

5.0 credits	30.0 h + 30.0 h	2q
-------------	-----------------	----

Teacher(s) :	Hendrickx Julien ;
Language :	Anglais
Place of the course	Louvain-la-Neuve
Prerequisites :	It is beneficial but not mandatory, to have followed the course INMA1731 (Stochastic Processes, estimation and prediction).
Main themes :	Identical to the contents of the course
Aims :	<p>The aim of this course is to enable the students to obtain a mathematical model of a dynamical process on the basis of input-output data measured on this process. Such mathematical model is typically required in order to predict, simulate or control this process. At the end of the course, the students will be able to estimate a mathematical model on the basis of input-output data; this implies estimating the mathematical structure of a model, estimating the parameters within that structure, and validating the model with respect to a pre-defined objective.</p> <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 :	<ul style="list-style-type: none"> - Exam at the end of the year - Identification of a system on the basis of real input/output data (using the Matlab System Identification Toolbox, developed by L. Ljung) - Exercises in the course of the year
Content :	<p>The following material will be covered :</p> <ol style="list-style-type: none"> 1. Mathematical models viewed as predictors 2. Non-parametric identification methods 3. Estimation of parametric models by Prediction Error Method 4. Frequency domain interpretation of the Prediction Error Method 5. Evaluation of the quality of an identified model (bias and variance) 6. Determination of the model structure : validation tools 7. Discussion of the design parameters in system identification : sampling period, number of data points, prefilters, choice of excitation signal, etc..
Bibliography :	<p>Support :</p> <p>The course is based on the two following books: « System Identification », Torsten Söderström and Petre Stoica http://user.it.uu.se/~ts/sysidbook.pdf « System Identification - Theory for the user », Lennart Ljung, Prentice Hall, 1999.</p>
Cycle and year of study :	<ul style="list-style-type: none"> > Master [120] in Biomedical Engineering > Master [120] in Electro-mechanical Engineering > Master [120] in Mathematical Engineering > Master [120] in Electrical Engineering
Faculty or entity in charge:	MAP