

# **CAP 4053 – AI for Computer Games Spring 2012**

## **SUBJECT MATERIAL**

This course presents an examination of the use of artificial intelligence in computer games. Topics to be covered include general AI knowledge, path finding, movement, tactics and planning, strategy, state machines, learning, dialogue, and emotions. The course will be taught as a seminar/project class. All students will make three presentations on the various course topics and everyone will be involved in the group development of a game.

## **INSTRUCTOR**

Dr. Douglas Dankel II  
E330 CSE - C.I.S.E.  
Office Hours: 9:35-10:25 a.m. MWF

Phone (office): (352) 505-1578  
E-mail: [ddd@cise.ufl.edu](mailto:ddd@cise.ufl.edu)  
Web: <http://www.cise.ufl.edu/~ddd/>

## **TA**

Ramin Tadayon  
E-Mail: [rtadayon@cise.ufl.edu](mailto:rtadayon@cise.ufl.edu)  
Office: TBA

## **TEXTS**

There are a number of recommended texts for this class:

*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

These books should be available in the local and on-line bookstores.

Additional resources can be found on the Web or in the following book

*AI Game Programming Wisdom*, Thomson Learning, Inc. – a series of books on various aspects of game development

*AI Game Programming Gems*, Thomson Learning, Inc. – a series of books on various aspects of game development

I have copies of each of these and can make copies available of any of the articles that they contain:

## **SOFTWARE**

There are a range of software packages that you can use for developing your course project. Here are a few:

XNA:	MS Development environment for Xbox 360 And Windows
<a href="http://msdn.microsoft.com/en-us/aa937791.aspx">http://msdn.microsoft.com/en-us/aa937791.aspx</a>	
Unity: <a href="http://unity3d.com/">http://unity3d.com/</a>	free, iPhone, Mac, PC 3-D development SW
DarkBASIC professional	\$70, game development based on BASIC
DarkBASIC	\$40
<a href="http://www.thegamecreators.com/">http://www.thegamecreators.com/</a>	

Blender <a href="http://wiki.blender.org/index.php/Main_Page">http://wiki.blender.org/index.php/Main_Page</a>	free, 3-D game engine, Python-based
Cocos2d <a href="http://cocos2d.org/">http://cocos2d.org/</a>	free, iPhone, Mac, 2-D game development
Game Maker: <a href="http://www.gamemaker.nl/">http://www.gamemaker.nl/</a>	\$20 – a 2D and 3D Game development package
Adrift: <a href="http://www.adrift.org.uk/~\$20">http://www.adrift.org.uk/~\$20</a>	Windows based development environment
Swat: <a href="http://www.storytron.com/">http://www.storytron.com/</a>	interactive story development software

Other free and commercial SW packages are available. Reviews can be found at:  
<http://www.devmaster.net/engines/>.

## PROJECT

Each student will be involved in the group development of a game during the semester. The domain of the project will be discussed in a later handout. The completed project will be due on the last day of class. Periodic deadlines involving the creation of some portion of the project and written reports will be specified in this later handout.

## GRADING

Tentatively, the grading for this course shall be weighted:

Presentation 1	10%
Presentation 2	15%
Homework	5%
Project(s)	50%
Attendance/Participation	20%

The final percentages might vary by, at most, 5%.

## LECTURE STRUCTURE

The instructor will provide ~4 weeks of general course lecture at the start of the semester. After that initial introduction, the students will make presentations on the various book chapters. All students will work in groups and be assigned chapters on which to make their presentations. These assignments will be based on the student's preferences. Everyone is required to participate in making the group presentation.

## TIME TABLE (approximate)

1/9 – 2/3:	Dr. Dankel will lecture providing an overview of the course, the class project, project software, and making presentations.
2/6 – 2/8:	Initial Game Concept Presentations
2/10 – 3/2	First Presentations
3/5 – 3/9:	Spring Break
3/12 – 4/13:	Second Presentation
4/16 – 4/25:	Final Project Presentations (tentatively 4/23 will be an open house to showcase all games to the public)

## **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 description of most of these – these sections are also posted on the Sakai class page as an assignment):

A\*, Command Hierarchy, Dead Reckoning, Emergent Behavior, Flocking, Formations, Influence Mapping, Level-of-Detail AI, Manager Task Assignment, Obstacle Avoidance, Scripting, State Machines, Stack-based State Machines, Subsumption Architecture, Terrain Analysis, Trigger System, Bayesian Networks, Blackboard Architecture, Decision Tree Learning, Filtered Randomness, Fuzzy Logic, Genetic Algorithms, N-Gram Statistical Prediction, Neural Nets & Perceptions, Planning, Player Modeling, Production Systems, Reinforcement Learning, Reputation System, Smart Terrain, Weakness Modification Learning, Emotions.

## **STUDENTS WITH DISABILITIES**

Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the course coordinator 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:

- University Counseling Center, 301 Peabody Hall, 392-1575, Personal and Career Counseling.
- SHCC mental Health, Student Health Care Center, 392-1171, Personal and Counseling.
- Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling.
- Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.