








5.00 credits

30.0 h + 30.0 h

Q1

Teacher(s)	Lambin Eric ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	<i>The prerequisite(s) for this Teaching Unit (Unité d'enseignement – UE) for the programmes/courses that offer this Teaching Unit are specified at the end of this sheet.</i>
Main themes	<p>Prerequisites : Notions of statistics, general physics course. The course has three components: 1: The presentation during lectures of the theoretical and methodological bases of remote sensing; 2: The application of image processing and interpretation methods to Landsat data on a region of Belgium, using image processing software on PC; 3: The exploration of a large range of remote sensing applications and of the methods used in each application, on the basis of CD-ROMs demonstrating case studies. Physical bases of remote sensing: - Definitions: radiant energy, radiant flux, radiant flux density, radiance; - Interactions between energy and the surface of the earth: laws of Stefan-Boltzmann and Wien. - Spectral reflectance curves ; - Atmospheric effects; - Physical interactions with thermal infra-red energy. The sensors used in remote sensing: - Landsat MSS and TM, SPOT; - AVHRR, Vegetation, MODIS; - the new high spatial resolution sensors. Image processing: - Corrections for non-systematic and systematic geometric distortions - Radiometric corrections - Extraction of statistics from images - Contrast enhancement - Spatial filtering - Supervised classification - Unsupervised classification - Classification errors estimation - Change detection methods - Multispectral transformations: Tasseled cap transformation; principal components analysis; - Notions of microwave remote sensing. Practical work: Processing of a Landsat TM image of Belgium: 1st session Introduction to image processing software 2nd session Color composites and contrast enhancement 3rd session Design of a scientific project 4th and 5th sessions Geometric correction 6th session Unsupervised classification 7th session Supervised classification 8th session Accuracy assessment of classification</p>
Learning outcomes	<p><b>At the end of this learning unit, the student is able to :</b></p> <p>1 Knowledge : The students will acquire a good knowledge of the different applications of remote sensing, and a capacity to decide which sensors and which image processing and interpretation methods are most appropriate for a given application. Skills : The students will gain understanding of the bases of remote sensing and will be able to process and interpret satellite data on a given region, using a image processing software on PC. Emphasis is put on optical remote sensing for terrestrial ecosystem applications.</p>
Bibliography	<ul style="list-style-type: none"> <li>• Richards J. 1986. remote Sensing Digital Image Analysis, Springer-Verlag, 2ème édition</li> </ul>
Faculty or entity in charge	GEOG

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Population and Development Studies	<a href="#">SPED2M</a>	5		
Master [120] in History of Art and Archaeology : General	<a href="#">ARKE2M</a>	5		
Master [120] in Biology of Organisms and Ecology	<a href="#">BOE2M</a>	5		
Master [120] in Physics	<a href="#">PHYS2M</a>	5		
Bachelor in Geography : General	<a href="#">GEOG1BA</a>	5	<a href="#">LMAT1101</a> AND <a href="#">LMAT1102</a> AND <a href="#">LPHY1101</a> AND <a href="#">LPHY1102</a> AND <a href="#">LBIO1110</a> AND <a href="#">LGEO1241</a>	
Minor in Geography	<a href="#">MINGEOG</a>	5		
Interdisciplinary Advanced Master in Science and Management of the Environment and Sustainable Development	<a href="#">ENVI2MC</a>	5		
Master [120] in Environmental Science and Management	<a href="#">ENVI2M</a>	5		