

# IME 3120 – Systems Decision Making

## Course Syllabus –Spring, 2005

### 2004-2006 Catalog Data:

Investigating decision-making opportunities while incorporating mathematical models and environmental factors such as time, uncertainty, constraints, and multiple goals. Specific emphasis is placed on analyzing problems using a systems approach. Topics include systems analysis, operations research methodologies, dynamic systems and the application of a variety of computer tools to aid in the decision making process.

### Prerequisite Courses:

STAT260 Elementary Statistics

### Textbook:

*The Art of Modeling with Spreadsheets*, Stephen G. Powell and Kenneth Baker, Wiley, 2004

### Course Coordinator:

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### Course Learning Objectives<sup>1</sup> – By the end of the semester the student should be:

1. Define a system under consideration (a, b, d)
2. Be able to create a graphical representation of a system. (a, b, d, g)
3. Apply mathematical modeling tools to solve a problem. (a,b,c,d,f)
4. Be able to represent and solve problems posed by dynamic systems.(f, g, i, j)
5. Develop descriptive models of systems (waiting lines and simulation) (a,b,c,d,f)

Letters in parentheses refer to ABET TAC Criterion 2, categories *a – k*.

### Professional Component

This course addresses ABET Criterion 4 (EAC) requirements for professional component as follows:

- a) College-level math, basic science: 1 credit or 33%
- b) Engineering topics (engineering science and design): 2 credits or 67%
- c) General education: 0%

### Relationship to IME Program Educational Objectives / Student Learning Outcomes

This course provides significant support for the following IME program outcomes:

1. a, c, d e; 2. c, d, e, f; 3. a, b, c; 4 a, b

### Computer Usage:

Use of computer hardware and software is expected for creation of all reports, as applicable. Students will use electronic office software as required.

### Laboratory Projects:

This course does not have a laboratory component.

### Oral and Written Communications:

Written reports are required for a variety of outside assignments. Documents should be well written.

### Calculus Usage:

Calculus is required in this class to solve a variety of optimization problems. Usage will be limited to differential calculus.

### Library Usage:

Use of the Library is expected for proper references on all written reports, as required.

## Topics and Schedule:

Date	Topic	Chapter
January 11	Introduction	*
January 18	Modeling	1,2
January 25	Einstein and Cases	*
February 1	<b>QUIZ</b> & Modeling Craft	3
February 8	Visual Modeling	4, *
February 15	Spreadsheet Engineering	5
February 22	<b>QUIZ</b> & Spreadsheet Analysis	6
March 1	SPRING BREAK	
March 8	Data analysis	7
March 15	<b>QUIZ</b> & Optimization-formulation	8
March 22	Optimization-Solver	8
March 29	Optimization – Non-linear Models	*
April 5	<b>QUIZ</b> & Simulation	9
April 12	Simulation	9
April 19	Creative Problem Solving	*
April 27	Einstein one more time	*
	Note: * indicates outside material to be provided by instructor	

### General comments:

Throughout this class, you will have some outside assignments; they will be due at the beginning of the class period, not the end. A late assignment will receive a reduction of 10% per day. Assignments are expected to be typed (or the computer equivalent of that) and spelling and grammar do count. Tests will be problems or short answer. I'll give you partial credit if I can figure out what you are doing. Students failing all exams will not pass the class.

This class will be conducted on an interactive basis, that is, during our discussion of concepts and techniques your participation is expected. Homework problems will not be assigned, you should do as many problems as you feel are necessary to master a technique.

An excused absence will be given if the reason is beyond the student's ability to plan for or control a particular circumstance. Notification must be as soon as possible and should be made before the next class meeting.

### Academic honesty:

You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate (pp. 274-276) and Graduate (pp. 26-28) Catalogues that pertain to Academic Integrity. These policies include definitions of cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Conduct. You will be given the opportunity to review the charge(s). If you believe you are not responsible, you will have the opportunity for a hearing. You should consult with me if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test. Students violating the Academic Honesty Policy can expect penalties ranging from failure of that assignment to failure of the class.

### Grading Policy:

<u>GRADE</u>	<u>RANGE</u>	<u>GRADE</u>	<u>RANGE</u>	<u>ACTIVITY &amp; WEIGHT</u>	
A	92.5-100	C	72.5-77.5	Quizzes	30%
BA	87.5-92.5	DC	67.5-72.5	Class Participation	10%
B	82.5-87.5	D	62.5-67.5	Outside assignments	30%
CB	77.5-82.5	Fail	below 62.5	Final Exam	30%