





5.0 credits	30.0 h + 30.0 h	2q
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Teacher(s) :	Absil Pierre-Antoine ; Vandendorpe Luc (coordinator) ;
Language :	Anglais
Place of the course	Louvain-la-Neuve
Inline resources:	http://moodleucl.uclouvain.be/course/view.php?id=4753
Prerequisites :	-- FSAB1106 (or equivalent training in signals and systems) -- FSAB1105 (or equivalent training in probabilities and statistics)
Main themes :	The object of this course is to lead to a good understanding of stochastic processes, their most commonly used models and their properties, as well as the derivation of some of the most commonly used estimators for such processes : Wiener and Kalman filters, predictors and smoothers.
Aims :	1.1; 1.2; 1.3 3.1; 3.2; 3.3 4.2 At the end of this course, the students will be able to : -- Have a good understanding of and familiarity with random variables and stochastic processes ; -- Characterize and use stable processes and their spectral properties; -- Use the major estimators, and characterize their performances ; -- Synthesize predictors, filters and smoothers, in both Wiener or Kalman frameworks. <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>
Evaluation methods :	-- Project during the course semester -- Exam -- Other activities, such as quizzes and homework exercises, can be taken into account in the final grade.
Teaching methods :	Learning will be based on courses interlaced with practical exercise sessions (exercises done in class or in the computer room using MATLAB). In addition, the training includes a project to be realized by groups of 2 or 3 students.
Content :	The course is subdivided into four parts/chapters: -- Probabilities, random variables, moments, change of variables. -- Stochastic processes, independence, stability, ergodicity, spectral representation, classical models of stochastic processes. -- Estimation (for random variables) : biais, variance, bounds, convergence, asymptotic properties, classical estimators. -- Estimation (for random processes) : filtering, prediction, smoothing, Wiener and Kalman estimators.
Bibliography :	Course notes, written by the two lecturers, are available.
Faculty or entity in charge:	MAP

Programmes / formations proposant cette unité d'enseignement (UE)				
Intitulé du programme	Sigle	Credits	Prerequis	Acquis d'apprentissage
Master [120] in Electrical Engineering	ELEC2M	5	-	
Minor in Statistics	LSTAT100I	5	-	
Additionnal module in Mathematics	LMATH100P	5	-	
Minor in Engineering Sciences: Applied Mathematics	LMAP100I	5	-	
Master [120] in Computer Science and Engineering	INFO2M	5	-	