

MATH 174/274
NUMERICAL METHODS FOR PHYSICAL MODELING
MWF 9:00-9:50AM, AP&M 2402
<http://www.math.ucsd.edu/~mleok/courses/math174/>

INSTRUCTOR	Prof. Melvin Leok Office: AP&M 5763 E-mail: mleok@math.ucsd.edu Office Phone: (858)534-2126 Office Hours: MW 10:00pm-11:00am, or by appointment
TEACHING ASSISTANT	Shi Cheng Office: AP&M 5760 E-mail: scheng@math.ucsd.edu Section: Tu 9:00-9:50am, AP&M 2402 Office Hours: TBA
PREREQUISITES	<ul style="list-style-type: none">• Completion of a 2-year calculus sequence, including differential equations, and linear algebra.• Some programming experience.
TEXTBOOK	<i>A Friendly Introduction to Numerical Analysis</i> , Brian Bradie, Prentice-Hall, 2006. ISBN: 0-13-013054-0
ADDITIONAL READING	For more exercises: R.L. Burden and J.D. Faires. <i>Numerical Analysis, 7th Edition</i> . Brooks/Cole, 2000. For more theory: E. Isaacson and H. B. Keller. <i>Analysis of Numerical Methods</i> . Dover Publishing, 1994. For more MATLAB examples: C.B. Moler. <i>Numerical Computing with MATLAB</i> . SIAM, 2004.
COMPUTER LANGUAGE	MATLAB (MATrix LABoratory) <ul style="list-style-type: none">• This software is available in computer labs around campus.• Student version can be purchased for home PC (NOT REQUIRED).
GOALS OF THE COURSE	<ol style="list-style-type: none">1. Develop numerical methods for approximately solving problems from continuous mathematics on the computer2. Implement these methods in a computer language (MATLAB)3. Apply these methods to application problems
COURSE TOPICS	<ol style="list-style-type: none">1. Introduction (Chap. 1)2. Rootfinding (Chap. 2)3. Numerical linear algebra (Chap. 3)4. Interpolation (Chap. 5)5. Numerical integration and differentiation (Chap. 6)6. Numerical methods for ordinary differential equations (Chap. 7)

GRADING Graduate students are required to complete a final project and do a short (20min) in-class presentation of their work during the last week of classes. The project proposal should be developed in consultation with the instructor. Undergraduate students may also elect to do a final project, although this is not required. The grades for this course will be determined as follows, and undergraduates may elect either option:

MATH 174 **40 %** – 8 Homework assignments and computer projects
20 % – 1 Midterms (50 minutes, in-class, 1 cheat sheet, front and back, no calculators)
40 % – 1 Final Exam (3 hours, in-class, 1 cheat sheet, front and back, no calculators)

MATH 274 **30 %** – 8 Homework assignments and computer projects
15 % – Final Project (Project Proposals are due the week of midterms)
20 % – 1 Midterms (50 minutes, in-class, 1 cheat sheet, front and back, no calculators)
35 % – 1 Final Exam (3 hours, in-class, 1 cheat sheet, front and back, no calculators)

HOMEWORK POLICY **NO LATE** homework will be accepted. Homework will be due at the **BEGINNING** of class.

COLLABORATION POLICY Homework is an essential part of advanced mathematics courses. Most students will find that some problems will require repeated and persistent effort to solve. This process is an integral component of developing a mastery of the material presented, and students who do not dedicate the necessary time and effort towards this will compromise their understand of the material in this course, and their ability to apply this material in their subsequent work.

A student may after working conscientiously on a problem for over 30 minutes, consult with other current Math 174/274 students to develop and clarify their approach to the problem. The written solution should however be an independent and individual effort that reflects the students understanding of the problem and its solution.

As a general guide, a student should be able to independently reproduce any solution that is submitted as homework. Copying of solutions is not permitted and is considered a violation of these guidelines, which will automatically result in zero credit for the assignment, and be reported to the graduate chair of the appropriate department.