

## COURSE OUTLINE OF RECORD

<b>Dept., Number</b>	CSC 4385	<b>Course Title</b>	System Simulation and Modeling
<b>Semester Hours</b>	3		
<b>Year</b>	2006	<b>URL (if any):</b>	

### Current Catalog Description:

This course covers model construction and simulation applied to problems taken from such diverse fields as economics, social science, communication networks, and computer systems. It includes programming in simulation languages such as SIMSCRIPT, SIMULA, or GPSS. Prerequisites: CSC 2331 and MAT 3310.

### Textbook:

Discrete Event System Simulation, 4<sup>th</sup> edition, Jerry Banks, Pearson Education (Prentice Hall)

### Course Goals:

Upon completion of this course the student should be able to:

1. Analyze a problem and determine whether simulation techniques could be used to solve it.
2. Develop a viable model of the system.
3. Program and execute a computer simulation of the model.
4. Analyze the results of the simulation.

### Prerequisites by Topic:

Data Structures, Probability and Statistics I.

### Major Topics Covered in the Course (number of weeks):

- |   |     |
|---|-----|
| 1. Introduction to Simulation                       | 1.5 |
| 2. Simulation Examples                              | 3.0 |
| 3. General Principles                               | 3.0 |
| 4. Simulation Languages, Software, etc.             | 4.5 |
| 5. Statistics Models in Simulation                  | 6.0 |
| 6. Queuing Models                                   | 4.5 |
| 7. Random Numbers and Random Variate                | 9.0 |
| 8. Input Modeling                                   | 3.0 |
| 9. Verification and Validation of Simulation Models | 1.5 |
| 10. Output Analysis                                 | 3.0 |
| 11. Continuous Systems                              | 1.5 |
| 12. Group Project Presentations/Discussion          | 2.0 |

### Laboratory Projects:

Work on some projects/programs among the following. Some of them are group projects.

1. Monte-Carlo Simulations. (2 week)
2. A simulation program on Queuing Models (2 weeks)
3. A simulation program using GPSS on Queuing Models (1 week)
4. A simulation program using MODSIM on Queuing Models (1 week)
5. Use Chi-square frequency method to test the validity of  
some random number generators (2 weeks)
6. A Web page design problem (3 weeks)

<b>Dept., Number</b>	CSC 4385	<b>Course Title</b>	System Simulation and Modeling
----------------------	----------	---------------------	--------------------------------

**Estimate Curriculum Category Content (Semester hours)**

<b>Area</b>	<b>Core</b>	<b>Advanced</b>	<b>Area</b>	<b>Core</b>	<b>Advanced</b>
Algorithms	2		Data Structures		
Software Design	1		Prog. Languages		
Comp. Arch.					

**Oral and Written Communication:**

Typically, every student is required to submit at least 1 to 2 written reports of 3-5 pages and to make the oral presentation of 5-10 minutes duration. Each student may have to do the oral presentation and demonstrations on his/her project assignments.

**Social and Ethical Issues:**

Every student needs to submit a 3-5 page paper dealing with the topics on the social and ethical issues. You may be required to give a brief talk on your paper. Some topics will be discussed in the class. These topics will be covered in approximately 20 minutes.

**Theoretical Content:**

The theoretical concept will cover the following topics among others: Statistical Models, Queuing Models, and Random Numbers.

**Problem Analysis:**

In each project assignment, students are required to write 1-2 pages of Analysis and Conclusion on their experiments on the project.

**Open-Ended Design:**

Students have to use comments to clarify their programming designs on each project. You are encouraged to submit separate pages on the designs of your projects.