CSCI-360 Introduction to Artificial Intelligence (Section 30304R) – Spring 2018 Syllabus and Schedule

Classes: Wednesday, Friday, 4:30-6:20PM, Room WPH B-27
Office Hours and TAs: RTH 512, (see http://www.isi.edu/~shen/CS360)
Text Books: Artificial Intelligence: A Modern Approach (AIMA)
Reading Option: Autonomous Learning from the Environment (ALFE)

Week	Date	Topic	Reading	Homework	Project
1	Jan 10 Jan 12	Welcome, Class lectures, readings, homework, projects, exams, grades **Introduction** to AI, intelligent agents, environments, systems, and robots	AIMA1-2 (ALFE-1)		Project-0 out: Robot alive
2	Jan 17 Jan 19	**Problem Solving**, **Search** and **Optimization (1-2)** Problem representation and search algorithms (DFS, BFS, BFS, A*, etc.)	AIMA3 (ALFE-2,6)	HW1	
3	Jan 24 Jan 26	**Search Algorithms** (DFS, BFS, BFS, A*, etc.) (3) **Game Playing**, Representations and Algorithms (min-max, alpha-beta) (4)	AIMA4 AIMA5	HW2	Project-1 out: Robot search
4	Jan 31 Feb 2	**Propositional Logic**: Syntax, Semantics, Representations, and Inferences **First-Order Logic**, Syntax, Semantics, Representations, and Inferences	AIMA7 AIMA8-9	HW3	
5	Feb 7 Feb 9	**First-Order Logic**, Syntax, Semantics, Representations, and Inferences **Planning** and **Actions and Sensor Models**	AIMA10-11 (ALFE-3, 6.1)	HW4	
6	Feb 14 Feb 16	**Neural Networks** and **Back-Propagation** **Probability**: Representations and Inferences (22)	AIMA 13,18 (ALFE-4)	HW5	
7	Feb 21 Feb 23	**Bayesian Networks** Representation and reasoning of uncertain models & knowledge (23)	AIMA14 (ALFE-4)	HW6	Project-2 out: Robot search
8	Feb 28 Mar 2	**Supervised Learning:** Decision Trees Support Vector Machines	AIMA18 (ALFE-4)	HW7	
9	Mar 7 Mar 9	Review for the midterm exam **Midterm Exam: Close-book Exam (all materials above) – in class**			
10	Mar 14 Mar 16	Spring Break (No Classes)			
11	Mar 21 Mar 23	**Utility, Reward,** and **Policy** **Reinforcement Learning** and Markov Decision Process (MDP) (24)	AIMA16-17 AIMA21	HW8	Project-3 out: Robot learn
12	Mar 28 Mar 30	**Temporal Models** (reasoning over time with probabilities) Hidden Markov Models, **POMDP**, Dynamic Bayesian Networks (25)	AIMA 15 (ALFE4)	HW9	
13	Apr 4 Apr 6	**Supervised Learning Relational Concepts:** Motivations, challenges, and algorithms. Inductive logic programing, Learning Decision Lists	AIMA 19 (ALFE 5)	HW10	
14	Apr 11 Apr 13	**Unsupervised Learning** Algorithms, K-Means, Naïve Bayesian, **EM Algorithms,** Clustering	AIMA 20 (ALFE-7-10)	HW11	
15	Apr 18 Apr 20	**Learning POMDP** with states **Learning POMDP** without states (Surprise-Based Learning)	AIMA24-25 (ALFE11-12)	HW12	
16	Apr 25 Apr 27	Future of Artificial Intelligence and Robotics Review of Final Exam	AIMA 26-27 (ALFE-13)		
17	May --	**Final Exam: Close-book (materials of entire semester) – in class**			Final Exam

Midterm Exam: Mar 9, in Class
Final Exam: Time and Place to be announced

Project 0: Design and program a simple robot to move in an open environment
Project 1: Program intelligence to your robot so that it can search and navigate a path from point A to point B in a crowded deterministic environment
Project 2: Program intelligence to your robot so that it can search and solve problems in an non-deterministic environment
Project 3: Program your robot to learn from its own experience so that it can solve complex problems quickly in stochastic environments

Pre-Class Reading Reports: These are short summaries (with 6 questions) of your readings of the class material due *before* each class
In-Class Participations: You are encouraged to participate and ask questions in class, and such activities are recorded at each class by sign-up sheets
Homework: Your answers to the homework questions are due on the day when the next homework is out (we will let you know the correct answers)

Grades: Midterm: 30%, Final: 30%, Project-0: 3%, Project-1: 7%, Project-2: 10%, Project-3: 10%, Homework/Reading Reports: 8%, In-Class: 2%
Late Project Penalty: -30% of the project grade for each day that is late.

Grading is absolute and according to the following scale: 90 or more: A+; 80 or more: A; 75 or more: A-; 70 or more: B+; 60 or more: B; 55 or more: B-; 50 or more: C+; 40 or more: C; 35 or more: C-; less than 35: F.