

Texts: Riley, Hobson and Bence - Mathematical Methods
Boccio - Lecture Notes
Readings in Optics - Boccio and Others

Website:

http://chaos.swarthmore.edu/courses/Physics50_2009/index.html

Topics (tentative)

(6.0 weeks) Linear Algebra, Fourier Series, Integral Transforms

Application to:

Matrix Geometrical Optics

Polarization Matrices

Interference and Diffraction

Fourier Optics

(2.5 weeks) ODEs

First-Order, Higher-Order

Series Solutions, Special Functions

(2.5 weeks) PDEs

General and Particular Solutions

Wave equation, Diffusion Equation, Laplace Equation,

Poisson Equation, Helmholtz Equation

Separation of Variables, Green's Functions

(1.0 week) Complex Analysis

Functions of a Complex Variable,

Complex Integration

(1.0 week) Tensors

(1.0 week) Group theory and the Eightfold Way (quarks)

Homework Schedule

Week	Homework Due	HW Topic
01	---	---
02	01	Review; Matrix optics
03	02	Review; Polarization
04	03	Fourier series
05	04	Integral transforms
06	05	Interference/Diffraction 1
07	06	Interference/Diffraction 2
08	07	ODE 1
09	08	ODE 2
10	09	ODE 3
11	10	PDE 1
12	11	PDE 2
13	12	PDE 3
14	13	Complex variables

No homework assignments on Tensors and Groups; we will learn about these topics just for fun.

Midterm:

Tue 03/03/08 **OR** Wed. 03/04/08

7 - 9PM (SC 104)

Covering weeks 1-6

Matrix optics, polarization, interference and diffraction

Final:

As scheduled (room to be scheduled)

Covering weeks 7-12

ODEs, PDEs and Complex Variables