

**EGN 5422 or EEL 6935 ENGINEERING APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS**  
(April 29, 2008)

This course is administered by Dr. Snider. Lectures are pretaped, and delivered by web

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Office hours to be announced

Catalog Description: Power series solutions for ordinary differential equations, Sturm-Liouville theory, special functions. Separation of variables for partial differential equations. Green's functions. Use of USFKAD software.

Course Prerequisites: MAP 2302 Differential Equations (solution methods for first order nonlinear and higher order linear equations)

Required Text: *Partial Differential Equations: Sources and Solutions*, A. D. Snider, Dover Publications, Mineola NY, 2006, ISBN 0-486-45340-5. NOTE: Computer access (PC) is also required.

**Welcome to my classes, USF students!**

You're taking a "web-only" class from me. That means you won't see me live; you'll watch lectures I taped in the past, on the course materials. I will be available in my office for consultation a few hours per week, and I'll always answer your emails promptly.

**Be sure to read this long-winded syllabus entirely.** Then print it out and stick it in the back of your textbook for future reference.

You may have misgivings about non-live lectures. Let me relate a few observations that I have made over the past years with this process.

First of all, this procedure has proved quite successful - to my surprise. I was leery about it at first, but I soon found out that the average student performance on tests was slightly better than it had been before, when I was lecturing live. I think the reasons for this are as follows:

1. You will never need to miss a lecture due to illness, conflicting appointments, being out of town, or simply being tired. The lectures are at the APEX web site all semester long, 24/7.
2. You can re-watch any lecture, or part of a lecture, as many times as you need.
3. If you need to take a break (no student has ever fallen asleep during my lectures, of course!!!), you can stop the playback and resume when you return.

The lectures may be numbered, or dated according to the year they were taped, so you will have to figure out the right pace to get you through them during the time allotted in your current semester. If you can't do this, please drop my class and re-take MTH 101, paying particular attention to the lessons on ratio and proportion.

Consult your email and my.usf.edu frequently for updates from me on assignments, test dates, and procedures in general. Don't take any administrative instructions that I give in the lectures seriously - they are out of date. I will keep you informed about test procedures, etc. by email as the semester progresses.

*Now let me take one paragraph to try to talk you out of taking this course. Partial differential equations is a very difficult subject. In my book and lectures I have tried to make it as simple as possible; but still EGN 5422 is the hardest course I teach. Only about 50-60% of the students who take it make an A; you need to be very good at mathematics to achieve an A. Don't take this course if you can't afford a B on your transcript; if you need to know the subject, consider auditing the course for non-credit.*

**Two tips on calculating:**

Some tests in this course require a lot of calculation. Here are two pointers that you may not have picked up yet:

1. If you require a certain number of significant digits in a final answer, you must maintain more digits in the intermediate calculations. For instance consider the addition  $1/3 + 1/3 = 2/3$ . The three-significant-digit expression for the answer,  $2/3$ , is .667. But if you first round the addends to three significant digits you get  $.333 + .333 = .666$ , which is not correct to 3 digits. A good rule of thumb is to retain at least two more digits than required, in all intermediate calculations.
2. Always introduce symbols (letters) when you evaluate a formula, especially on a calculator. For instance suppose you wanted to add 436 and 578 on a calculator. The worst way to do it is to enter 436, press enter, press +, enter 578, press enter, and press =. Because: suppose you get an answer that you know is wrong, like -23. You don't know whether you entered the 436 wrong, or the 578, or the + operation. You have to reenter all the data again. The smart

way is to let A equal 436, let B equal 578, and call for A+B. If the answer is absurd, you can recall A, B, and the formula; and you can correct only the one that's wrong. This is particularly significant when you're dealing with high-digit numbers, and complicated formulas that may require parentheses.  
*Remember these tips in all your classes.*

### Requirements and Assessment:

1. Most communications between instructor and students are accessed by email and through <https://my.usf.edu>. The site contains class announcements, documents, pointers to old exams, LaTeX instructions, etc. The lectures were taped in 2004, so procedures discussed in the lectures are out of date; any and all announcements you receive by email or posted on [my.usf.edu](https://my.usf.edu) take precedence over anything that is stated in the lectures. Consult [my.usf.edu](https://my.usf.edu) weekly to stay abreast of assignments, test procedures, etc.

Lecture notes replicating everything that appears on the blackboard during the lectures, and the software USFKAD, can be downloaded from [my.usf.edu](https://my.usf.edu) also. Note that since 2004 I have inserted 5 lectures on Fourier methodology ("Jan21A-E") and one on numerical implementation of the software output ("Physical Parameters"). Print out the lecture notes *before* you watch the lecture and have them in front of you.

LaTeX software is required to run USFKAD. LaTeX (the MiKTeX package) is available at [www.miktex.org](http://www.miktex.org). Download LaTeX during the first week and read the notes at [my.usf.edu](https://my.usf.edu) for installing it. *Experience has shown that if you wait until midsemester to start working with LaTeX, you will sabotage any chance of success in this course.* Test your installation by trying to open the article CompPhys5.tex. In addition facility with some (any) package for numerical evaluation of definite integrals will be required for one of the assignments. All standard software packages have this available.

2. Each student must email Prof. Snider with the following data: Last name: \_\_\_\_\_ First name: \_\_\_\_\_ Class: EGN 5422, by May 20. On May 21 you will receive an acknowledgement, by email, from Dr. Snider that you are in his class email address list; if you do not receive this acknowledgement, email me again – until I acknowledge receipt.

**Thereafter each student is liable for all email notices concerning the class from Prof. Snider.** Students who wish to use different email boxes should email this data from each box. Do not use one email box to request mail to a different box.

3. Each student must sign a copy of the final page of this syllabus as indicated below and submit it to Dr. Snider by May 20. You are not officially enrolled in the class until you have turned in a signed syllabus. Postal-mail a hard copy to Dr. A D Snider, Dept. of Electrical Engineering, University of South Florida, 4202 East Fowler Avenue ENB 118, Tampa FL 33620; or put a copy in his EE Department mailbox. Email is not acceptable.

4. Certain homework problems will be recommended to the students, but not graded. You should regard the old tests as a prime source of homework problems; work them during the semester as the particular topic is covered in the lectures. Once you have mastered the software, you can use it to confirm your answers.

5. A midterm examination (time and place to be arranged, covering all lectures through the one titled "Oct 20" and based on section 5.2) and a final will be given. A time and place on the Tampa campus will be arranged for these tests, but they can be taken at remote sites and more convenient times (within limits) if a proctor agreement is worked out with the APEX office (phone 813.974.3783).

Additionally a takehome test, based on Section 5.2 and the lecture "Physical Parameters," will be assigned. The takehome is heavily computational and will be computer graded with no partial credit, but you will be allowed three attempts (with, however, different numerical parameters each time). You will submit your answers by email to the TA, who will shortly respond with your score, a tabulation of your incorrect answers, and the correct answers for the parameters you used. Your first attempt is assessed at (only) 5%, the second at 60%, and the third at 35%. Each attempt has a deadline. If you miss a deadline, your subsequent submission will also count as the missed submission. If you are satisfied with your score you may stop submitting at any time, and your last submission will count for the subsequent ones. The takehome tests will be available at [my.usf.edu](https://my.usf.edu), and they contain more detailed instructions. Your final grade will be a weighted average of the midterm (20%), the takehome (30%), and the final (50%).

I recommend that you take a timed midterm and a timed final from [my.usf.edu](https://my.usf.edu) for practice. These tests are open-book, open-notes except that you are not permitted to bring old tests to the exams. (Experience has shown that old tests are counterproductive rather than helpful.)

6. An "incomplete" grade will be awarded if either the email, syllabus signoff, midterm, takehome, or final are not submitted. Unless USF policy dictates otherwise, incomplete item(s) can be made up in the next semester when EGN 5422 is offered (springs and summers), at no cost. Retaking a previously graded test or re-viewing the lectures, however, requires reenrollment.

Please mail a copy of this page to Dr. Snider.

Academic Dishonesty - It is not acceptable to copy, plagiarize or otherwise make use of the work of others in completing homework, project, exam or other course assignments. The minimum penalty for doing so is an automatic zero on the assignment and an "F" in the course. I have read the syllabus for EGN 5422, Summer 2008, and agree to abide by its schedule and terms.

Print name:

Sign name: