearson Education,2006,
2. AlSweigart,“Inventyourowncomputergameswithpython”,2ndedition,2008
3. Bill Lubanovic , “Introducing Python”,O‘Reilly, FirstEdition-SecondRelease,2014.
4. TonyGaddis,“Startingoutwithpython”,2ndedition, Addison Wesley, Pearson
5. Michael Dawson, “Python programming for the absolute beginner”, Premierpress,2003.

WEB RESOURCES

1. <https://www.w3schools.com/python/>
2. [https://en.wikipedia.org/wiki/Python_\(programming_language\)](https://en.wikipedia.org/wiki/Python_(programming_language))
3. https://www.w3schools.com/python/python_tuples.asp
4. <https://riverty.io/blog/free-resources-learn-python/>
5. <https://wiki.python.org/moin/BeginnersGuide/Programmers>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3						2		3	3	3	3		3
CO2	3	3	3					2		3	3	3	3		3
CO3	3	3				2		2		3	3	3			3
CO4	3	3						3		3				3	3
CO5	3	3						3		3					3
CO6	3	3	2	2	2	2	2	1	1		2	2			

Strong-3 Medium-2 low-1



SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI-614016.

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

DEPARTMENT OF COMPUTER APPLICATIONS
B.Sc., DATA SCIENCE

Semester: II-CP- II: Programming in Python Lab

Ins. Hrs./Week:4

Course Credit:4

Course Code: U26DS204P

COURSE OBJECTIVES:

- To develop Python programs using basic syntax, control flow, and command line arguments.
- To apply string, list, dictionary, and file handling operations in Python programming.
- To implement object-oriented programming concepts such as classes, constructors, inheritance, and polymorphism.
- To perform data processing and analysis using Python libraries and Pandas Data Frames. To design practical Python applications such as email slicers, password generators, and mathematical computations.

1. Write Python programs for the following: (using Basics of Python)

- (a) Purposefully raise Indentation Error and correct it.
- (b) Compute distance between two points taking input from the user (use Euclidean distance formula).
- (c) To take numbers as command line arguments and print its sum

2. Write Python programs for implementing the following: (using Control Flow)

- (a) Finding the factorial of a number.
- (b) Print the prime numbers below 100

3. Write Python programs for implementing the following: (using Strings)

- (a) Count the number of characters in the string and store the min in a dictionary data structure
- (b) Using split and joins methods in the string and trace a birthday with a dictionary data structure.

4. Write Python programs for the following: (using List)

- (a) Finding mean, median, mode for the given set of numbers in a list.
- (b) Function to find all duplicates in the list.

5. Write Python programs to do the following (using Methods)

- (a) Create a Python class named Circle constructed by a radius and two methods which will compute the area and the perimeter of a circle.
- (b) Create a Python class named Rectangle constructed by a length and width and a method which will compute the area of a rectangle.

6. Write Python programs to implement

- (a) Constructors to assign the PI_VALUE.
- (b) Polymorphism to print area of square/ rectangle depending upon the number of parameters passed.

7. Write Python programs to implement

- (a) Inheritance
- (b) Method overloading and overriding

8. Write a python program (using files)

- (a) To open and write "Hello World" into a file.
- (b) To write the content "Hi Python Programming" for the existing file.
- (c) To import values from a CSV file to create Pandas Data Frame

9. Write a Python program to create an Email slicer.

10. Write a Python program to generate password.

Total Lab Hours: 60

COURSE OUTCOMES

Upon successful completion of this course the students would be able to

1. Writes implement programs using control structures, functions and strings
2. Develop programs using tuples, lists, sets and dictionary
3. Writes implement programs using Constructors, Method overloading and inheritance
4. Develop programs using files and regular expressions
5. Write simple programs using packages and exception handling
6. Write Python programs using control structures, functions, and strings.

TEXT BOOK(S)

1. AllenB.Downey,“ThinkPython:HowtoThinkLikeaComputerScientist“,2nd edition,Updatedfor Python 3, Shroff O‘ Reilly Publishers, 2016
2. Satyanarayana, Radhika Mani, Jagadesh, ”Python Programming”, Universities Press (India) Pvt. Ltd 2018

REFERENCE BOOK(S)

1. Wesley Chun “Core python Programming ”Pearson Education, 2006,
2. AIS weigart, “Inventy our own computer games with python”, 2nd edition,2008
3. Bill Lubanovic, “Introducing Python”, O “Reilly, First Edition- Second Release,2014.
4. Tony Gaddis, “Starting out with python”, 2nd edition,Addison Wesley, Pearson
5. Dawson, “Python programming for the absolute beginner”, Premierpress,2003.

WEB RESOURCES

1. <https://www.w3schools.com/python/>
2. [https://en.wikipedia.org/wiki/Python_\(programming_language\)](https://en.wikipedia.org/wiki/Python_(programming_language))
3. https://www.w3schools.com/python/python_tuples.asp
4. <https://rivery.io/blog/free-resources-learn-python/>
5. <https://wiki.python.org/moin/BeginnersGuide/Programmers>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3						2		3	3	3	3		3
CO2	3	3	3					2		3	3	3	3		3
CO3	3	3				2		2		3	3	3			3
CO4	3	3						3		3				3	3
CO5	3	3						3		3					3
CO6	3	3	2	2	2	2	2	1	1		2	2			

Strong-3 Medium-2 low-1



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

SUNDARAKKOTTAI, MANNARGUDI-614016.
(For the Candidates admitted in the academic year 2026-2027)
DEPARTMENT OF COMPUTER APPLICATIONS
B.Sc., DATA SCIENCE

Semester: II-SEC-I Cyber Security

Ins. Hrs./Week:2

Course Credit:2

Course Code: U26SEDS21

COURSE OBJECTIVE:

- To understand cyber laws and legal framework in cyberspace.
- To study cyber offences and their penalties.
- To learn jurisdiction issues in cybercrime cases.
- To understand electronic evidence and its admissibility.
- To gain awareness of cyber ethics, privacy, and intellectual property rights.

UNIT-I: Introduction

(6-Hours)

Introduction to cybercrime: Classification of cybercrimes – reasons for commission of cybercrime – malware and its type – kinds of cybercrime – authentication – encryption – digital signatures – antivirus – firewall – steganography – computer forensics – why should we report cybercrime – introduction counter cyber security initiatives in India – generating secure password – using password manager-enabling two-step verification – security computer using free antivirus.

UNIT-II: Basics of Cyber Security

(6 Hours)

Cyber Security - Importance and challenges in Cyber Security Cyberspace - Cyber threats - Cyber warfare - CIA Triad - Cyber Terrorism- Cyber Security of Critical Infrastructure - Cyber security -Organizational Implications.

UNIT – III: Cyber investigation roles

(6-Hours)

Cyber investigation roles: Introduction – role as a cybercrime investigator – the role of law enforcement officers – the role of the prosecuting attorney – incident response: introduction-post mortem versus live forensics – computer analysis for the hacker defender program-network analysis – legal issues of intercepting Wi-Fi transmission – Wi-Fi technology – Wi-Fi RF-scanning RF – eavesdropping on Wi-Fi – fourth amendment expectation of privacy in WLAN.

UNIT – IV: Seizure of digital information

(6-Hours)

Seizure of digital information: introduction – defining digital evidence – digital evidence seizure methodology -common threads within digital evidence seizure – determining the most appropriate seizure method– conducting cyber investigations–demystifying computer/cyber-crime – IP addresses – the explosion of networking – interpersonal communication.

UNIT – V: Digital forensics and analyzing data

(6-Hours)

Digital forensics and analyzing data: introduction – the evolution of computer forensics phases of digital forensics-collection – reporting – Cyber-crime prevention: Introduction – crime targeted at a government agency.

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

Cyber Law and legal framework: Introduction to cyber laws –cyber offences and penalties – jurisdiction in cyberspace – electronic evidence and admissibility. Cyber ethics: ethical hacking vs illegal hacking – responsible disclosure – privacy and data protection – intellectual property rights in cyberspace.

Total Lecture Hours: 30

COURSE OUTCOMES

On completion of this course, students will be able to

1. Understand, describe, analyze and examine the basics of Cyber security concepts and its implementation in India.
2. Comprehend and demonstrate the security tips in browsers, WLAN, social networks, Email security and Smart phone. Apply the investigations in post mortem and Forensics.
3. Understand, apply and evaluate the various investigation roles and WiFi protecting mechanisms.
4. Understand, illustrate and evaluate the method of seize the digital information and evidences forensics data and evaluate the forensics reports.
5. Comprehend, apply and appraise the methods digital forensics with cybercrime prevention techniques
6. To understand cyber laws, ethics, jurisdiction, and electronic evidence in cybercrime cases.

TEXT BOOK(S):

1. Dr.Jeetendra Pande, "Introduction to Cyber Security" Published by Uttarakhand Open University, 2017.(Chapter: 1.2-6.4,9.3-12.2)
2. Anthony reyes, Kevin o'shea, Jim steele, Jon R. Hansen, Captain Benjamin R. Jean Thomas Ralph, "Cyber-crime investigations" - bridging the gaps between security professionals, law enforcement, and prosecutors, 2007.(Chapter: 4, 5, 6, 7, 8, 9,10)

REFERENCE BOOK(S):

1. Sebastian Klipper, "Cyber Security" Ein Einblickfur Wirts chafts wissens chaftler Fachmedien Wiesbaden,2015
2. John G.Voller Black and Veatch, "Cyber Security" Published by John Wiley & Sons, Inc., Hoboken, New Jersey Published simultaneously in Canada ©2014.
3. P.W.Singer, Allan Friedman, Cyber Security and Cyberwar: What Everyone Needs to know, Updated edition, Oxford University Press, 2022.
4. William Stallings, Lawrie brown, Computer Security: Principles and Practice, 5th edition, Pearson Publication, 2023.
5. William Stallings, Network security Essentials: Applications and Standards, 7th edition, Pearson Publication, 2023.

WEB RESOURCES

1. https://www.googleadservices.com/pagead/aclk?sa=L&ai=DChcSEwui-sP_vP-
2. <https://www.sans.org/security-resources/>
3. <https://www.cyberdegrees.org/resources/the-big-list/>
4. <https://onlinedegrees.sandiego.edu/top-cyber-security-blogs-websites/>
5. <https://www.estrellamountain.edu/institutes/networking-technologies institute/cybersecurity-resources>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3						2		3	3	3	3	3	
CO2	3	3	3					2		3	3	3	3	3	
CO3	3	3				2		2		3	3	3	3		
CO4	3	3						3		3	3			3	3
CO5	3	3						3		3	3				3
CO6	2	2	2	2	2	2	2	2	2			1	1		

Strong-3 Medium-2 low-1