UCLouvain

lepl1106

2020

Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

5 credits	30.0 h + 30.0 h	Q2

Teacher(s)	SOMEBODY ;Vandendorpe Luc ;Wertz Vincent ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	*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	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** 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. In case of doubts after the written exam, some students may be called for an additional oral exam.

Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** The learning process is made of courses, of practical training sessions and of sessions with Python. Some activities may take the form of distance learning.

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

Force majeure

Teaching methods	If the sanitary situation allows it, courses and exercise classes will be held in presence. Otherwise, courses and exercise classes will be organised on line, or in comodal format. Students may also be invited to watch podcasts.
Evaluation methods	The evaluation will address subjects covered in the courses, the podcasts and the exercise classes. It will consist in a written, individual exam, composed of open questions. A table of usual transforms will be provided. If the sanitary situation allows it, the exam will be on campus and no other material than the table of transforms will be allowed. If the situation requires the exam to be organised on line, then it will be an open book exam. In case of doubts after the written evaluation, the course holders have the right to call some students for an additional oral exam.

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