Physics 50 **Syllabus** **Spring 2006**

Texts: Riley, Hobson and Bence - Mathematical Methods for Physics and Engineering
Boccio - Lecture Notes
Readings in Optics - Boccio and Others
(Restricted access)

Website:
http://chaos.swarthmore.edu/courses/Phys6_2008/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
(2.0 weeks) ODEs
First-Order, Higher-Order
Series Solutions, Special Functions
(2.0 weeks) PDEs
General and Particular Solutions
Wave equation, Diffusion Equation, Laplace Equation,
Poisson Equation, Helmholtz Equation
Separation of Variables, Green's Functions
(2.0 weeks) Complex Analysis
Functions of a Complex Variable,
Complex Integration
(1.0 weeks) Probability and Statistics **or** Tensors
(1.0 weeks) Group theory and the Eightfold Way (quarks)

Laboratories

Weeks 01-05 - Matlab
Week 06 - Optical ray Tracing using Matrices
Week 07 - Polarization Experiments using Jones Calculus
Week 08 - Single and Double Slit Diffraction
Week 09 - Diffraction and the Fourier Transform
Weeks 10- 14 - Mathematica