



5.00 crédits	30.0 h + 30.0 h	Q2
--------------	-----------------	----

Enseignants	Jacques Laurent ;Vandendorpe Luc ;
Langue d'enseignement	Anglais > Facilités pour suivre le cours en français
Lieu du cours	Louvain-la-Neuve
Acquis d'apprentissage	<p>A la fin de cette unité d'enseignement, l'étudiant est capable de :</p> <p>At the end of this learning unit, the student is able to :</p> <ul style="list-style-type: none"> • 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 : AA1.1, AA1.2, AA1.3 1 AA2.1, AA2.2 AA6.1 <p>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".</p>
Modes d'évaluation des acquis des étudiants	<ul style="list-style-type: none"> • Concerning the lectures, the students are individually evaluated with a (in-session) written exam, including problems solving, and questions on the theory. • Regarding the numerical exercises on Python, the students are individually evaluated off-session, over two distinct evaluations, in a computer room. Each of these two evaluations are organized only once during the semester. <p>The written exam and the in-session evaluations amount to 80% and 20% of the final grade, respectively. The mark obtained for the numerical exercises is acquired for all sessions of the academic year.</p>
Méthodes d'enseignement	<p>The course is composed of</p> <ul style="list-style-type: none"> • lectures on the topics listed in the course content, • and practical sessions, both classical and numerical. <p>Lectures and practical sessions are given in the classroom exclusively.</p>
Contenu	<ul style="list-style-type: none"> • Sampling: theorem, interpolation, sequence • Sampling rate change: downsampling and interpolation for low-pass signals and bandpass signals, complex envelope • Processing structures and graph theory: switching, transposition, direct and polyphase structures • Discrete Fourier transform, properties, convolution, truncation and window • Finite impulse response filters, phase linearity, types and properties of poles and zeros • Synthesis of FIR filters: window method, frequency response sampling, minimax synthesis and Remez method • Synthesis of IIR filters by impulse invariance and bilinear transformation • Bayesian filtering, Kalman filtering, particle filter, and variants • Theory of multiresolution and wavelet transforms (from the Haar system to other wavelets) • Compressive sensing: principles and algorithms • Numerical exercises in Python related to these topics
Ressources en ligne	Moodle https://moodle.uclouvain.be/course/view.php?id=715
Bibliographie	<ul style="list-style-type: none"> • Course and lecture notes available on Moodle • Slides and reference articles available on Moodle <p>First half of the course available as a podcast</p>
Faculté ou entité en charge:	ELEC

Programmes / formations proposant cette unité d'enseignement (UE)				
Intitulé du programme	Sigle	Crédits	Prérequis	Acquis d'apprentissage
Master [120] : ingénieur civil biomédical	GBIO2M	5		
Master [120] : ingénieur civil électricien	ELEC2M	5		
Master [120] : ingénieur civil en mathématiques appliquées	MAP2M	5		