





4.00 credits

32.5 h + 20.0 h

Q1

Teacher(s)	Lambot Sébastien ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Prerequisites	- Applied geomatics. - Soil physics
Main themes	This course aims to teach technologies for characterization and monitoring of agroecosystems. In particular, geophysical imaging and characterization techniques of soil properties are presented, such as ground penetrating radar, electromagnetic induction or electrical tomography. Also, the course discusses the use of drones for environmental monitoring, including multispectral, thermal infrared, LiDAR sensors as well as photogrammetry. Fundamental concepts, instruments and methods of signal analysis will be particularly seen in-depth. The student will be made familiar with these tools through practical works and an integrated project.
Learning outcomes	<p><b>At the end of this learning unit, the student is able to :</b></p> <p>At the end of this teaching unit, the student is able to:</p> <p>a. Contribution of the activity to the program Learning Achievements (LA) M1.1; M1.2; M1.3; M2.1; M2.2; M2.3; M4.5; M5.1; M5.6; M5.8; M6.1; M6.2; M6.4; M6.9; M7.1; M7.2; M8.1; M8.2; M8.3; M8.4;</p> <p>b. Specific formulation for this LA activity of the program</p> <p><sup>1</sup> At the end of this course (3 ECTS), students will be able to:</p> <ul style="list-style-type: none"> <li>- understand the concepts of the different environmental sensors (geophysics, remote sensing);</li> <li>- understand and implement different signal processing methods;</li> <li>- develop a critical analysis on the application of these technologies;</li> <li>- to master the use of some of the instruments studied.</li> </ul>
Evaluation methods	<ul style="list-style-type: none"> <li>• Written exam with a section of multiple-choice questions and a section of open-ended questions.</li> <li>• Integrated project report (per group). Weight: 20% of the final grade if the written exam is passed.</li> <li>• Evaluation of seminars (per group). Evaluation is based on the quality and rigor of the presentation, the quality of responses and arguments presented during the debate, and communicative quality (slide quality, technical quality, oral expression). Weight: 20% of the final grade if the written exam is passed.</li> </ul>
Teaching methods	<ul style="list-style-type: none"> <li>• Theoretical classes in the lecture hall with slide presentations.</li> <li>• Team-based practical work with an integrated project involving the creation of a collective report.</li> <li>• Seminars aimed at delving into a scientific question related to the course and developing proficiency in reading English texts and professional communication skills.</li> </ul>
Content	<p>LBRES2101 Course (4 credits) constitutes the complete course. LBRES2101A Section (1 credit) is designed for students enrolled in the Certificate in Applied Geomatics and covers topics related to drones, drone sensors, and photogrammetry. LBRES2101B Section (3 credits) excludes the part concerning environmental sensors and topographic tools.</p> <p>Course Content:</p> <p>Theoretical Classes:</p> <p>Geophysical Techniques: ground penetrating radar (GPR), electromagnetic induction (EMI), radiometry, electrical tomography (ERT), seismic methods, reflectometry (TDR). Drone Remote Sensing Techniques: drones, thermal infrared sensors, multispectral sensors, LiDAR. Topography and Sensors.</p> <p>Practical Works: The key concepts presented during the classes will be applied during practical sessions (acquisition of operational skills) and as part of a group integrated project.</p> <p>Seminars: Students will analyze, synthesize, and present a scientific article addressing a scientific question related to the course content.</p>
Inline resources	The course slides, reference documents, exercise sessions, and additional materials are made available through Moodle.

Bibliography	<p>FR</p> <ul style="list-style-type: none"> <li>- Diapositives du cours</li> <li>- Livres de référence recommandés.</li> </ul> <p>EN</p> <ul style="list-style-type: none"> <li>- Slides of the course</li> <li>- Recommended reference books.</li> </ul>
Other infos	<p>This course is conducted in English.</p> <p>A portion of this course (drone remote sensing) is included in the University Certificate in Applied Geomatics, which is accessible to professionals as part of continuing education.</p>
Faculty or entity in charge	AGRO

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Forests and Natural Areas Engineering	BIRF2M	4		
Master [120] in Environmental Bioengineering	BIRE2M	4		
Master [120] in Chemistry and Bioindustries	BIRC2M	4		
Master [120] in Agriculture and Bio-industries	SAIV2M	4		
Master [120] in Agricultural Bioengineering	BIRA2M	4		