


5.0 credits

30.0 h + 30.0 h

1q

Teacher(s) :	Oestges Claude ; Vandendorpe Luc ;
Language :	Anglais
Place of the course	Louvain-la-Neuve
Inline resources:	Moodle > http://moodleucl.uclouvain.be/course/view.php?id=8268
Main themes :	This course is one of the last courses in the telecommunication cursus. LELEC2796 deals with the PHY layer of wireless communication systems, along three axes : radio channels, signal processing techniques and communication standards.
Aims :	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 -- AA2.1, AA2.2, AA2.4 -- AA3.1 -- AA4.1, AA4.2, AA4.4 -- AA5.2, AA5.3, AA5.6 -- AA6.1, AA6.3 At the end of the course, the student will be able to : -- Define concepts enabling to fully characterize radio channels (narrow- and wideband, as well multi-antenna channels) -- Explain through analytical models and Matlab simulations the impact of the propagation channel and co-channel interference on system performance -- Describe and compare various multiple access techniques (TDMA/FDMA/CDMA) -- Explain, via mathematical representations, and analyze receive techniques (Rake receiver, joint detection, OFDM, SIMO/MISO/MIMO) -- Describe the radio interface of wireless communication standards (GSM, UMTS, IS95/UTRA, 3G-LTE), together with the underlying concepts -- Present (written report and oral presentation) the results achieved within a group project, consisting in the Matlab implementation of a wireless system in a real-world channel <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 :	Regarding the course, the oral evaluation is individual (no book/notes allowed) and based on clearly announced objectives (see above). Regarding the project, the evaluation relies on a written group report and an oral group presentation.
Teaching methods :	The course is organized as 14 lectures 5 to 6 exercise sessions a group project
Content :	Introduction to wireless communication systems Random signals, modulations and detection Mobile transmission channels GSM standard Multiple access techniques CDMA, Rake reception and diversity

	<p>UTRA and WCDMA standards Multi-carrier and OFDM systems Multi-antenna channels and systems MIMO techniques LTE and LTE-A standards</p>
Bibliography :	<p>Supports -- Notes and slides available on Moodle -- Reference books available at BST</p>
Other infos :	<p>It is advized to follow LELEC2796 during Master 2.</p>
Faculty or entity in charge:	<p>ELEC</p>

Programmes / formations proposant cette unité d'enseignement (UE)				
Intitulé du programme	Sigle	Credits	Prerequis	Acquis d'apprentissage
Master [120] in Electrical Engineering	ELEC2M	5	-	
Master [120] in Computer Science and Engineering	INFO2M	5	-	