

5.00 credits

30.0 h + 30.0 h

Q1

Teacher(s)	Craeye Christophe (coordinator) ;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	<p><b>At the end of this learning unit, the student is able to :</b></p> <p>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</p> <ul style="list-style-type: none"> <li>• AA1.1, AA1.2, AA1.3</li> <li>• AA2.1, AA2.2, AA2.4</li> <li>• AA3.1</li> <li>• AA4.1</li> <li>• AA5.5, AA5.6</li> <li>• AA6.1, AA6.3</li> </ul> <p>1 <b>At the end of the course, the student will be able to :</b></p> <ul style="list-style-type: none"> <li>• Explain the fundamental properties characterizing an emitting and receiving antenna and calculate its characteristic parameters</li> <li>• Calculate the radiated field and the radiation pattern of antennas, antenna arrays, linear and aperture antennas.</li> <li>• Describe and calculate the influence of the troposphere, the ionosphere and the ground on the propagation of electromagnetic waves.</li> <li>• Write the radar equation and describe the radar.</li> <li>• Calculate a link budget, taking into account the various propagation effects and the signal-to-noise ratio, for a terrestrial and earth-space link.</li> </ul>
Evaluation methods	The students have a written examination, based on the objectives described above. It is a open-book exam. The evaluation of the projects is a report and a presentation, individual or for a group of 2 students.
Teaching methods	The course is organized in <ul style="list-style-type: none"> <li>• 12 courses of 2h</li> <li>• 10 supervised exercises of 2h</li> <li>• a project for the development of an antenna or a propagation model (1 or 2 students).</li> <li>• a project dedicated to the evaluation of tropospheric degradations for satellite communications.</li> </ul>
Content	<ul style="list-style-type: none"> <li>• Antenna theory</li> <li>• Modeling of antenna array</li> <li>• Radiation from linear distributions</li> <li>• Radiation from apertures</li> <li>• Propagation for terrestrial links</li> <li>• Earth-space propagation</li> <li>• Propagation through the troposphere and the ionosphere</li> <li>• Radar equation</li> </ul>
Inline resources	Moodle <a href="http://moodleucl.uclouvain.be/course/view.php?id=8229">http://moodleucl.uclouvain.be/course/view.php?id=8229</a>
Bibliography	<u>Supports</u> <ul style="list-style-type: none"> <li>• Syllabus de cours disponibles sur Moodle</li> <li>• Transparents disponibles sur Moodle</li> <li>• Livres de référence disponibles à la BST</li> </ul>

Faculty or entity in charge	ELEC
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<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Electrical Engineering	ELEC2M	5		