



**ST. JOSEPH'S**  
COLLEGE OF ENGINEERING  
AND TECHNOLOGY,  
- PALAI -  
**AUTONOMOUS**

Choondacherry P.O., Pala, Kottayam - 686579  
Kerala, India



# **CURRICULUM & SYLLABUS**

**Minor in**

**Artificial Intelligence and Data Science**

**Offering Department: Artificial Intelligence and Data Science (AD)**

**Eligible Departments: CE, EC, EE, ME**

**2024 SCHEME**

# CURRICULUM

Minor in Artificial Intelligence and Data Science											
Sl. No:	Semester	Course Code	Course Title (Course Name)	Credit Structure			SS	Total Marks		Credits	Hrs./ Week
				L	T	P		CIE	ESE		
1	3	24SJMNA DT301	Introduction to Artificial Intelligence*/MOOC#	3	1	0	5	40	60	4	4
2	4	24SJMNA DT401	Concepts in Machine Learning*/MOOC#	3	1	0	5	40	60	4	4
3	5	24SJMNA DT501	Deep Learning*/MOOC#	3	1	0	5	40	60	4	4
4	6	24SJMNA DT601	Natural Language Processing*/MOOC#	3	0	0	5	40	60	3	3
Total							20			15	15

\* Students must register for theory courses listed in the 3rd and 4th semesters of the Minor curriculum.

# Students who fail a theory course listed in the Minor curriculum are permitted to register for an alternate MOOC course specified in the Minor curriculum.

## SEMESTER S3

### INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Course Code	24SJMNA DT301	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3:1:0:0	ESE Marks	60
Credits	3	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	None	Course Type	Theory

#### Course Objectives:

1. Introduce the fundamental principles of intelligent systems.
2. Impart a good insight into the characteristics of intelligent systems, knowledge representation schemes, logic and inference mechanisms.

### SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	<b>Introduction to Artificial Intelligence:-</b> AI definition - Foundations of AI, History and applications of AI; Intelligent agents - Agents and Environments, The concept of rationality, The nature of environments, Structure of agents.	7
2	<b>Problem Solving by Searching:-</b> Problem Solving Agents and examples - Searching for Solutions; Uninformed Search strategies - Breadth First Search, Uniform Cost Search, Depth First Search, Depth Limited Search, Iterative deepening DFS; Heuristic function; Informed Search Strategies - Greedy Search, A* Search.	13
3	<b>Advanced Search and Game Playing:-</b> Adversarial Search - Games, Optimal decisions in Games, MinMax algorithm, Alpha_Beta pruning; Constraint Satisfaction Problems-Constraint Propagation, Inferences in CSP's, Backtracking Search for CSP's.	10
4	<b>Knowledge, Logic, and Reasoning Patterns:-</b> Knowledge Based Agents - The Wumpus World; Logic - Propositional Logic; First order logic - Syntax and Semantics, Using First Order Logic, Knowledge Engineering in First order logic, Inference in first order logic; Propositional vs. first order inference;	14

**Course Assessment Method**  
**CIE: 40 marks, ESE: 60 marks)**

**Continuous Internal Evaluation Marks (CIE):**

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	15	10	10	40

**End Semester Examination Marks (ESE)**

*In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions*

Part A	Part B	Total
<ul style="list-style-type: none"> <li>2 Questions from each module.</li> <li>Total of 8 Questions, each carrying 3 marks</li> </ul> <p align="center"><b>(8x3 =24 marks)</b></p>	<ul style="list-style-type: none"> <li>Each question carries 9 marks.</li> <li>Two questions will be given from each module, out of which 1 question should be answered.</li> <li>Each question can have a maximum of 3 subdivisions.</li> </ul> <p align="center"><b>(4x9 = 36 marks)</b></p>	<b>60</b>

**Course Outcomes (COs)**

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
<b>CO1</b>	Explain the fundamental concepts of intelligent systems.	<b>K2</b>
<b>CO2</b>	Apply searching strategies for real time scenarios.	<b>K3</b>
<b>CO3</b>	Apply Constraint satisfaction problems for real time scenarios.	<b>K3</b>
<b>CO4</b>	Apply methods of knowledge representation and processing within expert systems.	<b>K3</b>

Note: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create

**CO-PO Mapping Table:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
<b>CO1</b>	3	3	3								2
<b>CO2</b>	3	3	3	2							2
<b>CO3</b>	3	3	3	2							2
<b>CO4</b>	3	3	3	2							2

Note: 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation

<b>Text Books</b>				
Sl. No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
<b>1</b>	Artificial Intelligence – A Modern Approach	Stuart Russel, Peter Norvig	Pearson Education	4/e, 2021

<b>Reference Books</b>				
Sl. No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
<b>1</b>	Artificial Intelligence: A new Synthesis	J. Nilsson	Elsevier Publishers.	1/e, 1998
<b>2</b>	Computational Intelligence : A logical approach	David Poole, Alan Mackworth, Randy Goebel	Oxford University Press	1/e, 2004
<b>3</b>	Artificial Intelligence: Structures and Strategies for Complex Problem Solving	George F. Luger	Pearson Education	6/e, 2009

<b>Video Links (NPTEL, SWAYAM...)</b>	
Sl No.	Course Details
<b>1</b>	NPTEL Course Fundamentals of Artificial Intelligence, IIT Guwahati <a href="https://onlinecourses.nptel.ac.in/noc21_ge20/preview">https://onlinecourses.nptel.ac.in/noc21_ge20/preview</a>