Instructor
Professor Amy Sliva
Office: 256 West Village H
Office Hours: Th 3:30pm-4:30pm, or by appt.
asliva@ccs.neu.edu

Course Description

Prerequisite: Experience in Java programming
Credits: 4 credits
Lecture: Th 6:00pm–9:00pm, 435 Ryder Hall

This course introduces the fundamental problems, theories, and algorithms of the artificial intelligence field. Topics covered include: automated deduction and problem-solving; heuristic search and planning; Bayesian inference and statistical learning methods; natural language processing. Required course work includes the creation of working programs that solve problems, reason logically, and/or improve their own performance using techniques presented in the course.

Required Textbook

BE SURE TO GET THE 3rd EDITION—it is significantly different (and better) than the 2nd edition!!

Recommended Books

For students new to Python: Learning Python, 3rd edition by Mark Lutz (O’Reilly, 2007). Note: The latest edition (4th edition) describes Python 3.0, so please use the 3rd edition. Other (free) resources for learning python: The Python Tutorial (vers 2.6), and Dive into Python (somewhat out of date but still useful).
Course Administration

There will be 5-6 homework assignments, containing written and/or programming problems. We will use Python (vers. 2.x), a language that is replacing Lisp and Perl as the preferred language for AI programming. There will be two exams: a midterm exam and a final exam.

Assignments and lecture notes will be available online on the Schedule page. Weekly readings, sample programs and other class resources will be available on the Resources page and also on Blackboard.

This course will introduce the fundamentals of AI through lectures, readings, and discussions of relevant research topics. Each week, students will be assigned one or more relevant research papers to be discussed in class. Reviews of the papers must be completed using the template given in Bill Griswold’s “How to Read an Engineering Research Paper” and submitted to the instructor by 12:00 pm on the day of class.

In order to become more acquainted with applications of AI, students will work in teams to study an application paper, and present a 15 minute talk to the class describing the application and summarizing the paper. The papers will be selected from the annual IAAI conference (Innovative Applications of Artificial Intelligence) (or from AI Magazine—selections from AI magazine must be pre-approved by the professor to be sure they qualify as ”application papers”). The presentations will take place during the last four weeks of the semester.

Academic Honesty

The individual assignments must be each student’s own work. Any group projects assigned must be the work of the students in the group. Plagiarism or copying will result in official University disciplinary review. Security is an important aspect of computer science. Students are expected to protect their work from plagiarists.

Course Evaluations

The Teacher Rating and Course Evaluation (TRACE) survey is a required part of every course at Northeastern University. All students are expected to participate in TRACE at the end of the semester to provide feedback about the course and instructor. This will help us develop better courses for you!

Exams

The class includes a midterm and a final exam. Tentative dates for the exams are:
Midterm: October 27, 2011
Final Exam: December 15, 2011

The exact dates will be confirmed later, and may vary due to the progress of lecture and other factors.

Grading

Your course grades will be (tentatively) determined according to the following percentages:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Assignments</td>
<td>40%</td>
</tr>
<tr>
<td>Presentation</td>
<td>10%</td>
</tr>
<tr>
<td>Midterm</td>
<td>20%</td>
</tr>
<tr>
<td>Final</td>
<td>30%</td>
</tr>
</tbody>
</table>

Class attendance and participation in research discussions will also be taken into account in determining the course grade. Late assignments may be discounted, and very late assignments may be discarded. **In order to achieve a passing grade, students must pass both the homework and the exams portion of the course.**

Schedule (Tentative)

The following schedule may vary according to the pace of lecture.

September 7: *Introduction; Intelligent Agents; Python Introduction*
Readings: RN 1.3 & 1.4, Ch. 2

September 15: *Agents, Logic, & Reasoning*
Readings: RN 7.1–7.5, Ch. 8
Assignment 1 due by midnight (11:59pm)

September 22: *Logical Inference*
Readings: RN 9.1-9.3
Review: No review
*Select Teams for Student Presentations (sign up during the break)*

September 29: *Logical Inference (continued)*
Readings: RN 9.4–9.5

*Assignment 2–Part I due at beginning of class*

October 6: **Search Problems and Solutions**
Readings: RN Ch. 3

*Assignment 2–Part II due by midnight (11:59pm)*

October 13: **AI Planning**
Readings: RN 10.1–10.4

*Assignment 3–Part I due at beginning of class*

October 20: **Ontology Design & Development**

*Assignment 3–Part II due by midnight (11:59pm)*

October 27: MIDTERM EXAM!

November 3: **Probabilistic Inference**
Readings: RN Ch. 13, 14.1–14.3

November 10: **Bayesian Networks**
Readings: RN 14.4 & 14.7
Assignment 4 due by midnight (11:59pm)

November 17: **Decision Trees**
Readings: RN 18.1–18.4

November 24: **Thanksgiving Break!**

December 1: **Natural Language Processing**
Readings: RN Ch. 22, 23.1 & 23.2

Assignment 5 due by midnight (11:59pm)

December 8: **Support Vector Machines**
Readings: RN 18.9
Vikramaditya Jakkula, Tutorial on Support Vector Machine (SVM).

December 15: **Final Exam**