


This learning unit is not open to incoming exchange students!

Teacher(s)	Branders Vincent ;
Language :	French
Place of the course	Charleroi
Prerequisites	<ul style="list-style-type: none"> • Molecular biology • Biochemistry • Data visualization • Statistics <p><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></p>
Main themes	<p>This course will cover the different biological analysis techniques that generate high-throughput data (so-called "omics" techniques), such as: DNA and RNA sequencing, proteomics, metabolomics... (non-exhaustive list which will be adapted according to the rapid evolution of this field).</p> <p>For each method, the course will introduce:</p> <ul style="list-style-type: none"> • The operating principle of each method (sequencing, mass spectrometry, etc.) • Analysis, processing and normalization of raw data • Data interpretation and visualization. • The biases and pitfalls related to these techniques (problems of technical and biological variability, reproducibility, experimental design). <p>Generic methods for analyzing biological data will also be covered (clustering, enrichment, ontologies, etc.), in connection with the data analysis course and the statistics course.</p> <p>Finally, the course will include an introduction to the databases that can be used in this field (TCGA, GEO, Encode etc).</p>
Learning outcomes	<p>At the end of this learning unit, the student is able to :</p> <ul style="list-style-type: none"> • Understand the operating principle of omics methods • Understand the concepts and principles of omics data analysis • Analyze simple omics data • Understand and critique a publication presenting omics data
Evaluation methods	<p>The final grade consists of</p> <ul style="list-style-type: none"> • 25% for the continuous evaluation, • 75% for the final exam <p>The continuous evaluation, which consists of assignments, will result in a single overall grade, communicated at the end of the last assignment. Failure to comply with the methodological instructions defined on moodle, in particular with regard to the use of online resources or collaboration between students, for any work/assignment will result in an overall mark of 0 for the continuous assessment.</p> <p>The continuous assessment grade is fixed at the end of the semester: there is no option to receive a new grade for it during the second session.</p> <p>The final exam is, by default, a written exam (on paper or, when appropriate, on a computer).</p>
Teaching methods	<p>Lectures and guided practical session</p> <ol style="list-style-type: none"> 1. Practical sessions are performed in groups to use databases and results interpretation tools
Content	<ol style="list-style-type: none"> 1. Introduction 2. DNA sequencing (genomics) <ul style="list-style-type: none"> • Principle and technologies available • Genome, exome, panel • Analysis of raw data (alignment, reference genome, construction of a new genome, calling of variants, quality controls, etc.) • Interpretation

	<p>3. RNA sequencing (transtriptomics)</p> <ul style="list-style-type: none"> • Principle and technologies • Gene expression analysis • Variants, mergers, new transcripts <p>4. Proteomics</p> <ul style="list-style-type: none"> • Mass spectrometry, principle and technologies • Data analysis (identification of peptides and proteins, quantification) • Data interpretation
<p>Inline resources</p>	<p>https://moodle.uclouvain.be/course/view.php?id=5853</p>
<p>Faculty or entity in charge</p>	<p>SINC</p>

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Bachelor in Computer Science	SINC1BA	5	LSINC1231 AND LSINC1211	