Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
INF257	Statistics and Data Analysis	4	3	0	0	3	5

Prerequisites	
Admission Requirements	

Language of Instruction	French
Course Type	Compulsory
Course Level	Bachelor Degree
Objective	This course aims that the students who already have basic knowledge about statistics might combine different statistical concepts, make statistical inference from data, develop models for their data and easily create the codes that implements their models when they come across real-world engineering problems. Hence, those students can approach at first sight theoretically, then develop theoretical solutions and finally create practical structures to the engineering problems related to data.
Content	Week 1 — Concepts of Data, Information, and Actionable Information; Overview of Data Analysis Week 2 — General Statistical Concepts, Types of Variables, Data Description — Semester Project Introduction Week 3 — Univariate Descriptive Analysis: Description of Qualitative Data — Data Visualization Week 4 — Univariate Descriptive Analysis: Description of Quantitative Data — Data Visualization Week 5 — Parametric Statistics — Statistical Inference Week 6 — Hypothesis Testing — z-test Week 7 — Comparison of Two Samples — t-test — Interpretation of Results Week 8 — Midterm Exam Week 9 — Analysis of Variance (ANOVA) Week 10 — Linear and Multiple Regression — Statistical Regression Analysis Week 11 — Variants of Linear Regression: Logistic Regression, Generalized Linear Model, Hierarchical Linear Model Week 12 — Time Series Analysis Week 13 — Project Presentations 1 Week 14 — Project Presentations 2
References	1. PDQ Statistics, Geoffrey R. Norman, David L. Streiner, 2003 2. The Art of R Programming, A tour of Statistical Software Design, Norman Matloff, 2011 3. Data Mining Concepts and Techniques, Jiawei Han, Micheline Kamber, 2006 4. An Introduction to Statistical Learning, Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, 2013 5. Software for Data Analysis: Programming with R (Statistics and Computing), John M. Chambers, 2008 6. Modern Applied Statistics with S (Statistics and Computing), W.N. Venables, B.D. Ripley, 2002

Theory Topics

Week	Weekly Contents
1	Concepts of Data, Information, and Actionable Information; Overview of Data Analysis
2	General Statistical Concepts, Types of Variables, Data Description — Semester Project Introduction
3	Univariate Descriptive Analysis: Description of Qualitative Data — Data Visualization
4	Univariate Descriptive Analysis: Description of Quantitative Data — Data Visualization
5	Parametric Statistics — Statistical Inference
6	Hypothesis Testing — z-test
7	Comparison of Two Samples — t-test — Interpretation of Results
8	Midterm Exam
9	Analysis of Variance (ANOVA)
10	Linear and Multiple Regression — Statistical Regression Analysis
11	Variants of Linear Regression: Logistic Regression, Generalized Linear Model, Hierarchical Linear Model
12	Time Series Analysis

Week	Weekly Contents
13	Project Presentations 1
14	Project Presentations 2