GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2020-2021

Molecular Genetics I (C003179)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course size *(nominal values; actual values may depend on programme)*

Credits 5.0 **Study time 140 h** **Contact hrs** 53.0 h

Course offerings and teaching methods in academic year 2020-2021

A (semester 1)	Dutch	Gent	lecture	25.0 h
			seminar: coached exercises	3.75 h
			practicum	16.25 h
			online lecture	0.0 h

Lecturers in academic year 2020-2021

Goormachtig, Sofie	WE09	lecturer-in-charge

Offered in the following programmes in 2020-2021	**crdts**	**offering**
Bachelor of Science in Biology	5	A
Preparatory Course Master of Science in Biology	5	A

Teaching languages

Dutch

Keywords

genomes - gene expression - mutation - recombinant DNA technology

Position of the course

The student is confronted with the basic principles of molecular genetics and the associated technology. The course deals with the structure of the genome, the process of duplication of the genetic information and the way the information is expressed. As such, the course explains the relation between genotype and phenotype and further focuses on the plasticity of the genome, the way mutations occur and their effects -in combination with recombination- on biodiversity. Furthermore general molecular techniques will be discussed and the use of these techniques will be illustrated.

Contents

- Genomes of prokaryotes and eukaryotes: structure, replication, plasmids, transposons. Molecular aspects of replication. Use of replication enzymes in biotechnology: PCR, labeling DNA.
- Expression of genetic information: the genetic code and molecular aspects of transcription in pro- and eukaryotes. RNA processing in eukaryotes.
- Molecular aspects of translation.
- Differential gene expression in pro- and eukaryotes: transcription factors, sigma factors in prokaryotes and chromatin remodeling in eukaryotes.
- Recombinant DNA technology.
- Isolation and study of genes: PCR, hybridization, DNA sequencing, isolation of open reading frames and applications
- Study of gene expression: qRT-PCR, in situ hybridization, reporter fusions, Western blotting, expression vectors and immunolocalization.
- Homologous recombination and gene conversion, horizontal gene transfer in prokaryotes,
- Mutation and repair.

Initial competences

Basic knowledge cell biology, genetics, organic chemistry and biochemistry

Final competences

1 To know and use correctly the basic terminology in genetics.
2 To use the genetic terminology in a correct way.
3 To conceptualize the basic principles in genetics in different areas of the biology.
4 To have a basic knowledge on several fundamental, molecular biological techniques.
5 To apply some fundamental molecular techniques to solve basic genetic questions.
6 Report in a written way on molecular genetic principles and experiments.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, practicum, seminar: coached exercises, online lecture

Extra information on the teaching methods

Exercises: different aspects of the course material are studied starting from particular problems or texts, which are discussed in group.
Because of COVID19, teaching methods can change. Info will be available on Ufora

Learning materials and price

Syllabus (Dutch, 300 pages) and course material (Dutch) is available on Ufora.

References

Course content-related study coaching

Apart from the theoretical courses, the students have the opportunity to ask questions to the lecturer concerning particular parts of the course. This can be done after the lectures, in a personal discussion or during the practical course.

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination

Examination methods in case of periodic evaluation during the second examination period

Written examination

Examination methods in case of permanent evaluation

Report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Extra information on the examination methods

Theory: written.
Exercises: quotation of the report of the practical courses and exercises. Practica and exercises are mandatory

Calculation of the examination mark

The practical course and exercises count for 5% of the points