UCLouvain

lepl1106

2018

5 credits	30.0 h + 30.0 h	Q2

This learning unit is not being organized during this academic year.

Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	This courses assumes acquired the notions of mathematics (functions of one or several real variables, linear equations system, linear algebra) and physics (Point mass mechanics and electrical circuit theory) developped in the courses **LEPL1101, LEPL1102, LEPL1105 et LEPL1201.** *The prerequisite(s) for this Teaching Unit (Unité d'enseignement – UE) for the programmes/courses that offer this Teaching Unit are specified at the end of this sheet.*
Main themes	This course contains the basic notions about signals and systems, namely signal representations, both continuous time and discrete time, in the time domain and in the frequency domain, several representations of systems (impulse response, state space representation, transfer function), the Fourier, Laplace and Z transforms, their properties, elements of filtering and elements of stability.This course contains the basic notions about signals and systems, namely signal representations, both continuous time and discrete time, in the time domain and in the frequency domain, several representations of systems (impulse response, state space representation, transfer function), the Fourier, Laplace and Z transforms, their properties, elements of filtering and elements of stability.
Aims	**Contribution of the course to the program objectives**: Regarding the learning outcomes of the program of Bachelor in Engineering, this course contributes to the development and the acquisition of the following learning outcomes: • LO 1.1, 1.2 • LO 4.4 • LO 5.1 **Specific learning outcomes of the course**: More precisely, at the end of the course the students will be able to Disciplinary learning outcomes: 1 • Master the basic mathematical concepts in order to handle practical signal processing and system theory applications, in particular the Fourier transform, the Laplace transform, and the Z transform ; • Compute, including with specialized software tools, the different transformations for signals, be they continuous time or discrete time ; understand the results obtained ; be familiar with the time domain and the frequency domain properties of signals ; • Use the different representations for linear time invariant systems ; choose the most appropriate one according to the problem or the situation ; be able to switch from one representation to another ; analyze, including by means of specialized software tools, linear time invariant systems (internal or BIBO stability, controlability, observability). Transversal learning outcomes • Further investigate the concepts, by means of an English textbook • Write a short report for a small size project conducted in a group *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'.* - - - - *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".*

Evaluation methods	The students will be evaluated by means of a written and individual examination, on the basis of the learning outcomes provided above. Tables containing transformations is the only material permitted. An example of a former examination will be provided on MOODLE. Evaluation of the small size project A report has to be written and delivered about this project where MATLAB will be used. This report is mandatory. However it is not taken into account in the final mark.
Teaching methods	The learning process is made of courses, of practical training sessions and of sessions with MATLAB.
Content	• Signal and system representations, in the time domain and in the frequency domain, for both continuous time and discrete time signals ; • Representations of systems : • Impulse response, • State representation, • Transfer function • Fourier, Laplace and Z transforms and their properties; • Filtering, • Stability
Inline resources	> https://moodleucl.uclouvain.be/course/view.php?id=144
Bibliography	Les copies des transparents du cours de même que les énoncés des séances d'exercice sont disponibles sur le site MOODLE du cours. Le livre "Signals and Systems" (2nd edition) de Simon Haykin et Barry Van Veen, Editions Wiley, est fortement recommandé. Il contient des explications détaillées, des exemples nombreux, des problèmes et des programmes Matlab. Quelques exemplaires du livre sont disponibles à la BST.
Faculty or entity in charge	BTCI

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Physics	PHYS2M	5		
Bachelor in Engineering	FSA1BA	5	LEPL1101 AND LEPL1102 AND LEPL1105	
Additionnal module in Physics	LPHYS100P	5		