Statistics

1. **Course number and name:** 020STAES1 Statistics

2. **Credits and contact hours:** 4 ECTS credits, 2x1:15 contact hours per week

3. **Name(s) of instructor(s) or course coordinator(s):** Tony Khalil

4. **Instructional Materials:** Lecture notes - Assignment handouts - Videos.

   Textbooks/References:
   - Sheldon M.Ross, (2003). Introduction to probability models 8th edition: Academic Press an imprint of Elesevier.
   - 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.

   a. **Prerequisite:** Probability (020PRBNI4) or Algebra 3 (020AL3CI4).

   b. **Required** for CCE, EE, and ME students.

6. **Educational objectives for the course**
   a. **Specific outcomes of instruction:**
      At the end of this course, the student will be able to:
      1- Estimate the parameters of a population from random samples.
      2- Validate a hypothesis using statistical tests.
      3- 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).