UCLouvain

lbrmc2101

2020

Genetic engineering

Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

5 credits	37.5 h + 15.0 h	Q1

Teacher(s)	Chaumont François (coordinator) ;Hachez Charles ;Page Melissa (compensates Chaumont François) ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	The theoretical part will detail the major steps of genetic engineering: preparation and screening of libraries, gene cloning, gene characterization and modification, gene expression in heterologous hosts. Concrete problems of genetic engineering in the microbial, animal and plant fields will be discussed. Recent examples of genetic engineering achievements from the recent literature will be discussed.
Aims	a. Contribution de l'activité au référentiel AA (AA du programme) Cohérence des AA cours en regard de ceux du programme 1.2, 1.3 2.2 3.4, 3.9 6.1, 6.2 b. Formulation spécifique pour cette activité des AA du programme 1 By the end of this course, the student should be able: - To explain the main genetic engineering methodologies - To choose, according to the problem posed, among different strategies used to clone a gene, modify it and transfer it into other organisms - To propose experimental approaches aimed at solving practical problems of genetic engineering in the microbial, animal and plant fields - To understand and set out examples of genetic engineering in the microbial, animal and plant fields as described in English scientific journals - - - - *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".*
Evaluation methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** The assesment is based on, on the one hand, the preparation and presentation of the themes in front of the class (flipped classroom; 40%) and, on the other hand, an open-book written examination on the solving of problems of genetic engineering. This written examination may also cover the matter of the practicals (60%) The flipped classroom part is subject to continuous evaluation of student work, accounting for 40% of the final course evaluation. Therefore, no further evaluations are organized during the exam sessions for this part. The mark obtained for this part is deemed to be attached to each of the sessions of the academic year. Students are also required to self-assess on flipped classroom work and this self-assessment can be used to adapt the grades.
Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** The course is organized as a flipped classroom. Students are divided into work groups during the first course and must work on the themes assigned to them in order to prepare two presentations to the rest of the audience. They will develop certain theoretical aspects related to genetic engineering (key enzymes, vectors, cloning strategies and associated molecular biology techniques - DNA and RNA sequencing - Directed mutagenesis - Gene expression in host organisms, etc.). They will then focus on a model organism used in genetic engineering and answer a thematic synthesis question. Practical work sessions will illustrate, in a very concrete way, the basics of genetic engineering. Classroom exercises are also organized. They simulate specific genetic engineering problems and are solved individually by the students before being solved collectively.
Content	Theoretical part: Methods of genomic and cDNA screening - Global analysis of the genome and its expression (genomics, transcriptomics, proteomics, metabolomics) - directed mutagenesis - gene expression in heterologous hosts: Escherichia coli, other bacteria, yeast, transgenic cell lines and transgenic organisms (animals and plants) - protein engineering - genic therapy.

	Solving problems: concrete problems of genetic engineering will be exposed and solved by the students.
Inline resources	Moodle
Bibliography	Le syllabus et les notes de cours et de travaux pratiques rédigées par l'équipe d'enseignants et dont l'usage est jugé obligatoire sont disponibles sur Moodle. Le cours ne fait appel à aucun autre support particulier qui serait payant et jugé obligatoire. Les ouvrages payants qui seraient éventuellement recommandés le sont à titre facultatif et sont tous consultables à la Bibliothèque des Sciences et Technologies.
Other infos	This course can be given in English. Participation in the first course is mandatory for the organization of the flipped classroom.
Faculty or entity in charge	AGRO

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Aims
Master [60] in Biology	BIOL2M1	5		
Master [120] in Biochemistry and Molecular and Cell Biology	BBMC2M	5		
Master [120] in Chemistry and Bioindustries	BIRC2M	5		
Master [120] in Biomedical Engineering	GBIO2M	5		