Instructor:	Howard Haber
Office:	ISB, Room 326
Phone Number:	459-4228
Office Hours:	Mondays 2–3 pm and Thursdays 1:30–2:30 pm
E-mail:	haber@scipp.ucsc.edu

COURSE WEB PAGE:

`http://scipp.ucsc.edu/~haber/ph116A/index.html`

CLASS HOURS:

Lectures: Tuesdays and Thursdays, 10–11:45 pm, Physical Sciences Building, Room 110

REQUIRED TEXTBOOK:

Mathematical Methods in the Physical Sciences, 3rd edition, by Mary L. Boas

Other introductory texts:

Mathematical Methods for Physicists, 6th edition, by George B. Arfken and Hans J. Weber
Advanced Engineering Mathematics, by Erwin Kreyszig
Mathematical Methods for Scientists and Engineers, by Donald A. McQuarrie

PREREQUISITES:

Prerequisite math courses: Mathematics 23A and 23B.

It is assumed that you are familiar with the material in sections 4 and 5 of Chapter 3, and most of Chapters 4 and 6 of Boas.

Course Outline for Physics 116A

Topic	Reading
1. Infinite series, power series and asymptotic series	Boas, Chapter 1
2. Complex numbers and complex functions	Boas, Chapter 2
3. Special functions defined by integrals	Boas, Chapter 11
4. Matrices, linear algebra and vector spaces	Boas, Chapter 3
5. Eigenvalue problems and matrix diagonalization	Boas, Chapter 3
6. Tensor analysis	Boas, Chapter 10

Course Grading and Requirements

40% Weekly Homework (9 problem sets)
15% First Midterm Exam (Thursday, January 28, 2010)
15% Second Midterm Exam (Tuesday, February 23, 2010)
30% Final Exam (Tuesday, March 16, 2010, 4–7 pm)

Weekly homework assignments will be handed out on a weekly basis, and are due one week later at the beginning of class. The homework problem sets are not optional. 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. In order that homework can be graded efficiently and returned quickly, there will be a 50% penalty for late homework. This penalty may be waived in special circumstances if you see me before the original due date. Homework solutions will be made available two days after the official due date; no late homeworks will be accepted after that.

The two midterm exams and final exams will be held in the same classroom as the lectures. Each midterm will be one hour long, and will be followed by a shortened lecture of 45 minutes. The final exam will be three hours long and cover the complete course material. You must take the final exam to pass the course. You will be permitted to consult the class textbook, your own handwritten notes, and any class handout during the exams.

Course Outline for Physics 116A

1. Infinite Series, Power Series and Asymptotic Series
2. Complex Numbers and complex functions
3. Special Functions defined by integrals
4. Matrices, Linear Algebra and Vector Spaces
5. Eigenvalue Problems and Matrix Diagonalization
6. Tensor Analysis

Course outline for Physics 116B

1. Fourier Series and Transforms
2. Ordinary Differential Equations
3. Calculus of Variations
4. Functions of a Complex Variable: Theory
5. Functions of a Complex Variable: Applications

Course outline for Physics 116C

1. Series Solutions of Differential Equations
2. Orthogonal Polynomials and Sturm-Liouville Problems
3. Partial Differential Equations
4. Probability Theory
5. Mathematical Statistics