CAP 4053 and CIS 6930: Artificial Intelligence for Computer Games

Course Syllabus, v1.1, last revised 1/13/2016

Course Logistics

Meeting Times:
- Mondays, Wednesdays, Fridays Period 6 (12:50pm to 1:40pm, 50 minutes)

Meeting Location:
- CSE E119

Instructor Information

Instructor: Lisa Anthony, PhD
- E-mail address: lanthony@cise.ufl.edu (put ‘AI4G’ in subject)
- Office hours: Mondays 4:05pm to 4:55pm; Tuesdays 4:05pm to 4:55pm; Fridays 3:00pm to 3:50pm
- Office location: CSE Building, E542
- Telephone: 352-505-1589 (answered during office hours only)
- Class Web site: https://aiforgamesufcise.wordpress.com/
- E-learning (Canvas): https://ufl.instructure.com/courses/325220 (login via blue ‘Canvas’ button at https://lss.atl.ufl.edu)

Teaching Assistant(s): Gokhan Kaya
- E-mail address: gkaya@cise.ufl.edu (put ‘AI4G’ in subject)
- No office hours

Course Information

Catalog Description:
- CAP 4053 – Artificial Intelligence for Computing Games – Credits: 3.
  Examines the use of A.I. in computer games. Topics include general A.I. knowledge, path finding, movement, tactics and planning, strategy, state machines, learning, dialogue, and emotions.
- CIS 6930 – Special Topics in CISE – Credits: 3.

Course Overview:
This course focuses on game design and development of fun, smart, challenging games. Featuring guest lectures by industry insiders, the course emphasizes how AI techniques are used in current games to make enemies smarter, to balance puzzles, and more.

The highlight of the course is a group project to design and build a game. To make these games successful, this course is for students who are interested in game design, user experience and play-testing, art and animation, music and sound production, AI, and programming. Students
interested in taking this course need not have all of these skills; groups will be balanced 
according to individual skill to create well-rounded teams.

The course will be taught as a seminar/project class. Students will write several essays on topics 
related to game design, make one presentation on one of the various course topics, design a game 
concept and pitch it to the class, and develop a game in a group.

**Pre-requisites and Co-requisites:**
- [CAP4053] COP 3530 Data Structures and Algorithms.

**Course Components:**
This course involves the following components:
- Lectures – core game design and development topics will be presented and discussed. 
  Additional guest lectures from industry experts will be included.
- Presentations – students will prepare one group presentation on AI topics relevant to 
  game design and development. Peers will evaluate and critique presentations.
- Project – one group project involving the design and development of a novel game. 
  Game concepts will be pitched in groups, and students will vote on which one(s) they 
  would like to work on. A public showcase, Game Day, will be held at the end of the 
  semester (tentative date: April 18, 2016).
- Homework – individual written assignments related to current game design trends, 
  events, and topics.
- Peer Evaluations – all group assignments will incorporate peer feedback on teammate 
  contributions and skills.

**Course Objectives:**
By the end of this course, students will be able to:
- Identify elements of good game design in current and historical games.
- Choose an effective and appropriate game development platform for new game 
  concepts.
- Perform independent background research on a technical topic in AI and prepare a 
  professional presentation to introduce and explain the topic.
- Design, develop, and evaluate a game prototype that uses AI effectively to make 
  smarter enemies or more interesting challenges.

**Course Materials**

**Textbooks Required:**
No textbook is required for this course.

**Textbooks Recommended:**
There are two recommended texts for this class (available in the local and online bookstore):
- *Artificial Intelligence for Games*, by Ian Millington, Morgan Kaufmann, ISBN: 0-12- 
  497782-0
- *AI for Game Developers*, David Bourg and Glenn Seemann, O’Reilly, ISBN: 978-
  0596005559
Additional resources can be found on the Web or in the following books:

- *AI Game Programming Gems*, Thomson Learning, Inc. – a series of books on various aspects of game development
- *AI Game Programming Wisdom*, Thomson Learning, Inc. – a series of books on various aspects of game development (Dr. Anthony has copies of Vol. 1-3 and can make available sections as needed)

**Software Required:**
No software is required for this course. There are a number of free or low-cost software packages students can use to help in developing the game project. See ‘Resources’ on the course website.

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**Course Outline**

**Course Topics:**
- Introduction to game design.
- Game development in common platforms.
- Artificial intelligence algorithms and techniques for game design (see below).
- User interfaces for games.
- Playtesting and user evaluation for games.

**AI Presentation Topics:**
The following are topic ideas for the class presentations (see *AI Game Programming Wisdom 2*, section 1.1 and 1.2 for short descriptions of most of these – these sections are also posted on the Canvas class page under Files -> resources):


**Course weekly schedule will be posted separately.**

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**Grading**
The following items will contribute to students’ grades in this course:

- AI Topic Presentation 20%
- Game Project (including pitch) 40%
- Homework (essays) 20%
- Attendance/Participation 20%
- No mid-term or final exams

**Grading Scale:**

- 100-92 A, 91-90 A-
89-88 B+, 87-82 B, 81-80 B-
79-78 C+, 77-72 C, 71-70 C-
69-68 D+, 67-62 D, 61-60 D-
59-0 E

All final course grades will be rounded to the nearest whole number.

This course will use the Canvas e-Learning course management system (https://lss.at.ufl.edu) to post grades and to communicate with class members. If you have a question about the course that other students could benefit from hearing the answer, please post to the appropriate discussion thread on Canvas rather than sending individual emails to the instructor.

**Expectations for Graduates vs. Undergraduates in this Course:**
Graduate-level sections of this course involve more advanced material and more in-depth study than the undergraduate sections. Graduate students enrolled in this course must:
- Prepare a presentation on more advanced AI topics and in smaller groups than undergraduates are required to do.
- Conduct one additional play-testing iteration on their game project.
- Design and develop a more robust final prototype of their game project.

Undergraduate students who are interested may do the additional work as extra credit. See the instructor beforehand to arrange this. Your entire group must agree if opting for increased complexity in the game project.

**Undergraduate Grading Scale Note:**
A C- will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

**Graduate Grading Scale Note:**
Graduate students need an overall GPA of 3.00 truncated and a 3.00 truncated GPA in their major (and in the minor, if a minor is declared) at graduation. For more information on grades and grading policies, please visit: http://gradcatalog.ufl.edu/content.php?catoid=4&navoid=907#grades

**Honor Code & Collaboration:**
High level questions, syntax topics, and algorithms can be discussed amongst each other and amongst the groups. Not allowed in this course include the following:
1) **plagiarism** (misrepresenting others’ ideas as your own, can be fixed with simple citation),
2) **copying code**,  
3) **social loafing** (e.g., for group work), and  
4) **work offensive to others**.
As for other courses in CISE in the past, offenders will be held to the UF Honesty Policy (see below) including reporting incidents to the Dean of Students. The results of this have included failing grades, ethic lectures, and a permanent mark in records (which can lead to expulsion).

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**Course Policies**

**Late Assignments:**
All assignments will be assessed a late penalty of -10% for each day late. After 3 days, students will receive a 0. The only exception to this rule is if students contact the instructor **in writing before the assignment due date** to make arrangements for lateness.

**Attendance:**
Participation in critiques of the AI topic presentations is a required component of this course, and as such, **attendance of class meetings is expected**. If a student is sick or will be absent for a significant period of time, please contact the instructor to discuss options.

**Make-ups:**
Students who contact the professor **before the due date** with appropriate requests for extension and/or makeup assignments will be given an additional amount of time to make up late assignments equal to the time lost due to the unforeseen circumstance.

**Incompletes:**
Incompletes will be granted for only the most extreme circumstances, e.g. medical or family reasons. To be considered for an incomplete, the student **must** 1) let the professor know at in advance that they are seeking an incomplete, and 2) provide documentation to support the request.

Requirements for class attendance and make-up exams, assignments, and other work are consistent with university policies that can be found at: [https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx)

**Classroom Expectations:**
To be courteous to your fellow students, please:
- Turn all cell phone ringers to silent and step outside to take calls.
- Turn off all audible notifications on laptops and phones.
- Refrain from texting during class.
- Use laptops only for taking notes or looking up relevant information (no Facebook, YouTube, Twitter, etc.).

**Guest Lectures:**
In this course, industry experts may be invited to present material as guest lectures related to their areas of expertise and how it relates to the course material. These guests are taking time out of their busy schedules to share their knowledge with you. Please respect their time and attend the guest lectures as you would any other meeting of the course.
University Policies and Resources

Honesty Policy
UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Note that failure to comply with this commitment will result in disciplinary action compliant with the UF Student Honor Code Procedures. See http://www.dso.ufl.edu/sccr/procedures/honorcode.php

Accommodation for Students with Disabilities
Students requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

UF Counseling Services
Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
- Career Resource Center, Reitz Union, 392-1601, career and job search services.
- University Police Department 392-1111

Software Use
All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Course Evaluations
Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results.