Université de Neuchâtel

- Faculté des sciences
- www.unine.ch/sciences

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

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Contenu

1. Different areas of statistics will be covered in the seminar as for example:
- data and information visualisation
- machine learning techniques (decision trees, neural networks, support vector machines, bagging, random forests, boosting, ...)
- data mining (knowledge discovery in databases)
- big data analytics (methodological training in data science)
- business analytics and management statistics
2. A case study is proposed to a group of two students. 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
3. 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
- Cairo, A. (2021). How Charts Lie: Getting Smarter about Visual Information. W. W. Norton & Company: New York
- Efron, B. & Hastie, T. (2016). Computer Age Statistical Inference: Algorithms, Evidence and Data Science. Cambridge University Press: Cambridge
- Han, J., Kamber, M. & Pei J. (2011). Data Mining: Concepts and Techniques (3rd Edition). Morgan Kaufmann Publishers: San Diego
- 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. (2021). An Introduction to Statistical Learning with Applications in R (2nd Edition). Springer Series in Statistics: New-York
- Moore, D. S., McCabe, G. P. & Craig, B. A. (2017). Introduction to the Practice of Statistics (9th Edition). W. H. Freeman & Co.: New York
- Nolan, D. & Speed, T (2001). Stat Labs, Mathematical Statistics Through Applications. Springer Texts in Statistics: New York
- Rosling, H. (2018). Factfulness: Ten Reasons We're Wrong About the World-and Why Things Are Better Than You Think. Flatiron Books: New York
- Wickham, H. & Grolemund, G. (2015). R for Data Science. O'Reilly: Sebastopol
- Zumel, N. & Mount, J. (2020). Practical Data Science with R. Manning Publications: New York

Pré-requis

common basis in probability and statistics

Forme de l'enseignement

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Seminar of applied statistics (3ST2011)

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

Objectifs d'apprentissage

Au terme de la formation l'étudiant-e doit être capable de :

- Integrate the practice and theory of statistics to case studies
- Solve real live problems by applying adequate statistical methods
- Extract knowledge from data
- Summarize and interpret outputs (tables and graphs) provided by a statistical software
- Write a report on findings and present it