

# CS116 – Artificial Intelligence

## Fall, 2013

### Course Information

**OVERVIEW:** The course examines the principles of intelligence, asking questions such as: What is intelligence? How is it generated? How can we make computers behave intelligently? What would it mean to us as humans if or when we are able to do so? We will cover the standard problems and approaches of Artificial Intelligence and explore some of the standard questions in Philosophy of AI.

**PREREQUISITES:** CS030.

**COURSE OBJECTIVES:** (from the Westmont catalog) “Computational and philosophical principles of intelligence; methods for knowledge representation; automated reasoning, and learning.” Artificial Intelligence has become a very large discipline in its own right; much too large to allow an “introduction” at the undergraduate upper-division level. Thus, we will explore a few slices of AI in some depth, while considering some of the philosophical issues and questions that are relevant to the field as a whole. The primary objective is for students to acquire a solid and nuanced understanding of the central issues and techniques in AI. Upon completion of this course, students should be familiar with most of the significant areas of study in Artificial Intelligence, be familiar with the common techniques used to address the problems of AI, and broadly grasp the relevant questions from Philosophy of AI. The emphasis will be upon broad understanding and connections to Philosophy and Cognitive Science. However, the course should provide a good foundation for future work in AI, either in advanced undergraduate or graduate-level courses, or in certain applications within the commercial sector.

### Logistical Information

**INSTRUCTOR:** Dr. Wayne Iba

**OFFICE:** Winter Hall 308

**OFFICE HOURS:** *TBD*

**EMAIL:** [IBA@WESTMONT.EDU](mailto:IBA@WESTMONT.EDU)

**PHONE:** (805)565-6799

**LOCATION:** Voskuyl Library, room 307.

**DAYS & TIME:** Monday, Wednesday and Friday, 9:15-10:20 am.

**REQUIRED TEXTS:**

*Artificial Intelligence: A modern approach (second edition)*, by Stuart Russell and Peter Norvig. Prentice Hall. (2003).

**COURSE WEBPAGE:** <http://www.westmont.edu/~iba/teaching/CS116/F13>

## **Course Assignments, Requirements and Policies**

**CLASS PARTICIPATION:** A significant portion of the course will address readings in the Philosophy of Artificial Intelligence, and will be conducted in seminar discussion style. Students are expected to have read the assigned texts, written notes and questions in their journals, and thought carefully about it prior to class so as to contribute to the in-class discussion. Students will make periodic presentations to the class on special topics selected by the student in consultation with the instructor. Class participation will be an element in the grading scheme and will be based on preparation, contributions to discussion, and presentations.

**ASSIGNMENTS:** Assignments will consist of small-to-medium programming problems. Programs may be written in any language of your choice, *but must run on my linux box with minimal installation/configuration*. Additionally, the chosen language must support the standard socket layer and interface to the simulated environment that will be provided. Details for each assignment will be posted on the course web page and/or Eureka, and will be due as indicated there. Plan to turn your assignments in well before the deadline as late work will not be accepted.

**TESTS & EXAMS:** There will be one mid-term and a final exam. Exams must be taken at the scheduled time unless arrangement is made with the instructor in advance.

**ATTENDANCE:** Attendance is required. You will find it difficult to participate in class if you are not present. Students are responsible for all material covered either in class or assigned readings. Unexcused absences in excess of that allowed (3) will lower the course grade by one letter grade for each occurrence.

**GRADING:** Students will be evaluated on how well they master the concepts presented and discussed in class. A final weighted score will be based on the following scheme: class participation (including presentations) (30%), final exam (20%), mid-term (15%), projects (35%). The weighted final letter grade will be based on the standard 90%, 80%, etc. percentile brackets.

**ACADEMIC HONESTY:** As in every area of life, I expect that you will conduct yourself honestly within the context of this class. Do not attempt to receive credit for work that is not your own without properly acknowledging sources via appropriate citations or references. You are encouraged to get help from your peers, but be sure that you acknowledge such help and that you understand the problem on which help was received. The consequences of violating the trust I implicitly extend to you will be according to the Westmont policy; but more serious will be the damage done to our academic relationship.

## Nominal Schedule

8/26-30	Introductions; what is AI?	Foundations; Ch 1	Agents and agency; Ch 2
9/2-6	REACTIVE AGENT EXERCISE	Search; problem-solving; Ch 3	Informed search; Ch 4
9/9-13	SEARCH AGENT EXERCISE	Constraint satisfaction problems; Ch 5	Game tree search; Ch 6
9/16-20	GAME TREE SEARCH EXERCISE	Philosophical reflections	
9/23-27	Logical agents; Ch 7	Resolution/refutation	First-order logic; Ch 8
9/30-10/4	Knowledge representation; Ch 10		
10/7-11	Review and philosophical reflections		<i>Exam</i>
10/14-18	<i>Fall Holiday – no class</i>	Planning; Ch 11	Scheduling; Ch 12
10/21-25	PLANNING EXERCISE	Uncertainty; Ch 13	Probabilistic reasoning; Ch 14
10/28-11/1		Probabilistic reasoning over time; Ch 15	Making simple decisions; Ch 16
11/4-8	Making complex decisions; Ch 17		PROBABILISTIC AGENT EXERCISE
11/11-15	Communication; Ch 22	Probabilistic language processing; Ch 23	
11/18-22	LANGUAGE GENERATION EXERCISE	Perception; Ch 24	Robotics; Ch 25
11/25-29	Philosophical foundations; Ch 26	<i>Thanksgiving Holiday – no class</i>	
12/2-6	Philosophical reflections		
12/9-13	<i>Final Exam: Wed. Dec. 11, 8-10am</i>		