EEL-5840 : Elements of Machine Intelligence  
FALL SEMESTER 2015

2015 Catalog Data: Elements of Machine Intelligence (3) Prereq: Senior or graduate standing. Engineering and hardware concepts pertaining to the design of intelligent computer systems.

Textbook(s): LISP, Winston & Horn, 3rd edition or later, 0-201-08319-1  

Optional References: Nilsson, Principles of Artificial Intelligence, Tioga, ’80, 0-934613-10-9  


Goals: An in-depth look at Machine Intelligence (e.g., Artificial Intelligence grounded in reality), both classical and modern, with a view toward grounding in reality. To implement Machine Learning Algorithms in autonomous robots. To provide an "engineering approach" to the emerging field of MI, to impart a conceptual foundation on the principles behind the current MI technology.

Prerequisites by Topic:
1. Data Representation  
2. Engineering Programming  
3. Digital computer principles

Topics: {Tentative}
2. Search in State-Spaces: Agents that Plan, Uninformed Search, Heuristic Search, Planning, Acting and Learning, Alternative Search, Adversarial Search  
3. Problem Representation and Reasoning: Propositional Calculus, Resolution, Predicate Calculus, Knowledge-Based Systems, Representing Commonsense Knowledge  
4. Rule-Based Deduction: forward & backward reasoning, rule-based systems, logic programming, expert systems.  
5. AI Communication and Integration  
6. AI Programming: LISP, Prolog (an overview).  
7. An overview of animal learning and simulation.  
8. Robot Learning and Q-Learning (time permitting)

Computer Usage: 
Weekly programming assignments using PC/MAC-based LISP (shareware). One major / minor problem from the examples discussed in class might be assigned as a project. Homework and programs are worth 20% of the grade.

Laboratory Projects: 
No formal labs required.

Grading 
Two in-class exams (2 x 40%) 80%, homework assignments & programs (see above) 20%. Grading Scale is 93.67-100 A, 90-93.66 A-, 86.67-89.99 B+, 83.67-86.66 B, 80-83.66 B-, 76.67-79.99 C+, etc. NO MAKEUP EXAMS.

Attendance and Expectations 
Class attendance is not required, but class attendance is essential in that not all of the in-class material is expounded on in the class textbook(s). Tardiness is unacceptable and all cell phones must to be turned off during class.