

## Engineering Statistics

- SEMESTER:** Spring  
**CREDITS:** 6 ECTS (4 hrs. per week)  
**LANGUAGE:** English  
**DEGREES:** SAPIENS

### Course overview

This course is an introduction to the basic concepts in probability and statistics with engineering applications. Topics include probability, discrete and continuous random variables, confidence interval estimation, hypothesis testing, correlation, regression, and analysis of variance.

### Prerequisites

Basic knowledge of Calculus and being able to answer the following questions correctly:

- 1) Compute:  $\int_a^a F(x)$ .
- 2) Solve:  $2x - 5 = -3$ .
- 3) Solve:  $5x^2 - 10x + 5 = 0$ .
- 4) Use interval notation to write the solution:  $2x^2 \leq 3x + 5$ .
- 5) When a brown bear hibernates, its heart rate drops to 10 beats per minute, which is 20% of its normal value. Compute a brown bear's normal heart rate when not hibernating.
- 6) Solve:  $2x + 3y = 15$ 
  - a.  $x - 3y = 10$
- 7) Compute:  $\int_0^1 3x$ , interpret the result and obtain the same result but using no integrals!
- 8) Solve  $\frac{2}{\sqrt{x}} \leq 0.1$  in terms of  $x \geq$

### Course contents

1. Descriptive Statistics.
2. Probability.
3. Discrete and Continuous Random Variables.
4. Sampling and Simulation.
5. Inference, Confidence Intervals and Hypothesis Testing.

6. Linear Regression and Correlation.
7. Analysis of Variance.
8. Design of Experiments.
9. Statistical Quality Control.

## TextBook

- Navidi “Statistics for Engineers & Scientists”, 4th edition, McGraw-Hill, 2015

## Additional Reference

- R.E. Walpole, R.H. Myers, S.L. Myers and K.E. Ye Probability & Statistics for Engineers & Scientists, Global Edition. Pearson. 2016

## Software

You will need a computer for some homework assignments and practice. The main software used in class will be **R**.

## Grading

The following conditions must be accomplished to pass the course:

- A minimum overall grade of at least 5 over 10.

The overall grade is obtained as follows:

- Continuous evaluation (20 %):
  - Attendance
  - Periodical assignments
  - Active participation in class
- Exams (80%): Minimum average grade of exams: 4
  - Intermediate evaluation tests (February + April): 40% (20% + 20%)
  - Final exam (May): 40%
  - Compulsory to attend all exams unless duly justified

## Retake

- Previous continuous evaluation Grade: 20%
- Extraordinary exam: 80%