B. TECH.
IN
INFORMATION TECHNOLOGY

SEMESTER VII
(2021 SCHEME)

SYLLABUS

Rajagiri Valley, Kakkanad,
Kochi 682 039, Kerala, INDIA
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COURSE CODE	COURSE NAME	L	T	P	CREDIT	YEAR OF INTRODUCTION
101004/IT702B	ARTIFICIAL INTELLIGENCE	2	1	0	3	2021

1. Preamble

Artificial Intelligence is an elective course for the IT Engineering Graduates. The syllabus is prepared with an aim to emphasize concepts of Artificial Intelligence that solves general problems with the help of search techniques, inferred knowledge, reasoning and learning in discovering decision making information from knowledge base. It also give emphasis on neural network and expert systems to optimize human effort overall.

2. Prerequisite

101004/IT300B Data Structures
101004/IT600B Algorithm Analysis and Design.

3. Syllabus

Module 1: Overview of Artificial Intelligence

Introduction: Artificial Intelligence, Agents- Environments and its types, AI Application areas. Problems, Problem space, Problem characteristics, Production systems. Search algorithm terminologies, Example problems – toy and real world, uninformed searches.

Module 2: Informed Search

Informed Search: Generate and Test, Best First Search, Heuristics Search, A*, Problem reduction, AO*, Constraint Satisfaction problems, Hill climbing, Simulated annealing. **Adversarial Search:** Min-max search, Alpha beta cut-offs.

Module 3: Knowledge Representation

Knowledge Representation: Types of Knowledge, Knowledge based system and reasoning, frames, and semantic nets. **Logic and Inferences:** Propositional logic (PL) and Predicate Logic (FOPL), Inference rules, Conversion to clausal form, Unification, Forward & backward Chaining, Resolution refutation proof for PL and FOPL.

Module 4: Learning and Reasoning
Learning: Rote learning, Learning by Taking Advice, Learning in Problem-solving, Learning from example: induction, Explanation-based learning. Inductive Learning, Winston learning program, Version space, Candidate elimination algorithm, Decision tree.
Reasoning in uncertain environments: Probabilistic reasoning, Bayes theorem.

Module 5: Neural Network and Expert System

Neural Network: Basics of Neural Network, Back Propagation, Applications of Neural Networks, Natural Language Processing.

Expert system (ES) : Components of Expert System, Expert System Technology, Stages in the development of an Expert System, Expert System Tools, Benefits and Application of Expert Systems.

4. Text Books

1. E Rich, K Knight, *Artificial Intelligence*, 3/e, Tata McGraw Hil, 2009.
2. Stuart Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach* , 3rd Edition, Prentice Hall, 2010
3. Deepak Khemeni, *A First course in Artificial Intelligence*, Tata McGraw Hill, 2013.

5. Reference Books

1. George. F. Luger, *Artificial Intelligence- Structures and Strategies for Complex Problem Solving*, Fourth Edition, Pearson Education, 2002.
2. Brachman, R. and Levesque, H., *Knowledge Representation and Reasoning*, Morgan Kaufmann, 2004.
3. Patrick Henry Winston, *Artificial intelligence,* Addison Wesley, 1992.
4. Peter Norvig, *Paradigms of Artificial Intelligence Programming Case Studies in Common Lisp*, Elsevier Science, 2014
5. Ivan Bratko, Prolog: *Programming for Artificial Intelligence*, 3/E, Pearson Education, 2001.
6. D. Poole and A. Mackworth, *Artificial Intelligence: Foundations of Computational Agents*, Cambridge University Press, 2010.
7. Dan W Patterson, *Introduction to Artificial Intelligence*, Pearson,2009
8. Stefan Edelkamp, Stefan Schroedl, *Heuristic Search: Theory and Applications*, Morgan Kaufman, 2011.

6. Course Outcomes

After the completion of the course the student will be able to

CO 1: **Discuss** the fundamental foundations of artificial intelligence (AI) and familiarize with the search terminologies and uninformed search.

CO 2: **Demonstrate** various informed search methods to solve AI application problems.

CO 3: **Illustrate** the concepts of knowledge representation through logics, inference rules and deduce solutions using the principle of resolution.

CO 4: **Explain** the concept of learning and explore uncertainty with probabilistic reasoning.

CO 5: **Describe** the basics of neural network and the concepts of expert systems.

7. Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1								1
CO2	3	3	3	1								1
CO3	3	2	2	1								1
CO4	3	2	2	2								1
CO5	2	1	2	1	1	1						1

	PSO1	PSO2	PSO3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	2
CO4	-	-	-
CO5	-	-	3

8. Assessment Pattern

Learning Objectives	Continuous Internal Evaluation (CIE)		End Semester Examination (ESE out of 100)
	Internal Examination 1 (50)	Internal Examination 2 (50)	
Remember	5	5	10
Understand	20	35	60
Apply	25	10	30
Analyse			
Evaluate			
Create			

9. Mark Distribution

Total	CIE				ESE
	Attendance	Internal Examination	Assignment/Quiz/ Course Project	Total	

150	10	25	15	50	100

10. End Semester Examination Pattern

There will be two parts; Part A and Part B. Part A contain 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions. Part B contains 2 questions from each module of which student should answer any one. Each question can have maximum 2 sub-divisions and carry 14 marks.

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