

Content

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

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

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| 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 | <ol style="list-style-type: none"> 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 | <ol style="list-style-type: none"> 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 |
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| 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 |

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