

1. SM316 Engineering Mathematics with Probability and Statistics
2. 3 credit hours, 3 recitation hours
3. Course coordinator: Assoc. Prof. C. Moen
4. Textbook: Probability and Statistics for Engineers and Scientists (9th ed.) by Walpole et al. (2011)
 - a. Supplemental materials: Notes, Matrix Theory for SM316.
5. Specific course information
 - a. Basic concepts in probability and statistics, arithmetic of complex numbers, and Fourier analysis.
 - b. Prerequisite: SM212
 - c. Required course
6. Specific goals for the course
 - a. At the conclusion of the course, students will be able to:
 - use the concept and properties of and theorems about probability and probability distributions to model real life phenomena and to compute and interpret probabilities of events
 - use statistical methods to estimate parameters of a population from a sample and interpret the results
 - perform matrix computations and use basic spectral theory to analyze the structure of a matrix.
 - b. This course introduces the following Student Outcomes:
 - (a) an ability to apply knowledge of mathematics, science, and engineering
 - (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

7. Topics covered:

- Probability
- Conditional Probability
- Bayes's Rule,
- Random Variable,
- Probability Distributions
- Mean
- Variance
- Specific distributions (Uniform, Binomial, Poisson, Normal, Chi-squared, student t)
- Central Limit Theorem,
- Sampling distributions
- confidence intervals
- parameter estimation
- matrices
- linear systems
- inverse matrices
- linear dependence
- rank
- determinants
- Cramer's Rule
- Eigenvalues and Eigenvectors
- Diagonalization