University of Kerala

Discipline	**PHYSICS**				
Course Code	**UK2MDCPHY101**				
Course Title	**BASICS OF ARTIFICIAL INTELLIGENCE**				
Type of Course	**MDC**				
Semester	**II**				
Academic Level	**100 - 199**				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	3	3 Hrs	-	-	3 Hrs
Pre-requisites	1. Basic knowledge in calculus, probability, and statistics 2. Proficiency in any programming language will be an added advantage				
Course Summary	This course provides a foundational introduction to Artificial Intelligence (AI) tailored for students with minimal or no background in information technology. The aim is to introduce key concepts, applications, and implications of AI in a user-friendly manner, making it accessible to non-IT students.				

BOOKS FOR STUDY:

1. Russell, Stuart Jonathan, Norvig, Peter, Davis, Ernest. Artificial Intelligence: A Modern Approach. United Kingdom: Pearson, 2010.
2. Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, PHI Learning, 2014
3. Vinod Chandra S. S. and Anand Hareendran S. Artificial Intelligence and Machine Learning, PHI Learning Private Limited,2014.
4. Elaine Rich and Kevin Knight, “Artificial Intelligence”, Tata McGraw Hill
5. https:/nptel.ac.in/courses/106105077
6. https://nptel.ac.in/courses/106106126

DETAILED SYLLABUS: THEORY

Module	Unit	Content	Hrs	CO No
I		**Introduction to Artificial Intelligence (Book : 1, 4)**	**8**	
	1	Concept of AI, History, Current Status and Scope	1	1
	2	Intelligent Agents and Environments	1	1
	3	Problem Formulations	1	1
	4	Review of Tree and Graph Structures	1	1
	5	State Space Representation	1	1
	6	Search Graph	1	1
	7	Search Tree	2	1
II		**Knowledge Representations and Search Algorithms (Book : 2, 3)**	**9**	
	8	Definition of Knowledge	1	3
	9	Representation and Organization of Knowledge	1	3
	10	Random Search, Search with Closed and Open List	1	3
	11	Depth First Search	1	3
	12	Breadth First Search	1	3
	13	Heuristic Search, A* Algorithm	2	3
	14	Concepts of Game Playing, Expert Systems	2	3
III		**Machine Learning (Book : 2, 3)**	**10**	
	15	History of Machine Learning, Types of Problems in Machine Learning	1	1
	16	Machine Learning Paradigms- Supervised learning	2	1
	17	Semi-Supervised and Unsupervised Learning Methods	2	2
	18	Reinforcement Learning	1	2

	19	Association Learning and Market Basket Analysis	2	2
	20	Concepts of Computer Vision and Nature Inspired Computing	2	2
IV	**Performance Measures (Book : 01)**		**9**	
	21	Classification of Performance Measures	1	4
	22	Precision and Recall	2	4
	23	Accuracy, F-Measure and Receiver Operating Characteristic Curve (ROC)	2	4
	24	Area Under Curve (AUC)	1	4
	25	Bootstrapping	1	4
	26	Cross Validation and Ensemble Methods	2	4
V*	**Ethical Considerations and Applications in AI (Online Resource : 5, 6)**		**9**	
	27	Discussion on Bias, Fairness, and Transparency in AI	1	5
	28	Privacy Concerns and Responsible AI Practices	2	5
	29	Exploring AI Applications in Non-Technical Domains Like AI in Healthcare, Finance and Education	2	5
	30	Showcasing User-Friendly AI Tools and Platforms	2	5
	31	Case studies: Weather Predictions, Self-driving cars.	2	5

COURSE OUTCOMES

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO-1	Discuss Machine learning concepts	R, U	4
CO-2	Distinguish supervised, unsupervised and reinforcement learning concepts	R, U	4
CO-3	Contrast various search algorithms, such as uninformed search (breadth-first search, depth-first search) and informed search (heuristic search, A* algorithm), to solve problems in artificial	R, U	2,4

	intelligence and other related fields		
CO-4	Discuss real life problems using appropriate machine learning models and evaluate the performance measures	R, U	2,4
CO-5	Explain the ethical implications of various AI technologies and applications across diverse domains such as healthcare, finance, autonomous vehicles, and social media.	R, U	4,7

R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create

Name of the Course: BASICS OF ARTIFICIAL INTELLIGENCE

Credits: 3:0:0 (Lecture: Tutorial: Practical)

CO No.	CO	PO / PSO	Cognitive Level	Knowledge Category	Lecture (L)/ Tutorial (T)	Practical (P)
CO-1	Discuss Machine learning concepts	PO-1,6 PSO-4	R, U	F,C	L	-
CO-2	Distinguish supervised, unsupervised and reinforcement learning concepts	PO-1,6 PSO-4	R, U	F,C	L	-
CO-3	Contrast various search algorithms, such as uninformed search (breadth-first search, depth-first search) and informed search (heuristic search, A* algorithm), to solve problems in artificial intelligence and other related fields	PO-6,7 PSO-2,4	R, U	F,C	L	-
CO-4	Discuss real life problems using	PS-3,6,7 PSO-2,4	R, U	C,P	L	-

	appropriate machine learning models and evaluate the performance measures					
CO-5	Explain the ethical implications of various AI technologies and applications across diverse domains such as healthcare, finance, autonomous vehicles, and social media.	PO-6,7,8 PSO-4,7	R, U	C, P	L/T	-

F-Factual, C- Conceptual, P-Procedural, M-Metacognitive

Mapping of COs with PSOs and POs :

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO-1	-	-	-	2	-	-	-	1	-	-	-	-	2	-	-
CO-2	-	-	-	2	-	-	-	1	-	-	-	-	2	-	-
CO-3	-	1	-	2	-	-	-	-	-	-	-	-	2	2	-
CO-4	-	1	-	2	-	-	-	-	-	1	-	-	2	2	-
CO-5	-	-	-	2	-	-	2	-	-	-	-	-	2	2	2

Correlation Levels:

Level	-	1	2	3
Correlation	Nil	Slightly / Low	Moderate / Medium	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

Mapping of COs to Assessment Rubrics :

CO No	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO-1	✓	-	-	✓
CO-2	✓	-	-	✓
CO-3	✓	-	-	✓
CO-4	-	✓	-	✓
CO-5	✓	✓	-	-