Course Number & Title: ME 620 Fundamentals of Artificial Intelligence

L-T-P-C: 3-0-0-6

Type of Letter Grading (Regular Letter Grades / PP or NP Letter Grades): Regular Letter Grades

Kind of Proposal (New Course / Revision of Existing Course): New Course

Offered as (Compulsory / Elective): Elective (Departmental / Open)

Offered to: B.Tech (Fourth Year); M.Tech and Ph.D.

Offered in (Odd/ Even / Any): Any

Offered by (Name of Department/ Center): Mechanical Engineering

Pre-Requisite: None

Preamble / Objectives:
What does automatic scheduling or autonomous driving have in common with web search, speech recognition, and machine translation? These are complex real-world problems! Aim of artificial intelligence (AI) is to tackle these problems with rigorous mathematical tools. The objective of this course is to present an overview of the principles and practices of AI to address such complex real-world problems. The course is designed to develop a basic understanding of problem solving, knowledge representation, reasoning and learning methods of AI.

Course Content/ Syllabus
Introduction: Scope; History, Trends and Future Directions. Problem Solving by Search: Production Systems and AI; Graph-Search Strategies: Uninformed Search, Heuristic Search Techniques; Constraint Satisfaction Problems; Stochastic Search Methods; Searching Game Trees: Minimax, Alpha-Beta Pruning. Knowledge Representation and Reasoning: Predicate Calculus in AI: Syntax and Semantics, Expressivity, Unification, Resolution; Resolution Refutation Systems; Situation Calculus. Reasoning under uncertainty: Notion of Uncertainty; Uncertain Knowledge and Reasoning, Probabilities; Bayesian Networks. Planning: Planning with State Space Search; Planning Graphs; Partial Order Planning. Decision Making: Sequential Decision Problems, Algorithms for optimal Policies. Machine Learning: Learning from Observations: Overview of different forms of Learning, Learning Decision Trees, Computational Learning Theory, Statistical Learning Methods, Neural Networks and Connectionist Learning.

Books (In case UG compulsory courses, please give it as "Text books" and "Reference books". Otherwise give it as "References".

References: (Format: Authors, Book Title in Italics font, Volume/Series, Edition Number, Publisher, Year.)

1.	Patrick Henry Winston, Artificial Intelligence, Third Edition, Addison-Wesley Publishing Company, 2004.
2.	Nils J. Nilsson, Principles of Artificial Intelligence, Illustrated Reprint Edition, Springer Heidelberg, 2014.
3.	Stuart Russell and Peter Norvig. Artificial Intelligence: A Modern Approach, 3rd Edition, PHI, 2009.
4.	Nils J. Nilsson, Quest for Artificial Intelligence, First Edition, Cambridge University Press, 2010.

Sl. No.	Broad Title / Topics	Number of Lectures
	Detailed Course Content (Optional) It will not be included in the Courses of Study Booklet	
1	Introduction: History, Trends and Future Directions	1
2	Problem Solving by Search	10
3	Knowledge Representation and Reasoning	08
4	Reasoning under Uncertainty	06
5	Planning	04
6	Decision Making	03
7	Machine Learning	10
	Total Number of Lectures =	42

In case of revision of existing course, Please provide below the details of existing course. EXISTING COURSE
Course Number, Title, L-T-P-C:
Pre-Requisite (if any)
Contents:
References: