

**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 2025–2026)**

PROGRAMME CODE

3USAIM



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

(Affiliated to Bharathidasan University, Tiruchirappalli)

Accredited by NAAC

SUNDARAKKOTTAI, MANNARGUDI-614016.

TAMILNADU, INDIA.

**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 2025-2026)

CHOICE BASED CREDIT SYSTEM

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

OUTCOME-BASED EDUCATION (OBE)

LEARNING OUTCOME-BASED CURRICULUM FRAMEWORK (LOCF)

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

Some important aspects of the Outcome Based Education Course: is defined as a theory, practical or theory cum practical subject studied in a semester. **Course Outcomes (COs):** are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course. Generally three or more course outcomes may be specified for each course based on its weightage. **Programme:** is defined as the specialization or discipline of a Degree. **Programme Outcomes (POs):** Programme outcomes are narrower statements that describe what students are expected to be able to do by the time of graduation. POs are expected to be aligned closely with Graduate Attributes. **Programme Specific Outcomes (PSOs):** PSOs are what the students should be able to do at the time of graduation with reference to a specific discipline. **Some important terminologies repeatedly used in LOCF.** **Core Courses (CC)** A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course. These are the courses which provide basic understanding of their main discipline. In order to maintain a requisite standard certain core courses must be included in an academic program. This helps in providing a universal recognition to the said academic program. **Discipline Specific Elective Courses (DSE)** Elective course may be offered by the main discipline/subject of study is referred to as Discipline Specific Elective (DSE). These courses offer the flexibility of selection of options from a pool of courses. These are considered specialized or advanced to that particular programme and provide extensive exposure in the area chosen; these are also more applied in nature.

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

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

Skill Enhancement Courses (SECs) These courses focus on developing skills or proficiencies in the student, and aim at providing hands-on training. Skill enhancement courses can be opted by the students of any other discipline, but are highly suitable for students pursuing their academic programme. These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge.

Field Study/Industrial Visit/Case Study: It has to be completed during the fifth semester of the degree programme. Credit for this course will be entered in the fifth semester's marks statement.

Internship: Students must complete internship during summer holidays after the fourth semester. They have to submit a report of internship training with the necessary documents and have to appear for a viva-voce examination during fifth semester. Credit for internship will be entered in the fifth semester's mark statement.

Extra Credit Courses: In order to facilitate the students, gaining knowledge/skills by attending online courses MOOC, credits are awarded as extra credits, the extra credit are at three semesters after verifying the course completion certificates. According to the guidelines of UGC, the students are encouraged to avail this option of enriching their knowledge by enrolling themselves in the Massive Open Online Courses (MOOC) provided by various portals such as SWAYAM, NPTEL etc.

Undergraduate Programme:

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

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

Part-II : General English

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

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

Part –V

Extension activity, Gender studies

EXAMINATION

Continuous Internal Assessment (CIA):

UG - Distribution of CIA Marks

Passing Minimum: 40 %

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

Question Paper Pattern

Part A:

Part A 1 (10X1=10 marks)

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

Part A 2 (5X2=10 marks)

Match the following

Short Answers

One question from Each unit

Total Marks – 20

Part B: (5X5=25 marks)

Paragraph Answers

Either/ or type, One Question from each unit

Part C: (10X3=30)

Essay Type Answers

Answer 3 out of 5 Questions

One Question from each unit

Part A: K1 Level

Part B: K2, K3 and K4 Level

Part C: K5 and K6 Level

Knowledge levels for assessment of Outcomes based on Blooms Taxonomy

S. No.	Level	Parameter	Description
1	K1	Knowledge/Remembering	It is the ability to remember the previously learned
2	K2	Comprehension/ Understanding	The learner explains ideas or concepts
3	K3	Application/Applying	The learner uses information in a new way
4	K4	Analysis/Analysing	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	25			30		75
Continuous Internal Assessment (CIA)	20	25			30		75

QUESTION PATTERN FOR END SEMESTER EXAMINATION/Continuous Internal Assessment

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

BLUE PRINT OF QUESTION PAPER FOR END SEMESTER EXAMINATION

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

EVALUATION

GRADING SYSTEM

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

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

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

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

CLASSIFICATION OF FINAL RESULTS:

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

Table-1: Grading of the Courses - UG

Marks Range	Grade Point	Corresponding Grade
90 and above	10	O
80 and above and below 90	9	A+
70 and above and below 80	8	A
60 and above and below 70	7	B+
50 and above and below 60	6	B
40 and above and below 50	5	C
Below 40	NA	RA

The candidate's performance in every current semester is indicated by **Semester Grade Point Average (SGPA)** and from the second semester onwards, the continuous performance including previous semester /s is indicated by **Cumulative Grade Point Average (CGPA)**.

Table-3: Final Result

CGPA	Corresponding Grade	Classification of Final Result
9.00 and above	O	Outstanding
8.00 to 8.99	A+	Excellent
7.00 to 7.99	A	Very Good
6.00 to 6.99	B+	Good
5.00 to 5.99	B	Above Average
4.00 to 4.99	C	Average
Below 4.00	RA	Re-appearance

The candidates who have passed in the first appearance and within the prescribed duration of the UG programme are eligible. If the candidate's Grade is O/A+ with more than one attempt, the performance is fixed as "Very Good".

VISION

Attaining Global Recognition in Computer Science Education and to Develop the Software Professionals

MISSION

Imparting Quality Education through a Well – Designed Curriculum in tune with the Challenging Software Needs of the Industry

PROGRAMME OUTCOMES FOR B.Sc., DEGREE

PO No.	Programme Outcomes (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)

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 FRAMEWORK (CBCS –LOCF)

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

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

Sem	Part	Nature of the Course	Course Code	Title of the Paper	Ins. Hours / Wee k	L	T	P	S	Credit	Exam Hours	Marks		Total
												CIA	ESE	
I	I	Language Course-I	U25LC101	Pothu Tamil – I TAMILILAKKIYA VARALARU-I	6	5	1	-	-	3	3	25	75	100
	II	English Language Course-I	U25ELC101	General English – I	6	5	1	-	-	3	3	25	75	100
	III	Core Course- I	U25AI101	Programming in C	5	4	1	-	-	5	3	25	75	100
		Core Practical- I	U25AI102P	Programming in C Lab	4	1	-	3	-	4	3	25	75	100
		Allied Course- I	U25AMA101	Statistics	3	2	1	-	-	2	3	25	75	100
		Allied Course- II	U25AMA102	Numerical Analysis	2	1	1	-	-	-	-	-	-	-
	IV	Non Major Elective - I Those who choose Tamil in Part I can choose a non-major elective course offered by other departments. Those who do not choose Tamil in Part I must choose either a) Basic Tamil if Tamil language was not studied in school level (or) b) Special Tamil if Tamil language was studied up to 10th & 12thstd. Those Who choose NCC in Part V must choose NCC course as Non Major Elective			2	1	1	-	-	2	3	25	75	100
		Foundation Course	U25FCAI11	Introduction to Artificial Intelligence & Machine Learning	2	1	1	-	-	2	3	25	75	100
			TOTAL		30	20	7	3	-	21	-	-	-	700
	I	Language Course-II	U25LC202	Pothu Tamil – II TAMILILAKKIYA VARALARU-II	6	5	1	-	-	3	3	25	75	100

Sem	Part	Nature of the Course	Course Code	Title of the Paper	Ins. Hours / Week	L	T	P	S	Credit	Exam Hours	Marks		Total
												CIA	ESE	
II	II	English Language Course-II	U25ELC202	General English – II	6	5	1	-	-	3	3	25	75	100
	III	Core Course- II	U25AI203	Python Programming	5	4	1	-	-	5	3	25	75	100
		Core Practical- II	U25AI204P	Python Programming Lab	4	1	-	3	-	4	3	25	75	100
		Allied Course-II	U25AMA102	Numerical Analysis	2	1	1	-	-	2	3	25	75	100
		Allied Course – III	U25AMA203	Operations Research	3	2	1	-	-	2	3	25	75	100
	IV	Non Major Elective - II Those who choose Tamil in Part I can choose a non-major elective course offered by other departments. Those who do not choose Tamil in Part I must choose either a) Basic Tamil if Tamil language was not studied in school level (or) b) Special Tamil if Tamil language was studied up to 10th & 12thstd. Those Who choose NCC in Part V must choose NCC course as Non Major Elective			2	1	1	-	-	2	3	25	75	100
		Skill Enhancement Course-I	U25SEAI21	Object oriented programming	2	1	1	-	-	2	3	25	75	100
			TOTAL		30	20	7	3	-	23	-	-	-	800
III	I	Language Course-III	U25LC303	Pothu Tamil - III TAMILAZHA VARALARUM PANPADUM III	6	5	1	-	-	3	3	25	75	100
	II	English Language course-III	U25ELC303	General English - III	6	5	1	-	-	3	3	25	75	100
	III	Core Course- III	U25AI305	Java Programming	4	3	1	-	-	4	3	25	75	100
		Core Practical-III	U25AI306P	Java Programming Lab	4	1	-	3	-	4	3	25	75	100
		Allied Course-IV	U25APH301	Applied Physics –I	2	1	-	-	-	2	3	25	75	100
		Allied Practical -I	U25APH302P	Applied Physics Practical	2	-	-	2	-	-	-	--	--	--
	IV	Skill Enhancement Course-II	U25SEAI32	Relational Database Management Systems	2	1	1	-	-	2	3	25	75	100
		Skill Enhancement Course-III	U25SEAI33	Multimedia Systems	2	1	1	-	-	2	3	25	75	100
	V	Special Course	25UGSC	Health and Wellness	2	-	-	2	-	1	-	-	-	-

Sem	Part	Nature of the Course	Course Code	Title of the Paper	Ins. Hours / Wee k	L	T	P	S	Credit	Exam Hours	Marks		Total
												CIA	ESE	
				TOTAL	30	17	6	7	-	21	-	-	-	700
IV	I	Language Course-IV	U25LC404	Pothu Tamil – IV TAMILUM ARIVIYALUM IV	6	5	1	-	-	3	3	25	75	100
	II	English Language Course-IV	U25ELC404	General English - IV	6	5	1	-	-	3	3	25	75	100
	III	Core Course IV	U25AI407	Artificial Intelligence	5	4	1	-	-	5	3	25	75	100
		Core Practical-IV	U25AI408P	Artificial Intelligence Lab	4	1	-	3	-	4	3	25	75	100
		Allied Course –V	U25APH403	Applied Physics II	3	2	1	-	-	2	3	25	75	100
		Allied Practical –I	U25APH302P	Applied Physics Practical	2	-	-	2	-	2	3	25	75	100
	IV	Skill Enhancement Course-IV	U25SEAI44	Computer Vision	2	1	1	-	-	2	3	25	75	100
		Skill Enhancement Course –V	U25SEAI45	Cloud Infrastructure	2	1	1	-	-	2	3	25	75	100
				TOTAL	30	19	6	5	-	23	-	-	-	800
V	III	Core Course- V		Internet of Things	6	5	1	-	-	5	3	25	75	100
		Core Course – VI		Operating Systems	5	4	1	-	-	5	3	25	75	100
		Core Course- VII		Robotics	5	4	1	-	-	4	3	25	75	100
		Core Practical- V		Robotics Lab	4	-	1	3	-	4	3	25	75	100
		Elective Course-I		Data mining/ Neural Networks/ Pattern Recognition	4	3	1	-	-	3	3	25	75	100
		Elective Course – II		Tensor Flow / Information Security /Introductio n to Data Science	4	3	1	-	-	3	3	25	75	100
	IV	Environmental Studies		Environmental Studies	2	1	1	-	-	2	3	25	75	100
		Internship/ Industrial visit/ Field visit		Internship/ Industrial visit/ Field visit	-	-	-	-	-	2	-	-	-	-
				TOTAL	30	20	7	3	-	28	-	-	-	700
VI	III	Core Course- VIII		Machine Learning	6	5	1	-	-	4	3	25	75	100
		Core Practical-VI		Machine Learning Lab	6	-	1	5	-	4	3	25	75	100
		Core Project		Project with viva- voce/ Group Project	5	-	1	4	-	5	3	25		100
		Elective Course-III		Natural Language Processing/ Deep Learning/ Cloud Computing	4	3	1	-	-	3	3	25	75	100
		Elective Course-IV		Human Computer Interaction / Simulation and Modeling/ Computer Networks	4	3	1	-	-	3	3	25	75	100
	IV	Value Education		Value Education	2	1	-	-	1	2	3	25	75	100
		Professional		Aptitude and reasoning	2	1	1	-	-	2	3	25	75	100

Sem	Part	Nature of the Course	Course Code	Title of the Paper	Ins. Hours / Week	L	T	P	S	Credit	Exam Hours	Marks		Total
												CIA	ESE	
	V	competency Course		Skills for competitive examinations										
		Gender Studies		Gender Studies	1	1	-	-	-	1	3	25	75	100
		Extension activity		Extension activity	-	-	-	-	-	1	-	-	-	-
		TOTAL			30	14	6	9	1	25	-	-	-	800
		GRAND TOTAL			180	110	39	30	1	141	-	-	-	4500
		*Extra Credit		Value Added Courses (At least One Per Year)						2	-	-	-	-

L-Lecture

T-Tutorial

P-Practical

S-Seminar

Credit Distribution for UG PROGRAMME-Science

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

Note:

		CIA	ESE
1.	Theory	25	75
2.	Practical	25	75

Separate passing minimum is prescribed for Internal and External marks

FOR THEORY

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

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

FOR PRACTICAL

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

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

NON MAJOR ELECTIVE (NME) OFFERED BY THE DEPARTMENT

Semester	Part	Course	Course Code	Title of the Paper
I	IV	NME –I	U25NMEAI11	Fundamentals of Artificial Intelligence
II		NME –II	U25NMEAI22	Applications of Artificial Intelligence

SEMESTER III



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

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

B.Sc., Artificial Intelligence & Machine Learning

Semester: III–CC-III-Java Programming

Ins.Hrs./Week: 4

Course Credit: 4

Course Code: U25AI305

UNIT I INTRODUCTION

(12Hours)

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

UNIT II INHERITANCE AND EXCEPTION HANDLING

(12Hours)

Inheritance: Basic concepts - Types of inheritance - Member access rules - Usage of this and Super key word - Method Overloading - Method overriding - Abstract classes - Dynamic method dispatch - Usage of final keyword. **Packages:** Definition-Access Protection -Importing Packages. **Interfaces:** Definition–Implementation–Extending Interfaces. **Exception Handling:** try – catch- throw- throws – finally – Built- in exceptions - Creating own Exception classes.

UNIT III MULTI-THREADED PROGRAMMING

(12Hours)

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

UNIT IV AWT CONTROLS

(12Hours)

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

UNIT V EVENT HANDLING

(12Hours)

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

Total Lecture Hours-60

COURSE OUTCOME

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

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

TEXTBOOKS:

1. Gary Cornell, Core Java2 Volume I – Fundamentals, Addison Wesley, 2022
2. Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2020

REFERENCEBOOKS:

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

E-Resources:

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

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO	Pos										PSOs				
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5
CO1	3	3	2	2	3	2	2	2	2	3	3	3	3	3	3
CO2	3	3	2	3	3	2	2	2	3	3	3	3	3	2	3
CO3	3	3	2	3	3	2	2	2	3	3	3	3	3	2	3
CO4	3	3	2	3	3	2	2	2	3	3	3	3	3	2	3
CO5	3	3	3	3	2	3	3	3	2	3	2	3	2	3	2

S-Strong-3

M-Medium-2

L-Low-1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

(Affiliated to Bharathidasan University, Tiruchirappalli)

(Accredited by NAAC)

SUNDARAKKOTTAI, MANNARGUDI-614016.TAMILNADU,INDIA.

B.Sc., Artificial Intelligence & Machine Learning

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



Semester: III-CP-III: Java Programming Lab

Ins. Hrs. /Week: 4

Course Credit: 4

Course Code: U25AI306P

EXERCISE

1. Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer
2. Write a Java program to multiply two given matrices.
3. Write a Java program that displays the number of characters, lines and words in a text.
4. Generator and om numbers between two given limits using Random class and print messages according to the range of the value generated.
5. Write a program to do String Manipulation using Character Array and perform the following string operations:
 - a. String length
 - b. Finding a character at a particular position
 - c. Concatenating two strings
6. Write a program to perform the following string operations using String class:
 - a. String Concatenation
 - b. Search a substring
 - c. To extract substring from given string
7. Write a program to perform string operations using String Buffer class:
 - a. Length of a string
 - b. Reverse a string
 - c. Delete a sub string from the given string
8. Write a threading program which uses the same method asynchronously to print the numbers 1to10 using Thread1 and to print 90 to100 using Thread2.
9. Write a program to demonstrate the use of following exceptions.
 - a. Arithmetic Exception
 - b. Number Format Exception
 - c. Array Index Out of Bound Exception
 - d. Negative Array Size Exception
10. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.

Total Hours: 60

COURSE OUTCOME

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

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

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

CO	Pos										PSOs				
	1	2	3	4	5	6	7	8	9	10		2	3	4	5
CO1	3	3	2	2	3	2	2	2	2	3		3	3	3	3
CO2	3	3	2	3	3	2	2	2	3	3		3	3	2	3
CO3	3	3	2	3	3	2	2	2	3	3		3	3	2	3
CO4	3	3	2	3	3	2	2	2	3	3		3	3	2	3
CO5	3	3	3	3	2	3	3	3	2	3		3	2	3	2
S-Strong-3					M-Medium-2					L-Low-1					

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B.Sc., Artificial Intelligence & Machine Learning

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

SEMESTER: III–SEC-II: Relational Database Management Systems

Ins. Hrs. / Week: 2

Course Credit: 2

Course Code: U25SEAI32

UNIT-I INTRODUCTION TO DATABASES (6 Hours)

Databases and Database Users - Introduction - Example - Characteristics of the Database Approach - Actors on the Scene - Workers behind the Scene - Advantages of Using the DBMS Approach - A Brief History of Database Applications.

UNIT-II DATABASE SYSTEM CONCEPTS AND ARCHITECTURE (6 Hours)

Data Models, Schemas, and Instances - Three-Schema Architecture and Data Independence - Database Languages and Interfaces - The Database System Environment - Centralized and Client/Server Architectures for DBMSs - Classification of Database Management Systems.

UNIT-III THE RELATIONAL DATA MODEL (6 Hours)

The Relational Data Model - Database Constraints - Relational Model Concepts - Relational Model Constraints and Relational Database Schemas - Update Operations, Transactions, and Dealing with Constraint Violations.

UNIT-IV BASIC SQL (6 Hours)

SQL Data Definition and Data Types - Specifying Constraints in SQL - Basic Retrieval Queries in SQL - INSERT, DELETE, and UPDATE Statements in SQL - Additional Features of SQL.

UNIT-V MORE SQL (6 Hours)

Complex Queries, Triggers, Views, and Schema Modification - More Complex SQL Retrieval Queries - Specifying Constraints as Assertions and Actions as Triggers - Views in SQL - Schema Change Statements in SQL.

Total Lecturer Hours: 30

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

- # TEXT BOOK

- ## REFERENCE BOOKS

- ## E-RESOURCES

- COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)**

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
	CO1	3	3	3	2	3	2	3	3	2	3	2	3	3	3	3	1
	CO2	3	1	3	3	2	2	3	3	3	3	2	3		1	3	3
	CO3	2	3	3	3	2	3	2	3	3	3	3	2		3	3	3
	CO4	3	3	2	3	3	2	3	2	3	3	3	1		2	3	3
	CO5	3	3	2	3	3	3	3	3	1	3	3	3		3	3	2
S-Strong (3)				M-Medium (2)				L-Low (1)									

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B.Sc., Artificial Intelligence & Machine Learning

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



Semester: III–SEC-III: Multimedia Systems

Ins. Hrs. /Week: 2

Course Credit: 2

Course Code: U25SEAI33

UNIT-I INTRODUCTION OF MULTIMEDIA

(6 Hours)

Definition-Use of Multimedia-Delivering Multimedia- Text: About Fonts and Faces - Using Text in Multimedia -Computers and Text Font Editing and Design Tools-Hypermedia and Hypertext.

UNIT-II IMAGES AND SOUND

(6 Hours)

Images: Plan Approach - Organize Tools - Configure Computer Workspace -Making Still Images - Color - Image File Formats. Sound: The Power of Sound -Digital Audio-Midi Audio-Midivs. Digital Audio-Multimedia System Sounds Audio File Formats -Vaughan's Law of Multimedia Minimums - Adding Sound to Multimedia Project

UNIT-III ANIMATION

(6 Hours)

Animation: The Power of Motion-Principles of Animation-Animation by Computer - Making Animations that Work.

UNIT-IV VIDEO

(6 Hours)

Video: Using Video - Working with Video and Displays-Digital Video Containers- Obtaining Video Clips - Shooting and Editing Video.

UNIT-V MAKING MULTIMEDIA

(6 Hours)

The Stage of Multimedia Project - The Intangible Needs -The Hardware Needs - The Software Needs - An Authoring System Needs-Multimedia Production Team.

Total Lecture Hours: 30

COURSE OUTCOME

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

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

TEXT BOOK

1. Tay Vaughan, "Multimedia: Making It Work", 8th Edition, Osborne/McGraw-Hill, 2014.

REFERENCE BOOK

1. Ralf Steinmetz & Klara Nahrstedt "Multimedia Computing, Communication & Applications", Pearson Education, 2020.

E-RESOURCES

1. <https://www.geeksforgeeks.org/multimedia-systems-with-features-or-characteristics/>
2. <https://www.slideshare.net/slideshow/multimedia-audio-and-video-technology/233051631>

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE UTCOM	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	2	2	3	2	3	2	2	3	2	3	3	3	3	1
CO2	3	1	2	3	3	2	2	3	3	3	2	2	3	2	1	3	3
CO3	2	3	3	2	2	2	3	2	3	2	2	3	2	3	3	2	3
CO4	3	3	2	3	3	2	3	2	3	3	2	3	1	3	2	3	3
CO5	3	3	2	3	3	3	3	3	2	3	2	2	3	3	2	3	2

S-Strong (3)

M-Medium (2)

L-Low (1)

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

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B.Sc., Artificial Intelligence & Machine Learning

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



Semester: III- Special Course- Health and wellness

Ins. Hrs. /Week: 2

Course Credit: 1

Course Code: 25UGSC

1. Introduction to Holistic Well-being

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

2. Wellness Wheel Exercise (Overall Analysis)

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

Introduce Tech Tools:

Explore the use of technology to support well-being.

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

3. Breaking Bad Habits (Overall Analysis)

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

4. Physical Well-being

1. Fitness

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

(Include theoretical explanations and outdoor activity).

2. Nutrition

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

3. Yoga & Meditation

Discuss the benefits of Yoga and Meditation for one's overall health.

Demonstrate different yoga postures and their benefits on the body through visuals (pictures or videos)

4. Brain Health

Discuss the importance of brain health for daily life.

Habits that affect brain health (irregular sleep, eating,

screen time). Habits that help for healthy brains

(reading, proper sleep, exercises). Benefits of breathing

exercises and meditation for healthy lungs.

5. Healthy Lungs

Discuss the importance of lung health for daily

life. Habits that affect lung health (smoking,

lack of exercises). Benefits of breathing

exercises for healthy lungs.

6. Hygiene and Grooming

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

Nutrition:

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

5. Emotional Well-being

1. Stress Management

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

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

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

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

2. Importance of saying 'NO'

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

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

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

3. Body Positivity and self-

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

Be kind to yourself.

Understand that everyone's

unique. **Suggested Activities**

(Sample):

(Importance of saying 'NO')

Provide worksheets to self-reflect

on... how they feel when others

say 'no' to them the situations

where they should say 'no'

Challenge students to write a song or rap about the importance of saying no and how to do it effectively.

Students can perform their creations for the class.

6. Social Well-Being

1. Practicing Gratitude

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

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

2. Cultivating Kindness and Compassion

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

Foundation.

The power of small gestures.

Understanding another's perspective. The fruits of compassion.

3. Practising Forgiveness

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

Benefits of forgiveness.

Finding forgiveness practices.

4. Celebrating Differences

Appreciate the value of individual differences and foster inclusivity.

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

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

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

5. Digital Detox

Introduce the students to:

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

7. Intellectual Well-being

1. Being a lifelong Learner

Give students an understanding on:

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

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

2. Digital Literacy

Discuss:

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

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

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

3. Transfer of Learning

Connections between different subjects how knowledge gained in one area can be applied to others.

Suggested Activities (sample): Intellectual Well-being.

Provide worksheets to students for teaching them how to boost intellectual well-being.

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

8. Environmental Well-being

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

The session could be around:

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

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

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

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

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

9. Mental Well-being

1. Importance of self-reflection Discuss:

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

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

The role of journaling in mental well-being

2. Mindfulness and Meditation Practices.

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

1. Connecting with nature

Practising to be in the present moment Nature walk, feeling the sun,

listening to the natural sounds Exploring with intention Hiking,

gardening to observe the nature Reflecting on the emotions, and feeling kindled by nature.

2. Serving people

Identifying the needs of others

Helping others.

Volunteering your time, skills and listening ear. Finding joy in giving.

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

Suggested Activities (Sample):

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

10. Situational Awareness (Developing Life skills)

1. Being Street smart

Discuss:

Who are street smart?

Why is it important to be street smart?

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

2. Digital Awareness

Discuss:

Cyber Security

Information

Literacy. Digital

Privacy Fraud

Detection

Suggested Activities (sample):

(Street Smart) Inviting professionals to demonstrate the CPR Procedure

Conducting a quiz on Emergency Numbers

11. Understanding Addiction

Plan this session around:

Identifying the environmental cues, triggers that lead to picking up this habit

Knowing the impact of substance abuse Adverse health conditions, social isolation, ruined future, hidden financial loss and damaging the family reputation.

Seeking help to get out of this addiction.

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

Share case studies with students from real-life.

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

*Conduct awareness programmes on Drugs and its ill effects.

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

SEMESTER IV



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B.Sc., Artificial Intelligence & Machine Learning

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

Semester: IV- CC-IV: ARTIFICIAL INTELLIGENCE

Ins. Hrs. /Week: 5

Course Credit: 5

Course Code:U25AI407

UNIT-I INTRODUCTION TO ARTIFICIAL INTELLIGENCE

(15Hours)

Artificial Intelligence: AI Problems – Underlying Assumption – AI Technique – Level of the Model – Criteria of Success – Some General References. Problems, Problem Spaces, and Search: Defining the Problem as a State Space Search – Production Systems – Problem Characteristics – Production System Characteristics – Issues in the Design of Search Programs.

UNIT-II SEARCH TECHNIQUES

(15Hours)

Heuristic Search Techniques: Generate and Test – Hill Climbing – Best-First Search – Problem Reduction – Constraint Satisfaction – Means-ends Analysis. Knowledge Representation Issues: Representations and Mappings – Approaches to Knowledge Representation – Issues in Knowledge Representation – The Frame Problem.

UNIT-III PREDICATE LOGIC

(15Hours)

Using Predicate Logic: Representing Simple Facts in Logic–Representing Instance and ISA Relationships–Computable Functions and Predicates–Resolution–Natural Deduction– Representing Knowledge Using Rules: Procedural versus Declarative Knowledge – Logic Programming – Forward Versus Backward Reasoning–Matching–Control Knowledge.

UNIT-IV SYMBOLIC REASONING

(15Hours)

Symbolic Reasoning Under Uncertainty: Introduction to Non-monotonic Reasoning – Logics for Non-monotonic Reasoning – Implementation Issues – Augmenting a Problem-solver – Implementation Depth First Search – Implementation Breadth First Search. Statistical Reasoning: Probability and Baye's Theorem – Certainty Factors and Rule- based Systems – Bayesian Networks – Dempster-Shafer Theory – Fuzzy Logic.

UNIT -V SEMANTIC NETS

(15Hours)

Semantic Nets- Frames.- Conceptual Dependency – Scripts – CYC - Syntactic-Semantic Spectrum of Representation – Logic and Slot-and-Filler Structures – Other Representational Techniques.

Total Lecture Hours-75

COURSE OUTCOME

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

1. Understand the basic idea of artificial intelligence and its application areas.
2. Apply basic principles of AI in solutions that requires problem solving, inference, perception, knowledge representation, and learning.
3. Demonstrate the awareness and a fundamental understanding of various applications of AI techniques.
4. Understand about Logic programming and about reasoning related to AI.
5. Know about the different representational techniques in AI.

TEXTBOOKS

1. Kevin Night, Elaine Rich, and Nair B., "Artificial Intelligence", McGraw Hill, 2017
2. M. Tim Jones, - Artificial Intelligence: A Systems Approach (Computer Science), Jones and Bartlett Publishers Inc.; First Edition, 2008.

REFERENCE BOOKS

1. Nils J. Nilsson, - The Quest for Artificial Intelligence, Cambridge University Press, 2009.
2. Gerhard Welss, - Multi Agents Systems, Second Edition, 2013
3. David L. Poole and Alan K. Mackworth, - Artificial Intelligence:
4. Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2007

E-RESOURCES

1. <https://www.slideshare.net/slideshow/artificial-intelligence-in-power-system-overview/267224147>

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	2	2	3	2	3	2	2	3	2	2	3	3	3	1
CO2	3	1	2	3	3	2	2	3	3	3	2	2	3	2	1	3	3
CO3	2	3	3	2	2	3	3	2	3	2	3	3	2	2	3	2	3
CO4	3	3	2	3	2	2	3	2	3	3	2	3	1	3	2	3	3
CO5	3	3	2	3	3	3	3	3	2	3	2	2	3	3	2	3	2

S-Strong (3)

M-Medium (2)

L-Low (1)



SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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B.Sc., Artificial Intelligence & Machine Learning

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

Semester: IV- CP-IV: Artificial Intelligence Lab

Ins. Hrs./Week:4

Course Credit: 4

Course Code: U25AI408P

EXERCISES

1. Write a program to implement the Hill Climbing problem
2. Write a program to implement the Towers of Hanoi problem
3. Write a program to implement the Missionaries and Cannibals problem
4. Write a program to implement the 8 queens problem
5. Write a program to implement the A* Algorithm
6. Write a program to Implement the Breadth first algorithm
7. Write a program to implement the Depth first algorithm
8. Write a program to implement the predicate logic

Total Lecture Hours: 60

COURSE OUTCOME

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

1. Know various kinds of problems using AI techniques.
2. Practice basic AI based problems using any programming language.
3. Understand to implement the various kinds of AI based algorithms.
4. Apply AI techniques to real-world problems to develop intelligent systems.
5. Understand problems related to AI.

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	2	2	3	2	3	2	2	3	2	3	3	3	3	1
CO2	3	1	2	2	3	2	2	3	3	3	2	2	3	2	1	3	3
CO3	2	3	3	2	2	3	3	2	3	2	3	3	2	3	3	2	3
CO4	3	3	2	3	2	2	3	2	3	3	2	3	1	3	2	3	3
CO5	3	3	2	3	3	3	3	3	2	3	2	2	3	3	2	3	2

S-Strong (3)

M-Medium (2)

L-Low (1)

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



Semester: IV–SEC-IV- COMPUTER VISION

Ins. Hrs. /Week: 2

Course Credit: 2

Course Code: U25SEAI44

UNIT I INTRODUCTION TO COMPUTER VISION

(6 Hours)

Digital Image Processing – Various Fields that use Image Processing – Fundamentals Steps in Digital Image Processing – Components of an Image Processing System. Applications of Computer Vision – Recent Research in Computer Vision. Introduction to Computer Vision and Basic Concepts of Image Formation: Introduction and Goals – Image Formation and Radiometry – Geometric

UNIT II IMAGE PROCESSING CONCEPTS AND IMAGE FEATURES (6 Hours)

Image Processing Concepts: Fundamentals – Image Transforms – Image Filtering – Colour Image Processing – Mathematical Morphology – Image Segmentation. Image Descriptors and Features: Texture Descriptors – Colour Features – Edge Detection – Object Boundary and Shape Representation – Interest or Cornet Point Detectors.

UNIT III IMAGE PROCESSING WITH OPENCV

(6 Hours)

Introduction to OpenCV and Python: Setting up OpenCV – Image Basics in OpenCV – Handling Files and Images – Constructing Basic Shapes in OpenCV. Image Processing in OpenCV: Image Processing Techniques.

UNIT IV OBJECT DETECTION

(6 Hours)

Models and types – Importance of Object Detection. The Working: Inputs and outputs – Basic Structure – Model Architecture Overview – Object Detection on the Edge.

UNIT V APPLICATIONS AND CASE STUDIES

(6 Hours)

Applications: Machine Learning algorithms and their Applications in Medical Image Segmentation – Motion Estimation and Object Tracking – Face and Facial Expression Recognition – Image Fusion. Case Studies: Face Detection – Object Tracing – Eye Tracking .

Total Lecture Hours-30

COURSE OUTCOME

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

1. Understand the major concepts and techniques in computer vision and image processing
2. Infer known principles of human visual system
3. Demonstrate a thorough knowledge of Open CV
4. Develop real-life Computer Vision Applications.
5. Build design of a Computer Vision System for a specific problem.

TEXT BOOKS

1. Mastering OpenCV with Practical Computer Vision Projects ,Publisher: Packt Publishing, 2012 ,
2. Computer & Machine Vision ,Fourth Edition, Academic Press, 2012
3. Programming Computer Vision with Python ,O'Reilly Media, 2012
4. Feature Extraction & Image Processing for Computer Vision ,Third Edition, Academic Press, 2012
5. Computer Vision: Algorithms and Applications ,Springer, 2011

REFERENCES:

1. "Digital Image Processing", 4th Edition (Global Edition), Rafael C Gonzalez and Richard E Woods, Pearson Education Limited, 2018.
2. "Computer Vision and Image Processing – Fundamentals and Applications", Manas Kamal Bhuyan, CRC Press, 2020.
3. "Mastering OpenCV 4 with Python", Alberto FernándezVillán, Packt Publishing, 2019.
4. "Practical Python and Open CV: Case Studies", 3rd Edition, Adrian Rosebrock, PyImageSearch, 2016.
- 5.

E-RESOURCES

1. https://onlinecourses.nptel.ac.in/noc22_cs89/preview.

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3		2	3	2	3	2	2	3	2	3	3	3	3	1
CO2	3	1	2	2	3	2	2	3	3	3	2	2	3	2	1	3	3
CO3	2	3	2	2	2	3	3	2	3	2	3	3	2	3	3	2	3
CO4	3	3	2	3	2	2	3	2	3	3	2	3	1	3	2	3	3
CO5	3	3	2	3	3	3	3	3	2	3	2	2	3	3	2	3	2

S-Strong (3)

M-Medium (2)

L-Low (1)

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)

(Affiliated to Bharathidasan University, Tiruchirappalli)

(Accredited by NAAC)

SUNDARAKKOTTAI, MANNARGUDI-614016, TAMILNADU, INDIA.

B.Sc., Artificial Intelligence & Machine Learning

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



Semester: IV-SEC-V- CLOUD INFRASTRUCTURE

Ins. Hrs. /Week: 2 Course Credit: 2 Course Code: U25SEAI45

UNIT I – INTRODUCTION TO CLOUD COMPUTING AND INFRASTRUCTURE (6 HOURS)

Introduction to cloud computing – characteristics and advantages of cloud infrastructure – cloud service models (IaaS, PaaS, SaaS) – cloud deployment models (public, private, hybrid and community cloud) – evolution of data centers – basic concepts of distributed computing – overview of cloud providers and applications.

UNIT II – VIRTUALIZATION AND CLOUD ARCHITECTURE (6 HOURS)

Concepts of virtualization – types of virtualization – hypervisors and virtual machines – container technology – cloud architecture components – resource allocation and load balancing – server consolidation – scalability and elasticity in cloud environments – introduction to virtualization tools and platforms.

UNIT III – CLOUD STORAGE AND NETWORKING (6 HOURS)

Cloud storage concepts – storage virtualization – distributed file systems – object, block and file storage – cloud networking basics – virtual networks and software-defined networking – data backup and disaster recovery – content delivery networks – bandwidth management and data synchronization.

UNIT IV – CLOUD SECURITY AND SERVICE MANAGEMENT (6 HOURS)

Cloud security fundamentals – identity and access management – authentication and authorization – data privacy and protection – security threats and risk management – service level agreements (SLA) – cloud monitoring and maintenance – compliance and governance in cloud environments.

UNIT V – CLOUD DEPLOYMENT, MONITORING AND EMERGING TRENDS (6 HOURS)

Cloud deployment strategies – migration of applications to cloud – cloud orchestration and automation – performance monitoring and optimization – cost management in cloud infrastructure – edge computing – green cloud computing – Internet of Things (IoT) integration with cloud – future trends in cloud infrastructure.

Total Lecture Hours-30

COURSE OUTCOME

1. On the successful completion of the course, students will be able to
2. To understand the basic concepts, characteristics and service models of cloud computing.
3. To learn virtualization techniques and cloud architecture used in modern computing environments.
4. To gain knowledge about cloud storage, networking and resource management.
5. To understand cloud security mechanisms, service management and risk handling techniques.
6. To explore cloud deployment methods, monitoring tools and emerging trends in cloud technologies.

TEXT BOOKS

1. Cloud Computing: Principles and Paradigms – Rajkumar Buyya, James Broberg and Andrzej Goscinski, Wiley Publications.
2. Cloud Computing – Kai Hwang, Geoffrey C. Fox and Jack J. Dongarra, Morgan Kaufmann Publishers.
3. Mastering Cloud Computing – Rajkumar Buyya, Christian Vecchiola and S. Thamarai Selvi, McGraw Hill Education.

REFERENCES

1. Cloud Security and Privacy – Tim Mather, Subra Kumaraswamy and Shahed Latif, O'Reilly Media.
2. Distributed and Cloud Computing – Kai Hwang, Geoffrey C. Fox and Jack J. Dongarra, Elsevier Publications.
3. Cloud Computing Bible – Barrie Sosinsky, Wiley India.
4. Architecting the Cloud – Michael J. Kavis, Wiley Publications.

E-RESOURCES

1. [NPTEL – Cloud Computing Course](#)
2. [AWS Cloud Computing Tutorials](#)
3. [Microsoft Azure Learning Portal](#)
4. [Google Cloud Training](#)
5. [IBM Cloud Learning Hub](#).

COURSE LEARNING OUTCOME (FOR MAPPING WITH POS AND PSOS)

COURSE OUTCOMES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	2	2	3	2	3	2	2	3	2	3	3	3	3	1
CO2	3	1	2	2	3	2	2	3	3	3	2	2	3	2	1	3	3
CO3	2	3	3	1	2	3	3	2	3	2	3	2	2	3	3	2	3
CO4	3	3	2	3	2	2	3	2	2	3	2	3	1	3	2	2	3
CO5	3	3	2	3	3	3	3	3	2	3	2	2	3	2	2	3	2

S-Strong (3)

M-Medium (2)

L-Low (1)

VALUE ADDED COURSE



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Semester: III-VAC-II- CYBER SECURITY TOOLS

Course Credit: 2

Course Code: U25VAAI32

UNIT-I INTRODUCTION TO CYBER SECURITY

Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat.

UNIT-II CYBER ATTACKS

Motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Cyber Threats- Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy-Benefits of cyber security.

UNIT-III SECURITY TECHNOLOGIES

Types of cyber security tools-Firewalls: Packet filter- Connection tracking- Application/layer 7-Intrusion Detection Systems (IDS) and Intrusion Prevention Systems (IPS)- Antivirus and Antimalware Software.

UNIT-IV PASSWORD AUDITING TOOLS

Penetration Testing - Password Auditing and Packet Sniffers: John the Ripper- Hashcat-packet sniffer Tcpdump-Network Security Monitoring.

UNIT-V VULNERABILITY TOOLS

Encryption Tools-Vulnerability Scanners: Acunetix-Nessus-Burp Suite-Nikto-Cain and Abel- Kali Linux.

COURSE OUTCOME

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

1. Understand the basic concepts, need, approaches, principles and components of security.
2. Explain the various cyber threats and attacks.
3. Explain the basic principles of cryptography and algorithms.
4. Examine the various protocols for secure communication.
5. Explore the significant aspects of cyber security.

TEXTBOOKS

1. Anand Shinde ,” Introduction to cyber security”, 2021.
2. Principles of Information Security By Michael E.Whitmanand Herbert J. Mattord.

REFERENCE BOOKS

- 1.William Stallings,”Cryptography and Network Security–Principles and Practice”, Pearson Education, 7th Edition.
- 2.Atul Kahate,”Cryptography and Network Security”, McGraw Hill,4th Edition
- 3.Fundamentals of Information Systems Security By David Kim and Michael G. Solomon.

E-RESOURCES

1. <https://www.slideshare.net/slideshow/basic-foundation-for-cybersecurity/255397768>

