Syllabus for PHYS 272 (Section 1)
Methods of Applied Physics – Spring 2020

Class Location / Times: MWF, 12:00 PM - 12:55 PM, RITA 363

Instructor Information: Dr. Mike Larsen
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Office Location: RITA 317
Larsen Research Lab Location: RITA 392

Office Hours: Mondays 9-10:30 AM, Wednesdays 1-2 PM, Fridays 10-11:30 AM and by appointment.

Prerequisite: (MATH 221) and (PHYS 112 or HONS 158)
Course Webpage: http://larsenml.people.cofc.edu/phys272_spr20.html
(Please see course page for full description of course, rationale, and supplementary information).

Official Course Description

> This course is designed to develop skills in applying mathematical tools and concepts developed formally in the mathematics curriculum for use in the undergraduate physics curriculum. The focus will be on the practical problem solving process rather than the abstract or theoretical nature of techniques.

Attendance Policy
It is expected that you will attend class. I will. You are responsible for any material missed in class, including announcements about homework/test date changes, etc. Since this course doesn't closely follow the text, missing class could be more detrimental for this class than most.

Students with Disabilities
The College will make reasonable accommodations for persons with documented disabilities. Students should apply at the Center for Disability Services/SNAP located on the first floor of the Lightsey Center, Suite 104. Students approved for accommodations are responsible for notifying your professor as soon as possible and subsequently contacting your professor again at least one week before any specific accommodation is needed.

Honor Code / Code of Conduct
It is expected that you will adhere to the university's honor code and student code of conduct as can be found in your student handbook: https://tinyurl.com/cofc-handbook.

Textbook and References
None required, but the recommended textbook for this class is "Mathematical Methods in the Physical Sciences" by Mary L. Boas. (Any edition). I think this is a pretty decent book and I use it as a reference fairly often. That being said, recent informal feedback from students suggests that many don't like it. Along with this syllabus I will supply you with a list of other texts that you may find helpful.

I will not be assigning homework out of the text, and all expected course content will be part of the lecture – so purchasing a textbook is optional (but I *do* recommend you have some sort of mathematical methods book on your shelf as a reference for when you are working on stuff for your other upper-level courses).

Classroom Policies
Please treat your classmates and professor with the respect due to them as fellow adults and human beings. Your professor always reserves the right to dismiss you from the room. Please do not text message, browse the internet, check email, or engage in other non-class-related communications during class.

Cell Phone Policy
Be considerate and turn your phone on vibrate or silent during lectures. Also, all cell phones must be turned off, put away, and remain invisible during all exams. You may be asked to leave your cell phone at the front desk during your midterms and/or final.

Final Exam Time Period:
Wednesday, April 29th (4-7 PM). (The last day of finals. Not my choice. Sorry).

Tentative Midterm Test Dates (Subject to Change):
Friday, February 14th Friday, March 13th Wednesday, April 15th

Campus Closure Statement:
If the College of Charleston closes due to inclement weather, students are responsible for taking course materials with them and continuing to work on assigned homework as posted on the course webpage. In cases of extended periods of institution-wide closure where students have relocated, your professor will post a plan for proceeding with course content on the course webpage and/or communicate through your official CofC email accounts.

Grading

Grading Scale: The formal numerical scale might move around a little bit depending on the class performance, but the final grading scale will be *no more stringent* than:

A	$\geq$91	B+	89	B-	80	C	71-78	D	60 - 69
A-	90	B	81-88	C+	79	C-	70	F	<60

Your course grade will be based on 3 components:

a) Homework (40% of course grade). Homework will be assigned most weeks. Homework assignments are to be completed clearly and legibly and turned in on time. (Homework turned in Friday will be returned Monday, so work more than one class late will generally not be accepted; even penalties for turning in work a few hours late will be Draconian because I likely will be starting to grade Friday afternoon).

   You are encouraged to seek help from your instructor, your classmates, and anyone else who can help you with your homework. However, your answers should not be exact copies of a classmate's work. Cooperation is ok, but everyone should turn in their own solutions! (See more complete explanation of this policy on header material of HW02). At the end of the semester, I will drop the grade from your lowest homework score.

b) Midterm Exams (45% of course grade total, split evenly between 3 exams).

c) Cumulative Final Exam (15% of course grade).

Note that your worst midterm exam score will be dropped so long as you perform better on your final than your lowest midterm (your final exam score counts for 15% of your course grade AND replaces your lowest midterm score if it is better than your lowest midterm score). Because of this, *no make-up tests will be given for any reason.* If you have a known conflict, approach your instructor *well in advance of the test* to arrange to take the exam *before* it is scheduled. If illness or other unexpected conflict develops, you will merely need to replace the score of "0" from the missed exam with your final exam score. (If you miss two exams, you are very unlikely to pass the class).

Specific Course Objectives
Throughout this course, we endeavor to aid the motivated student in the following tasks:

- Develop a familiarity and working knowledge of the basic mathematical techniques and tools used by Physicists daily.
- Geometrically and/or physically interpret mathematical expressions given an applied context.
- Connect ideas from the Mathematics curriculum to applications in the Physics curriculum.
- Learn basic techniques to solve differential equations

Student Learning Outcomes
At the conclusion of the course, the successful student will be able to:

- Graph functions of a single variable without resorting to use of a computer algebra system or hand-held calculators.
- Use basic principles from Linear Algebra to solve problems.
- Geometrically interpret and analytically calculate vector calculus expressions.
- Solve simpke physically motivated differential equations given appropriate boundary and/or initial conditions.
- Interpret and/or analyze data using Fourier, statistical, and/or probabilistic techniques.
- Associate particular mathematical techniques to their area of utility in the undergraduate Physics curriculum.