

Math 446/MTE 646 Syllabus
Mathematical Modeling for Middle School Teachers
Summer 2005 Dr. Susann Mathews

Textbook: Online course reserves

Class Meets: Monday -Thursday, 9:00-12:00 for 3 weeks

Instructor: Susann Mathews

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Office Hours: Monday -Thursday, 12:00 -1:00,
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Rm 120 MM (Math. & Microbio. Sci. Bldg.)

If you really need to get in touch with me and can't get me by phone,
please send a message to both of my email addresses (I can't access
my school account from home or my home account from school.):

susann.mathews@wright.edu or susmathews@woh.rr.com

Materials: Grid (or graph) paper, ruler, calculator (preferably a TI-83).

Software recommended: *Fathom*

Course Description:

MTH 446/546 is an introduction to mathematical modeling. Mathematical modeling is a generalization of problem solving, in that we set up a model to describe a situation and the relationships that it contains. Then we can solve for various unknowns in the model, depending upon what we know. Furthermore, if the parameters of the problem change, we still have the model and can solve it anew, given the new parameters. With a mathematical model, we can often solve a whole class of problems. Often, we find another problem that at first appears completely different than the one our model solved, but that is mathematically similar so that we can use our model to solve the new problem. We start with a very simplified model and add complexity as needed for fidelity to the physical situation.

In this course, we will develop models to describe situations such as the following:

- Drainage of a parking lot,
- Population growth and the spread of disease.

Evaluation

Item	Percent of Course Grade
Class participation*	15%
Assignments	60%
Final project/ exam	25%

PARTICIPATION: *Class participation implies that you are present in class to fully participate. I expect you to attend class unless you absolutely cannot do so; e.g. if you or your child is sick or your car does not run. I will be passing around an attendance sheet for each class. Due to the interactive nature of the classroom environment, most students find that attending class regularly is essential to learning the material. Naturally, you are responsible for material covered and announcements made during classes that you miss. To pass this class, you **MUST** attend at least 75% of the class meetings (unless there you have official university commitments that we discuss ahead of time). Therefore, you must be in class for at least 15 class sessions.

Remember that this summer we are meeting for three hours per day for three weeks! Thus, your work load will be intense. You will be required to work outside of class, just as though this were a regular 10-week course. However, the work-load will be heavier because we are meeting for only three weeks.

Tentative Schedule for Mathematical Modeling

Date	Model and mathematical activities	Assignment	Due Date
June 13	Parking lot drainage	Write up more complex drainage problem	June 15
June 14	Moose population growth – linear models; Moose population growth – exponential models;	Read and write reaction to <i>Mathematical Modeling: Teaching the Open-ended Application of Mathematics</i>	June 20
June 15	Skeeters are overrunning the world – simulation of exponential growth; Growth of a virus	Answer questions, showing work, to Growth of a virus	June 16
June 16	Pulling together recursive and closed forms of linear and exponential		

	models; introduction to logistic growth with spread of Aids simulation		
June 20	Logistic growth – COMAP Course 3, Unit 6, Individual work 4; Supplement Act. 6.4; Individual work 5	Individual Work 5, #3 & 4	June 21
June 21	Model of drugs in system or alcohol in system		
June 22	S-I-R model for spread of disease – COMAP Course 3, Activity 6; Individual work 6	Individual Work 6, #2, 4-9	June 23
June 23	Simulation of spread of disease; Continued work with spread of disease, adding complexity to model	Write up simulation	June 27
June 27	Continued work with spread of disease, adding complexity to model – education to combat AIDS, from <i>Epidemiological Modeling</i> .		
June 28	Final Project – To convoy or not to convoy, that is the question.	Write up or convoy problem	Due June 30
June 29	Final Project – To convoy or not to convoy, that is the question.		
June 30			