



SRI CHANDRASEKHARENDRASARASWATHI VISWA MAHAVIDYALAYA

(Deemed to be University U/S 3 of UGC Act 1956) (Accredited with "A" Grade by NAAC)
Enathur, Kanchipuram - 631561

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CURRICULUM AND SYLLABUS FOR FULL TIME

**B.E. (Hons.) Computer Science and Engineering
with Specialization in Artificial Intelligence and
Machine Learning**

(Applicable for students admitted from 2025-2026 onwards)

**B.E. (Hons.) Computer Science and Engineering with
Specialization in Artificial Intelligence and Machine Learning**

These regulations are applicable to the students admitted from the AY 2025-26 Onwards.

**CHOICE BASED CREDIT SYSTEM FOR B.E. (HONS.) CSE with AIML FULL-TIME
PROGRAMME CREDITS**

Theory courses: Courses with 4/3 credits will be assigned 3 Lectures and 2/1 Tutorial hours per week.

Practical courses: Courses with 2 credits will be assigned 4 hours of lab/practical work per week

From semester III to VII, the honors. Credits distribution as follows

Sl.No	Semester	Credits
1.	III	3
2.	IV	5
3.	V	3
4.	VI	3
5.	VII	5
Total		19

For the award of the Hons./Minor degree, a student has to earn a minimum of 19 credits.

DURATION OF THE PROGRAMME

A student is normally expected to complete B.E. (HONS.) CSE with AIML programme in four years and in any case, not more than seven years from the time of admission.

REGISTRATION FOR COURSES

A newly admitted student will automatically be registered for all the courses prescribed for the first year, without any option.

All other students shall submit a completed registration form indicating the list of courses intended to be credited during the next semester. This registration will be done a week before the last working day of the current semester. Late registration, with the approval of the Dean on the recommendation of the Head of the Department, along with a late fee will be done, up to the last working day.

Registration for the project work shall be done only for the final semester.

ASSESSMENT

The break-up of assessment and examination marks for theory subjects is as follows.

First Assessment Test	:	15 Marks
Second Assessment Test	:	15 Marks
Assignment & Attendance (seminars, group discussion)	:	10 Marks
Total (Internal Marks)	:	40 Marks
End semester Examination (External Marks)	:	60 Marks
Total (Internal + External)	:	100 Marks

The break-up of the assessment and examination marks for practical is as follows.

Observations	:	15 Marks
Model Test	:	15 Marks
Record book & Attendance	:	10 Marks
Total (Internal Marks)	:	40 Marks
End semester Examination (External Marks)	:	60 Marks
Total (Internal + External)	:	100 Marks

The project work will be assessed for 40 marks by a committee consisting of the Guide and the Head of the Department. The Head of the Department shall be the Chairman. 60 marks are allotted for the project viva voce examination at the end of the semester.

WITHDRAWAL FROM A COURSE

A student can withdraw from the course at any time before a date fixed by the Head of the Department prior to the second assessment, with the approval of the Dean on the recommendation of the Head of the Department.

TEMPORARY BREAK OF STUDY

A student can take a one-time temporary break of study covering the current year/semester and/or the next semester with the approval of the Dean on the recommendation of the Head of the Department, not later than seven days after the completion of the mid-semester test. However, the student must complete the entire program within the maximum period of seven years.

SUBSTITUTE ASSESMENT

A student, who has missed, for genuine reasons accepted by the Head of the Department, one or more of the assessments of a course other than the end semester examination, may take a substitute assessment for any one of the missed assessments. The substitute assessment must be completed before the commencement of the end-semester examination.

A student who wishes to have a substitute assessment for a missed assessment must apply to the concerned faculty member within a week from the date of the missed assessment.

ATTENDANCE REQUIREMENTS

To be eligible to appear for the examination in a particular course, a student must put in a minimum of 80% of attendance in the course. However, if the attendance is 70% or above but less than 80% in any course, the authorities can permit the student to appear for the examination in the course on payment of the prescribed condonation fee.

A student who withdraws from or does not meet the minimum attendance requirement in the course must re-register for and repeat the course.

PASSING AND DECLARATION OF EXAMINATION RESULTS

All assessments of all the courses on the absolute mark basis will be considered and passed by the results passing board in accordance with the rules of the University. Thereafter, the Controller of Examinations shall convert the marks for each course to the corresponding letter grade as follows, compute the grade point average & cumulative grade point average and prepare the grade cards.

90 to 100 marks	-	Grade 'S'
80 to 89 marks	-	Grade 'A'
70 to 79 marks	-	Grade 'B'
60 to 69 marks	-	Grade 'C'
55 to 59 marks	-	Grade 'D'
50 to 54 marks	-	Grade 'E'
less than 50 marks	-	Grade 'F'
Insufficient attendance	-	Grade 'I'
Withdrawn from the course	-	Grade 'W'

A student who obtains less than 50 marks out of 100 in the subject or less than 24 out of 60 in External exam or is absent for the examination will be awarded Grade 'F'.

A student who earns a grade of S, A, B, C, D or E for a course is declared to have successfully completed that course and earned the credits for that course. Such a course cannot be repeated by the student.

A student who obtains letter grade F in a course has to reappear for the examination in that course.

The following grade points are associated with each letter grade for calculating the grade point average.

S - 10; A-9; B-8; C-7; D-6; E-5; F-0

A student can apply for revaluation of one or more of his /her examination answer papers within a week from the date of issue of Grade sheet to the student on payment of the prescribed fee per paper. The application must be made to the Controller of Examinations with the recommendation of the Head of the Department.

After results are declared, Grade cards will be issued to the students. The Grade card will contain the list of courses registered during the year/semester, the grades scored and the grade point average (GPA) for the year/semester.

GPA is the sum of the products of the number of credits of a course with the grade point scored in that course, taken over all the courses for the Year/Semester, divided by the sum of the number of credits for all courses taken in that year/semester. CGPA is similarly calculated considering all the courses taken from the time of admission.

After successful completion of the program, the Degree will be awarded with the following classification based on CGPA:

For First Class with Distinction, the student must pass all the courses in the first attempt and obtain a CGPA of 8.25 or above.

For First Class, the student must pass within four years from the time of admission and obtain a CGPA of 6.5 or above.

For Second Class, the student must pass within seven years from the time of admission.

B.E. (Hons.) Computer Science and Engineering with Specialization in Artificial Intelligence and Machine Learning

Hons. Course						
Sl.No	Semester	Course Title	L	T	P	C
1.	III	Intelligent Systems: Principles and practice	3	0	0	3
2.	IV	Foundations of Artificial Intelligence and Data Science	3	0	4	5
3.	V	Natural Language Processing	3	0	0	3
4.	VI	Deep Learning	3	0	0	3
5.	VII	Generative AI and LLM with Lab	3	0	4	5
Total						19

III – SEMESTER

Course Code												L	T	P	C
Course Title	INTELLIGENT SYSTEMS: PRINCIPLES AND PRACTICE											3	0	0	3
PRE-REQUISITES															
Basic programming knowledge, problem-solving skills, basic mathematics															
OBJECTIVES															
•	To introduce the fundamental concepts and applications of Artificial Intelligence.														
•	To understand intelligent agents and their interaction with environments.														
•	To study search techniques and problem-solving strategies.														
•	To explore knowledge modeling and reasoning methods.														
•	To learn planning and decision-making techniques in AI.														
COURSE OUTCOMES															
At the end of course, the students will be able to															
1.	Understand AI Concepts, Intelligent Agent and Environments.														
2.	Apply appropriate search algorithms and heuristic techniques to solve complex AI problems.														
3.	Analyze and solve constraint satisfaction and adversarial problems using suitable AI strategies.														
4.	Model and represent knowledge using logical and rule-based approaches, and perform reasoning.														
5.	Design and implement basic AI planning solutions for real-world problem scenarios.														
POs and COs MAPPING TABLES															
	PO 01	PO 02	PO 03	PO 04	PO 05	PO 06	PO 07	PO 08	PO 09	PO 10	PO 11	PO 12	PSO 01	PSO 02	PSO 03
CO 01	3	2	1	1	1	-	-	-	-	-	-	-			
CO 02	3	3	1	2	2	-	-	-	-	-	-	-			
CO 03	3	2	2	1	1	-	-	-	-	-	-	-			
CO 04	2	2	3	2	3	-	-	-	-	1	2	1			
CO 05	3	3	2	3	2	-	-	-	-	-	-	-			
LEGEND:1-LOW, 2 - MEDIUM, 3-HIGH															
UNIT - I	INTRODUCTION TO AI & INTELLIGENT AGENT														9
Introduction - Definition of AI, Brief History of AI - Turing test, Types of AI and its applications. Intelligent Agents, Agents & environment, nature of environment, structure of agents, goal-based agents, utility-based agents, learning agents.															
UNIT - II	PROBLEM SOLVING AGENTS														9
Problem solving agents - searching for solutions - uniformed search strategies, iterative deepening search, bidirectional search, Informed search, A* search,, AO* search, memory															

bounded heuristic search: local search algorithms & optimization problems: Hill climbing search, simulated annealing search, local beam search.		
UNIT - III	CONSTRAINT SATISFACTION PROBLEMS AND GAME THEORY	9
Local search for constraint satisfaction problems. Adversarial search, games, optimal decisions & strategies in games, the min max search procedure, alpha-beta pruning.		
UNIT - IV	KNOWLEDGE MODELING AND REASONING	9
AI for knowledge representation, rule-based knowledge representation, procedural and declarative knowledge, Logic programming, Forward and backward reasoning.		
UNIT - V	PLANNING	9
The planning problem, planning with state space search, partial order planning, planning graphs, planning with propositional logic, Analysis of planning approaches, hierarchical planning, conditional planning, continuous and multi agent planning.		
TEXT BOOKS		
1.	S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, Pearson, Fourth Edition, 2022.	
2.	A Classical Approach to Artificial Intelligence, M.C. Trivedi, Khanna Book Publishing, 2019.	
3.	Denis Rothman, Artificial Intelligence By Example: Acquire advanced AI, machine learning, and deep learning design skills, Packt Publishing; 2 nd edition, 2020.	
4.	Deepak Khemani, A First Course in Artificial Intelligence, McGraw Hill Education, 2017.	
REFERENCES		
1.	Elaine Rich, Kevin Knight & Shivashankar B. Nair, Artificial Intelligence, 4 th Revised Edition, MedTech / McGraw Hill, 2024.	
2.	Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, Pearson, 1 st Edition, 2015.	
LEARNING OUTCOMES		
1.	Describe fundamental AI concepts, types, and agent architectures with relevant examples.	
2.	Solve AI problems by applying appropriate search and heuristic algorithms.	
3.	Analyze and formulate solutions for constraint satisfaction and game problems using suitable techniques.	
4.	Construct knowledge representation models and demonstrate reasoning using logical methods.	
5.	Design and implement basic AI solutions incorporating planning and decision-making approaches.	
PREPARED BY		
Dr. M. Gayathri, Assistant Professor (S-II)		

IV – SEMESTER

Course Code												L	T	P	C
Course Title	FOUNDATIONS OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE											3	0	4	5
PRE-REQUISITES															
Basic knowledge of mathematics (algebra, calculus, probability), programming (Python/C++), data structures & algorithms, and introductory statistics.															
OBJECTIVES															
•	To introduce the fundamental concepts of Artificial Intelligence (AI) and intelligent agents														
•	To understand various problem-solving techniques and search algorithms														
•	To explore different methods of knowledge representation and reasoning														
•	Introduce the mathematical foundations required for data science														
•	Introduce a practical capstone case study														
COURSE OUTCOMES															
At the end of course, the students will be able to															
1.	Understand the fundamentals of AI, intelligent agents, and AI applications														
2.	Apply problem-solving techniques and search algorithms to AI problems														
3.	Demonstrate knowledge representation schemes and reasoning methods														
4.	Analyze data using descriptive statistics and visualization techniques														
5.	Apply Python programming and data analysis techniques to solve real-world problems using a practical capstone case study.														
POs and COs MAPPING TABLES															
	PO 01	PO 02	PO 03	PO 04	PO 05	PO 06	PO 07	PO 08	PO 09	PO 10	PO 11	PO 12	PSO 01	PSO 02	PSO 03
CO 01	3	2	1	-	-	-	-	-	-	1	-	2			
CO 02	3	3	2	2	1	-	-	-	-	1	-	2			
CO 03	3	3	2	2	-	-	-	-	-	1	-	2			
CO 04	3	3	2	3	2	-	-	-	-	1	-	2			
CO 05	3	3	2	3	2	-	-	-	-	-	-	-			
LEGEND: 1-LOW, 2 - MEDIUM, 3-HIGH															
UNIT - I	INTRODUCTION														9
INTRODUCTION: Artificial Intelligence and its applications - Artificial Intelligence Techniques -Level of models - Criteria of Success - Intelligent Agents - Nature of Agents - Learning Agents- AI Techniques - Advantages and Limitations of AI - Impact and Examples of AI - Application domains of AI - AI Ladder.															
UNIT II	PROBLEM SOLVING TECHNIQUES:														9

State space search - Control Strategies - Heuristic Search - Problem Characteristics - Production System Characteristics - Generate and test - Hill climbing - Best First Search - A* search - Constraint Satisfaction Problem - Min-Max Search - Alpha-Beta Pruning .		
UNIT III	KNOWLEDGE REPRESENTATION	9
Representations and Mappings, Approaches to knowledge representation - Representing simple facts in logic, Computable functions and predicates, Procedural vs Declarative knowledge, Logic Programming, Forward vs backward reasoning- Non-monotonic Reasoning, Logics for non-monotonic reasoning		
UNIT - IV	DESCRIPTIVE STATISTICS AND DATA VISUALIZATION	9
Introduction; Typology of problems; Importance of linear algebra, statistics and optimization from a data science perspective; Structured thinking for solving data science problems.		
UNIT - V	PRACTICAL CAPSTONE CASE STUDY USING PYTHON	9
Libraries: Hands-on experience with NumPy, Pandas, Matplotlib, Seaborn. Data Preparation: Data cleaning, handling missing values, data manipulation. Pandas dataframe related operations on Handloom Cluster Dataset-Reading files-Exploratory data analysis-Data visualization on Handloom Cluster dataset using matplotlib and seaborn libraries-Scatter plot-Line plot-Bar plot-Histogram-Box plot-Pair plot		
LIST OF EXPERIMENTS		
UNIT - I	INTRODUCTION	
1.	Implementation of a Simple Reflex Agent <ul style="list-style-type: none"> Vacuum cleaner problem using condition-action rules 	
2.	Design of a Simple Learning Agent <ul style="list-style-type: none"> Basic model that improves performance based on feedback 	
UNIT - II	PROBLEM SOLVING TECHNIQUES:	
3.	Implementation of Search Algorithms <ul style="list-style-type: none"> BFS / DFS for state space problems 	
4.	Implementation of Heuristic Search <ul style="list-style-type: none"> A* Algorithm and Hill Climbing 	
UNIT - III	KNOWLEDGE REPRESENTATION	
5.	Implementation of Forward and Backward Chaining <ul style="list-style-type: none"> Rule-based inference system 	
6.	Representation of Knowledge using Predicate Logic <ul style="list-style-type: none"> Logical statements and inference 	
UNIT - IV	DESCRIPTIVE STATISTICS AND DATA VISUALIZATION	
7.	Statistical Analysis of Dataset <ul style="list-style-type: none"> Mean, median, variance, standard deviation 	
8.	Data Visualization Techniques <ul style="list-style-type: none"> Histogram, bar chart, scatter plot 	
UNIT - V	PRACTICAL CAPSTONE CASE STUDY USING PYTHON	
9.	Mini Project: Data Analysis on Handloom Cluster Dataset <ul style="list-style-type: none"> Define a problem statement (e.g., production trends or regional analysis) Perform data cleaning and preprocessing Conduct exploratory data analysis (EDA) 	

	<ul style="list-style-type: none"> • Create visualizations using Matplotlib and Seaborn • Interpret results and derive insights • Present findings through a report and presentation
Lab Tools and Environments (optional)	
Programming Environment: Python (latest stable version) Jupyter Notebook / Google Colab	
Core Libraries: NumPy,Pandas,Matplotlib,Seaborn,Scikit-Learn	
Libraries: heapq	
Cloud & Collaboration Platforms: Google Colab,Kaggle (datasets and competitions)	
SWI-Prolog (optional) SymPy (for logic handling)	
Data Formats & APIs: CSV/Excel files for datasets	
Regional Needs(kanchipuram): Supports digital transformation in local silk, handloom dataset	
Local Needs: Develop basic AI & Python skills among students	
Global Needs: Prepares students for global AI and data Science careers	
TEXT BOOKS	
1.	Rich and Knight, "Artificial Intelligence", The McGraw Hill, 2021.(Unit 1-3)
2.	Russell and P. Norvig, Artificial Intelligence: A Modern Approach, 4th ed. Upper Saddle River, NJ, USA: Pearson, 2021.
3.	Introduction to Linear Algebra – Gilbert Strang, Wellesley-Cambridge Press, Latest Edition.(Unit-4)
4.	Python Programming using problem solving Approach by Reema Thareja, Oxford University, Higher Education Oxford University Press; First edition (10 June 2017). (Unit-5)
REFERENCES	
1.	Gilbert Strang, Introduction to Linear Algebra, Wellesley Cambridge Press, Sixth Edition, 2023
2.	Grus, Data Science from Scratch: First Principles with Python, 2nd ed. Sebastopol, CA, USA: O'Reilly Media, 2019.
3.	M.C. Trivedi, "A Classical Approach to Artificial Intelligence", Khanna Book Publishing, 2021.
4.	Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer
5.	Dhivya Naga Subramanian, Agentic AI for Engineers: Architecting Goal-Driven Systems. Apress 2026
6.	Allen B. Downey, Think Stats, O'Reilly
7.	E-learning Resources ONLINE/NPTEL Courses: An Introduction to Artificial Intelligence: https://nptel.ac.in/courses/106102220 https://nptel.ac.in/courses/106106179

LEARNING OUTCOMES	
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By the end of this course, learners will be able to:	
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| 1. | Understand and explain key AI concepts and real-world applications |
| 2. | Design solutions using search algorithms like A*, Min-Max, and heuristic methods |
| 3. | Represent knowledge using logical and procedural approaches |
| 4. | Describe a flow process for data science problems (Remembering) |
| 5. | Classify data science problems into standard typology (Comprehension) |

PREPARED BY	
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Dr. R. Prema, Assistant Professor	
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