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Seminar of applied statistics (3ST2011)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
Master en statistique	Séminaire: 2 ph	Voir ci-dessous	3

ph=période hebdomadaire, pg=période globale, j=jour, dj=demi-jour, h=heure, min=minute

Période d'enseignement:

- Semestre Printemps

Equipe enseignante:

Associate Professor Jacques Zuber
University of Neuchâtel
jacques.zuber@unine.ch

Objectifs:

Learning from data or turning data into knowledge from planning for the collection data and data management to exploratory data analysis, statistical data analysis, interpretation of statistical software outputs, presentation of results and composition of the report. Integrating the practice and theory of statistics to case studies. Solving real live problems by applying adequate statistical methods. Studying different topics in statistics in order to help students develop statistical thinking. Finally, illustrating a variety of topics in statistical theory and data science.

Contenu:

- Different areas of statistics will be covered in the seminar as for example :
 - data and information visualisation
 - data mining (knowledge discovery in databases)
 - big data analytics (methodological training in data science)
 - business analytics and management statistics
 - quality control (industrial statistics)
- A case study is proposed to a group of two students. More precisely, each group has to solve a scientific or an economic problem. For solving it, students have :
 - to make investigations about the problem by reading different papers or books
 - to collect data
 - to analyse the data by applying the adequate statistical method
 - to summarize and interpret outputs (tables and graphs) provided by a statistical software (S-Plus or R)
 - to write a report on their findings
- Groups will present their solutions, and supply their own handouts, outputs and materials

Forme de l'évaluation:

CA graded: Continuous assesment, final grade according to the following weighting system : 80% for the report and 20% for the presentation.

Reexamination next session (August-September): a new projet will be given with the same system.

Documentation:

- Bishop, C. M. (2009). Pattern Recognition and Machine Learning. Springer: New York
- Groebner, D. F., Shannon, P. W. & Fry, P. C. (2017). Business Statistics, A Decision-Making Approach (10th Edition). Pearson International Edition: New Jersey
- Han, J., Kamber, M. & Pei J. (2011). Data Mining: Concepts and Techniques (3rd Edition). Morgan Kaufmann Publishers: San Diego
- Harrell, F. E. Jr (2015). Regression Modeling Strategies: With Applications to Linear Models, Logistic and Ordinal Regression, and Survival Analysis. Springer Series in Statistics: New York
- Hastie, T., Tibshirani, R. & Friedman, J. H. (2009). The Elements of Statistical Learning. Data Mining, Inference, and Prediction (2nd Edition). Springer Series in Statistics: New York
- James, G., Witten, D., Hastie, T. & Tibshirani, R. (2013). An Introduction to Statistical Learning with Applications in R. Springer Texts in Statistics: New York
- Larose, D. T. & Vallaud, T. (2005). Des données à la connaissance : Une introduction au data mining. Vuibert: Paris

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- Montgomery, D. C. (2012). Statistical Quality Control: A Modern Introduction (7th Edition). John Wiley & Sons: New York
- Moore, D. S., McCabe, G. P. & Craig, B. A. (2015). Introduction to the Practice of Statistics (8th Edition). W. H. Freeman & Co.: New York
- Nolan, D. & Speed, T (2001). Stat Labs, Mathematical Statistics Through Applications. Springer Texts in Statistics: New York

Pré-requis:

common basis in probability and statistics

Forme de l'enseignement:

- 3 ECTS credits
- Compulsory course for master in statistics
- Spring semester
- Exercises : Application of the methods using software R.