



University of Tehran
School of Electrical and Computer Engineering

Course:	8101000 – Introduction to Artificial Intelligence		
Course type:	Required	CE	Credit: 3
Level:	Undergraduate		
Co-requisite(s):	Course Name (8100000)		
Prerequisite(s):	Course Name (8100000) Analysis of algorithms		
Prerequisite by topic:			
Textbook(s):	[1] Use IEEE format. “Artificial Intelligence, A Modern Approach” 2 nd Edition, Stuart Russell and Peter Norvig, Prentice Hall		
Coordinator:	Manouchehr Moradi		
Goals:	To introduce the basics of artificial intelligence, such as problem solving, search algorithms, reasoning, planning and decision making under uncertainty, and learning to the students.		
Outcome:	<p>Upon successful completion of the course, students will be able</p> <ol style="list-style-type: none"> 1. to understand the structure of intelligent agents 2. to appreciate problem solving by search 3. to understand the importance of heuristic functions in search 4. to appreciate the usefulness of first order logic (FOL) in AI 5. to perform inferences in FOL 6. to understand of planning in AI 7. to understand the importance of uncertainty in AI systems 8. to understand learning from observations 9. to appreciate of the usefulness of knowledge-based systems 10. to understand the nature of robots, including perception, reasoning and action 		
Topics:	<ol style="list-style-type: none"> 1. Intelligent agents 2. Problem solving, complexity metrics 3. Uninformed search (BFS, DFS, Uniform cost, depth-limited, iterative deepening) 4. Informed search (Greedy, A*) 5. Other search (simulated annealing, genetic algorithms) 6. Game playing (minimax, alpha-beta pruning, nondeterministic games) 7. Knowledge-based agents 8. Propositional logic, syntax, semantics, inference, limitations 9. First-order logic (including inference, unification, Goedel’s 		

	<p>theorem, generalized modus ponens, resolution, forward chaining, backward chaining, situation calculus)</p> <p>10. Building a knowledge base (ontologies, translation between English and FOL, difficult cases like events, substances, composite objects)</p> <p>11. Logical reasoning systems (Implementing indexing, retrieval and unification. Theorem provers. Frame systems and semantic networks)</p> <p>12. Planning (including STRIPS)</p> <p>13. Uncertainty</p> <p>14. Decision Trees</p> <p>15. Fuzzy logic</p> <p>16. Neural networks (including Hopfield, perceptrons, backprop)</p>								
Computer usage:	<ul style="list-style-type: none"> - Implementing the projects using different programming lang. and packages. - 								
Assignments:	<ul style="list-style-type: none"> - 5 to 6 homework covering different topics 								
Projects:	<ul style="list-style-type: none"> - Uninformed search - Informed search - Game playing - Neural Networks 								
Grading:	<table> <tr> <td>Assignments:</td> <td>40%</td> </tr> <tr> <td>Quiz:</td> <td>5%</td> </tr> <tr> <td>Midterm exams:</td> <td>25%</td> </tr> <tr> <td>Final exam:</td> <td>30%</td> </tr> </table>	Assignments:	40%	Quiz:	5%	Midterm exams:	25%	Final exam:	30%
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Further readings:	[1]								
Prepared by:	Manouchehr Moradi, Hesham Faili								
Date:	November, 3, 2010								

*EE: Electrical Engineering CE: Computer Engineering IT: Information Technology