ISE415/515 - Introduction to Systems Engineering Winter 00/01

Course:

ISE 415/515 Introduction to Systems Engineering - 3 hours, Call number: 03507-03527

Catalog description:

Prerequisites: ISE305, MATH340, ET240. (winter) Introduction to systems engineering concepts. Systems structure, open-loop and closed-loop systems, positive and negative feedback. Applications to production and inventory systems, population, and physical systems. Design project required. 3 lecture.

Sessions:

TTh 4:10-5:30, Stocker 102, Final exam F 03/16/2001 12:20pm

Instructor:

Dr. Dusan Sormaz, Room 280, Stocker Center, phone: (740) 593-1548,

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URL: http://www.ent.ohiou.edu/~sormaz/ise415-web

Office Hours:

TTh 2:30-4:00 or by appointment

Textbook:

Donald W. Boyd, *Systems Analysis and Modeling, A Macro-to-Micro Approach with Multidisciplinary Applications*, Academic Press, 2001

Readings (on reserve in the library):

1. J. Forrester, *Industrial dynamics,* M.I.T. Press, 1961.
2. B. Zeigler, *Theory of modelling and simulation* John Wiley, 1976.
3. B. Zeigler, *Multifacetted modelling and discrete event simulation*, Academic Press, 1984.
4. G. A. Korn, Interactive Dynamic System Simulation, McGraw-Hill, 1989.
5. A. A. Legasto, J. W. Forrester, J. M. Lyneis, System Dynamics, TIMS Studies in the Management Sciences, Vol 14, North Holland, 1980.

Manuals:

On line manuals and Web resources for Excel and Matlab.

Computer usage:

Students will use spreadsheet software (Excel) and Matlab on PC computers to solve homework problems and projects. Software is available in ENT computer labs (Stocker rooms 127, 264, 267, 305, 308, 414). If you do not have account, speak to Bryan Jordan (room 264).

The course objective:

The objective of this course is to teach students approaches and methods for modeling of systems in various areas. Emphasis of the course will be on modeling. The students are expected to understand the importance of models in manufacturing, service industries, physical and biological systems. By the end of the course students will be able to select the appropriate model, to build simulation program and execute it in order to describe the behavior of the system under analysis.

Requirements:

Readings - you are required to read the chapter before the class in which it will be covered, you are required to read assigned segments from reserved material

Homeworks - you are to solve problems from the textbook, 5-6 homeworks throughout the quarter, using paper and pencil and/or software

Projects - five simulation programming assignments using Matlab

Midterm exam - to be held about the middle of the quarter

Term project – extended simulation study of production facility (group work).

Final exam – comprehensive, will be held on Friday, 03/16/00 at 12:20pm

Grading Policy:

	ISE415	ISE515
Homeworks	15%	15%
Projects	20%	20%
Midterm exam	25%	25%
Term project	15%	15%
Final exam	25%	25%

Your homeworks and projects will be graded both individually and for the group (for each you will receive two grades, your own and your group average). Term project will be graded only for a group

Midterm exam and final exam will be graded individually.

Attendance policy:

Attendance to all sessions is mandatory. The group will keep record of attendance in the group folder. In very rare cases you may ask the instructor (in advance) to let you skip the session.

Academic misconduct:

Collaboration is advised and required in group discussions, projects and reviews. No unauthorized collaboration of any kind is permitted during exams, homeworks, or quizzes. All suspected cases will be treated according to the University Policy as stated in the Catalog and the Student Handbook.

Tentative schedule:

1. Week (1/3-5): Systems Analysis and Model Syntehsis (Chapter 1)
2. Week (1/8-12): Systems Modeling Principles (Chapter 2)
3. Week (1/15-19): Population Model (Chapter 3), Modeling software (Matlab)
4. Week (1/22-26): Modeling with Dynamic Forms (Chapter 4)
5. Week (1/29-2/2): Small Arms Exterior Ballistic Model (Chapter 5), Midterm
6. Week (2/5-9): Inventory Systems Models (Chapter 6)
7. Week (2/12-16): System Dynamics (Forrester)
8. Week (2/19-23): Modeling Corporate Assets (Chapter 7)
9. Week (2/26-3/2): Stochastic Analysis (Chapter 8)
10. Week (3/5-9): Work Physiology Model (Chapter 9), Overview

Friday, 03/16/2001, Final exam starts at 12:20pm

Cooperative learning:

Throughout the course we will apply concepts of cooperative learning. You are expected to work in groups in the classroom and on projects. In the classroom you are expected to construct, discover, transform and extend your understanding and knowledge of the subject. The role of the instructor will be one of facilitator. Classroom sessions will consist of short lectures mixed with group work on the topic. Interaction between the instructor and students will be on group level as well as whole classroom level. You are expected and required to engage in interactions with your group members during class session and in your work on projects.

Term project description:

You will build simulation models of a manufacturing facility. Method used will be system (industrial) dynamics. You will build models in Matlab and execute models for several production planning and control scenarios. You will make any necessary assumptions about this facility.

The term project will be group work and you should submit one copy of your program and report. You should engage in an e-mail communication during implementation of your model. You will submit electronic version of the program as well as hard copy report and printout of model and its executions. In your report you will specify which member of the group completed which task.