1. Course number and title
   ORE 608 Probability and Statistics for Ocean Engineers

2. Credits and contact hours
   3 credits, Two 1.25-hour sessions per week

3. Instructor
   Eva-Marie Nosal

4. Textbooks:
   Textbooks: None
   Reference books:
   a. C Moler, *Numerical Computing with MATLAB*, Society for Industrial Mathematics, 2004
   b. C Moler, *Experiments with MATLAB*, Society for Industrial Mathematics, 2011
   c. S.M. Kay, *Intuitive Probability and Random Processes using MATLAB*, Springer, 2006
   d. SM Kay, Fundamentals of Statistical Signal Processing, Vol. III Practical Algorithm Development, Prentice Hall, 013
   e. Emery & Thomson, *Data Analysis Methods in Physical Oceanography*, 2004

5. Specific course information
   a. Course Content: Probability and statistical analysis including distributions, multiple regression and correlation, autocovariance, cross-spectra, and practical applications in ocean engineering.
   b. Prerequisite:
      i. Calculus
      ii. Probability and statistics
      iii. Water wave mechanics
      iv. 607 or consent
   c. Designation: Elective

6. Specific goals for the course
   The objective of this course is to provide students with the background and skills required to conduct statistical analyses of data in ocean engineering. This will be a hands-on class with theory accompanied by practical implementation in MATLAB. After a review of programming in MATLAB and fundamentals of probability and statistics, topics including data exploration, descriptive statistics, linear and non-linear models, hypothesis testing, multivariate statistics, time series analysis, and spectral analysis will be covered. Emphasis will be placed on application to ocean engineering problems such as water waves, ocean structures, and ocean acoustics.

7. Brief list of topics to be covered
   a. MATLAB Review
   b. Fundamentals of probability and statistics
   c. Data exploration and visualization
   d. Descriptive statistics
   e. Linear models
   f. Nonlinear regression models
   g. Hypothesis testing
   h. Multivariate statistics
   i. Time series analysis

j.    Spectral analysis