ABET Course Syllabi for IND E 315: Probability and Statistics for Engineers

1. Course number and name: IND E 315: Probability and Statistics for Engineers

2. Credits and contact hours: 3 credit hours, 3 contact hours per week.

3. Instructors’ Names: Linda Boyle, Kal Kapur, Christina Mastrangelo

4. Textbook:

5. Specific Course Information:
   a. Description: Application of probability theory and statistics to engineering problems, distribution theory and discussion of particular distributions of interest in engineering, statistical estimation and data analysis. Illustrative statistical applications may include quality control, linear regression, and analysis of engineering data sets.
   b. Pre-requisites: Either MATH 136, MATH 307 or AMATH 351.
   c. This is a required course in the program.

6. Specific goals for the course: In this course students will learn the basic fundamentals of probability and statistics. This course is designed to not only introduce students to the basics, but to develop students’ probabilistic and statistical intuition for application in their discipline.
   a. Specific outcomes: At the end of the course students will be able to do the following:
      i. Identify various probability distributions.
      ii. Calculate basic statistical measures.
      iii. Design and perform hypothesis tests and other evaluative tests.
      iv. Analyze a problem in which they are able to apply at least 3 different topics from the class.
      v. Learn a statistical software package.
   b. Criteria 3 outcomes addressed by the course:
      a. An ability to apply knowledge of mathematics, science, and engineering.
      b. An ability to design and conduct experiments, as well as analyze and interpret data.
      e. An ability to identify, formulate, and solve engineering problems.
      i. A recognition of the need for, and ability to engage in life-long learning.
      j. A knowledge of contemporary issues.
      k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
      l. An understanding of the integrated, inter-disciplinary nature of the discipline.

7. Brief list of topics covered:
   - Probability: Sample Spaces and Events, Counting Techniques
- Discrete Random Variables and Probability Distributions
- Continuous Random Variables and Probability Distributions
- Random Sampling and Data Description
- Point Estimation of Parameters
- Statistical Intervals for One & Two Sample
- Hypothesis Testing for One & Two Sample