CAP 6675: Complex Adaptive Systems
Fall 2012

- **Instructor:** Dr. Ivan Garibay, UT-556, 2-1163, igaribay@ucf.edu

- **Class Time and Location:** TR 3:00 PM – 4:15 PM, ENGR 383

- **Office Hours:** After classes or by appointment at the UCF Office of Research and Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826 (UCF Research Park, University Towers Building).

- **Class website:** http://ivan.research.ucf.edu/classes/CAP6675_Fall2012/

Complex adaptive systems (CAS) are a broad class of systems consisting of multiple interacting adaptive agents. These systems, which span a wide range of disciplines, have a number of characteristics in common. They are large distributed systems consisting of many self-similar components that interact and adapt. These interactions among the distributed components are self-organizing and produce emergent collective behavior in the system as a whole. CAS tends to be difficult to analyze using traditional analytical models. Agent-based models have been shown to be effective methods for studying CAS. This course will introduce the basic definitions of CAS, discuss example cases of CAS and their features, and implement and analyze computational simulations of CAS.

Topics:
- Cellular automata
- Social systems
- Evolution of cooperation
- Self-organization
- Social networks
- Agent-Based Computational Economics

This course will be structured as follows:

1. Two papers will be assigned each week. You will be asked to read the papers and write a one-page summary/critique/comparison of the papers each week. These summaries will make up 15% of your final grade. Late summaries will not be accepted. You may drop two summaries.

2. Each week two students will be asked to present the papers for that week to the class in an oral presentation. This presentation will include summarizing the paper and leading a discussion on the paper topic. These presentations will make up 20% of your final grade.

3. You will have one homework assignment during the first half of the course. All programming can be done in any programming language. This homework will be worth 25% of your final grade.

4. Throughout the class you will work on a final research project. Before the middle of the course each student proposes an individual project. The proposed ideas are discussed in one or more individual meetings and one particular project is agreed upon between the instructor and the student. During the second half of the course, the student carries out the agreed project. The student writes up his/her work in an 8 to 10 pages paper (in the style of a conference paper).

Towards the end of the semester all students will be ask to present their project to the class. The project due date, students must bring three extra copies of their project to be distributed to other three students to be anonymously peer reviewed. The last day of classes all students must bring their written reviews. Your final project grade will be partially based on the peer reviews of your work and the reviews that you write about other student's projects. All projects will be compiled into a class book and published as an EECS Technical Report and also in the class website. Copies of this book will be distributed to all students. This final research project is worth 40% of your final grade.

Grades:

Your final grade of this class will be determined as follows:

Paper Summaries (you may drop two)	15%
Presentations	20%
Homeworks	25%
Final project, paper and presentation	40%

- No make-ups will be given

- You may drop two lowest paper summary grades. Late summaries will not be accepted

- If you need to reschedule a paper presentation, please let me know at least two weeks before your originally scheduled presentation time. Otherwise, you will be responsible for the presentation at the originally scheduled time.

- Unless otherwise specified, all assignments are due at the *beginning* of class on the due date. Assignments turned in after class begins are considered to be late. Late homeworks and projects will have grades reduced by 10% per day.

- Homework and project code that does not compile or run will receive an automatic zero.

Cheating, plagiarism, and any other form of academic dishonesty will not be tolerated.
Plagiarism and paraphrasing are forms of cheating. Plagiarism is the presentation of others' ideas and writings as your own. Paraphrasing is taking someone else's sentence, changing a few words, and then presenting it as your own. Both are unacceptable in this class.

Other Issues:
- Students are responsible for all material presented in class.
- Please do not bring cell phones or pagers to class.