




This biannual learning unit is not being organized in 2021-2022 !

Language :	English
Place of the course	Louvain-la-Neuve
Learning outcomes	<p>At the end of this learning unit, the student is able to :</p> <p>Currently, system biology is widely used in environmental sciences. This class is a theoretical course of genomics and proteomics.</p> <p>1 It aims at teaching the students the scientific and informatics skills in order to be able to determine DNA sequences of organisms and fine-scale genetic mapping of genomic data.</p> <p>In addition, it gives the students scientific and technical skills in order to deeply understand scientific articles relating to environmental proteomics, and to help them to fit in research teams developing this approach.</p>
Evaluation methods	<p>For Prof. Melissa Page (transcriptomic part) is an exam made up of open and written questions For the part of Prof K. Van Doninck (genomic part) it is a written report (max 5 pages) which develops a genomic topic in more detail.</p> <p>For both parts of the practical work, a detailed report of the practical work must be submitted. It is necessary to participate in all the practical work sessions to obtain a TP rating.</p> <p><i>Please note :</i> <i>the success of the exam with a total of 10/20 is conditioned by the success of each part (two theoretical parts, two practical parts) with a minimum of 7/20. The overall rating for the course will be the rating of the failed game if either game is rated at 7/20 or even lower.</i> <i>Partial exemptions valid for sessions of the same academic year are possible if one, but not all of the parts of the course are successful (i.e. 10/20 or more), after request and written agreement from the holders (by email).</i></p>
Teaching methods	<p>Lectures in the classroom ; practical work with assistants in the computer room. Support ppt files on moodle UCL and UNamur platform.</p>
Content	<p>This course is given by two lecturers in two parts. This course has 30 hours of volume 1 and 18 hours of volume 2 : - 18 hours volume 1 + 12 hours volume 2 by Prof Van Doninck at UNamur - 12 hours of volume 1 + 6 hours of volume 2 by Prof. Melissa Page at UCLouvain This course is partially linked to the LBOE2124 Molecular Ecology course.</p> <p>Transcriptomics part (Melissa Page, UCLouvain) : Theory : History: Transcriptomics as one tool in the toolkit box- Why is transcriptomics such a huge success in Evolution and Ecology? Methodology : Experimental procedure - Differences between genomics and transcriptomics - Technological limitations and perspectives of transcriptomics; Another tool in the toolkit box: (e) Quantitative Trait Loci; Case studies using transcriptomics in Evolutionary Ecology with a focus on studies done with data obtained from the wild : Transcriptomics for understanding the Anthropocene, Stickleback fishes <i>Gasterosteus aculeatus</i> case study, Transcriptomics in butterflies, General conceptual conclusions from these case studies; Conclusions at the methodological level. Part practical work : analysis of an unpublished transcriptome and identification of candidate genes involved in the production of a physiological trait under sexual selection, the sex pheromone of a model butterfly.</p> <p>Genomics part (Prof. K Van Doninck, UNamur) : Theory : - History of genomics - Evolution of genomes - High throughput sequencing methods - Principles of genome assembly - Comparative genomics, functional genomics - Research applications genomics (conference given by Dr. Olivier Jaillon of Genoscope (France) or another researcher who does cutting-edge research in genomics). Part practical work : Computer tools used to :</p>

	<p>1/ analyze a protein of interest - search for homology by Blast - localization on the genome - functional analysis by Pfam - 3D visualization by Swissmodel,</p> <p>2/ search for primers by Primer3 and search for sites of restriction by Webcutter or Nebcutter,</p> <p>3/ alignment and phylogenetic analysis (ML) of genes homologous to the protein of interest,</p> <p>4/ E.coli genome assembly using Illumina data (different parameters are tested),</p> <p>5/ synteny analyzes in order to study the evolution of genomes.</p>
Inline resources	Access UCLouvain's online moodle platform for course content and information on the practical organization of the course
Bibliography	<ul style="list-style-type: none"> • Fichiers ppt des cours; livres et documents de référence sur la plateforme en ligne moodle
Other infos	<p>Prerequisites :</p> <ul style="list-style-type: none"> - basic knowledge in genetics and biochemistry are necessary - the slides seen during the course serve as teaching support - scientific articles will be analyzed during the course.
Faculty or entity in charge	BIOL

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Biology of Organisms and Ecology	BOE2M	4		
Master [60] in Biology	BIOL2M1	4		