

- Faculté des sciences
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### Statistical Learning Methods (3IN2046)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
<b>Master en statistique</b>	<b>Cours: 2 ph Exercice: 2 ph</b>	Voir ci-dessous	5

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

#### Période d'enseignement:

- Semestre Printemps

#### Equipe enseignante:

Prof. Jacques Savoy

#### Objectifs:

The main objectives of this course is to introduce the students to the various techniques coming mainly for the statistical domain in the machine learning paradigm. The main objectives of the course are the followings:

- 1) to be able to use and program in R, the statistical language (used to analyze Big Data);
- 2) to select, apply and evaluate a learning method using R and to interpret the results;
- 3) to select the most appropriate method according to the data, and to evaluate the quality of the fit.

#### Contenu:

Introduction to R (statistical software); statistical models and evaluation with R; regression simple and multiple; logistic regression; k-nearest neighbors; linear discriminant analysis (LDA); model evaluation, variable selection and regularization; resampling approaches & evaluation; support vector machines (SVM); boosting; unsupervised approaches (principal component analysis, multidimensional scaling);

#### Forme de l'évaluation:

Written 2 hours + Practical exercices

#### Documentation:

Copies of the slides will be available

#### References:

G. Jones, D. Witten, T. Hasti, R. Tibshirani: An Introduction to Statistical Learning. With Applications in R. Springer, 2013.  
C.M. Bishop: Pattern Recognition & Machine Learning. Springer, 2006.  
T. Hasti, R. Tibshirani, J. Friedman: The Elements of Statistical Learning. 2nd Ed. Springer, 2009.

M.J. Crawley: The R Book. 2nd Ed., Wiley, 2012

#### Pré-requis:

Bachelor in Computer Science

#### Forme de l'enseignement:

+ 2 hours of practical exercices (with R)

URLs	1) <a href="http://mcs.unibnf.ch/program/courses-timetable/courses/statistical-learning-methods">http://mcs.unibnf.ch/program/courses-timetable/courses/statistical-learning-methods</a>
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