

Statistics

1. **Course number and name:** 020STAES1 Statistics
2. **Credits and contact hours:** 4 ECTS credits, 2x1:15 contact hours
3. **Name(s) of instructor(s) or course coordinator(S):** Rafic Faddoul
4. **Instructional materials:** Course handouts; assignment handouts; videos

References:

- Sheldon M.Ross, (2003). *Introduction to probability models* 8th edition: Academic Press an imprint of Elsevier
- Philippe Tassi, (1992) *Méthodes statistiques*, 2nd edition : Economica
- Robert W.Keener, (2010). *Theoretical Statistics. Topics for a Core Course:* Springer
- Hogg, McKean, Graig (2005). *Introduction to Mathematical Statistics*, 6th edition: Pearson Prentice Hall
- WalPole, Meyers, Meyers, (1998). *Probability and Statistics*, 6th edition: Prentice Hall
- Donald G.Childers (1997). *Probability and Random Processes:* McGraw-Hill

5. Specific course information

a. Catalog description:

Sampling distribution - Estimation by confidence intervals, estimation by maximum likelihood, and estimation by the method of moments - Hypothesis tests for the mean, the variance, the proportion, independence and fitting to a distribution - Simple and multiple linear regression - Non-parametric tests.

b. Prerequisites: 020PRBNI4 Probability or 020AL3CI4 Algebra 3

c. Required for CCE, EE and ME students

6. Educational objectives for the course

a. Specific outcomes of instructions:

- Estimate the parameters of a population from random samples.
- Validate a hypothesis using statistical tests.
- Conduct a simple and multiple linear regression and perform the corresponding tests."

b. PI addressed by the course:

| | | | | |
|-----------------|-----|-----|-----|-----|
| PI | 1.1 | 1.2 | 6.3 | 6.4 |
| Covered | x | x | x | x |
| Assessed | | | x | x |

7. Brief list of topics to be covered

- Review on random variables and probability densities (2 lectures)
- Difference between descriptive statistics and inferential statistics (1 lecture)
- Study of the sampling distribution (1 lecture)
- Confidence intervals for the mean (2 lectures)
- Confidence intervals for the variance (1 lecture)
- Confidence intervals for a proportion (1 lecture)
- Estimation by the method of maximum likelihood (2 lectures)
- Estimation by the moment method (1 lecture)
- Introduction to the concepts of statistical hypothesis tests (2 lectures)
- Hypothesis test for the mean (2 lectures)
- Hypothesis test for the variance (2 lectures)
- Hypothesis test for proportions (2 lectures)
- Hypothesis test for independence (2 lectures)
- Hypothesis test for conformity to a law (2 lectures)
- Linear regression (2 lectures)
- Introduction to non-parametric tests (3 lectures)