

# ENGR 6101, 8102, 8103 - Computational Engineering: Fundamentals, Elliptic and Parabolic PDE's Fall 2009 Syllabus

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**Course website:** <http://www.math.uga.edu/~caner/09engr810X>

**Office Hours:** 4:25pm-5:00pm Mondays and Wednesdays, and anytime by appointment.

**Text:** *Numerical Methods for Engineers* by Steven C. Chapra and Raymond P. Canale.

**Objective:** Formulation and analysis of numerical methods for algebraic and differential equation solutions, followed by elliptic and parabolic partial differential equations.

**Topics:** Here's tentative schedule of topics to be covered:

| ENGR 6101 - Topics  | Dates     |
|---|-----------|
| Error propagation, Numerical differentiation, Taylor series | 8/17-8/26 |
| Algebraic equation solutions, Introduction to Matlab        | 8/28-9/2  |
| Numerical Integration                                       | 9/4-9/11  |
| Ordinary Differential Equation solutions                    | 9/14-9/18 |

Tentative exam date for ENGR 6101: 9/21

| ENGR 8102 - Topics                           | Dates       |
|--|-------------|
| Introduction to PDE's, transport equation    | 9/28-10/7   |
| Discretization types, Gauss-Seidel algorithm | 10/19-10/26 |
| Mixed boundary conditions, sources and sinks | 10/28-11/6  |

| ENGR 8103 - Topics                          | Dates       |
|---|-------------|
| 1d diffusion equation, Discretization types | 11/9-11/16  |
| Von Neumann Analysis, Crank-Nicholson       | 11/18-11/30 |
| Diffusion in 2 dimensions, mixed BC's       | 12/2-12/8   |

Tentative exam date for ENGR 8102 ad ENGR 8103: Final exam hours

**Grading:** The course grade for each module will be based on three or four homework assignments (60%) and an in-class exam (%40). There will be only one exam for the last two modules. Homework assignments will be posted on the course website.

**HW Policy:** You need to show all your work on solutions of HW assignments. Correct answers with no work will receive no points. However, wrong answers with reasonable work will get partial credit. Same is true for the exams.

In this course, you will grade your own HW assignments. I will provide the correct solutions. The advantages are that you will have the opportunity to grade your own work from your point of view, and learn better by comparing your work to the correct solution. The disadvantage is the delay in getting back your graded assignments, more paper waste, and some more extra work for you. I will give you the option to revert back to a regular grading scheme at the end of ENGR 6101. Here is how it works:

On the due date, right before you hand in your HW assignment, photocopy your **entire** solution. Hand in the original, but keep the copy. No alterations should be done to the copies. The day after the due date, a detailed solution set will be posted on the course website. You will grade your own HW, and hand in the graded copies. I will re-evaluate your solutions and assign a final grade. Each problem will be graded out of 3 points, according to the following grading criteria:

3/3 The solution is totally correct.

2/3 The solution is mainly correct, except for a few little mistakes.

1/3 The solution is partially correct, but there are serious mistakes.

0/3 The solution is totally wrong, or there is no solution.

Late assignments will not be accepted, as a solution will be posted on the due date on the course website. If you do not hand in a graded HW assignment, or if you do a “bad job” in grading, you will lose at least 10% of your grade. **Attach an empty HW problem set in front of your graded solutions, and clearly write grades for each problem on this first page.**

**Collaboration:** You are encouraged to work together on homework assignments, but **you should write your own solution**. In other words, you are not allowed to see the actual paper that somebody else is handing in. **This rule applies to computer codes and graphs as well.** You may discuss formulas or algorithms with your friends; but you should write your own code. The only code you are allowed to see and modify is the one that is available through the course website. **You should not send, receive, start as a template or look at your friend’s code.** Since your course grade is mostly based on HW grades, any penalty you receive will have a significant impact on your final grade. Therefore I strongly suggest that you pay extra attention to this matter.

**Academic Honesty** All students are responsible for maintaining the highest standards of honesty and integrity in every phase of their academic careers. The penalties for academic dishonesty are severe and ignorance is not an acceptable defense. All academic work must meet the standards contained in “A Culture of Honesty”. Students are responsible for informing themselves about those standards before performing any academic work.

**Attendance:** Attendance is required. If you miss any classes, it is your responsibility to get notes from your classmates and make up for the class you missed.

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.