

SAMPLE SYLLABUS

This syllabus is to be used as a guideline only. The information provided is a summary of topics to be covered in the class. Information contained in this document such as assignments, grading scales, due dates, office hours, required books and materials may be from a previous semester and are subject to change. Please refer to your instructor for the most recent version of the syllabus.

ABET Course Syllabus EEE350

1. **Course: EEE 350 Random Signal Analysis**
 2. **Credits and Contact Hours:** 3 Credit Hours (lecture), Topics: Engineering
 3. **Course Coordinator:** Dr. Cihan Tepedelenlioglu, Associate Professor
 4. **Textbook:** R. D. Yates and D. J. Goodman, *Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers*, 3rd Edition, John Wiley & Sons, 2014
- Supplemental materials:**
1. D. P. Bertsekas and J. N. Tsitsiklis, *Introduction to Probability*, Athena Scientific, 2002.
 2. Henry Stark and John W. Woods, *Probability and Random Processes with Applications to Signal Processing* (2nd edition), Prentice Hall, 2002.
 3. P Z Peebles, *Probability, random variables, and random signal principles*, McGraw-Hill, New York, 1993.
 4. A. Papoulis and S. U. Pillai, *Probability, Random Variables, and Stochastic Processes*, Fourth Edition, McGraw-Hill, 2002.
5. **Specific course information**
 - a. **Catalog description:** Probabilistic and statistical analysis as applied to electrical signals and systems.
 - b. **Prerequisites or co-requisites:** EEE203.
 - c. **Required/elective/selected elective:** Required
 6. **Specific goals for the course**

Students can perform statistical analysis. Students can extract math models from word problems and solve engineering problems that include probability, with awareness of the Monte Carlo method. Students are well prepared for senior level electives

 - a. **Outcomes of instruction:**
 - i) Students can perform rudimentary statistical analysis of univariate and bivariate data
 - ii) Students can solve engineering problems using axiomatic probability theory, random variables, and random processes
 - iii) Students are well prepared for senior-level electives that include EEE 350 as a prerequisite, with awareness of computer simulation tools, incl. the Monte Carlo method.
 - b. **Outcomes of Criterion 3 addressed by the course:**

(1) Understanding of random variables and their applications is central for the constituent industries. Students apply mathematics to understand and solve problems in this course. Students can perform and design engineering algorithms/procedures to analyze data, and solve engineering problems.

(1,2) Students utilize modern tools (software) to solve homework problems.
 7. **Brief list of topics to be covered**
 1. Axiomatic probability
 2. Random variables, distribution functions, and density functions
 3. Special distributions: Gaussian, exponential, Poisson, Binomial, Geometric, etc.
 4. Expectation and variance
 5. Multiple random variables
 6. Central limit theorem and law of large numbers
 7. Maximum-likelihood estimation and confidence intervals

8. Random processes
9. Statistical analysis using sample statistics, histograms, and linear regression

Computer Usage: Several computer projects are assigned during the semester.

Laboratory Experiments: None.

Course Contribution to Engineering Science and Design:

This course teaches engineering science through the application of fundamental statistical principles to engineering problems. For example, students are exposed to the ideas of statistical signal processing with applications to image and speech signals, communication systems design issues. This course also provides students with opportunities to solve open-ended problems. For example, students use the statistics to perform semiconductor process control, yield management, and reliability analysis.

Person preparing this description and date of preparation: K. Tsakalis, Cihan Tepedelenlioglu, June, 2021.