UCLouvain

lelec2910

2026

Antennas and propagation

5.00 credits	30.0 h + 30.0 h	Q1

Teacher(s)	Craeye Christophe ;Oestges Claude ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Main themes	This course is a part of the "Telecommunications" orientation in the Master in Electrical Engineering. LELEC2910 is dedicated to the electromagnetic aspects of wireless communications, more specifically to the antenna technology and microwave propagation theory.
Learning outcomes	**At the end of this learning unit, the student is able to :** 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, AA3.2, AA3.3 • AA4.1, AA4.2 • AA5.5, AA5.6 **At the end of the course, the student will be able to :** • explain the fundamental properties characterizing an emitting and receiving antenna and calculate its characteristic parameters; • calculate the radiated field and the radiation pattern of antennas, antenna arrays, linear and aperture antennas; • describe and calculate the influence of the troposphere, the ionosphere and the ground on the propagation of electromagnetic waves; • write the radar equation and describe the radar; • calculate a link budget, taking into account the various propagation effects and the signal-to-noise ratio, for a terrestrial and earth-space link.
Evaluation methods	Students are assessed in writing on the basis of the specific objectives set out above. Course notes are allowed for thr written examination. The assessment of projects is based on the submission of a written report and an oral presentation carried out alone or by groups of (normally) two students. The global mark out of 20 is broken down as follows: • 10 points for the written exam (in session), covering the antenna part, • 6.67 points for the propagation project (report due no later than the day of the written exam of the related session) • 3.33 points for the mini-project on antennas. Projects failed in January may be repeated in the second session.
Teaching methods	The course is organized in • 12 courses of 2h • 10 supervised exercises of 2h • a mini-project for the design, fabrication and testing of an antenna (2 students), in the anechoic chamber of the Welcome facility. • a project dedicated to the evaluation of tropospheric degradations for satellite communications.
Content	• Antenna theory • Modeling of antenna array • Radiation from linear distributions • Radiation from apertures • Propagation for terrestrial links • Earth-space propagation • Propagation through the troposphere and the ionosphere • Radar equation

Inline resources	Moodle http://moodleucl.uclouvain.be/course/view.php?id=8229
Bibliography	Supports • Syllabus de cours disponibles sur Moodle • Transparents disponibles sur Moodle • Livres de référence disponibles à la BST
Faculty or entity in charge	ELEC

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Electrical Engineering	ELEC2M	5		🔍