GEOPHYSICAL DATA ANALYSIS (11:628:452, 3 credits)

Instructors
Professor Robert Chant
Professor John Wilkin

Prerequisites
Differential Equations for Engineering and Physics 01:640:244
or
Elementary Differential Equations 01:640:252

Course Materials
We will use Matlab extensively to illustrate theoretical concepts, display data, and demonstrate how to implement computational methods. You need to have a relatively recent version of Matlab running on a personal computer or have access to a machine that does.
Bring your computer to class since there will frequently be in-class exercises.

Topics
Introduction, Review of Statistics
Regression and Correlation
Harmonic Analysis
Linear algebra review and Matlab linear algebra
Empirical Orthogonal Functions
Convolution Theorem
Filtering
Demodulation
Least Squares for Linear Models
Weighted least squares
Optimal interpolation
Maximum Covariance Analysis
Fourier Transforms
Spectral Analysis
Auto-regressive noise
Wavelet

Course Learning Goals and Assessment
The Learning Goals for the Marine Science Program are posted on our website at http://marine.rutgers.edu/main/academics/undergraduate/program-description. The learning goals for this course apply to Program Learning Goal 1 (master the basic biological, chemical, physical, and geological principles of marine science), Goal 2 (analyze and interpret
Students completing this course will be able to:

**Goal A.** Apply theoretical concepts to analysis of real data and demonstrate how to implement computational methods
  Instructional Activities: lectures, in-class exercises
  Assessment Method: homework assignments

**Goal B.** Develop and conduct an independent data analysis project
  Instructional Activities: lectures, class presentations
  Assessment Method: draft and final written project report, oral class presentation

**Grading**
  Homework assignments 50%
  Data analysis project 50%