

Department of Mechanical and Industrial Engineering

Fall 2012

IE 621 Systems Analysis and Simulation

Instructor: Dr. Reggie J. Caudill, Professor of Mechanical and Industrial Engineering

Office Hours: By appointment, 203 MEC, 973-596-3331

Lecture: Wednesday, 6:00 pm – 9:05 pm in GITC 1100

The application of well-integrated systems approach and engineering in the system life cycle and system design process, mathematical tools and techniques applied to systems analysis, design for operational feasibility, systems engineering management, modeling techniques including simulation, application of discrete simulation techniques to model industrial systems, design of simulation experiments using software, output data analysis. Prerequisites: IE 331, IE 466, or equivalent or department approval.

Note: The NJIT Honor Code will be upheld, and any violations will be brought to the immediate attention of the Dean of Students. Homework assignments and/or projects, in addition to the reading assignments shown below, will be given on a weekly basis with due dates explicitly stated. Assignments and projects will not be accepted after the noted deadline. Students are expected to have a working knowledge of Excel and general engineering analytical skills. Exams will consider all material covered in the lectures including that which may not be in the textbook, reference books or handout notes. Students will be consulted by the instructor and must agree to any modifications or deviations from the syllabus through out the course of the semester.

Primary Reference: *Principles of Systems*, Jay W. Forrester, 1968 MIT Press.

Other References: *Discrete Event System Simulation*, Banks, Carson and Nelson, 2004 4th Ed., Prentice Hall.
Other selected references, handouts, and simulation software user documentation

Grading: Exam 1.....30% Exam 2.....30% Projects & Assignments.....40%

Week	Date	Lecture Topic	Major Assignment
1	9/05/12	Systems Overview and Introduction	Ch 1
2	9/12/12	1 st and 2 nd Order Negative Feedback Loops	Ch 2.1 - 2.3
3	9/19/12	Positive and Coupled Nonlinear Feedback Loops	Ch 2.4–2.5 & Project 1(20%)
4	9/26/12	Models and Structure/System Equations	Ch 3 – Ch 5
5	10/03/12	Differential Equations & Laplace– A Digression	Handouts & Project 2 (20%)
6	10/10/12	System Optimization Techniques	Handouts
7	10/17/12	System Optimization Techniques (Cont'd) & Review	Handouts
8	10/24/12	Exam 1	
9	10/31/12	Introduction to Vensim Simulation Software	User Guide & Project 3 (20%)
10	11/07/12	Advanced Discrete Simulation Concepts	Project 3 (20%)
11	11/14/12	Introduction to FlexSim Simulation Software	Handouts
12	11/28/12	Problem Solving Using FlexSim	Handouts & Project 4 (40%)
13	12/05/12	Lifecycle Analysis and Sustainability	Handouts
14	12/12/12	Project Presentation	
15	12/19/12	Exam 2	

Guidelines to submit Projects and Homework to TA: Zhenqing (Ethan) Zheng

- Put your name and e-mail address on the top of the first Excel sheet you are working on.
- Send only the final version. Do not send your gradual improvements.
- For final submission of homework/project, the “Subject” should be written as follows: IE621 [Homework/Project Number] [Your last name]. In case you are asking questions with an attachment, the subject of the e-mail should indicate this.

Instructor e-mail: caudill@njit.edu

TA email: zz36@njit.edu

Course website: <http://web.njit.edu/~caudill>