

Fall 2008

Scientific knowledge is a body of statements of varying degrees of certainty--some most certain, some nearly sure, none absolutely certain--R.P.Feynman

MATHEMATICAL MODELING (MATH 445W)

Dr. Ani P. Velo
Office: Serra 152
Phone: (619) 260-7846
Fax: (619) 260-4293
E-mail: avelo@san Diego.edu
Website: <http://www.sandiego.edu/~avelo>

CLASS SCHEDULE AND LOCATION

T,TH, 4pm-5:20pm, Loma Bldg.336

OFFICE HOURS:

T: 1:20-2:20pm
W, 1pm-5pm
Th: 1:30-2pm

PREREQUISITES

Mathematics 250 (Calculus III), Mathematics 320 (Linear Algebra) or consent of the instructor, and Mathematics 330 (ODEs)

TEXTBOOK

Mathematical Models, Mechanical Vibrations, Population Dynamics and Traffic Flow, by Richard Haberman (RH), SIAM Classics in Applied Mathematics

OTHER REFERENCES

Principles of Mathematical Modeling, Second Edition, by Clive L. Dym (CD), Elsevier Inc., 2004
Differential Equations, by Blanchard, Devaney, and Hall, Brooks/Cole
Matlab PDE Toolbox Manual: User's Guide, The Mathworks Inc.(1996)

LOCAL RESEARCH SEMINARS

University of San Diego:
<http://home.sandiego.edu/~avelo/SEMINARSERIES.htm>
San Diego State University:
<http://www.csrc.sdsu.edu/csrc/events/>
University of California, San Diego:
<http://www.math.ucsd.edu/announcements/seminars/>

DISABILITY:

For accommodations due to a disability please contact me within the first 2 weeks.

ACADEMIC HONESTY:

Cheating and plagiarism are in violation of USD's academic integrity policy and are taken very seriously. You can find the Academic Integrity Policy Summary at <http://www.sandiego.edu/as/resources/policy.php>.

GENERAL COURSE EXPECTATIONS:

Graded activities for this course will include quizzes, homework assignments, projects, journal paper readings and exam(s).

Regular attendance is necessary. If you happen to miss a class, it is your responsibility to catch up. Office hours can not be a substitute for missed classes and lectures. Come prepared with questions to my office hours.

The graded activities each week may include homework, quizzes, or both. The problems assigned for homework will be selected and graded at random. If some of the problems selected for grading are missing, you will receive zero points for those problems. Make-up quizzes or tests will not be given except of personal emergency situations such as hospitalization. Even under such circumstances, the instructor should be notified in advance about the absence.

Calculators are not mandatory and the use of the calculators will be limited as this course emphasizes the conceptual understanding more than the computational features of your calculator.

A student is supposed to spend at least two hours at home for each class hour. You will be struggling in this course if you are not consistent and do not study the material in depth.

TENTATIVE COURSE CONTENT BY THEMES:

Introduction

Analytical Modeling:

- ❖ **Block I:** Wave Propagation and Traffic Flow: Part 3, RH, Exam 1
- ❖ **Block II:** Population Dynamics, Part 2, and Mechanical Vibrations, Part 1, RH, Exam 2
Paper Reading, Discussion and Written Summary

Computational Modeling with Applications:

- ❖ **Block III:**
Maple Programming on Population Dynamics and Mechanical Vibrations
Matlab Programming on Two Dimensional Material Design for Heat Conductors

Final Meeting/Exam
Tues, Dec. 16, 2pm-4pm

EVALUATION:

Your grades will be available on WebCT.

Tentative Point Distribution:

<u>Activity</u>	<u>Points</u>	<u>Weight</u>
Assignments	200	1/3
Exams (2)	200	1/3
Final Exam	200	1/3
Total	600	100%