

Northern Arizona University
College of Engineering, Forestry, and Natural Sciences
Department of Mathematics and Statistics

MAT 362 (Intro to Numerical Analysis) Syllabus

Spring 2015, 3 Credit Hours, in AMB 225

Section 4, Class Number 5251, MWF 1:50-2:40

Instructor Information

Instructor: Jim.Swift@NAU.edu AMB 110 523-6878 www.nau.edu/Jim.Swift

Office Hours: MWF 11:15-12:15, WTh 3:00-4:00 in my office (AMB 110). If these times are inconvenient, you can make an appointment, or drop by my office. E-mail is always a good way to contact me.

Course Description

Text: *Numerical Analysis* ninth edition, by Burden and Faires.

Prerequisite: A grade of C or better in MAT 137 and knowledge of a computer language, as evidenced by a C or better in (CIS 220, CS 112, CS 122H, CS 123, CS 126, or EE 222). You are responsible for making sure that you have met this prerequisite.

Content: This course is about numerical algorithms, computational errors, single variable equations, curve fitting, interpolation, numerical differentiation and integration, numerical solutions of differential equations, and systems of linear equations.

Student Learning Outcomes: By the end of this course, you will be able to ...

Compare multiple algorithms for solving problems (such as solving $f(x) = 0$, numerical integration, etc.). Explain the strengths and weaknesses of the different algorithms. Implement these algorithms in a programming language such as MATLAB or Mathematica. Produce coherent papers explaining the implementation of these algorithms and results on sample problems.

Course Structure/Approach The class will use lecture-discussion format. We will occasionally go to the computer lab (AMB 222).

Assessment of Student Learning Outcomes

Points: There will be approximately 800 or 900 possible “class points.” All class points are assigned with the scale A (90%), B (80%), C (70%), and D (60%). The timeline for assessment is simple; whenever *class points* are assigned, they are fully “curved” and will not change further. So at any point students can calculate the fraction of the possible class points obtained so far to determine their current grade.

Midterms: ($2 \times 100 = 200$ class points) There will be 2 midterm exams. Each exam will have a raw score and a “curved” or scaled score based on 100 possible class points. In fairness to those with classes before or after ours, the exams will start and end on time. The Math department has special permission to give exams during end of semester week, and we might do that.

Homework: (approximately 200 class points) We will be homework assignments from the textbook.

Projects: (2, or 3×100 Class points) The goal of the project is to produce a coherent paper that explains a numerical implementation of some algorithms, and gives results. Neatness and notation is important.

Final Exam: (200 class points) The Final Exam will be comprehensive. The final exam is scheduled for Thursday, May 7, from 3:00 to 5:00 pm. This might be moved earlier if the whole class can agree on a time. I reserve the right to raise your course grade from the 90/80/70 curve, based on an exceptional final exam.

Extra Credit: At each midterm exam I will give you 3 points if you had no unexcused absences since the previous exam. Any points that you get for the math department’s “Problem of the Week” will be credited to this class.

Course Policies

Calculators: A graphing calculator will be allowed at the exams. Please bring your calculator to class. (You don’t need to bring your textbook to class.)

Missed Class Days: I will allow excused absences, for extra credit purposes, for institutional excuses, illness, or other reasons that I approve. Please notify me of an absence by e-mail or voice mail *before* class if possible. Furthermore, if you are late and I take roll before you arrive, then you will be counted absent.

Makeup Exams: A similar policy to “Missed Class Days” holds. I will give a makeup exam for illness or other emergencies. Please notify me that you will miss an exam by e-mail or voice mail *before* the exam if possible.

Academic Honesty: Do not look at other people’s exams during tests. You may not use cell phones or other electronic communication devices during the exams. You may work together with others in the class on the homework, but please do your own work.

University and Departmental Policies: Our class web site has links to the Departmental and University Policies at <http://nau.edu/Jim.Swift/classes/MathDepartmentPolicies.pdf> and <http://nau.edu/university-policies>

Amendments: Any changes to this syllabus will be announced in class, and an updated version will be posted on my website.