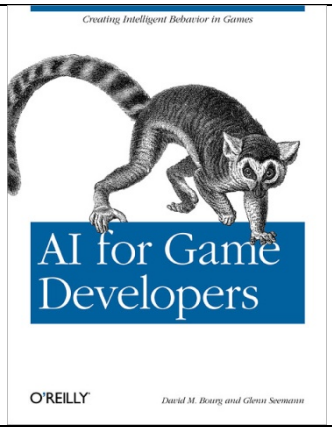
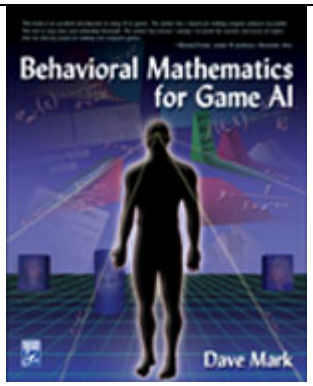
CS 330 – Artificial Intelligence and Game Development Semester Hours: 3

Techniques and concepts of artificial intelligence applied to game development and production. Topics: path planning, decision making, tactics, and non-rational behaviors. Prerequisites: CS 143 and CS 221.

Texts:

	
AI for Game Developers By David M Bourg, Glenn Seemann O'Reilly Media, July 2004	**Behavioral Mathematics for Game AI** by Dave Mark Cengage, 2009

Topics to be covered

Movement (Chasing and Evading; Pattern Movement; Flocking; Potential Function-Based Movement; Basic Pathfinding and Waypoints; A* Pathfinding)
Behavior and decisions (Finite State Machines; Fuzzy Logic; Rule-Based AI; Decision Theory; Probability Math for Decisions; Decisions Under Uncertainty—Bayesian Techniques)
Modeling (Mathematical Modeling; Modeling Individual Choice; Modeling Simulations)
Learning (Symbolic Learning; Neural Networks; Genetic Algorithms)

The course is focused on what makes a character appear intelligent to a human user. Both rational and non-rational techniques will be examined in order present a coherent account of programmable intelligent behavior that is neither mechanistic nor random.

Goals and Outcomes

After completing CS330, you should

- be familiar with the concepts and techniques related to NPC movement, decision making and learning.
- know basic algorithms and procedures related to path finding, targeted movement, FSM implementations of agent behaviors, probability driven decision making, and simple learning
- understand how to make a NPC interestingly intelligent by modeling actual human intelligent behavior.

Requirements and grading

Quizzes 40%

During the semester there will be quizzes that are administered through Canvas.

Collaborative work 25%

In order to better understand the human element to be built into realistic and interesting intelligence algorithms and procedures there will be frequent collaborative exercises. These exercises will begin in class and extend outside of class. In general you will work in groups of three.

Discussions 15%

Discussion boards administered through Canvas will provide the opportunity for reflective questions and answers.

Final report 10%

The final report will summarize what you have learned through the semester in terms of concepts and techniques for interestingly intelligent computational agent behavior.

Final exam 10%

A comprehensive examination based on the abstract core course content.

Policies

1. Responsibilities of the teacher

1) Provide a detailed syllabus. This syllabus should list office hours, course objectives, textbooks, references, prerequisites, and grading policy/method of assessment.
2) Come to class well prepared, on time, and make full use of the class time.
3) Provide timely and adequate feedback on grades. Return graded material promptly.
4) Conduct final exam at the time designated in the class schedule. Never post grades.
5) Not assign **new** work (i.e. not listed on syllabus) that is due in last two weeks of classes.
6) Avoid leaving the examination room without a proctor. Provide paper for exams.
7) Make reasonable use of the assigned textbook.
8) Check students have proper prerequisites. Instructor does not waive assigned prerequisites.
9) **Report all incidences of academic misconduct to the Department and VP for Student Affairs**

2. Responsibilities of the student (see also, Student Handbook Article II)

1) Come to class with the proper prerequisites, well prepared, on time, and make full use of the class time.
2) Provide adequate notice of anticipated absences and take full responsibility for finding out about missed work, announcements, and assignments.
3) Submit assessment material on time and submit **only your own work**. (see integrity)
4) Do not allow other students to copy your work.
5) Read and understand the syllabus and follow announced policies.

3. Integrity

We expect CS instructors and students to conduct themselves in a professional manner. Students are subject to all the provisions in the UAH Code of Student Conduct, which is available free from the Office of Admissions and Records. Information on plagiarism and other forms of misconduct is presented in the **Student Handbook Article III**. *Departments are obliged to report all student misconduct to the Office of Student Affairs.*

4. Complaint Procedure

If you have difficulties or complaints related to this course, your first action should be to discuss them with your instructor. If such a discussion would be uncomfortable for you or fails to resolve your difficulties, you should ask for a meeting with the Chair of the Computer Science Department in Technology Hall N-300, info@cs.uah.edu, telephone 256- 824-6088. *If you still are unsatisfied, you should discuss the matter with Dr. Emanuel Waddell, Associate Dean of the College of Science. The Associate Dean's office is MSB C207, telephone number 256-824-6844 and email address adeancos@uah.edu.*

5. Students with disabilities

Your instructor would like to hear from anyone who has a disability that may require a modification of seating, testing, or other class procedures. Please see instructor after class or during office hours to discuss appropriate modifications. You should also contact Disability Support Services in WH 317 (Ph. 824-1997) or online at http://www.uah.edu/health-and-wellness/disability-support/requesting-services for further assistance.

6. Student computer account

Students enrolled in any CS course are entitled to an account on the departmental computer network. Use of such an account is subject to departmental and university policies. To apply for an account, and see the current policies, go to the departmental web site at *http://www.cs.uah.edu/account/*

7. Examination policy

In response to past student complaints about problems during examinations, the Computer Science Department has developed the following guidelines for in-class examinations in all courses.

1. Come to the exam prepared to complete it without a break. If you think you will need a break, please inform the proctor before the exam if possible.
2. Do not communicate with other students. Talk only to the instructor.
3. Whenever you leave the exam room, turn in your exam.
4. Use only the paper provided by the instructor for all writing.
5. If assigned a specific seat, remain in that seat.
6. Unless specifically permitted by the instructor, use no books or other reference materials. Do not bring calculators, computers, pocket-organizers, cell phones, pagers, or other electronic devices to the exam.

UAlert Emergency Notification System:

UAH has implemented the **UAlert** emergency notification system. UAlert allows you to receive time-sensitive emergency messages in the form of e-mail, voice mail, and text messages.

Everyone who has a UAH e-mail address will receive emergency alerts to their campus e-mail address. In order to also receive text and voice message alerts, you are asked to provide up-to-date phone contact information. Participation in UAlert text and voice messaging is optional, but enrollment is strongly encouraged. **You can't be reached through UAlert unless you participate.** The information you supply is considered confidential and will not be shared or used for purposes other than emergency notification.

To review your UAlert account, add or update phone and alternate e-mail addresses, and set the priority for your contact methods, please visit the UAlert web site: http://ualert.uah.edu.