

# Physics 116C

## Mathematical Methods

**Instructor:** Peter Young (office ISB 212, phone 459-4151, e-mail: [peter@physics.ucsc.edu](mailto:peter@physics.ucsc.edu))

**Place:** Physical Sciences Building 114.

**Time:** Tuesdays and Thursdays, 10:00–11:45 pm.

**Note:** Course materials, such as homework assignments, homework solutions, and handouts will be available at my web site

<http://physics.ucsc.edu/~peter/116C/>

### Books

The recommended book for the course is

- **Mathematical Methods in the Physical Sciences** by M. Boas

Other useful books (available on reserve in the science library) are

- *Mathematical Methods for Scientists and Engineers* by D. A. McQuarrie.
- *Mathematical Methods for Physics and Engineering* by K. F. Riley, M. P. Hobson, and S. J. Bence,
- *Essential Mathematical Methods for Physicists* by H. J. Weber and G. Arfken.

There are also web sites which give problems and solutions. One of these is

[http://exampleproblems.com/wiki/index.php/Main\\_Page](http://exampleproblems.com/wiki/index.php/Main_Page).

### Topics

This is the third course of a three-quarter sequence, at the end of which you should have a good knowledge of *all* the material in Boas' book. This course will cover Chapters 12, 13 and 15.

The topics to be covered are:

- Series solutions of ordinary equations, Legendre Polynomials, Bessel functions, sets of orthogonal functions, Ch. 12.
- Solving partial differential equations by separation of variables, Secs. 13.1–13.7.
- Solving partial differential equations by Green's functions, Sec. 13.8 and handout.
- Solving partial differential equations by integral transforms, Sec. 13.9 and handout.
- Probability and statistics, Ch. 15 and handouts.

## Grading

Your performance in the class will be decided on the basis of the midterm, final, and homework assignments as follows:

midterm	30%
final	50%
homework	20%

The midterm and final exams will be closed book. You will be allowed to bring one sheet of hand written notes if you wish.

## Homework

A homework assignment will be handed out every week and will be due back one week later.

It is very important to work hard on the homework problems. You don't really understand a topic until you are able to solve problems in it. The way to learn how to solve problems is through *practice*. You are encouraged to discuss the homework problems with other students.

You are also encouraged to attend the discussion section and office hours for additional help, either with problems or bookwork.

## Exam Times

Midterm:	In class, date to be decided later
Final:	Monday December 7, 12:00-3:00 pm.

## Discussion Section

The TA is Edward Perepelitsky, email: [eperepel@ucsc.edu](mailto:eperepel@ucsc.edu). The discussion section will be in ISB 231 on Tuesdays 6:00-7:30 pm. The first section will be on September 29.

## Office Hours

The time of the office hours for myself and the TA will be decided in class.