ENGR 19/MATH 24 – NUMERICAL METHODS FOR ENGINEERING
COURSE SYLLABUS

Course Description
This course is geared towards students who want to know how to transform a set of equations on a page into a working computer program. Topics will include root finding, discrete and continuous optimization, gradient descent, solution of linear systems, finite element methods, and basic methods in computational geometry. We will also discuss how real numbers are represented by computers, especially insofar as they affect precision and accuracy of calculations. Techniques will be applied in a series of projects focused on engineering applications.

Instructor Information
Prof. Matt Zucker
Office: Hicks 219 – office hours: Tuesday 2:00 PM - 4:00 PM
Phone: (610) 328-8636
Email: mzucker1@swarthmore.edu

Meeting Times
Lecture: Hicks 211, Monday, Wednesday, Friday 11:30 AM - 12:20 PM
Labs: self-scheduled (see below)

Prerequisite
MATH 025/026 or its equivalent, or permission of the instructor.

Textbook

Assignments and grading
Homework consisting of math, short answer questions, and small programming exercises will be assigned weekly. There will be five larger projects/labs which are both more open ended and more programming intensive, as well as a self-directed final project. Projects
and labs are self-scheduled, although I will arrange to be present to give advice and assistance at a regularly scheduled time. The course has two midterm exams and a final exam. Grading will follow approximately the divisions shown below:

- Homework: 20%
- Projects/labs: 35%
- Midterm exams: 2 x 15%
- Final exam: 15%

**Collaboration policy**

- Homework should be completed individually.
- Projects and labs should be completed in groups of two.
- Although you may discuss the homeworks and labs with your other classmates, I expect that the work you turn in is your own.
- If you do discuss your solutions with your classmates, I expect you to disclose any such collaboration clearly in your writeups and/or reports. Err on the side of caution — it’s the best way to avoid awkward conversations about suspicious similarities between assignments with no attribution of credit.
- Cite any external sources used, including the textbook, web sites, discussions with other professors, etc.

**Webpage**

The course webpage is at [http://www.swarthmore.edu/NatSci/mzucker1/e19/](http://www.swarthmore.edu/NatSci/mzucker1/e19/). This page will be regularly updated with assignments, projects and reading. You are expected to be responsible for checking for webpage updates in a timely fashion.