Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
INF356	Introduction to Data Analysis	5	3	0	0	3	4

Prerequisites	IND211/INF256/INF257/INF211
Admission Requirements	IND211/INF256/INF257/INF211

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	1. Week Data-Information-Knowledge, General View to Data Analysis 2. Week Basic Statistical Concepts, variable types, Data description, Introduction to R 3. Week Numerical Data Description - Application in R and R visualization functions 4. Week Parametric Statistic, Statistical Inference, creating toy data in R and inference from it 5. Week Comparing two samples, t-test, Interpreting the results, R application 6. Week Analysis of variance, AOV and ANOVA in R 7. Week Linear and Multiple regression, lm function in R 8. Week Midterm 9. Week Covariance analysis, R application 10. Week Variations of Linear Regression: Logic Regression,General Linear Model, Hierarchical linear Model 11. Week Time Series Analysis, Declaration of Term Project 12. Week Non-parametric Statistic, Significance test 13. Week Non-parametric Statistic, Measures of Association 14. Week Advanced non-parametric methods and project presentations
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	Data-Information-Knowledge, General View to Data Analysis
2	Basic Statistical Concepts, variable types, Data description
3	Numerical Data Description
4	Parametric Statistic, Statistical Inference
5	Comparing two samples, t-test, Interpreting the results
6	Analysis of variance
7	Linear and Multiple regression
8	Midterm
9	Covariance analysis
10	Variations of Linear Regression: Logic Regression,General Linear Model, Hierarchical linear Model
11	Time Series Analysis, Declaration of Term Project
12	Non-parametric Statistic, Significance test
13	Non-parametric Statistic, Measures of Association

Week	Weekly Contents
14	Advanced non-parametric methods and project presentations