

CAP 4800/CAP 5805: Computer Simulation Concepts

Fall 2007

- **Course Summary**

Students will learn the basic design and algorithmic elements for modeling dynamic systems--systems that change state over time. This year, we are back to basics by using a visualization approach to appreciate the core elements. This will be done using Java and a media-savvy subset of Java called [Processing](#). Case studies will be handed out for real-world applications of the elements. In the homework and final projects, students may choose to use simulation for abstract visual and auditory results in Processing, or produce practical simulations of engineering and scientific scenarios. This web page serves as an overview of the course, and a rough guideline to the topics covered as time permits.

- **Course Information**

- Location: CSE E107, MWF 2nd period
- Course Content: Instructor Lectures, Multimedia Demos
- **Lecture is given using pre-recorded videotapes**
- Grade Breakdown: 2 Midterms (20% each), Final (25%), Project (20%), Homework (15%)
- *Required Background:* Java, Discrete Structures, Program + Data Structures, Senior Year CS Mathematics

- **Contact Information**

- TA: Hyungwook Park, Email: hwpark@cise.ufl.edu
- Course website : <http://www.cise.ufl.edu/class/cap4800fa07>
- Office hours : CSE 309, Monday 9:30-11:30AM, Thursday 2:00-3:00PM
- WebCT and Yahooogroup will be used for announcement.

- **Textbook and Software**

- Textbook is not required.
- Required software: Java, Processing, SimpackJ

- **Course Topics**

- **Topics for EXAM 1 (October 12, 2007)**
 - Video Introductions to Modeling and Philosophy
 - Basic graphics transformation approach (in-class discussion)
 - Random variables
 - Fuzzy numbers
 - System: formal definition of a system, and its components

- Two methods of simulation: time slicing and event scheduling
 - Calendar Queues (Dynamic Hashing)
 - Finite state machines
 - Turing Machines (in-class discussion):
 - Markov Models
 - Rule-Based Production Models
- **Topics for EXAM 2 (November 16, 2007)**
 - Event-Based Models
 - Rule-Based Cellular Automata
 - Petri Nets
 - System Dynamics Graphs
- **Additional Topics for the FINAL EXAM (December 14, 7:30-9:30AM)**
 - Lindenmeyer (L) Systems
 - Functional Block Models
 - Digital logic models
 - Queuing models + Table simulation
 - Kinetic Graphs
 - Difference Equations
 - Logistic Equation
 - Fibonacci sequence
 - Complex variables
 - Iterated Function Systems
 - *Model Identification*
 - Ordinary Differential Equations (ODE)
 - Delay-Differential equations
 - Partial Differential equations
- **Course Policies**
 - Accommodations for 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 Instructor when requesting accommodation."
 - Academic Honesty As a result of completing the registration form at the University of Florida, every student has signed the following statement: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University." We agree to comply with the new Honor Code, which specifies that "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."

- UF Counseling Services Resources are available on campus for students having personal problems or lacking clear career and academic goals that interfere with their academic performance. These resources include:
 1. University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling
 2. Student Mental Health, Student Health Center, 392-1171, personal counseling
 3. Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual counseling
 4. Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.