

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
Main themes :	Linear and nonlinear data analysis methods, in particular for regression and dimensionality reduction, including visualization.
Aims :	<p>With respect to the AA referring system defined for the Master in Electrical Engineering, the course contributes to the development, mastery and assessment of the following skills :</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 (not mandatory) mentioned on the website of the course

Faculty or entity in charge:	ELEC
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Programmes / formations proposant cette unité d'enseignement (UE)				
Intitulé du programme	Sigle	Credits	Prerequis	Acquis d'apprentissage
	STAT9CE	5	-	
Master [120] in Statistics: General	STAT2M	5	-	
Master [120] in Electrical Engineering	ELEC2M	5	-	
Master [120] in Computer Science and Engineering	INFO2M	5	-	
Master [120] in Mathematical Engineering	MAP2M	5	-	
Master [120] in Computer Science	SINF2M	5	-	
Master [120] in Biomedical Engineering	GBIO2M	5	-	
Master [120] in Electro-mechanical Engineering	ELME2M	5	-	
Master [120] in Chemistry and Bioindustries	BIRC2M	5	-	
Master [120] in Environmental Bioengineering	BIRE2M	5	-	
Master [120] in Forests and Natural Areas Engineering	BIRF2M	5	-	
Master [120] in Agricultural Bioengineering	BIRA2M	5	-	
	STAT2FC	5	-	