

5.0 credits	30.0 h + 30.0 h	1q
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Teacher(s) :	Verleysen Michel ; Lee John (compensates Verleysen Michel) ;
Language :	Anglais
Place of the course	Louvain-la-Neuve
Inline resources:	 > http://moodleucl.uclouvain.be/course/view.php?id=84
Prerequisites :	/
Main themes :	Linear and nonlinear data analysis methods, in particular for regression and dimensionality reduction, including visualization.
Aims :	<p>Regarding the learning outcomes of the program of "Master in Electrical Engineering", this course contributes to the development and the acquisition of the following learning outcomes :</p> <ul style="list-style-type: none"> - AA1.1, AA1.2, AA1.3, - AA3.1, AA3.2, AA3.3, - AA4.1, AA4.2, AA4.4 - AA5.1, AA5.2, AA5.3, AA5.5, - AA6.3 <p>At the end of the course, students will be able to :</p> <ul style="list-style-type: none"> - Understand and apply machine learning techniques for data and signal analysis, in particular for regression and prediction tasks. - Understand and apply linear and nonlinear data visualization techniques. - Evaluate the performances of these methods with appropriate techniques. - Choose between existing methods on the basis of the nature of data and signals to be analyzed. <p><i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i></p>
Evaluation methods :	Closed book oral examination, or written examination (depending on the number of students)
Teaching methods :	Lectures, exercises, practical sessions on computers, project to be carried out individually or by groups of 2 students
Content :	<ul style="list-style-type: none"> -- Linear regression -- Nonlinear regression with multi-layer perceptrons -- Clustering and vector quantization -- Nonlinear regression with radial-basis function networks -- Probabilistic regression -- Ensemble models -- Model selection -- Principal Component Analysis -- Nonlinear dimensionality reduction and data visualization -- Independent Component Analysis -- Kernel methods
Bibliography :	Reference books (non-obligatory) mentioned on the website of the course

<p>Cycle and year of study :</p>	<p> > Master [120] in Statistics: General > Master [120] in Agricultural Bioengineering > Master [120] in Environmental Bioengineering > Master [120] in Forests and Natural Areas Engineering > Master [120] in Chemistry and Bio-industries > Master [120] in Computer Science > Master [120] in Computer Science and Engineering > Master [120] in Biomedical Engineering > Master [120] in Mathematical Engineering > Master [120] in Electro-mechanical Engineering > Certificat universitaire en statistique > Master [120] in Electrical Engineering </p>
<p>Faculty or entity in charge:</p>	<p>ELEC</p>