

## **Modeling and Simulation for Systems Architecting and Engineering ISE 599: (3 units) Wednesdays 6:30pm – 9:10pm**

Instructor: Dr. Raymond Madachy

Fall 2007

The architecting and engineering of complex systems requires the use of computer-assisted modeling and simulation. All types of systems in various disciplines can utilize these techniques. Simulation usage continues to increase in many disparate fields due to constantly improving computer capabilities, and because other methods don't work for complex systems. Simulation is general-purpose and can be used when analytic solutions are extremely difficult if not impossible to apply to complex systems. This course will equip the student to better understand how modeling and simulation can support the architecting process across a variety of domains, and be able to apply the techniques.

### **Course Description**

This course covers modeling and simulation principles with applications to systems architecting and engineering. Students will use simulation tools and conduct studies to address current research issues for complex systems. It covers different modeling approaches with a focus on continuous and discrete simulation, but other types will also be described.

The course will review basic simulation methods and principles; it will describe the art and science of the modeling process; and provide access to tools and executable models. Students will be exposed to a variety of simulation applications for system architecting and engineering disciplines by domain experts.

The course projects for the semester will be simulation studies related to systems architecting and engineering that address critical research issues and/or industrial applications. The variety of topics is flexible, and each student will define his/her research topic to be addressed by modeling and simulation.

### **Course Prerequisites**

This course is open to students in graduate engineering or science disciplines. Previous courses or experience in computer simulation are not required, but basic computer programming skills are assumed.

### **Course Text**

Law M, Kelton W, *Simulation Modeling and Analysis*. McGraw-Hill, New York, NY, 2000

### **Other Material**

Madachy R. *Software Process Dynamics*, Wiley/IEEE Press, 2007

Khoshnevis B, *Systems Simulation - Implementations in EZSIM*. McGraw-Hill, New York, NY, 1992

U.S. Defense and Modeling Office, <http://www.dmsso.mil>

Selected papers and reading material will be provided to students during the class.

### **Contact Info**

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