

Physics 116A Mathematical Methods in Physics Winter 2012

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Course Web Page

<http://scipp.ucsc.edu/~profumo/teaching/phys116A-12/phys116A-12.html>

Class Hours

Lectures: MWF, 11:00 AM - 12:10 PM, Thimann 1

Discussion Sections: Tue, 6:00 PM - 7:10 PM, PhysSciences 110

Course Description

- Infinite series including power series
- Complex numbers and complex power series
- Topics in linear algebra including matrices and determinants, systems of linear equations, eigenvalue problems and matrix diagonalization
- Asymptotic expansions and special functions

Prerequisites

- Physics: 5A/L, 5B/M, 5C/N
- Mathematics: 23A, 23B

Required Textbook (on reserve)

- *Mathematical Methods in the Physical Sciences* by Mary L. Boas

Other Introductory Textbooks

- *Mathematical Methods for Scientists and Engineers* by D. A. McQuarrie
- *Essential Mathematical Methods for Physicists* by G. B. Arfken and H. J. Weber

Course Outline

Infinite Series, Power Series	Boas, Chapter 1	Jan 9 – Jan 20
Complex Numbers	Boas, Chapter 2	Jan 20 – Jan 30
Linear Algebra and Vector Spaces	Boas, Chapter 3	Feb 1 – Mar 2
Special Functions	Boas, Chapter 11	Mar 2 – Mar 12
Review		Mar 14 – Mar 16

Course Grading and Requirements

Student evaluations will be based on their performance in the following three tasks. The tasks and their relative weights in determining the students' overall course grades are given below (see however below for special "reward points"):

- **35%** Weekly Homework (9 problem sets)
- **25%** Midterm Exam (Friday, February 17, 11 AM – 12:15 PM)
- **40%** Final Exam (Monday, March 19, 12 PM – 3 PM)

Homework

Weekly homework assignments will be handed out each Wednesday and are due at the beginning of class on the Wednesday of the following week. The homework problem sets are (effectively) not optional, and will consist of a few problems from Boas' textbook. You are encouraged to discuss the class material and homework problems with your classmates and to work in groups,

but all submitted problems should represent your own work and understanding. Late homework can be submitted to the grader, but will not contribute any points to the final grade. The Grader will grade each homework, and is responsible for the given grade. Grades for each homework set will consist of 2 points (mostly correct), 1 point (less than 50% correct) or 0 points (no homework returned in time). Homework solutions will be typically made available on the course website on the homework due date.

Discussion Section and Reward Points

Discussion Section will be typically devoted to discussing problems in the assigned homework. The discussion will be lead by TA Tim Linden, who will survey the audience and suggest which homework problems to examine at the beginning of the section. The problems will then be discussed at the board by “volunteers”, who will be awarded “Reward Points” (at the discretion of the TA). Reward Points will be counted as an extra credit towards the final, overall course grade and can contribute up to 10% of the overall grade.

Midterm and Final

The midterm exam and the final exam will be held in the same classroom as the lectures. The midterm will be a 1 hour written exam in class (regular lecture time) on Friday February 17, on the material covered up to Friday February 15, while the final (Monday March 19, 12:00PM-3:00PM) will be three hours long and cover the complete course material. Both the midterm and the final will be open-book (you can bring with you any book or notes), but only non-graphical, non-programmable calculators will be allowed (it will be up to the discretion of the Instructor to decide whether a calculator is or not allowed). Laptop computers and cellular phones of any kind will not be allowed. A practice midterm and final will be handed out a week before the exams. You must take the final exam to pass the course.

Final Grade

The minimal score not to fail the class is 60%.

The final grade will follow the percent guideline below:

- 60% to 70%: **C** range
- 70% to 85%: **B** range
- 85% to 100%: **A** range