Video games are examples of successful real world applications of Artificial Intelligence.

Instructor:
Name: Dr. Robert G. Reynolds
Office location: 5057 Woodward Ave; Suite 14001
Phone: 313-577-0726
Email: aa0057@wayne.edu

Dr. Robert G. Reynolds
CSC 6800
Office Hours: Monday and Wednesday 02:45 PM – 03:45 PM (or by appointment)

GRADER:

Thomas Palazzolo
Office hours: M W 2:45-3:45 (or by appointment)
Office Location: 5057 Woodward, Suite 3216 (AI Lab)
Email: dz3786@wayne.edu

Course Description:

6800 Artificial Intelligence I. Cr. 3

Basic concepts; topics include: recursive problem solving, knowledge representation using semantic networks and frames, state space search methods, planning and problem solving, game playing and adversarial search methods, rules and production systems (RETE networks), constraint satisfaction techniques and applications, optimization algorithms including genetic algorithms, logic programming.

This course will emphasize the contribution of Artificial Intelligence to the solution of problems in Data Science. The emphasis will be on the implementation of various AI tools in terms of the Ruby language and CLIPS knowledge based programming language.

Supplementary information for the course is available at http://blackboard.wayne.edu. Log on with your Access ID for class notes, lecture slides, class announcements, the course syllabus, and other information for the course. You will submit your assignments and project and check grades there too.

Credit Hours:
3 Credit Hours (Lct: 3)

Perquisite: CSC 22000 and CSC 2201 or CSC 5800, or CSC 3200, or consent of instructor.

Text(s) Book:


Computer Programs:

The course will use the Ruby 2.1.6, LISP, PROLOG, and CLIPS 6.30 programming languages. They can be downloaded along with tutorial documentation from the web at:

http://rubyinstaller.org/downloads/


STUDENT LEARNING OUTCOMES: At the conclusion of the course the student will be able to do the following:

1. Describe the basic approaches to Artificial Intelligence research and their relation.

2. Identify the various phases of problem solving and apply those phases to the solution of classic problems in Artificial Intelligence as well as related real-world problems.

3. Describe and apply the basic representational frameworks used to encode knowledge such as semantic networks, frames, probabilistic, logic, and rule-based approaches.

4. Describe and apply the basic algorithms to support uninformed, and informed search.

5. Describe and apply the basic reasoning framework such as logic-based, rule-based, and probabilistic approaches to the solution of problems.

6. Describe the basic approaches to machine learning such as decision trees, neural networks, and nature-inspired techniques to the acquisition of knowledge.

7. Describe and apply the basic Artificial Intelligence techniques to areas such as Planning and Scheduling, Language Understanding, and Computer Vision.

GRADING:

Homework (10 X 20 = 200 points)
Midterm (150 points, October 16, 4:00 – 5:20 in class)
Final (150 points, December 13, 4:00 – 5:20 in class)

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Total 500 points

ALL STUDENTS IN BOTH SECTIONS (IN CLAA AND ON LINE) MUST BE ABLE TO TAKE THE EXAMS IN CLASS ON OCTOBER 16TH AND DECEMBER 13TH. NO EXCEPTIONS WILL BE MADE OR MAKE UP EXAMS GIVEN.

A 90-100%
A- 85-89%
B+ 80-84%
B 75-79%
B- 70-74%
C+ 67-69%
C 63-67%
C- 60-62%
F 0-59%

The grades for the course will be based upon the percentages given above. Differential grading criteria/requirements will be used since this is a dual level course (i.e., at the 5000 or 6000 level and can be taken for credit by both undergraduate and graduate students). Undergraduate and graduate students will graded separately, but the adjusted scores will be given using the same scale as above.

LK=Lucci and Kopec
B= Brownlee
CL= Giarrantano.
K=Kopec, Shetty, and Pileggi.

<table>
<thead>
<tr>
<th>WEEK</th>
<th>CHAPTER</th>
<th>Subject</th>
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<tr>
<td>Aug. 30</td>
<td>LK 1, B1, B.App.A, K1</td>
<td>Overview of Artificial Intelligence of AI A1 OUT.</td>
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<tr>
<td>Sep. 04</td>
<td>Holiday - University Closed</td>
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<tr>
<td>Sep. 06</td>
<td>LK 1, B1, K2</td>
<td>Overview of Artificial Intelligence</td>
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<tr>
<td>Sep. 11</td>
<td>LK 2, B2, K3</td>
<td>Uninformed Search A1 IN, A2 OUT</td>
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<tr>
<td>Sep. 13</td>
<td>LK 2, B2, K3</td>
<td>Uninformed Search</td>
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<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Topic</th>
<th>Details</th>
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<tr>
<td>Sep. 18</td>
<td>LK 3, B3, K4</td>
<td>Informed Search</td>
<td>A2 IN, A3 OUT</td>
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<tr>
<td>Sep. 20</td>
<td>LK 3, B3, K4</td>
<td>Informed Search</td>
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<tr>
<td>Sep. 25</td>
<td>LK 4, B4, K5</td>
<td>Search Using Games</td>
<td>A3 IN, A4 OUT</td>
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<tr>
<td>Sep. 27</td>
<td>LK 4, B4, K5</td>
<td>Search Using Games</td>
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<td>Oct. 02</td>
<td>LK 5, CL2, K6</td>
<td>Logic in Artificial Intelligence</td>
<td>A4 IN, A5 OUT</td>
</tr>
<tr>
<td>Oct. 04</td>
<td>LK 5, CL 2-3, K6</td>
<td>Logic in Artificial Intelligence</td>
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<tr>
<td>Oct. 09</td>
<td>LK 6, CL 2-3, K6</td>
<td>Knowledge representation</td>
<td>A5 IN</td>
</tr>
<tr>
<td>Oct. 11</td>
<td>LK 6, CL 6-7, K6</td>
<td>Knowledge Representation</td>
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<tr>
<td>Oct. 16</td>
<td>LK 7, CL 7, B5</td>
<td>MIDTERM EXAM (IN CLASS AND ON LINE TAKE TOGETHER, NO MAKEUPS)</td>
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<tr>
<td>Oct. 18</td>
<td>LK 7, CL 7, B5</td>
<td>Production Systems</td>
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<tr>
<td>Oct. 23</td>
<td>LK 8, CL 4, B5, K7</td>
<td>Uncertainty in Artificial Intelligence</td>
<td>A6 OUT</td>
</tr>
<tr>
<td>Oct. 25</td>
<td>LK8, CL 4, B5, K7</td>
<td>Uncertainty in Artificial Intelligence</td>
<td></td>
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<tr>
<td>Oct. 30</td>
<td>LK 9, CL 8, B6, K8</td>
<td>Expert Systems</td>
<td>A6 IN, A7 OUT.</td>
</tr>
<tr>
<td>Nov. 01</td>
<td>LK 9, CL 8, B6, K8</td>
<td>Expert Systems</td>
<td>A7 IN, A7 OUT.</td>
</tr>
<tr>
<td>Nov. 06</td>
<td>LK 10, B8, K9</td>
<td>Machine Learning I</td>
<td>A7 IN, A8 OUT</td>
</tr>
<tr>
<td>Nov. 08</td>
<td>LK 10, B8, K9</td>
<td>Machine Learning I</td>
<td>A7 IN, A8 OUT</td>
</tr>
<tr>
<td>Nov. 13</td>
<td>LK 11, B3, K10</td>
<td>Machine Learning II: Neural Networks</td>
<td>A8 IN, A9 OUT</td>
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<tr>
<td>Nov. 15</td>
<td>LK 12, B3, K10</td>
<td>Nature Inspired Search</td>
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<tr>
<th>Date</th>
<th>Lecture</th>
<th>Topic</th>
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| Nov. 20  | LK 12, B3, K11 | Nature Inspired Search  
|          |          | A9 IN, A10 OUT                                                        |
| Nov. 22  | Holiday- No Classes |                                                                 |
| Nov. 27  | LK 13, B7, K11 | Natural Language Understanding                                      |
| Nov. 29  | LK 14, B7, K11 | Automated Planning                                                  |
| Dec. 04  | LK 15-16, B9, K12 | Robotics, Advanced Computer Games  
|          |          | A10 IN                                                               |
| Dec. 07  | LK16-17, B9, K12 | Advanced Computer Games, The Present and Future                     |
| Dec. 11  | LK 17, K13-14 | The Present and Future                                              |
| Dec. 13  |          | Final Exam (In Class and On Line)                                    |

**SUBMISSION REQUIREMENTS AND GRADING POLICY:**

1. There will be no in-completes given for the course.

2. Cheating of any kind is not allowed and will be handled in accordance with University Policy.

3. Points deduction for late submission for lecture assignments will be applied as the following:

<table>
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<tr>
<th>On Due Date</th>
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<th>One Week</th>
<th>Then</th>
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<tr>
<td>0 deduction</td>
<td>10% deduction</td>
<td>50%</td>
<td>100% deduction</td>
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4. **Submission format for assignments:**
All lecture assignments must be submitted by the blackboard. No email or hard copy is accepted. You must follow the following format:

   a. Use Microsoft word file (don’t use the text box on the blackboard) to answer the assignment questions or to write comments.
   b. Include the following information (we will deduct points for each missing piece of information even if your answer is correct):
      1. Full name
      2. Class name (CSC 6800)
      3. Assignment number and date
      4. Complete Quiz or assignment questions.

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c. State your answer clearly

d. If your assignment requires more than one file make sure to include all files including Microsoft word file in one folder and compressed (zipped) your folder using (.zip) not rar.

e. Submit your file to the blackboard (FirstName_LastName_AssignmentNumber), we will not grade any file that is not in the above format. You must submit the file on time; otherwise, points will be deducted for late submission. In addition, you are not allowed to submit your file more than one time.

f. There will be one folder on the blackboard for lecture assignments. You need to upload your file using that folder on the blackboard.

g. There are 3 STEPS required to submit a document as an Assignment in Blackboard:

   1. Browse
   2. Attach
   3. Submit

If you do not attach the document before submitting, your instructor will not receive your assignment.

It is your responsibility to make sure that your file is uploaded correctly; you can check that by going to the assignment folder on the blackboard and click the link to your file that you uploaded.

h. Grades will be posted on the blackboard after the assignment folder disappears from the blackboard.

7. Code and documentation submission

5-10 points of each programming part of any assignment will be taken away if you miss one of the followings:

**Code:**

- Includes the whole project including executable file
- Includes run instructions
- Use only the code and the software associated with the required books

**Documentation:**

In a Microsoft word:

- Type each question and the answer under it
- List code, highlight changes and explain them
- Show output/screenshot and explain it

**RELIGIOUS HOLIDAYS:**

Because of the extraordinary variety of religious affiliations of the University student body and staff, the Academic Calendar makes no provisions for religious holidays. However, it is University policy to respect the faith and religious obligations of the individual. Students with classes or examinations that conflict with their religious observances are expected to notify their instructors well in advance so that mutually agreeable alternatives may be worked out.

**STUDENT DISABILITY SERVICES:**

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If you have a documented disability that requires accommodations, you will need to register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS) office is located in the Adamiy Undergraduate Library. The SDS telephone number is 313-577-1851 or 313-202-4216 (Videophone use only). Once your accommodation is in place, someone can meet with you privately to discuss your special needs. Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.

Students who are registered with Student Disability Services and who are eligible for alternate testing accommodations such as extended test time and/or a distraction-reduced environment should present the required test permit to the professor at least one week in advance of the exam. Federal law requires that a student registered with SDS is entitled to the reasonable accommodations specified in the student’s accommodation letter, which might include allowing the student to take the final exam on a day different than the rest of the class.

ACADEMIC DISHONESTY:
Academic misbehavior means any activity that tends to compromise the academic integrity of the institution or subvert the education process. All forms of academic misbehavior are prohibited at Wayne State University, as outlined in the Student Code of Conduct (http://www.doso.wayne.edu/student-conduct-services.html). Students who commit or assist in committing dishonest acts are subject to downgrading (to a failing grade for the test, paper, or other course-related activity in question, or for the entire course) and/or additional sanctions as described in the Student Code of Conduct.

• **Cheating**: Intentionally using or attempting to use, or intentionally providing or attempting to provide, unauthorized materials, information or assistance in any academic exercise. Examples include: (a) copying from another student’s test paper; (b) allowing another student to copy from a test paper; (c) using unauthorized material such as a "cheat sheet" during an exam.

• **Fabrication**: Intentional and unauthorized falsification of any information or citation. Examples include: (a) citation of information not taken from the source indicated; (b) listing sources in a bibliography not used in a research paper.

• **Plagiarism**: To take and use another’s words or ideas as one’s own. Examples include: (a) failure to use appropriate referencing when using the words or ideas of other persons; (b) altering the language, paraphrasing, omitting, rearranging, or forming new combinations of words in an attempt to make the thoughts of another appear as your own.

• **Other** forms of academic misbehavior include, but are not limited to: (a) unauthorized use of resources, or any attempt to limit another student’s access to educational resources, or any attempt to alter equipment so as to lead to an incorrect answer for subsequent users; (b) enlisting the assistance of a substitute in the taking of examinations; (c) violating course rules as defined in the course syllabus or other written information provided to the student; (d) selling, buying or stealing all or part of an un-administered test or answers to the test; (e) changing or altering a grade on a test or other academic grade records.

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COURSE DROPS AND WITHDRAWALS:
There will be no in-completes given for the course. In the first two weeks of the (full) term, students can drop this class and receive 100% tuition and course fee cancellation. After the end of the second week there is no tuition or fee cancellation. Students who wish to withdraw from the class can initiate a withdrawal request on Pipeline. You will receive a transcript notation of WP (passing), WF (failing), or WN (no graded work) at the time of withdrawal. No withdrawals can be initiated after the end of the tenth week. Students enrolled in the 10th week and beyond will receive a grade. Because withdrawing from courses may have negative academic and financial consequences, students considering course withdrawal should make sure they fully understand all the consequences before taking this step. More information on this can be found at: http://reg.wayne.edu/pdf-policies/students.pdf

STUDENT SERVICES:
- The Academic Success Center (1600 Undergraduate Library) assists students with content in select courses and in strengthening study skills. Visit www.success.wayne.edu for schedules and information on study skills workshops, tutoring and supplemental instruction (primarily in 1000 and 2000 level courses).
- The Writing Center is located on the 2nd floor of the Undergraduate Library and provides individual tutoring consultations free of charge. Visit http://clasweb.clas.wayne.edu/writing to obtain information on tutors, appointments, and the type of help they can provide.

CLASS RECORDINGS:
Students need prior written permission from the instructor before recording any portion of this class. If permission is granted, the audio and/or video recording is to be used only for the student’s personal instructional use. Such recordings are not intended for a wider public audience, such as postings to the internet or sharing with others. Students registered with Student Disabilities Services (SDS) who wish to record class materials must present their specific accommodation to the instructor, who will subsequently comply with the request unless there is some specific reason why s/he cannot, such as discussion of confidential or protected information.

OTHER ISSUES:
- Food and drink are not allowed during the lecture or lab hours.
- Cell phones and other two-way communication devices: Students are expected to turn off their devices or turn them to the silent mode when they come to the lecture or to the lab. If a device is used in any way in the lab, you will receive a verbal warning first and then you will be asked to leave immediately.

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