

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



SILVER JUBILEE INSTITUTION

(Affiliated to Bharathidasan University)

(Accredited by NAAC)

SUNDARAKKOTTAI, MANNARGUDI – 614016, TAMILNADU, INDIA.

**B.Sc., ARTIFICIAL INTELLIGENCE & MACHINE
LEARNING**

LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK(CBCS-LOCF)

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

PROGRAMME CODE

3USAIM



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B.Sc., ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

CHOICE BASED CREDIT SYSTEM- LEARNING OUTCOMES

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 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, 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

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Part-II: Ability Enhancement Course (English)

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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
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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

PROGRAMME OUTCOMES FOR B.Sc., DEGREE

PO No.	Programme Outcomes (Upon completion of this undergraduate programme on B.Sc. Artificial Intelligence and Machine Learning, the students 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.

Program Specific Outcomes

PSO No.	<i>(Upon completion of the B.Sc., ARTIFICIAL INTELLIGENCE & MACHINE LEARNING Degree Programme, the Undergraduate will be able to)</i>
PSO-1	Understand, analyze and demonstrate the knowledge of human cognition, Artificial Intelligence and Machine Learning in terms of real world problems to meet the challenges of the future.
PSO-2	Understand, analyze and develop essential proficiency in the areas related to artificial Intelligence and Machine Learning in terms of underlying statistical and computational principles and apply the knowledge to solve practical problems.
PSO-3	Learn the basic concepts of Artificial Intelligence and Machine Learning and to apply them to various areas, like Image Processing, Speech Recognition, Product Recommendations, Medical Diagnosis etc.
PSO-4	Develop computational knowledge and project development skills using innovative tools and techniques to solve problems in the areas related to Deep Learning, Machine learning, Artificial Intelligence.
PSO-5	Develop automated solutions for current societal problems using AI & ML computing techniques.
PSO-6	Apply the concepts of Artificial Intelligence and Machine Learning, to analyze, design and develop intelligent systems for Computer Vision, Virtual Reality, Augmented Reality and Natural Language Processing
PSO-7	Solve the complex problems, using latest hardware and software tools, along with analytical skills to arrive at cost effective and appropriate solutions .



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B.Sc., Artificial Intelligence & Machine Learning

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)	U26AI101	Programming in C and Data Structures	4	4	3	30	70	100
		Core Practical - I (CP - I)	U26AI102P	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		2	2	3	30	70	100
		Interdisciplinary Course – I (IDC - 1) #	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)	U26AI203	Programming in Python	4	4	3	30	70	100
		Core Practical - II (CP - II)	U26AI204P	Programming in Python 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 - 1) ##	U26SEAI21	Big Data Analytics using Pandas and Apache Spark	2	2	3	30	70	100
		Interdisciplinary Course – II (IDC - 2) #	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)		RDBMS and NoSQL	4	4	3	30	70	100
		Core Practical - III (CP - III)		RDBMS and NoSQL 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 - 2) ##		Open Source Technology	2	2	3	30	70	100
		Interdisciplinary Course – III (IDC - 3) \$\$		Digital Marketing	2	2	3	30	70	100
		Health & Wellness @			–	1	–	20	80	100
	Total					30	25	–	--	--
	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)		Artificial Intelligence	4	4	3	30	70	100
		Core Practical - IV (CP - IV)		Artificial Intelligence 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) ##		Mobile Application Development	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									

Sem	Part	Courses	Course Code	Title	Ins. Hrs.	Credits	Exam Hours	Maximum Marks		
								Int.	Ext.	Total
V	III	Core Course - V (CC - V)		Robotics	4	4	3	30	70	100
		Core Course - VI (CC - VI)		Machine Learning	5	4	3	30	70	100
		Core Course - VII (CC - VII)		Embedded System	5	4	3	30	70	100
		Core Course - VIII (CC - VIII)		Artificial Neural Networks	5	4	3	30	70	100
		Core Practical - V (CP - V)		Robotics 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 (DSE-1)		Computer Graphics/ Research Methodology / Deep Learning	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	--	20	80	100
			Total			30	28	--	--	--
VI	III	Core Course - IX (CC - IX)		Human Computer Interaction	4	4	3	30	70	100
		Core Course - X (CC - X)		Computer Vision	5	4	3	30	70	100
		Core Practical - VI (CP - VI)		Natural Language Processing Lab	5	4	3	40	60	100
		Core Project Work (CPW) @@		Project Work (with Viva-Voce)	6	4	3	20	80	100
		Skill Enhancement Course - V(SEC - V) ##		Internet of Things	2	2	3	30	70	100
		Discipline Specific Elective -II (DSE-II)		Virtual Reality and Augmented Reality /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	Operation 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 Open Source Technology
3	IV	SEC-III Mobile Application Development
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 / Deep Learning
2	VI	DSEC-II Virtual Reality and Augmented Reality /Data Mining /Distributed Computing

INTERDISCIPLINARY COURSE (IDC)

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

VALUE ADDED COURSE

Semester	Course	Course code	Title of the Course
II	VAC-I	U26AIVA21	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 up to 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	III Semester	Basic Tamil - I
	IV 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 (AP)	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



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PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE
B.Sc., ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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

Ins. Hrs. /Week: 4

Course Credit:4

Course Code: U26AI101

COURSE OBJECTIVES

1. To understand the fundamentals of C programming language.
2. To develop problem-solving skills using functions, arrays, strings, pointers, and file handling concepts in C.
3. To apply structured programming techniques for designing efficient and modular programs.
4. To understand the concepts of linear and non-linear data structures.
5. 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.

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. 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.

TEXT BOOKS

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.

REFERENCE BOOK(S)

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.

E- RESOURCE

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

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



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PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE
B.Sc., ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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

Ins. Hrs. /Week: 4

Course Credit:4

Course Code: U26AI102P

COURSE OBJECTIVES

1. To understand C programming fundamentals.
2. To develop problem-solving skills using data structures.
3. To implement stacks, queues, linked lists, and trees using C.
4. To apply data structures in real-time applications.
5. 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- RESOURCE

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

S-Strong-3

M-Medium-2

L-Low-1



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PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE
B.Sc., ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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):

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 - Mqfjy 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



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PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

B.Sc., ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Semester: II -CC-II : PROGRAMMING IN PYTHON

Ins. Hrs. /Week: 4

Course Credit:4

Course Code: U26AI203

COURSE OBJECTIVES

1. To understand the fundamentals of Python programming language and its syntax.
2. To develop problem-solving skills using Python control structures, functions, and modules.
3. To create and manipulate data using Python data structures such as lists, tuples, dictionaries, and sets.
4. To design and implement file handling and exception handling techniques in Python applications.
5. To develop Python programs for real-world applications using object-oriented programming concepts and standard libraries.

UNIT-I : INTRODUCTION TO PYTHON

(10 Hours)

Introduction to Python: Features of Python - How to Run Python - Identifiers - Reserved Keywords - Variables - Comments in Python - Indentation in Python - Multi-Line Statements - Multiple Statement Group (Suite) - Quotes in Python - Input, Output and Import Functions - Operators. Data Types and Operations: Numbers - Strings - List - Tuple - Set - Dictionary - Data type conversion

UNIT- II : LOOPING AND FUNCTIONS

(10 Hours)

Flow Control: Decision Making - Loops - Nested Loops - Types of Loops. Functions: Function Definition - Function Calling - Function Arguments - Recursive Functions - Function with more than one return value

UNIT -III : MODULES AND PACKAGES

(10 Hours)

Modules and Packages: Built-in Modules - Creating Modules - import Statement - Locating Modules - Namespaces and Scope - The dir() function - The reload() function - Packages in Python - Date and Time Modules. File Handling- Directories in Python.

UNIT-IV : OBJECT ORIENTED PROGRAMMING

(12 Hours)

Object-Oriented Programming: Class Definition - Creating Objects - Built-in Attribute Methods - Built-in Class Attributes- Destructors in Python - Encapsulation - Data Hiding - Inheritance - Method Overriding- Polymorphism

UNIT-V : EXCEPTION HANDLING

(15 Hours)

Exception Handling: Built-in Exceptions-Handling Exceptions Exception with Arguments - Raising Exception - User-defined Exception - Assertions in Python. Regular Expressions: The match() function - The search() function - Search and Replace - Regular Expression Modifiers: Option Flags-Regular Expression Patterns Character Classes-Special Character Classes - Repetition Cases - findall() method - compile() method.

UNIT - VI CURRENT CONTOURS (For continuous internal assessment only): An Introduction to Interactive Programming in Python - Study on Julia – an high level language appra

Total Lecture Hours-60

COURSE OUTCOME

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

1. To recall and understand the features of python programming language
2. To illustrate various programming mechanism used in python
3. To apply various language construct to write simple programs in python
4. To examine the application of object oriented concept in python
5. To distinguish the various constructs used in python

TEXT BOOKS

1. Jeeva Jose and P. Sojan Lal, "Introduction to Computing and Problem Solving with PYTHON", Khanna Book Publishing Co, 2016.
2. Mark Summerfield. — Programming in Python
- 3: A Complete introduction to the Python Language, Addison-Wesley Professional, 2009. 3. Martin C. Brown, —PYTHON: The Complete Reference, McGraw Hill, 2001
- 4.Wesley J. Chun, "Core Python Programming", Prentice Hall Publication, 2006.

REFERENCE BOOK(S)

- 1 Timothy A Budd, "Exploring Python", Tata McGraw Hill, New Delhi, 2011
- 2.Jake Vander Plas, "Python Data Science Handbook: Essential Tools for Working with Data", O'Reilly Media, 2016.
- 3.Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist, 2nd edition, Updated for Python 3, Shroff/O Reilly Publishers, 2016 4. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

E- RESOURCE

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
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PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

B.Sc., ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Semester: II - CP-II : PROGRAMMING IN PYTHON LAB

Ins. Hrs. /Week: 4

Course Credit:4

Course Code: U26AI204P

COURSE OBJECTIVES

1. To provide hands-on experience in writing, testing, and debugging Python programs.
2. To develop problem-solving skills through practical implementation of Python programming concepts.
3. To apply control structures, functions, and data structures in developing Python applications.
4. To gain practical knowledge of file handling, exception handling, and object-oriented programming in Python.
5. To design and implement Python-based solutions for real-world computing problems.

EXERCISES

1. Write a python program that displays the following information: Your name, Full address Mobile number, College name, Course subjects.
2. Write a python program to find the largest three integers using if-else and conditional operator.
3. Write a python program that asks the user to enter a series of positive numbers (The user should enter a negative number to signal the end of the series) and the program should display the numbers in order and their sum.
4. Write a python program to find the product of two matrices [A]mxp and [B]pxr
5. Write recursive functions for GCD of two integers.
6. Write recursive functions for the factorial of positive integer.
7. Write recursive functions for Fibonacci Sequence up to given number n.
8. Write recursive functions to display prime number from 2 to n
9. Write a python program that writes a series of random numbers to a file from 1 to n and display
10. Write a python program to sort a given sequence: String, List and Tuple.
11. Write a python program to make a simple calculator.
12. Write a python program for Linear Search and Binary Search

Total Hours:60

COURSE OUTCOME

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

1. To recall and relate the features of python programming language
2. To compare various programming mechanism used in python
3. To construct simple programs in python using various language features
4. To distinguish the various constructs used in python
5. To apprise the application of object oriented concept in python

TEXT BOOKS

1. Jeeva Jose and P. Sojan Lal, "Introduction to Computing and Problem Solving with PYTHON", Khanna Book Publishing Co, 2016.
2. Mark Summerfield. — Programming in Python
- 3: A Complete introduction to the Python Language, Addison-Wesley Professional, 2009.
3. Martin C. Brown, —PYTHON: The Complete Referencell, McGraw Hill, 2001
4. Wesley J. Chun, "Core Python Programming", Prentice Hall Publication, 2006.

REFERENCE BOOK(S)

1. Timothy A Budd, "Exploring Python", Tata McGraw Hill, New Delhi, 2011
2. Jake Vander Plas, "Python Data Science Handbook: Essential Tools for Working with Data", O'Reilly Media, 2016.
3. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist, 2nd edition, Updated for Python 3, Shroff/O Reilly Publishers, 2016
4. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

E- RESOURCE

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

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



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PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

B.Sc., ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Semester: II - SEC -I: BIG DATA ANALYTICS USING PANDAS AND APACHE SPARK
Ins. Hrs. /Week: 2 Course Credit: 2 Course Code: U26SEAI21

Course Objectives

1. To understand the basics of data analytics and big data.
2. To learn data handling techniques using Pandas.
3. To perform basic data visualization and analysis.
4. To understand Apache Spark and distributed data processing.
5. 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-I: 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 (5 Hours)

Assignment on Pandas Operations - Seminar on Big Data Applications - Hands-on Exercises using Spark - Mini Project and Viva Voce.

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 BOOKS

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-RESOURCES

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

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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., ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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

Ins. Hrs. /Week: 2

Course Credit:2

Course Code: U26IDCS11

COURSE OBJECTIVES

1. To understand the basics of Information Technology.
2. To learn computer hardware and software concepts.
3. To use internet and office applications effectively.
4. To understand basic networking and security concepts.
5. 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 Hour)

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



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PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

B.Sc., ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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 BOOKS

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
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B.Sc., ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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

Ins. Hrs. /Week:

Course Credit:2

Course Code: U26AIVA21

COURSE OBJECTIVES

1. To introduce the fundamental concepts of ancient Indian technology and its historical significance.
2. To understand scientific and technological contributions of ancient India in various fields.
3. To explore traditional knowledge systems in engineering, mathematics, astronomy, and medicine.
4. To analyze the innovations and techniques used in ancient Indian civilization.
5. 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					