

Teacher(s)	Craeye Christophe (coordinator) ;Oestges Claude ;Oestges Claude (compensates Vandendorpe Luc) ;Vandendorpe Luc ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	This project supposes acquired the notions developed in the courses LEPL1106 and LEPL1755 .
Main themes	<p>The project is linked to the courses of the major orientation ELEC: devices and electronic circuits, telecommunication, electromagnetism, automatic, control of electrical systems.</p> <p>Examples of systems and existing data will be chosen among information systems, electrical transducers, spectral analysis of real signals including noise, hardware (circuits and systems) and software implementation(signal processing, real time), etc.</p>
Learning outcomes	<p>At the end of this learning unit, the student is able to :</p> <p>Contribution of the course to the program objectives</p> <p>Regarding the learning outcomes of the program of Bachelor in Engineering, this course contributes to the development and the acquisition of the following learning outcomes:</p> <ul style="list-style-type: none"> • LO 1.1, 1.2 • LO 2.6, 2.7 • LO 4.6 <p>Specific learning outcomes of the course</p> <p>The skills addressed by « Project 4 » include on one hand transverse skills, common to all projects 4, and on the other hand disciplinary, technical skills that are specific to each engineering specialty.</p> <p>Transversal learning outcomes:</p> <p>Projects 4 aim at providing students with transversal skills close to the practice of engineering jobs within a multi-disciplinary context :</p> <p>1</p> <ul style="list-style-type: none"> • analyse and improve existing systems ; • analyse experimental data with a critical mind ; • make the distinction between reality and models used to describe or modify it ; • deal with the notion of uncertainty in the project approach, its conception and the obtained results. <p>The project will allow for a trial-and-error approach, typically adopted by young engineers at the beginning of their careers.</p> <p>Disciplinary learning outcomes:</p> <p>At the end of the course, students will have increased their knowledge in</p> <ul style="list-style-type: none"> • electromagnetic modelling of the transmission channel, • signal processing and estimation of parameters in noise, • microwave circuits. <p><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></p>
Evaluation methods	<p>In the framework of the course, the students will be evaluated through:</p> <ul style="list-style-type: none"> • A continuous evaluation of the 3 milestones (small mark) • A written individual exam during exam session <p>The final mark is based on a weighting</p> <ul style="list-style-type: none"> • 3/4 of mark if individual exam yields >10/20 • 0 if individual exam yields <6/20 • A linear progression in between. <p>The milestones are evaluated and will each represent 6.67% of the group's mark.</p>

Teaching methods	<ul style="list-style-type: none"> • 1 initial homework (not marked) • 3 milestones (intermediate reports) • 2 supervised labs • A “challenge” activity following goals that are essentially defined by the students et making use of experimental demonstration platforms • A written report and a final presentation (+ individual exam; see evaluation)
Content	<p>The project consists of several steps:</p> <ul style="list-style-type: none"> • Discover and understand the functioning of an FMCW radar (frequency modulated continuous wave) • Discover and understand a technique for angle estimation using a radar with multiple antennas • Get familiar with circuits using a reconfigurable equipment, with access to the raw data. • Use concepts concerning antennas and cross-sections, with access to raw data. • Extend the analysis to the study of micro-Doppler, tracking of persons or vehicles, bistatic configurations, etc. • Carry out an experimental validation using equipment that can be taken home. • Describe precisely, in written or oral form, the concepts, methods and obtained results
Inline resources	<p>https://moodleucl.uclouvain.be/course/view.php?id=8884</p>
Other infos	<p>This course is part of the set of courses « Project 4 » of the program of bachelor in engineering. Projects 4 share common transversal objectives, but exist under different versions oriented towards specific disciplinary objectives, corresponding to the bachelor tracks. Each student chooses the project related to one of his/her tracks.</p>
Faculty or entity in charge	<p>ELEC</p>

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Bachelor in Engineering	FSA1BA	5		