Numerical Analysis

Math 370 Fall 2002 MWF 9:30am - 10:25pm
 Fowler 127

INSTRUCTOR Ron Buckmire ∼ 320 Fowler ∼ 259-2536 ∼ `ron@oxy.edu`
∼ `http://faculty.oxy.edu/ron`

OFFICE HOURS I am almost always in my office (Fowler 320) until at least 5pm (except Tuesdays). My official office hours for Math 370 in Fall 2002 are MF 10:30-11:30am and R 1:30-3:00pm.

I am readily accessible by electronic mail at `ron@oxy.edu` and by phone at x2536. If you need to see me at a time not specified here, do not hesitate to contact me and make an appointment and I'll be happy to meet with you. I think out-of-classroom student interactions with faculty are important and I encourage it as much as I can (NOTE the participation portion of your course grade).

CLASSROOM We will meet in Fowler 127, MWF from 9:30am-10:25am.

TEXTBOOK *Numerical Methods with MATLAB: Implementations and Applications* by Gerald W. Recktenwald (Prentice Hall, 2000). ISBN 0201308606.

NATURE OF THE CLASS Numerical Analysis is the study of computational methods used for the solution of real-world problems, mathematically. In this class, I shall introduce you to a number of modern approximation techniques and algorithms. I will explain how, why and when these methods can be expected to work. The class will be of an introductory nature, but with enough depth to provide a solid basis for further study in numerical analysis and/or scientific computation. You should gain proficiency with a number of tools which can be useful in solving scientific problems in a number of different fields.

FORMAT OF THE CLASS We will be making extensive use of the MATLAB computer algebra system. I expect a lot of participation in class and will facilitate this through the use of daily class formats (worksheets), group work, in-class computer exercises, abbreviated lectures and online communication.

GOALS At the end of this class you will have been exposed to a number of standard numerical methods and algorithms which you can use when you are faced with certain typical mathematical problems. The idea is that you are being trained to be someone who can solve various numerical problems using computers. Even though computer programming in any particular language is not a large part of the course, you should be able to express HOW to solve a problem using "pseudocode" and also be able to demonstrate how you would solve a problem by hand or using a calculator.

GRADES Your course grade will be composed of the following:

- Homework Sets **30%**
- Two (2) Tests **20 % (10 % each)**
- Quizzes **30 %**
- Term Project **10 %**
- Participation **10 %**

HOMEWORK SETS (30%) There will be approximately 5 to 8 homework sets which will attempt to assess how and what you are learning in the class. They will mainly consist of short homework questions, reflective writing assignments, longer computer-related assignments, and some open-ended problems. They will have two parts: one part on course content, the other part is for you to give written feedback on how the class is going and your assessment of the way in which you are learning the material. This is an opportunity for you to reflect on your own learning of the material.

QUIZZES (30 %) There will be quizzes given every week. These quizzes will almost always be take-home, weekend quizzes given out on class on Friday to be handed in in class on Monday. They will consist of relatively simple homework problems which you work on by yourself and will be a way in which you can assure yourself you are keeping up with the course. The quiz, and hints to the quiz will be posted on the web messageboard.

TESTS (20%) There will be **two (2)** exams in this course. The mid-terms are currently scheduled for **Friday October 4** and **Friday November 8** . These dates are subject to change until 1 week before the scheduled date. You may not be excused from a test without notifying me at least 1 week before the scheduled test date.

TERM PROJECT (10%) In groups of 2 or 3 you will attempt to solve a real-world problem using numerical techniques learned during the course. After the mid-term exam I will assign groups and you will be able to select one of several open-ended problems to which your group will produce a written solution. The format will be that your group is acting as "mathematical consultants" to the person who posed the problem. This is not to be treated as an academic exercise, but as an example of how the problem-solving skills you have developed can be applied. The presentation of the solution reports may involve oral or poster presentations.

PARTICIPATION (10%) This consists of two parts: online participation and offline participation. Online participation consists of electronic exchanges with me and your classmates. In order to earn full credit for this you must post a total of at least 10 messages throughout the semester, or about one per week. In addition to the email list there is a class messageboard on Blackboard. Posts to the messageboard will count towards fulfilling your online participation quota. Offline participation consists of visits during office hours, attendance in class, asking questions in class, answering questions in class, participation in groupwork, private appointments and overall participation in the class.

ACADEMIC HONESTY I expect the highest level of academic honesty from my students. If you have any questions about academic honesty you should read the sections on "Spirit of Honor" (front cover) and "Academic Policies" (pp 111-112) found in the Student Handbook. Any instances of plagiarism or cheating will be dealt with strictly and in accordance with procedures outlined in the Handbook.

ON-LINE MATERIALS There is a class mailing list, to which all registered students are subscribed, at `math370-L@oxy.edu`. I have produced a website for the course, where more detailed (and current) information about the class will be published. The URL is `http://faculty.oxy.edu/ron/math/370/02/` . The website can be accessed also via Blackboard, at `http://blackboard.oxy.edu`. Part of the Blackboard website includes web bulletin boards, where students are encouraged to interact with each other, with me and continue engagement with the course material outside the classroom. You will need your Oxy webmail login and your student ID number (as your initial password) in order to access Blackboard, where you can also check your grades online.

The official syllabus is found at: `http://faculty.oxy.edu/math/370/02/syllabus.htm`

OTHER NOTES We will not have class on Monday September 4 (Labour Day), Monday October 11 (Fall Break) and Friday November 24 (Thanksgiving Break). On Wednesday September 4 and Friday October 14 I will be out of town and class will be cancelled. I will let you know at least one week ahead of time if there may be other days on which class is cancelled.