UCL Université catholique de Louvain

# LELEC2700

*2013-2014*

# Microwave

| 6.0 credits | 30.0 h + 45.0 h | 1q |
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| Teacher(s) : | Huynen Isabelle ; Janvier Danielle ; |
| Language : | Anglais |
| Place of the course | Louvain-la-Neuve |
| Inline resources: | > http://icampus.uclouvain.be/claroline/course/index.php?cid=ELEC2700 |
| Prerequisites : | Basic knowledge in transmission lines and electronics |
| Main themes : | It is a course giving a basic knowledge about microwave methods, techniques and measurements used in wireless systems and communications. The originality of the microwave frequency range is that the wavelength is of the order of magnitude of the size of the devices. This course presents the fundamentals of microwave engineering and is proposed as the basic course in this domain for the telecommunication and electronic orientations. |
| Aims : | a. Contribution de l'activité au référentiel AA (AA du programme)<br>Axe 1 (1.1, 1.2, 1.3), Axe 2 (2.2, 2.4), Axe 5 (5.3)<br>b. Formulation spécifique pour cette activité des AA du programme (maximum 10)<br>After this course the students will be able to :<br>--<br>calculate the parameters of various microwave transmission lines<br>--<br>analye the parameters of various passive circuits and assess their performances<br>--<br>design basic passive devices, in waveguide and planar technology<br>--<br>measure S-parameters of 2-port and 4-port microwave devices, using a Vector Network Analyser (VNA)<br>--<br>understand the operation of non-reciprocal devices and microwave sources<br>--<br>use adequate active devices in the frequency range of interest<br>*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 : | Written examination (exercises to be solved with open textbook and slides). The project is evaluated on the basis of a written report, and counts forts 25% of the total mark gained for the course |
| Teaching methods : | The course includes :<br>--<br>14 theoretical lectures<br>--<br>6 exercices modules with tutorial and and solutions posted on iCampus<br>--<br>Training modules using microwave CAD and simulation softwares.<br>--<br>A project, using ADS design program of Agilent, where each student individually has to design, simulate and measure a passive planar device. |
| Content : | The course will provide students with necessary knowledge and tools for designing RF and microwave circuits, and illustrate the limitations induced by a lumped-element circuit approach. Topics addressed include:<br>--<br>wave formalism and S-parameter<br>--<br>transmission lines and resonators (planar lines, waveguides)<br>--<br>passive devices (obstacles, junctions, couplers, filters, non-reciprocal circuits, matching networks)<br>--<br>measurement of circuit parameters : reflection, transmission, power and noise<br>--<br>instrumentation : network analysers, spectrum analyser, calibration methods<br>-- |

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| | sources and active components : vacuum tubes, semiconductors (diodes, transistors) |
| Bibliography : | Supports<br>--<br>Slides available on icampus<br>--<br>Reference textbooks available in UCL public library |
| Cycle and year of study : | > Master [120] in Electrical Engineering |
| Faculty or entity in charge: | ELEC |