<u>**Course Syllabus**</u>
020STAGS2 Probability and Statistics

1. **Course number and name:** 020STAGS2 Probability and Statistics.
2. **Credits and contact hours:** 4 credits, 2x1:35 course hours.
3. **Instructor's or course coordinator's name:** Rafic FADDOUL
4. **Textbook and other supplemental material:**
   a. Lecture notes;
   b. Assignement handouts.
5. **Specific course information**
   a. **Catalog description:** Modeling – equiprobability – counting – conditional probability – statistical independence – discrete and continuous random variables – probability distributions – cumulative distributions – joint probability distributions – marginal distributions – Expected value – variance – common probability distributions – generating functions – variable transformations – convergence – central limit theorem – Gaussian vectors – simulation – descriptive statistics – sampling – estimation – statistical hypotheses testing.
   b. **Prerequisites:** High-school level elementary calculus and counting concepts.
   c. **Required/Elective/Selected Elective:** Required major course for Civil engineering students.
6. <u>**Specific goals for the course**</u>
   a. **Specific outcomes of instruction:**
      ▪ Uncertainty modeling using probability distributions;
      ▪ Optimize decision making under uncertainty;
      ▪ Estimating the parameters of a population;
      ▪ Statistical hypotheses testing.

   b. **KPIs addressed by the course:**

| KPI | a1 | b1 | b3 | k1 |
|---|---|---|---|---|
| **Covered** | X | X | X | X |
| **Assessed** | X | | X | X |
| **Give Feedback** | X | | X | X |

7. <u>**Brief list of topics to be covered and approximate number of lectures:**</u>

| Nbr Hours | Content |
|---|---|
| 4 | Discrete and continuous random variables – Probability distributions - Cumulative distributions |
| 4 | Joint probability distributions – mariginal distributions |
| 4 | Moments – Expected value - Variance |
| 6 | Common probability distributions |
| 4 | Moment Generating Functions - Transformations of Variables |
| 2 | Descriptive statistics |
| 4 | Sampling - Estimation |
| 4 | Hypothesis Testing |

| 3 | Linear Regression |
|---|---|

## 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