

**EEL-5840 : Elements of Machine Intelligence  
FALL SEMESTER 2008**

**2008 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, 3<sup>rd</sup> edition or later, 0-201-08319-1  
Nilsson, Artificial Intelligence: A New Synthesis, Morgan-Kauffman, 1998, 1-55860-467-7

**Optional References:** Nilsson, Principles of Artificial Intelligence, Tioga, '80, 0-934613-10-9  
Russell & Norvig, Artificial Intelligence: A Modern Approach, Prentice-Hall, '03, 0-13-103805-2  
Winston, Artificial Intelligence, Addison-Wesley, 1993, 0-201-53377-4

**Coordinator(s):** Instructors: Assoc. Prof. A. Antonio Arroyo. Machine intelligence, robotics, artificial intelligence, microcomputers, expert systems, human-machine interaction, computer software & hardware, pattern recognition, DSP, natural language processing. MAEB 338, 392-2639 arroyo@mil.ufl.edu.  
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**Goals:** An in-depth look at Machine Intelligence, 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 }

1. Reactive Machines: Stimulus-Response Agents, Neural Nets, Machine Evolution, State Machines and Robot Vision.
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:**

Bi-weekly programming assignments using a PC/MAC-based LISP (shareware). One major and one minor problem from the examples discussed in class will be assigned as projects. Homework and programs are worth 34% of the course grade.

**Laboratory Projects:**

No formal labs required.

**Grading**

Two in-class exams (2 x 33%) 66%, homework assignments & programs 34%